

# ISVR Consulting

Consultants in Noise and Vibration

## ISVR Consulting

University of Southampton

Highfield Campus

Southampton

SO17 1BJ United Kingdom

Tel: +44 (0)23 8059 2162

Fax: +44 (0)23 8059 2728

Email: [consultancy@isvr.co.uk](mailto:consultancy@isvr.co.uk)

Web: [www.isvr.co.uk](http://www.isvr.co.uk)



## ISVR Consulting and the aerospace industry

ISVR Consulting undertakes consultancy and applied research across the fields of acoustics, dynamics, vibroacoustics and aeroacoustics. Our diverse skills in lab testing, field trials and modelling enable us to investigate and solve practical engineering problems for the aerospace industry.

Our well-equipped labs include anechoic and reverberant test rooms for measurement of the acoustic and dynamic characteristics of machines, structures and materials, and access to University wind tunnels for aero-acoustic tests. We design and build bespoke rigs for specific tests.

We have high level skills in the application of numerical, semi-empirical and analytical modelling methods, which enable us to work with our customers on detailed design optimisation studies, as well as the interpretation of experimental data.

### Services

#### Laboratory testing:

- Sound power to various ISO standard methods
- Transmission loss testing of panels and structures
- High intensity acoustic fatigue testing
- Measurement of acoustic and dynamic material properties
- Dynamic modal tests
- Aero-acoustic tests
- Motion simulators

#### Field measurements and tests:

- Environmental noise measurements and mapping
- Tests for aircraft noise control manoeuvres
- Noise at work assessments on board aircraft
- Audibility and intelligibility of communications systems

#### Design Studies:

- Design reviews for noise and vibration control
- Design of silencers and noise control systems
- Design of specialist test facilities
- Investigations of mechanical and aerodynamic noise mechanisms
- Active control of noise and vibration

#### Modelling studies:

- Dynamic response of structures
- Performance of silencers
- Optimisation of noise barriers
- Vibroacoustics
- Noise mapping
- CFD modelling

ISVR Consulting is one of five Enterprise Units within the Faculty of Engineering and the Environment at the University of Southampton:

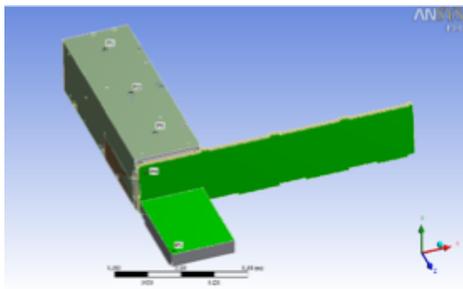
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# Case studies for the aerospace industry



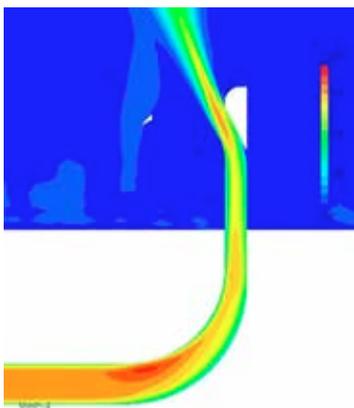
## Field measurements

The Baffles project investigated the design of screens to deflect the plume of pollution created by departing aircraft. Our role was to determine the acoustic effect of the screens, and we participated in field trials at Cranfield University airport.



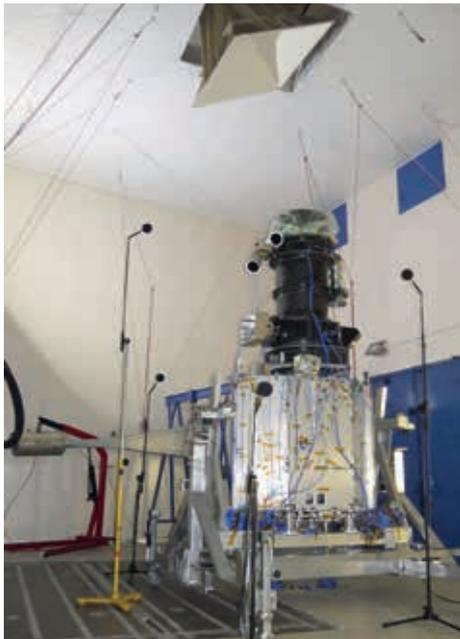
## Design reviews and FE modelling

We complement our acoustic fatigue testing services by carrying out design reviews and FE modelling of electronic equipment packages. The aim is to ensure heavy components are well supported and PCBs and covers are designed to avoid low frequency modes of vibration which can lead to high stresses.



## Design of test facilities

We were commissioned to design a new low noise flow control system for a fan test facility. We carried out CFD predictions of the flow path, lab tests on various designs of low noise control valve, and acoustic FE predictions of the attenuation from in duct mufflers.



## High intensity acoustic tests

We use our reverberation chambers to simulate the launch noise spectrum to produce a partial fatigue life test of satellites. We can generate up to 160dB in our large test chamber, 165 dB in the small chamber, and above 170 dB inside the horn of the acoustic driver.



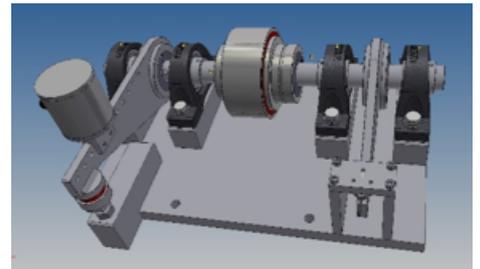
## Aeroacoustics tests

Our DARP facility delivers up to 12 kg/s of low noise airflow, turning our anechoic chamber into an aero-acoustic wind tunnel. We have used it to measure noise produced by flow over aerofoils, components from aircraft and high speed trains, car wing mirrors and cycle helmets.



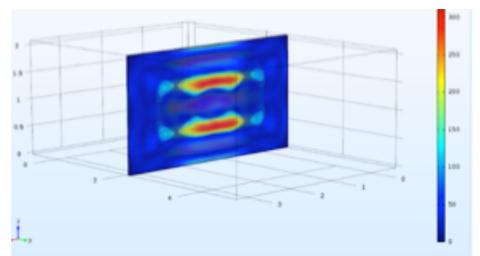
## Wind tunnel measurements

We have participated in many EU, DTi, Innovate UK and industry funded projects investigating various aspects of airframe noise from landing gears and high lift devices.



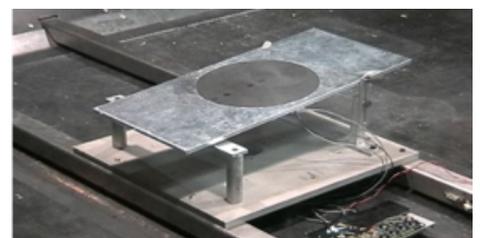
## Bespoke testing

We design and manufacture bespoke test rigs for various purposes. This rig measured the torsional dynamic stiffness and damping of a flexible shaft coupling with variable static loads applied.



## Modelling transmission loss

Composite materials are light and strong, but often have poor sound transmission properties. We carried out an FE modelling study to predict the sound reduction index of double wall partitions, comparing results with data measured in our transmission loss suite.



## Ultrasonic devices

We assisted in the development of an ultrasonic device to measure the characteristics of the flow over an airframe. The amplitude and phase information at various receiver locations was used to infer the local flow vector and boundary layer thickness.



## Noise at work measurements

Our manikin has flown many miles in the cockpits and passenger seats of commercial aircraft.