

ATTACHMENT #1

U.S. ARMY AEROFLIGHTDYNAMICS DIRECTORATE (AFDD)

CODE YA

STATEMENT OF WORK

1. INTRODUCTION

The U.S. Army has an engineering group co-located at NASA Ames Research Center. This group, the AeroFlightDynamics Directorate (AFDD), performs research on helicopters ranging from fielded aircraft to scale model rotor systems. Recent development in low noise rotor systems has identified the need for a dedicated acoustics data acquisition system. This Purchase Request (PR) is for the procurement of a portable data acquisition system that is capable of acquiring acoustics data, over a wide dynamic range and at high sampling rates, to support DoD classified work in both wind tunnel and outdoor field testing environments.

2. SCOPE

Recent development of U.S. Army's next generation helicopters incorporate low noise rotor technologies that will be tested at the National Full-Scale Aerodynamics Complex (NFAC) wind tunnels at Ames Research Center, and also at outdoor flight testing government facilities. A dedicated, portable, high-performance, turnkey acoustics data acquisition system is identified to support DoD classified work in these environments.

A list of the minimum requirements for the unit is stated in Table 1.

Table 1. Acoustics Data Acquisition System Requirements

	REQUIREMENTS	DESCRIPTIONS
1.	Portability	Small form factor not-to-exceed 20 x 20 x 6 inches. Weight should be less than 20 lbs. Self-contained, single box unit with built-in display.
2.	Removable data drive	Data drive must be removable to support DoD classified work. Preferably solid-state drive (SSD) with at least 240 GB capacity per drive.
3.	High channel counts	At least 16 BNC channels with isolated inputs for constant current or voltage sensors.
4.	Simultaneous sampling	All channels must be sampling at the same time. Multiplexing units are not admissible.
5.	Sampling capability	Each channel must have 24-bit resolution, up to 500 kHz sampling, with at least 6 th -order anti-aliasing filters.
6.	Timing capability	Must have built-in IRIG and GPS absolute time synchronization capability. Must include compatible GPS antenna.
7.	Scope mode	Unit must have the ability to constantly stream and display channel data like an oscilloscope.
8.	Matlab and FlexPro compatibility	Data compatibility with existing in-house FlexPro and Matlab scripts developed for acoustics post-processing.
9.	Turnkey capability	Must be ready to operate without extensive component-level programming.

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In addition to portability and the need for removable hard drives, it is desired to take advantage of emerging 24-bit resolution analog-to-digital conversion technologies that enables accurate measurement over a wide dynamic range of sound levels. Once a proper amplifier gain is set, the 24-bit cards alleviate the need for changing gains between test points even when extreme levels of noise measurement are encountered. This capability reduces the work load/manpower required and also reduces the possibility of errors associated with logging amplifier gain settings.

The unit must also have at least 16-channels, simultaneous sampling (not multiplexed), and the ability to sample up to 500 kHz per channel. The unit must also have built-in IRIG and GPS time capture to allow the acoustics data to be synchronized with other fielded data acquisition systems. Other considerations include the ability to constantly stream and display data (scope-mode) for system health-monitoring, and compatibility with existing, in-house software developed based on Matlab and FlexPro.

Delivery Date: **December 21, 2015**