Software Helps Qualify Aerospace Components

S.A.B.C.A., Societe Anonyme Belge de Constructions Aeronautiques, has implemented LMS Test.Lab in developing components and assemblies for a wide range of aircraft and space projects, including those for the European Space Agency's (ESA) new launcher VEGA. Based in Brussels, Belgium, S.A.B.C.A. has been active for decades designing, testing and manufacturing parts and systems for major aircraft and spacecraft, including the Ariane 5 and several Airbus aircraft.

S.A.B.C.A. is utilizing the LMS Test.Lab Environmental software to perform "shake and bake" qualification testing with sine profiles, shock and random inputs in a vibration range of 1 to 22 g, from 5 to 2000 Hz. These tests have to ensure that prototype assemblies can operate properly under the severe vibration environment of rocket lift off and in-flight conditions. Data acquisition is handled by LMS SCADAS III front-end units, each with a capacity of 24 input channels. The system is highly scalable, enabling S.A.B.C.A. to readily add channels and interconnect multiple LMS SCADAS units to further increase the channel count of their system.

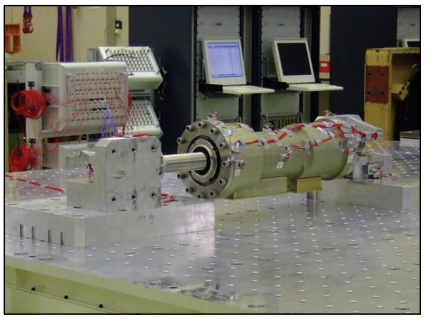
According to S.A.B.C.A., engineering, channel count is critical for acquiring the large amount of measurement data generated through their testing campaigns. S.A.B.C.A. requires a particularly high level of accuracy in qualifying their new mechatronics systems containing complex electronic control systems and intricate parts made of lightweight materials. Some of the latest innovations under development at the S.A.B.C.A. Mechatronics department are thrust vector control systems (TVC) consisting of electromechanical actuators, integrated power drive control electronics, sets of lithium ion batteries and cable harnesses. These TVCs will be used on the new European VEGA launcher instead of the more expensive and heavier hydraulic systems used for previous TVCs.

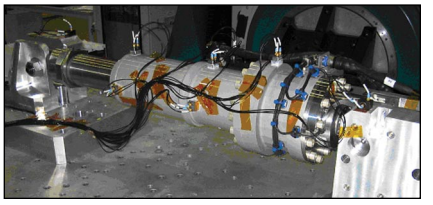
These actuators control the positioning of the launcher nozzles and are therefore critical to the trajectory of the vehicle and success of the space mission. The new TVC designs use lightweight materials and contain state-of-the-art control electronics, including a proprietary processor designed and ESA qualified by S.A.B.C.A. for demanding aerospace applications. Because this new TVC design relies heavily on electronic circuitry, tests entail a much more refined vibration control of three axes simultaneously, requiring considerably more channels than was previously available on the former system.

LMS Test.Lab Environmental was selected for the high channel count, the scalability of the system and the ability of refined vibration control needed for this advanced testing. Controlling vibrations at 22 g of complex 100 kg mechanisms with moving elements is not easy with any kind of controller. In addition these vibrations use complex multi-channel control accelerometers combined with several types of estimators. The LMS system enables results monitoring on-line in real time so S.A.B.C.A. engineers can confirm the validity of data as tests are being run and also remotely shut down the system in case of emergency without destroying the test specimen.

Another major selection factor was the data management and reporting capabilities of the system in accommodating the large amounts of test results generated. The Active Pictures feature in LMS Test.Lab is especially helpful in allowing S.A.B.C.A. engineers to view and manipulate live test data in an office environment.

Having these powerful capabilities in a single integrated solution allows S.A.B.C.A. engineers to set up tests, take accurate measurements, interpret data and report results much more quickly than was possible with their previous system. The productivity gain is significant, with the time from start to finish typically condensed by half with LMS Test.Lab.





