

A Complete Range of Dynamic Testing Services

Dynamic testing has been a cornerstone of CSA since our inception; the company is well known for its capabilities in this discipline. CSA recognizes that test and measurement are essential in real-world problem solving. At any given time, CSA is typically involved in five to ten projects that incorporate dynamic testing. Many of these require execution of sophisticated tests such as modal surveys at a remote facility, often under conditions of some urgency, or development of a special test apparatus. Testing services are sometimes provided in response to specific customer requests; in other situations, testing is done at the choice of CSA itself as a means towards a larger project goal.

Testing Facilities

CSA's laboratories in California and New Mexico contain state-of-the-art instrumentation, dynamic test equipment and software, including multi-reference modal and test-analysis correlation capabilities. Most of the testing equipment is transportable so tests may be performed either in our labs or on-site. Advanced control software is used to automate repetitive tests, and data is post-processed for presentation or use in Matlab, IDEAS, and other applications. Facilities include a wide variety of sensors, multiple shakers and a large selection of spectrum analyzers.

Technical Qualifications

CSA's test engineers have extensive experience in dynamic testing, signal processing methods, instrumentation, and fixture and machine design. Senior staff members have over 20 years' experience in applying their technical skills to real-world problems. CSA's engineers have developed several unique applications of dynamic testing technology and have applied them in numerous problem-solving situations. Engineers have the background to determine test configurations best suited to an application.

Modal Testing



Modal tests are used to characterize a structure's dynamic properties in terms of frequencies, modal damping, mode shapes, and modal mass. CSA uses commercial and custom test software to perform pretest analyses, data acquisition, parameter extraction, and test-analysis correlation. Tests may be performed at customer facilities and in clean room environments. Lapsed time for data acquisition and reduction can often be less than five working days depending on the scope of the test.

Operational Testing

CSA has the capabilities necessary to perform measurements on operating equipment to characterize vibration and acoustic levels by test. CSA has performed operational testing on a variety of structures including a battleship propulsion system, laser weapon systems, disk drives, communications hardware, and medical equipment. Operational testing often includes monitoring of control subsystems.



Specialized Testing



CSA generates custom test systems where necessary to identify the dynamic properties of structural components and other physical systems. Examples are complex stiffness tests of vibration isolators or other mechanical elements, and test systems to identify the vibration sensitivity of machines that are subjected to floor vibration. Other tests involve characterization of electromechanical, electromagnetic, pneumatic and hydraulic devices and systems.

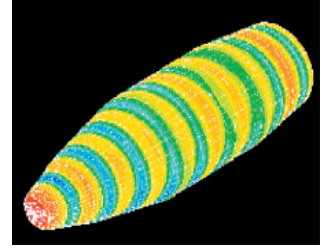
Field Testing

CSA performs tests at customer facilities, providing the instrumentation, spectrum analyzers, and engineering personnel needed to perform tests. CSA's instrumentation and engineers are commonly available on relatively short notice. Field tests may merely acquire frequency response functions or may support installation and performance verification of CSA components in customer products.



For more information on dynamic testing, contact Brad Allen or Dave Kienholz.

Designing quiet, high precision products requires a thorough understanding of acoustics. Acoustic testing and analysis is increasingly important in the design of automobiles, computers, and home appliances. Demanding applications in the aerospace and semiconductor industries require sensitive measurement, inspection, and fabrication equipment.



CSA offers a wide range of testing, analysis, and design services for solving complex problems in acoustics. Our testing and analysis capabilities help you understand the nature of your problem and determine the most effective solution.

Models of products and systems are developed with sophisticated finite element and boundary element software. Cost effective solutions are proposed using accurate models to investigate your design trade-offs. Our integrated capabilities offer a wide range of services useful in any stage of product development - from prototype testing through final design.

Acoustic and Vibration Testing

CSA performs detailed on-site surveys to measure the acoustic and vibration environment of your facilities. Test engineers use microphones, accelerometers, acoustic intensity probes, and portable multichannel analyzers to measure acoustic and vibration levels. Products can also be brought to CSA for extensive acoustic and vibration tests. Detailed reports are provided to help you decide on the solution that will best suit your needs.

Acoustic Analysis and Design

Our expertise in structural analysis and damping design aids in the solution of complex problems. CSA engineers are experienced in finite element analysis, boundary element analysis, solid modeling, and the design of viscoelastic damping treatments. Detailed structural-acoustic models can compute acoustic radiation of vibrating structures, analyze sound transmission of flexible bodies, and predict acoustic fields inside enclosed spaces. A proprietary viscoelastic material database enables us to design passive damping treatments that reduce structural and acoustic response.

Cost effective solutions are proposed through integrated analysis and design. Sensitivity studies determine how the acoustic field is affected by changes in structural parameters; panel calculations are useful for understanding which structural components contribute to the acoustic response; and effective damping treatments are designed by choosing materials from a proprietary database. With this information, CSA can propose structural changes, sound absorbing treatments, and passive damping designs that will reduce acoustic levels.

Active Control Solutions

Passive solutions are not always the most effective means of reducing low frequency sound. Our engineers have expertise in the design of actuators, sensors, and control systems for active vibration and noise cancellation. CSA's active control products are effective means of reducing both airborne and structure-borne sound, and isolating sensitive instruments from external disturbances. The relatively high frequencies of interest often necessitate high-speed control using digital signal processors.

Recent Projects

- Noise reduction for large scale power systems
- Treatments for semiconductor manufacturing equipment
- Active control of acoustically-induced jitter in optical systems
- Panels for interior noise reduction in amphibious vehicles

