Environmental Noise: Non-Infrastructure Award

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Winner

Acoustic Consultants Ltd - Gravity Industries

The Gravity Industries noise and vibration assessment represents the first comprehensive acoustic evaluation of a human flight jet suit system. Powered by seven micro turbine engines mounted on the pilot's back and arms, the suit enables short duration flight but produces extremely high noise levels at close range. This created acoustic challenges far beyond those typically encountered in engineering, aviation or workshop environments, requiring a bespoke and highly adaptive technical approach.

The acoustics team was appointed to assess exposure for pilots, ground staff and spectators in line with regulations. Given the extreme sound pressure levels and the proximity of operators to the engines, the team developed a suite of non standard measurement techniques. These included in ear microphone monitoring beneath hearing protection, high pressure microphones for near field measurements, and multi axis vibration monitoring fixed directly to pilots during live flight trials. Together, these methods enabled the capture of reliable, repeatable data in an exceptionally challenging environment.

An acoustic camera was also deployed to visualise noise sources, generate live noise contours and support Gravity Industries in producing acoustic imagery for internal analysis and marketing. Combined with the measurement programme, this provided a detailed understanding of exposure levels, operational risks and the acoustic characteristics of the jet suit during real world use.

The results confirmed extremely high noise exposure, prompting the development of a tailored survey methodology and a set of engineering and operational control strategies. Recommendations were also provided to inform future jet engine design, with a focus on reducing noise and vibration exposure during development, testing and demonstration activities. The work therefore contributed both to immediate operational safety and to longer term product evolution.

Client feedback emphasised the value of the work delivered under significant time pressure. Judges recognised the unusual and highly innovative nature of the project. They highlighted the challenges of assessing such an unconventional and extreme noise source, praising the technical approach and specialist measurement techniques. The underlying work demonstrated clear innovation, strong methodological adaptation and meaningful contributions to safety and risk management.