

# Spacecraft Modal Testing Seminar

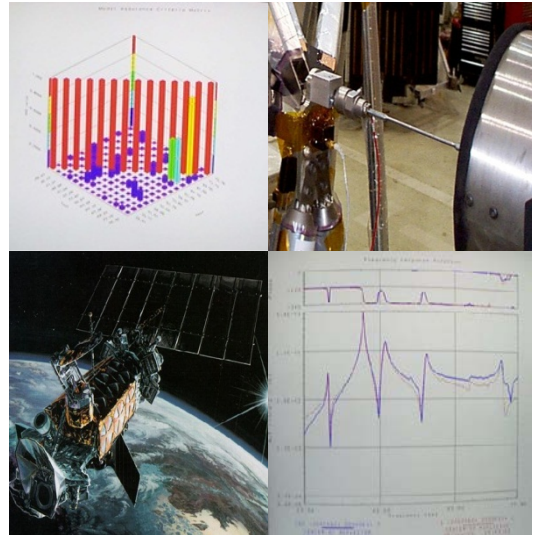
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3 Days

An integral part of the flight verification process for a spacecraft is achieved through validation of the finite element model of the spacecraft structure. Modal survey testing is the method used to meet this requirement. This course provides an in-depth look at modal survey testing of spacecraft systems and subsystems. Emphasis is on the practical aspects of test planning, execution, data analysis and post-test data processing. The techniques discussed will provide the attendee with the necessary tools to produce a set of verified natural frequencies and mode shape vectors that represent the mass and stiffness of the spacecraft in the test configuration.



## 1. Introduction

History of modal analysis  
Normal mode theory  
Description of the modal technique

## 2. Modal Test Requirements

Boundary Conditions  
Instrumentation  
Mechanical Support Equipment  
Modal Test Facilities  
Pre-test Analysis

## 3. Data Acquisition

Hardware  
Software  
Data recording

## 4. Structural Excitation Techniques

Discussion of the pros and cons as well as technical considerations for available excitation techniques

## 5. Spectrum Analysis of Recorded Test Data

FFT & Frequency Response Analysis

## 5. Modal Analysis of Spectral Data

SDOF, MDOF, SIMO, MIMO Techniques for generating Modal Parameters and Mode Shape Vectors

## 6. Post Processing and Animation of Results

Test-Test, Test-Analysis correlation, orthogonally

## 7. Verification of Modal Test Results

Synthesis of Frequency Response Functions  
Modal Assurance Criteria, Reciprocity

## 8. Overview of Finite Element Model Correlation

Synthesis of Frequency Response Functions  
Modal Assurance Criteria

## 9. Avoiding Common Modal Test Problems

Response Location Problems  
Test Setup Problems  
Pitfalls in Data Acquisition, Processing  
Practical Considerations and Tips

## 10. Modal Test Demonstration

Data acquisition & processing on a test structure