

## SO Analyzer

### Applications (Examples)

#### Modal Analysis on Multi-Joint Systems

The R&D team "Procédés et Systèmes Mécaniques" of the Mechanical Engineering Laboratory at the INSA University in Rennes, France has purchased our SO Analyzer solution with National Instruments acquisition hardware in order to study the dynamic behavior of structures. This investment is part of ongoing research conducted by the PSM team whose main tasks include improvement and mastering dynamic performances of multi-joint mechanisms.

The picture shows a modal analysis application on a delta-type parallel robot using a NI CompactDAQ 9172 chassis, 923x acquisition modules, a 9263 generator module and a PCB modal shaker. In order to guarantee motion accuracy on multi-joint systems used in a large variety of applications requiring mechanical structures with high dynamic ranges, precise knowledge of modal parameters will allow the user to act on the control system and to modify dynamic characteristics of the structure during the design stage: geometry modification, selection of material and actuators.



#### Vehicle Pass-by-Noise Testing

Our industry-leading pass-by-noise testing solution is available with updates for the latest ISO standards and this single operator system gets rave reviews from the users. The unique GPS system provides extremely accurate triggering, positioning and speed - freeing the user from cumbersome and error prone manual triggers, radar guns and allows immediate reverse runs and instantaneous pass fail criteria. Here is the system in operation at Cooper Tire in Texas.



"Easiest and most advanced PBN system on the market today." Carson Miller, Track Director at Cooper Tire, says. And Gary Welch, Senior Test Technician, explains: "Simple setup and GPS operation allows me to run the system myself and knock out the runs."

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#### US Navy: SO Analyzer Selected for Unique Classified Test Program

m+p international has won a contract for an extremely unique classified test program from the US Navy. Although the specifics of the application are classified the system is unique in that it will test with 15 independent Modal Shakers supplied by The Modal Shop in Cincinnati and utilize some of the newest features in the SO Analyzer software suite. All 15 shakers can be driven by the single VXIbus mainframe containing four VT1434 digital-to-analog cards as well as two VT1432 cards for the acquisition of the FRF, Coherence, PSD, and Time Domain data. Each of the 16 outputs is uncorrelated and independent and can deliver Sine, Random, Shock, as well as Arbitrary Wave Forms from Wav files. The SO Analyzer, in addition to handling the 16 uncorrelated outputs, can provide closed-loop control of 4 of the outputs for Random and Sine testing greatly enhancing Multi-Input/Multi-Output Modal Testing.

#### University of Illinois Uses New VibPilot for Vibration Control and DSA

The Linear and Nonlinear Dynamics and Vibrations Laboratory at the University of Illinois have selected the m+p international's new multichannel vibration/acoustic controller plus analyzer, the VibPilot. This unique capability of dual use of the new custom designed VibPilot 24-bit frontend includes 2 sources for DAC out and 8 input channels for both vibration control and as a noise and vibration analyzer. The primary use is to perform linear and non-linear dynamics experiments to support current research. Applications include linear and nonlinear vibrations, flutter analysis, joint mechanics, system identification, seismic vulnerability of structures, and passive and active control of structures.



#### Pressure Measurements of Naval Ships

m+p international's SO Analyzer covers a full range of real-time data acquisition and online & offline analysis applications in diverse industrial sectors. The WTD 71, a technical center of the German Bundeswehr, uses the SO Analyzer for multi-channel shock testing of naval ships. In this application several systems are synchronized to increase the channel count. The shock responses resulting from mine explosions are acquired simultaneously across all channels. Typically, these measurements are made using piezo-resistive pressure sensors that are completed as bridge.

The acquisition hardware consists of the EX1629 48-channel, LXIbus-based bridge amplifier, three VT 1432B high-speed digitizers for a total of 48 channels measuring the dynamic bridge voltages and an EX 2500 Gigabit-Ethernet interface for remote control of the front-end. The conditioned, analog signals are transmitted via the broadband outputs ( $\geq 100$  kHz bandwidth) of the EX1629 to the inputs of the VT1432B digitizers. Both parameterization of the EX1629 bridge amplifier and data acquisition by means of the VT1432B digitizers is done using the SO Analyzer software.

