

Working to minimise aircraft noise

With the economic and social benefits of air travel comes increased responsibility for minimising environmental impact. And that is the purpose of a newly refurbished laboratory

The Institute of Sound and Vibration Research (ISVR) at the University of Southampton – a facility housed on campus in the Rolls Royce University Technology Centre in Gas Turbine Noise – now contains an anechoic chamber in which detailed measurement and analysis of the noise emission from Rolls Royce aero engine components is being undertaken. The results will help researchers understand how and why these components generate noise with the ultimate aim of developing noise reduction technologies.

The research requires the noise from the component to be measured from all directions. This is achieved in part by parallel, driven Hepco Motion linear motion systems that move a semi-circular gantry system carrying a microphone array to given positions in the chamber. “The main benefit of this traversable microphone array is that we need fewer microphones to make the test comprehensive,” explains project researcher Dr Chris Lewis. “We can also move the array to many different positions automatically without any manual intervention.”

The design also maximises the number of measurements that can be taken using a given amount of compressed air. This is piped in to the chamber and fed through the component under test.



Synchronised package

The linear motion system designed for this project combines the talents of HepcoMotion and SmartDrive and was delivered fully synchronised. The package included a control system and custom-written software to drive the array. This allows a linear position to be specified or chosen from a list of pre-sets. “All we have to do is click a button to move the array or return it to its home position,” Lewis continues. “There’s also the possibility of fully automating this movement in the future, for example, to move and arrest the array at a series of pre-determined positions.”



Lewis advises that in acoustics positional accuracy becomes more important as frequency increases.

Although the full potential of the HepcoMotion system in this regard is not currently being explored, its published repositioning accuracy of $\pm 0.5\text{mm}$ will certainly come into its own in the future.

The HepcoMotion system specified for this new anechoic chamber was similar to a larger one the company installed in another laboratory at the ISVR. This experience stood HepcoMotion in good stead for this new

project enabling it to make intelligent design recommendations. It also provided 3D CAD models of the chosen system to ISVR’s appointed design company so that it could be integrated with other hardware.

“We were very happy with how HepcoMotion handled the integration of SmartDrive electronics and drive motors,” Lewis concludes. “We had every confidence that each component would work well together. Our application is a good example of the company’s modular approach. It’s a good looking system that is very accurate, useful and future-proof.”