

THE CASEstudy

Keeping you up-to-date with the world of **noise measurement**

Optimus[®] Fired Up for Rocket Testing Project

Rocket Engine Noise Suppression Programme
at Airborne Engineering Limited



Airborne Engineering Limited (AEL) specialises in measurement, testing and research; particularly of advanced rocket propulsion systems. One of AEL's principle services is carrying out static tests of rocket engines for other aerospace companies.

AEL is based at Westcott Venture Park, formerly the Rocket Propulsion Establishment, and operates two test bunkers, purpose built in 1949 for rocket and turbo-pump tests.

Conventional low-cost noise meters could not be used since they do not have sufficient response rate.

AEL has refurbished the bunkers and outfitted them with state-of-the-art equipment and instrumentation.

The Programme

In conjunction with one of its customers, AEL is carrying out a research programme to investigate noise suppression systems for rocket engines. If successful, this will allow AEL to test bigger rocket engines on the Westcott site without causing noise issues for other nearby businesses.



Stay connected with the noise experts



An important benefit of NoiseTools was the ability to export the noise data into AEL's in-house data processing and reporting system.

A prototype noise suppressor was manufactured and a series of test runs conducted to quantify the reduction in noise between unsuppressed and suppressed firings. The rocket engine being used in this programme has a firing duration of less than two seconds, due to the consumption of large amounts of expensive propellant and the need to eliminate the extreme heat generated. This means that conventional low-cost noise meters could not be used since they do not have sufficient response rate to capture the effect of the noise suppression system in such a short time period.

Cirrus Research's Optimus range of instruments were identified as having ability to measure high noise levels with sufficient frequency response to capture the noise profile of each firing. The rugged nature of the Cirrus equipment was also appreciated as it could cope with the variable weather conditions encountered during a winter test campaign.

Two Optimus instruments, supplied in field kit form, were placed at two fixed positions on the test site; around 100-140m from the engine. A third hand-held instrument was used to take spot-measurements at other locations in and around the test site.

Conclusion

The Optimus instruments and NoiseTools software worked well. The Cirrus equipment allowed AEL to capture

data which clearly shows the noise profile of each firing. An important benefit of NoiseTools was the ability to export the noise data into AEL's in-house data processing and reporting system. This allowed correlation with the rocket engine's performance data. The information gained from the Cirrus equipment has allowed AEL and their client to refine the noise suppression system. It has also given reassurance that the overall levels of noise are within acceptable limits across the site.

Key Features

- Optimus Green for Environmental & Occupational Noise
- Comprehensive measurement capability
- Real-time 1:1 and 1:3 Octave Bands
- Acoustic Fingerprint triggering and audio recording
- Tonal noise detection
- Repeating measurements

www.cirrusresearch.co.uk/optimus

Cirrus products used in this case study

- Optimus Green Sound Level Meter
- NoiseTools noise analysis software