In a further step, the SO Analyzer "Shock Response Spectrum" module helps the operator to post-process the measured data.

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### m+p international Wins NASA Langley Contract

NASA Langley Research Center selected m+p international's SO Analyzer to support existing installations of VXI and National Instrument measurement hardware. NASA's Structural Acoustics, Systems Integration/Test and Aero-Elasticity Branches installed seven seats of the SO Analyzer data acquisition and analysis software to preserve their investment in hardware, guarantee product support and future software development.

All installations were completed within one day and included two National Instruments PXI based systems as well as five VTI Instruments VXI based systems, with a total channel count exceeding 200 channels. The interface with existing PC workstation went seamlessly with support of MXI-2, IEEE 1394 FireWire, PCI Express and MXI-4 standards.

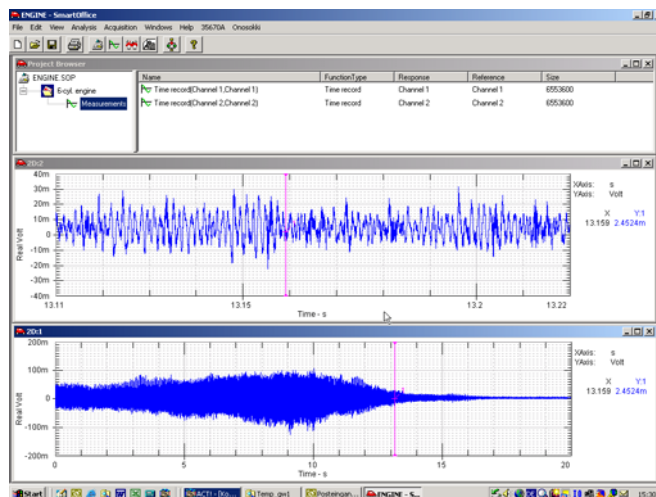
The ease of use of SO Analyzer allowed the users at NASA to produce results immediately with very little training.

### University of Cincinnati Selects LXI/VXI-Based SO Analyzer

m+p international's SO Analyzer software based on measurement hardware of our partner VTI Instruments inc. has been selected by Prof. Randy Allemang (Director of the University of Cincinnati Structural Dynamic Research Lab -SDRL) for use by the students of the Structures and Motion Laboratory.

Six seats of LXI/VXI laptop based systems were installed enabling the students to utilize the VT1435 24-bit, 100 kHz, 8-channel input modules with output source and new LXI Ethernet interface. m+p's SO Analyzer software worked immediately after interfacing the new hardware and allowed a range of dynamic measurements to be acquired the first day of scheduled labs. The ease of use, extensive integrated analysis and visualization along with direct conversion to MATLAB allows students to focus on understanding the measurements instead of losing time learning software.

This continues the long standing relationship between m+p international and the SDRL which has resulted in many exciting and productive product features such as m+p's Impact Measurement Wizard, the Polyreference Time Domain Curve Fit, Advanced MDOF Wizard and Multivariate Mode Indicator Function.



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#### m+p international Provides Ethernet (LXI) Based VibControl/SO Analyzer System

m+p international has been awarded a contract to upgrade two VibControl and SO Analyzer systems for vibration data acquisition and analysis applications at Y-12 National Security Complex in Oak Ridge, Tennessee, currently using diskless computer technology.

The initial installation in 2003 proved that data acquisition and analysis could be performed on a system that is booted via the network with all test set-ups and results transmitted in encrypted form and saved on a secure remote central computer.

The upgrade includes the integration and functional operation of the EX2500 gigabit Ethernet slot-0 card and multiple VT1436 102.4kHz sampling, 24-bit digitizers of our measurement hardware partner, VTI Instruments inc., with our VibControl and SO Analyzer software in Y-12's diskless environment. The EX2500 Ethernet card allowed to integrate the system directly to the secure network and increase the performance by easing the workload of the PC workstation.

This application fully benefits from the modular design of the used VXIbus platform: The VibControl vibration data acquisition software and the SO Analyzer software run in parallel on the VXI measuring front-end, thus saving money and space.