



## How The Slam Stick Vibration Data Logger Helped The US Navy to Quickly Isolate a Vibration Issue - Saving Time And Money

### SNAPSHOT:

#### Challenge

Isolate source of excessive vibration in the cockpit of a US NAVY C-2A Greyhound Aircraft

#### Solution

Replace traditional wired accelerometer DAQ System with portable Slam Stick vibration data loggers

#### Result

Set-Up Time Saved = **34.5 Hours**  
Set-Up \$\$\$ Saved = **\$5,175**

**95.8%**  
Time &  
Cost Savings

### Challenge

Vu Bui, Subject Matter Expert (SME) for Vibration Issues at the US NAVY’s Naval Air Station, North Island, had a problem. The crew of a C-2A Greyhound continued reporting excessive vibration in the cockpit. Despite checking the engine’s vibration monitoring system, no abnormal vibrations were detected. Further tests would need to be conducted to isolate the source of vibration.

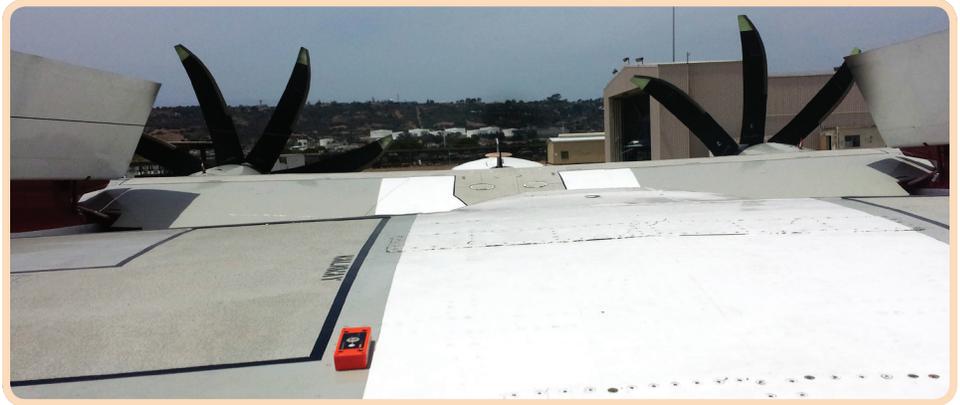
These tests would involve instrumenting accelerometers throughout the entire aircraft, over several days, in order to isolate the problem area. Setting up such tests with traditional wired accelerometers would be very time consuming and costly.

### Solution

Fortunately for Vu Bui, the US Navy had recently funded development for, and purchased, Midé Technology’s Slam Stick vibration data loggers. Simple to use and easy to install Slam Sticks require no wiring, making them ideal for testing in the field. As Vu Bui puts it;

**“Traditional wired accelerometers work great in the lab; but the environment in the aircraft is totally different and much more conducive for Slam Sticks.”**

The NAVAIR engineering team installed 9 Slam Sticks with double sided tape throughout the aircraft in a broad sweep to identify the vibration location. Installation was easy - and significant time was saved as the team only required one engineer, for 30 minutes



**“The Slam Sticks worked really well for us; we much preferred them to a traditional wired accelerometer setup because of the time savings they offered.”**

**Vu Buu, SME Vibration Issues, US Navy**

to install 9 Slam Sticks throughout the aircraft. A traditional wired accelerometer setup would have taken a team of 3 engineers about 4 hours. Once installation was complete several engine ground turns were conducted to further isolate the vibration issue.

After analyzing the data, excessive vibrations were identified coming from the rear of the C-2A aircraft. The team was now able to easily re-locate their Slam Sticks to the rear of the aircraft in order to hone in on the vibration source - one of the Slam Stick installation locations was on the outside of the aircraft, which would have been nearly impossible to do with a traditional wired setup.

The vibration data gathered on the second day identified a faulty dampener on one of the flight surfaces. This dampener muffles the vibrations from the flight control surface to the yoke (or stick) of the aircraft. The faulty dampener was replaced, and final testing verified that the vibrations had stopped - allowing Vu Buu and his team to return the aircraft back to service.

### Results

Slam Sticks only required 1.5 hours of test setup (1 engineer, 0.5 hours each day, 3 days). A traditional wired accelerometer system would have totaled 36 hours of setup (3 engineers, 4 hours each day, 3 days). This represents over \$5K of labor savings if an engineer is billed at \$150/hr - and does not include the hardware savings.

### The Future of NAVAIR & Slam Stick

The Navy now prefers Slam Sticks to traditional wired accelerometer systems for other applications, such as instrumenting the landing gear of an aircraft. Running wires to such a location would have been impossible.

NAVAIR is now doubling down on their investment on Slam Sticks with a purchase of an additional 280 units after already buying and using nearly 200. They plan to buy 600 units over the next couple years and expect to see a savings of \$3-5M in vibration testing costs over the next four years. Check out the [NAVY SBIR Success Story](#).



### About NAVAIR

The Fleet Readiness Center Southwest (FRCSW) is located at Naval Air Station North Island, “the birth place of naval aviation.” The Command provides comprehensive, quality support to our nation’s aviation warfighters through the overhaul, repair, and modification of Navy and Marine Corps front line tactical, logistical, and rotary-wing aircraft and their components.

FRCSW repairs and maintains Navy and Marine Corps aircraft, including the F/A-18 Hornet, AV-8B Harrier, H-60 Seahawk, H-53 Super Stallion, E-2C Hawkeye and C-2A Greyhound.

This command center drove the requirement definition during the Slam Stick development effort to ensure this product directly supports the testing and maintenance of our nation’s military aircraft. Check out their [Slam Stick Case Study](#).

Find out more about Vu Buu on the [COMFRC Facebook page](#)

### Contact

Feel free to contact us for more information about our endAQ products and services.

Contact: [www.endaq.com](http://www.endaq.com)

### Resources

Check out the Slam Stick datasheet and how-to videos to see how it can save you time. The Slam Stick Lab analysis software is also available for free along with some example recordings to give you a feel for the capabilities of both the hardware and software. All data can be exported to CSV (Excel readable) or directly to MATLAB for post processing.

- >> [Slam Stick Products](#)
- >> [Datasheet](#)
- >> [Software](#)
- >> [How-To Videos](#)

### Which Slam Stick is Right For Me?

For this particular case study the NAVY used a group of Slam Stick X’s. Midé’s suite of Slam Sticks offer a solution for a wide range of shock and vibration applications. If you’re not sure which accelerometer is right for you:

Check out our blog: [Taking the Guesswork out of Accelerometer Selection](#).

| SELECTING THE RIGHT SLAM STICK |   |   |   |
|--------------------------------|---|---|---|
| FREQUENCY RESPONSE             | (LESS THAN)<br><b>&lt; 500 Hz</b>   | (MORE THAN)<br><b>&gt; 500 Hz</b>   |   |
| ACCELEROMETER TYPE             | <b>Shock &amp; Vibration</b><br>CAPACITIVE MEMS                                     | <b>Vibration &amp; Shock</b><br>PIEZOELECTRIC   | <b>Shock &amp; Vibration</b><br>PIEZORESISTIVE  |
| IDEAL PRODUCT                  |  |   |  |
|                                | <b>SLAM STICK C</b>   | <b>SLAM STICK X</b>   | <b>SLAM STICK S</b>   |