



# PRODERA



*Courtesy Airbus*

Vertical (1000 N EX 420C shaker) and lateral excitations (long stroke 550 N EX 520 C50 shaker) of the left Rolls Royce inner engine during the ground vibration tests carried out on the Airbus A340/600 in February 2001 at the plant of Airbus in Toulouse (France) (ONERA realisation)

## Complete Solutions for Ground Vibration Tests (GVT) & In-Flight Tests

### Electrodynamics Shakers



- *Complete range from 3 to 5000 N*
- *Light and robust moving system*
- *Near zero suspension stiffness*
- *Large stroke*

### Power Amplifiers



- *From 30 up to 4000 Watt*
- *Well adapted for our shakers*
- *Ultra precise output current*
- *High output impedance, allowing constant force independent of the movement of the moving system*

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## Acquisition & Multi-Point Excitation System

### P-SYS-MODAL<sup>®</sup>

- Sine, impulse or random excitation
- 16 analogue outputs and 1024 differential inputs
- Frequency stability:  $10^{-8}$  Hz
- Amplitude stability:  $5 \times 10^{-3}$  V



## Modal Analysis Software

### P-WIN-MODAL<sup>®</sup>

- Direct display and printout of all modal parameters
- Direct link with Dynaworks<sup>®</sup>

## Accelerometers

- Low weight
- High sensitivity



## Charge amplifiers

- Multichannel amplifiers
- Reliable and stable measurement of the structure's response



## Ground Suspension Systems



- Pneumatic isolation providing an isolation of 0.9 Hz

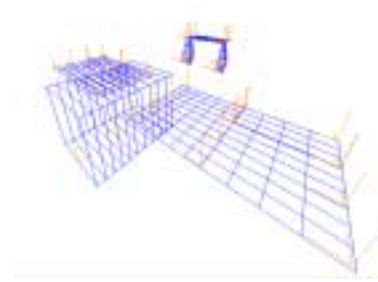
## Electronic Structure Strucsim-3-D<sup>®</sup>



- Calibration unit and training tool
- Simulation of the complete excitation and measurement system
- 8 pre-programmed vibration modes
- Independent of the test conditions

## Flutter Prediction Software

- *Flutter Analysis from Ground Vibration Test (GVT) data or imported data*
- *Prediction of the evolution of the modal parameters during flight in the sub, super and transonic ranges*



## Pyrotechnical Thrusters



- *Vibration analysis during flight using pyrotechnical impulse techniques*
- *Supply of a calibrated force of short duration in a precise frequency range*

## Matlab Toolbox Flutter-Monitor-Toolbox®

- *Real-time analysis during flight tests*

## Inertial Shakers

- *Based on the same principle as the electrodynamic shakers, they supply the necessary multi-point input forces during the flight test.*

## Telemetry

- *Complete PCM system*
- *Solid state recorders*
- *Video compressors*
- *GPS controlled antennas*



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