

CASE STUDY:

GaND Engineering Services Collaborates with Navy Engineers on Test Stand

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Exlar[®] actuators are a brand of Curtiss-Wright Actuation Division

GaND Engineering Services Collaborates with Navy Engineers

Exlar Corporation Contracted to Build Small Linear Actuator Test Stand (SLATS)

Introduction

The Naval Systems Warfare Center, Philadelphia Division (NSWCPD), identified a need to characterize and compare electromechanical actuators and electrohydraulic actuators to understand performance, reliability, maintainability, and failsafe operations in a scaled down research and development setting to reduce cost, and lead-time.

Working through their Maritime Sustainment Technology & Innovation Consortium (MSTIC) they developed a request for prototype projects (RPP) named Fleet Introduction Technologies FIT-001 Small Linear Actuator Test Stand June of 2022.

As member of the MSTIC consortium, Curtiss-Wright's Exlar Ground and Naval Defense (GaND) business segment bid and was awarded the contract to design build and construct SLATS (Small Linear Actuator Test Stand), under contract MSTIC-22-01-EWP RPP-FIT-001.

The contract would be managed by Advanced Technology International using an Other Transaction Agreement (OTA) to relieve contractual burdens in technology development projects.

Curtiss-Wright has been supplying Exlar Electromechanical Actuators (EMA) to industry since 1991 as Exlar Corp. In 2004, Exlar setup a market focus specifically for Ground and Naval Defense (GaND), specializing in robust, commercially derived EMA solutions for ground defense vehicles and navy vessels. The GaND portfolio includes linear and rotary commercial designs that speed time to deployment and provide a clean, efficient, and powerful alternative to traditional hydraulics. In 2012, Exlar Corp was acquired by Curtiss-Wright. By then, the Exlar brand of EMA had international recognition.

In a year-long collaboration between NSWCPD and Exlar, the project yielded a one-of-a-kind test system meeting the objectives of being able to test both electromechanical and electrohydraulic actuators under load and collect data for analysis.

SLATS is essentially a base system consisting of a **load actuator**, **configurable and maneuverable mounting stand**, and **data acquisition software** with the capability to test various linear actuators with stroke length up to 12", forces up to 5,000 lb in both directions, and rod end speeds up to 8.0 in/sec and ability to capture real-time data for: temperature, vibration, force, and drive variables (current, position and speed).

For a load actuator the system uses a Exlar Electromechanical GSX50-1202-XDM-RO2-338-24-AR-RB-RD.

For Equipment under Test (EUT) one of two linear actuators can be used:

1. Electrohydraulic 8C6F-2AFG-H8C-11C-0305-N3MHD (S08C20-11)
2. Exlar Electromechanical SA-L080-325-01-F-48-B



Virtual Rendition of SLATS Early Phase Design

Having these EUT's included in the order, enabled functional testing of the Base SLATS System, and facilitated operational training to the end users before transitioning from Exlar to NSWCPD.



Bryan Meldrum, and Shreyansh Shah with SLATS Final

In July 2023, NSWCPD members Maboury Gueye, Bryan Meldrum and Shreyansh Shah visited Exlar for an introduction to SLATS. Over a period of 2 weeks, the collaboration team conducted first article testing and operational training, completing the final milestone of the project.

Benefits of SLATS

The opportunity to collaborate with NAVSEA on SLATS helped forge a strong relationship and provides NSWCPD with a state-of-the-art linear actuator test stand to test multiple linear actuators technologies.

They no longer need to rely on the accuracy of general specifications as they can now verify actual performance under specific circumstances. The ability to collect accurate data for analysis and decision making will aid future technology decisions.

Results

Overall, the notional idea of SLATS has come to fruition and by virtue of this first ever PPO via an MSTIC for FIT, NSWCPD can use SLATS in

a research and development setting to learn a tremendous amount of information on various linear technologies by collecting accurate data that is easy to use with the designed system. The data can help understand, performance and accuracy over life, efficiency, noise, thermals, reliability, and failure modes.

At the close of the PPO, Shreyansh Shah (NSWCPD) stated, "I wanted to thank you for an incredibly productive two weeks of testing. As the Technical Point of Contact on this OTA award, I am beyond pleased with the SLATS capability. The initial data from the test stand is helping us understand the similarities and differences between electromechanical and electrohydraulic actuators as intended when we first proposed this project.



About NAVSEA

The Naval Sea Systems Command engineers, builds, buys, and maintains ships, submarines, and combat systems. NAVSEA has the further responsibility of establishing and enforcing technical authority in combat system design and operation.

<https://www.navsea.navy.mil/Who-We-Are/About-NAVSEA/>



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