

**MODENT™**, **MODESH™**, **MESHGEN™** & **MODPLAN™** embody the experience of over 30 years of research in structural dynamics. The **MODENT™** Suite provides cutting-edge **modal analysis** and **finite element** software for applications in aerospace, automotive, power generation, electronics, off-shore structures, white goods, precision tools, civil engineering & shipbuilding. **MODENT™** offers unrivalled modal parameter extraction capabilities from SIMO & MIMO FRF measurements. It combines highly refined versions of classical modal analysis techniques such as SDOF circle- & line-fit, together with advanced routines for non-linear behaviour. It offers automated modal analysis via well-proven MDOF frequency-domain SIMO & MIMO analysis methods. Further capabilities include output-only modal analysis (OMA) for time and frequency domain data. The quality of FRF measurements and modal analysis results can be assessed using various techniques.

Advanced options include SIMO & MIMO mode indicator functions, principal response functions and noise elimination from measured FRFs. **MODESH™** provides extensive post-processing facilities for vibration data. It can overlay several FRFs & perform mode shape, ODS, forced response and time domain animation. Structural modification can be done by adding mass, stiffness, dashpot, vibration absorber and general matrix elements. It has extensive facilities to perform correlation analyses on FE & modal testing data. It also incorporates algorithms to realize complex mode shapes. **MESHGEN™** is a multi-purpose 3D-mesh generator which can also transform modal models obtained from FRFs measured in local co-ordinates into global co-ordinates. **MODPLAN™** uses an existing FE model of the structure for planning optimum modal tests. It can select best measurement & excitation locations for a range of test equipment and procedures.

## OVERVIEW

### Hardware and O/S

- PC with at least 1Gb RAM running Windows NT, 2000, XP or Vista.

### Limits

- Max FRFs per global analysis: 1,024
- Max data points per FRF: 65,536
- No software imposed limits on the maximum number of animation DOFs, nodes and elements.

### Reporting/Data Transfer

- Universal file format (UFF) support
- Tabulated results on screen & file
- Extensive FRF plotting facilities

### Mesh Generation

- Automatic, mouse & command line
- ANSYS™ compatible
- Cartesian, cylindrical or spherical

### Utility Programs

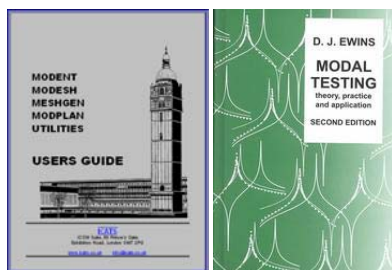
- Mapping of FE and MA data
- Manipulation of FRF data
- ANSYS™, PATRAN™ & UFF interface
- Manipulation of eigen files
- Mapping of test & FE nodes
- FRF generation

## FINITE ELEMENT MODULE

- Static & dynamic analysis - **FINES™**

## TEST & ANALYSIS SYSTEM

- **MODENT™** suite of programs
- Textbook by D. J. Ewins
- Colour notebook PC
- Multi-channel portable FFT analyser  
Contact ICATS for details
- Hammer kit & cables
- Multi-purpose accelerometer
- Carry case



## MAIN FEATURES

### Modal Analysis

- **Single FRF, SDOF fit:** Circle-fit, line-fit, non-linear modal analysis
- **Single FRF, MDOF fit:** IDENT, peak-pick frequency/damping analysis
- **SIMO Multi-FRF, MDOF fit:** SVD least-squares, non-linear least-squares, rational fraction
- **MIMO Multi-FRF, MDOF fit**
- **Output-only Modal Analysis (OMA)**

### FRF Display

- Real/Imag, inverse FRF, linear modulus, modulus dB, modulus dB & Phase, Nyquist, 1/3 octave

### Model Display

- Independent dual model display
- Animation and FRF link
- Wire frame/hidden lines
- Nodal lines, node numbers
- Solid and line contours
- Maximum deflection, zero deflection
- Zoom into any area of the model
- Maximum deflection node

