2016 DoD Maintenance Innovation Challenge (MIC)

Abstract Form	
Innovation Title:	Wireless Vibration/Temp/Pressure Data Logger
Submitter:	Brett Gardner
Organization:	Fleet Readiness Center South-West
Phone:	(619) 545-4760
Email:	brett.g.gardner@navy.mil

Abstract: (300-500 words)

NAVAIR sustainment engineers are in need of data loggers capable of measuring vibration, temperature and pressure to troubleshoot the platforms and systems they support.

This problem became readily evident in late 1995 when an Airborne Self-Protection Jammer (ASPJ) system installed in an F/A-18 aircraft departed the avionics bay during flight. It took two years and hundreds of thousands of dollars to properly instrument a test aircraft to discover that 68 G's were traveling up the keel during catapult stroke, causing failure of the ASPJ rack system. Forward deployed F/A-18 aircraft sustained millions of dollars worth of damage to their keels before the issue was identified and the ASPJ was grounded for carrier use. During that time-frame, the idea of a portable, lightweight, wireless, cost effective data logger was born in the mind of a young engineer.

Fast forward to the 2011 Navy SBIR forum, Fleet Readiness Center South-West (FRCSW) Advanced Aircraft Technology (AAT) Team member, Brett Gardner, came across a device that could solve this problem. Utilizing 2014 Rapid Innovation Funding, the AAT partnered with Midé Technology to further develop the device. The result, SlamStick-X, a data logger capable of accurately measuring vibration (DC to >2KHz at sample rates up to 20KHz), temperature, and atmospheric pressure. A device that can be installed in minutes on any fleet aircraft located anywhere on the globe for $1,200 a copy.

In the current NAVAIR environment, sustainment engineers rely on Flight Test Engineers to perform instrumentation testing on specific flight test aircraft. This testing is expensive, $5K-100K per flight, and often times either the flight test aircraft and/or the flight test engineers are not readily available to perform testing due to prior aircraft scheduling commitments. With the appropriate flight clearance, SlamStick-X allows for cost effective and timely testing of fleet aircraft by the sustainment engineers charged with their support.

In July of 2016 SlamStick-X was used at VFA-37 by F/A-18 environmental control systems (ECS) sustainment engineers to test and troubleshoot fleet aircraft experiencing cockpit pressure scheduling anomalies. During SlamStick-X testing, specific ECS anomalies were identified allowing sustainment engineers to provide specific maintenance repair disposition for each aircraft. After repair of all VFA-37 aircraft, grounding restriction was lifted.

SlamStick-X was also used to troubleshoot a C-2 aircraft at FRCSW. Conventional troubleshooting was not able to detect the cause of a vibration anomaly detected in the flight yoke. Delivery of the aircraft back to the Fleet had been delayed by 80 days as the ground crews worked to resolve the issue. Nine SlamStick-X units were used to instrument the aircraft allowing sustainment engineers to quickly identify the issue as a damaged flight control dampener.

SlamStick-X was developed for approximately $450,000. Savings realized by using SlamStick-X is over $1.5 million (302 flights) and climbing when compared to the cost of conventional flight test instrumentation (based of $5,000 saved per flight test).

SlamStick-X can be used anywhere in the world by DoD and industry sustainment engineers to quickly understand, analyze, and resolve issues with vibration, temperature or pressure on equipment such as; aircraft, tanks, submarines, avionics, and depot/industry machinery.