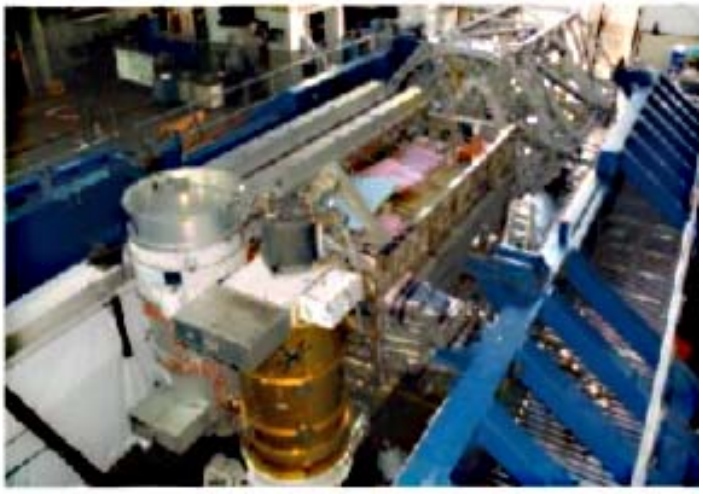
Modal Test Facility

Purpose:

To dynamically characterize structural systems identifying their modes of vibration including frequencies, damping values, and shapes.

The Modal Test Facility is equipped for testing flight structures, systems, payloads, and components requiring fixed, fixed-free or free-free boundary conditions. Customized fixture design and manufacture can be provided through in-house design organizational resources. Flight hardware requiring a 100K cleanliness environment can be tested in a 30 x 30 x 30 ft 100K clean room. Test article excitation using transient, sinusoidal, or random input is accomplished by a numerous variety of impulse hammers and electrodynamic exciters. A maximum of six input forcing functions with peak force levels up to 1,000 pounds can be simultaneously applied. An inventory of 1,200 accelerometers (0.5-500 Hz) is available for instrumentation of the test article. Simultaneous acquisition and time averaging of 224 input channels of force input and acceleration response output can be digitally processed and stored as frequency response functions in real time at a frequency up to 10 kilohertz. State-of-the-art modal analysis software, residing on computer workstations, utilizes basic and complex time and frequency domain algorithms to calculate modal parameters of frequency, mode shape, and damping. Animated mode shape display, extensive hard copy modal data formats, and various tests to analytical data correlation and comparison methods are available. Advanced modal parameter acquisition techniques such as "Time Average Holographic Interferometry" are used to reveal contours of amplitude on the surface of a vibrating object. The primary advantage of this approach when compared to more conventional techniques is that displacement information can be obtained over an entire surface of interest producing complex high frequency mode shape information readily from a single holographic image. Modal holo-interferograms can be acquired throughout a 0-35kHz frequency range with a displacement sensitivity of approximately 125 nm using piezoelectric shaker excitation.



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