### Post-processing

- FRF overlays
- Complex to real mode conversion
- Consistent modal database
- Time & frequency domain animation
- ODS animation
- Forced response animation

### Correlation Analysis

- Natural frequency comparison
- MAC & COMAC
- AUTOMAC & SCO-MAC
- Iterative BEST MAC
- 2D, 3D & advanced MAC displays
- Mode shape correlation
- Amplitude & shape correlation
- Mass/stiffness error matrices

### Structural Modification

- Mass, stiffness, damper, tuned absorber & general matrix elements

### Modal Test Planning

- Best excitation/suspension points
- Best response points
- Measurement points to avoid

### Further Features

- On-line access to .pdf documentation
- Animation (.AVI) file generation
- Principal response functions (PRF)
- Noise elimination from test FRFs
- Coherence optimisation
- Mode isolation & residual calculation
- Detection of double modes
- SIMO/MIMO mode indicator functions
- Sensitivity analysis
- Best MAC co-ordinate analysis
- Statistical modal parameter analysis
- Modal database consistency checks
- Measurement quality assessment
- Modal analysis quality assessment via reciprocal modal vectors

## PARTIAL USER LIST

### Industrial

Acovib, Aircraft Research & Testing Institute Praha, Aramco, ASM Pacific Technology, AWE, Bombardier, Bosch, BR Research, Britax Wingard, CASA, CBE Sound & Vibration, Central Road Research Institute Delhi, ChangSha R&D, Comau, Dupont, ESKOM, ESSWEIN, Fiat Geotech, Ford, GEC Alstom ERC, GKN Automotive AG, IROST, ITRAC, Instituto de Investigaciones Electricas, Fujitsu SIL Ltd., Honda R&D, Hunting Engineering, Khodro Co., Kent Engineering Services, Magnox Electric, MAN Technologie, Korean Materials Research Laboratory, Laboratoire Central des Ponts et Chaussées, Matsushita, National Engineering Laboratory, Niigata Engineering, Nuclear Electric, Philips Components BV, Protos, QinetiQ, Renault Automation, RMS Vibration Test Laboratory, Rafael, Rolls-Royce Marine Power, Rolls-Royce Deutschland, Rover, Vickers, Royal Mail, Shian Co., Swedish National Testing & Research Institute, Seagate, T&N, Thales Sensors, TSUS Bratislava, Xian Space Star Technology Corp, Xian Xiangyang Ltd, Yutaka Giken Co. Ltd.

### Educational

AlFateh University, Australian Defence Force Academy, Birmingham University, Bristol University, Brookes University, Central Queensland University, City University, Ecole Centrale de Nantes, Ege University, EISI, Fachhochschule Niederrhein, Faculte Polytechnique of Mons, Federal University of Minas Gerais, Heriot Watt, Hong Kong Polytechnic, Indian Institute of Technology - Bombay, Isfahan University, Indian Institute of Technology - Delhi, Iowa State University, King Saud University, Royal Institute of Technology, Middle East Technical University, Monash University, Nan Yang University, National Technical University of Athens, Nottingham Trent University, Prague Academy of Sciences, Polytechnic Institute of Bucharest, Robert Gordon Institute of Technology, Semnan University, Shahid Chamran University, Singapore Polytechnic, Tarbiat Modarres University, Technical University Chemnitz, Technical University Dresden, Technical University Ilmenau, Technical University of Istanbul, Technical University Munchen, Technical University Stuttgart, Technical University Ostrava, UMIST, Universite de Technologie Compiègne, Università de L'Aquila, Universidade Nova de Lisboa, Universidade Tecnica de Lisboa, Universidade Federal de Santa Catarina, University of Bochum, University of Dar-es-Salaam, University of Eindhoven, University of Hertfordshire, University of Hong Kong, University of Kingston, University of Leeds, University of Liverpool, University of Malaya, Università di Messina, University of Newcastle, University of Padova, University of Plymouth, University of Rome, University of Sheffield, University of Stuttgart, University of Wales, University of Strathclyde, Victoria University of Technology

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