

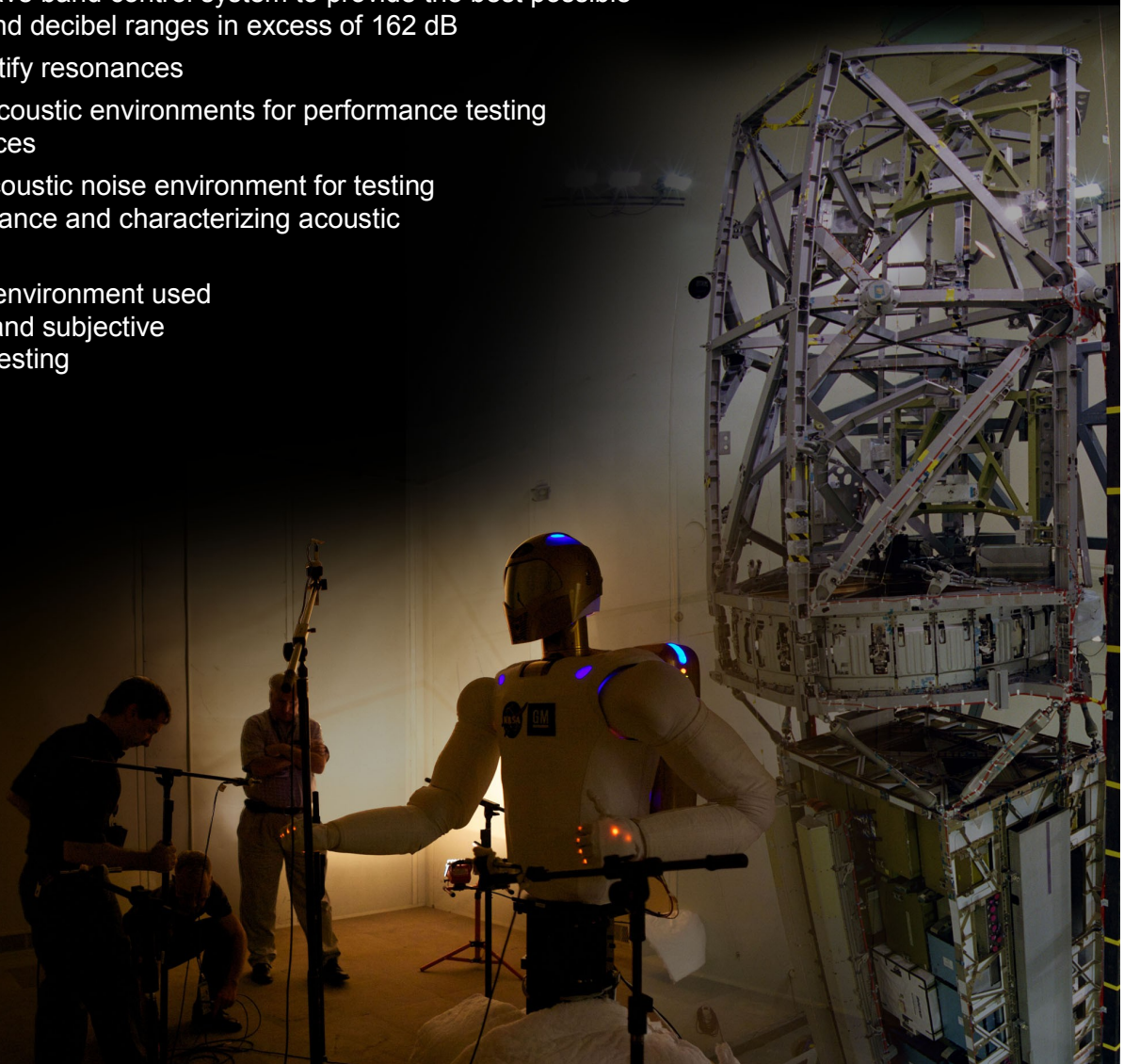


Acoustic Testing

Johnson Space Center (JSC) provides a wide range of tests needed to evaluate exposure to harsh acoustic environments and audio communication system performance associated with the powered flight of aerospace vehicles. Capabilities include reverberant and progressive wave acoustic testing, electroacoustic and audio processing equipment testing, and audio and acoustic research.

Services Provided

- Simulations of broadband random vibrations induced in spacecraft by external acoustic pressures
- Vibroacoustic structural testing to high sound pressure levels of large structures, components, and small subsystems
- Closed-loop 1/3 octave band control system to provide the best possible spectrum shaping and decibel ranges in excess of 162 dB
- Sine sweeps to identify resonances
- Uniform simulated acoustic environments for performance testing electroacoustic devices
- Ultra low ambient acoustic noise environment for testing microphone performance and characterizing acoustic emission sources
- Low acoustic noise environment used for audio recording and subjective audio performance testing



Vibroacoustic Testing

Vibroacoustic and sound transmission loss testing is primarily performed in the Spacecraft Acoustic Laboratory (SAL) or the Sonic Fatigue Laboratory (SFL). These two laboratories are versatile in their test capabilities. Noise generation is through the use of compressed air to the high- and low-frequency modulators, which in turn are coupled to the acoustic horns for generating the acoustic excitation in the reverberant chambers and progressive wave tubes.

Facility	Facility Size	Sound Pressure Level
SAL	Chamber size: ~39' x 47' x 75' high Ceiling can be lowered to ~33' high.	<u>High Ceiling</u> 152 dB (current) 162 dB (future) <u>Low Ceiling</u> 155 dB (current) 165 dB (future)
SFL	Chamber size: ~19' x 40' x 16'	158 dB (current) 167 dB (future)

Noise Generation
<ul style="list-style-type: none"> • Horn cutoff frequency selection (20 – 400 Hz) • 20 low-frequency air modulators (0 – 500 Hz) • 18 high-frequency air modulators (20 – 5000 Hz) • Speakers (10,000 Hz) • Duration of run time at max OASPL unlimited • Acoustic sound media – compressed dry air • Air supply – digital controlled compressor (700 hp) • Additional continuous supply of more than 4,000 scfm at 20 psig • Automated holographic array (36 microphones)

Audio and Acoustic Research

The Audio Development Laboratory (ADL) provides for design, development, test, and evaluation of audio sound equipment. The laboratory houses a reverberation chamber, quiet room, and an anechoic chamber. The reverberation chamber provides uniform simulated acoustic environments for performance testing electroacoustic devices, such as earphones, with passive noise attenuation and noise canceling microphones. The anechoic chamber provides ultra low ambient acoustic noise environment for testing microphone performance and characterizing acoustic emission sources. The quiet room provides low acoustic noise environment used for audio recording and subjective audio performance testing.

Facility	Facility Size	Sound Pressure Level
ADL	15' x 8'	125 dB SPL 30 to 500 Hz 115 dB SPL 500 to 8 kHz

We have developed customer-friendly agreements to streamline business relationships and are eager to share our unique facilities and expertise with new customers. We invite your inquiries regarding application or adaptation of our capabilities to satisfy your special requirements. Briefings on general or specific subjects of mutual interest can be arranged at JSC or at your business site.

Facility Testing Information

<http://jsceng.nasa.gov>

Point of Contact

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