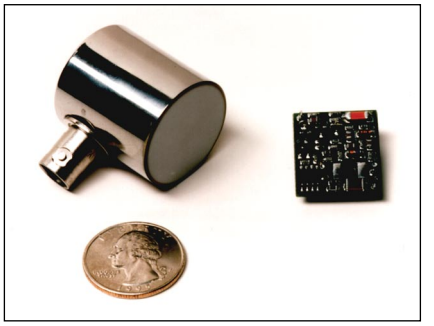
S.A.B.C.A. confirmed that the LMS technical support team was particularly responsive in providing guidance and information for achieving this level of improved efficiency. LMS support personnel are valued as high-caliber professionals with the know-how needed to get answers to questions very quickly. According to S.A.B.C.A., LMS has gone far beyond selling a test system throughout the implementation. LMS has been an active partner in applying advanced technology to its full potential in strengthening the leadership position of S.A.B.C.A. in the highly competitive aerospace market.

For more information on LMS Test.Lab and other LMS products, please visit: www.lmsintl.com.

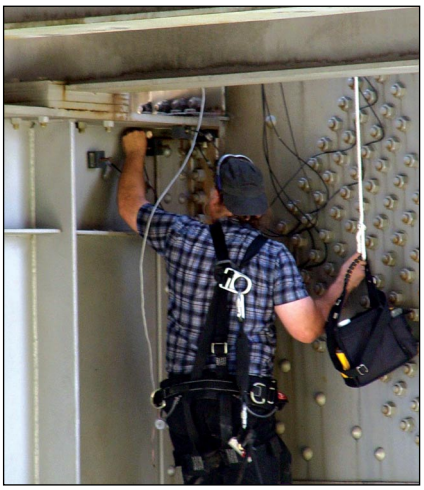
On-line Bridge Monitoring

Physical Acoustics Corporation (PAC), a member of MISTRAS Group Inc., specializing in Nondestructive Testing (NDT) and Inspection, has developed digital wireless sensor technology that assists bridge operators in preventing bridge failures. Rising demand for ensuring the integrity and performance of our nation's aging bridges and infrastructure may sometimes require more than typical visual inspection for evaluation of their structural conditions by using advanced inspection technologies. The additional information from NDT can provide input to authorities and assist in making informed and effective decisions with regards to planning for maintenance, repair, rehabilitation or replacement. While there are several factors that can lead to degradation and deterioration of a bridge, increased traffic on our nation's bridges, coupled with corrosive environments, are the leading causes of deterioration for steel bridges. For concrete bridges, corrosion of reinforcement due to chloride ingress, vehicle impact, concrete cracking and fatigue are the major factors of degradation. On-line monitoring and sensor fusion can cover all possible failure mechanisms including unpredictable deterioration.

Since 1972, PAC has applied sound technology, called Acoustic Emission (AE), for 'global' bridge monitoring while other sensors, such as vibration accelerometers, strain gages, corrosion gages, etc., are used by our staff and bridge engineers to assess the possible mechanism of failures and predict bridge life. AE testing is a technique used to detect "warning signals" forecasting defect formation and impeding failures in structural materials. Cracks can be heard from remote distances by using AE sensors similar to using geophones for earthquake



Remote AE sensor.



Technicians installing AE sensors.

detection and location or sonar devices to detect enemy submarines. Commonly used visual inspection to detect small cracks/defects, is like finding a needle in a haystack and impossible in areas that are inaccessible or hard to access.

Per the NY Times, "warning sounds were heard for months by neighbors prior to the I-95 CT bridge collapse 15 years ago" reports Dr. Sotirios J. Vahaviolos, Founder and Chairman/CEO of PAC and MISTRAS Group Inc. The airport manager at Charles De Gaulle airport reported to CNN that they also heard warning sounds a couple of years prior to the collapse of a terminal. In both these instances, PAC's systems could have differentiated "crack sounds" from other normal daily sounds in a bridge structure including heavy rain.

Since the early 1990s bridge monitoring using AE has been investigated by the Federal Highway Administration (FHWA) that continues to fund development, testing and demonstrations on the use of AE for bridge inspection and monitoring. PAC has been awarded several FHWA contracts since the late 1980s and has successfully monitored over 20 bridges. "It is only because of State DOT's and government funding that has prevented wide scale deployment of on-line monitoring using sensor fusion and wireless technologies on bridges" states Dr. Vahaviolos. More recently, FHWA selected PAC's Sensor Highway II™ System for awarding and participation under the Steel Bridge Testing Program.

"AE can also be used by Homeland Security for prevention of vandalism" states PAC's National Sales & Applications Director, Terry Tamutus. Recently youths with hacksaws cut dozens of wires from four main cables on a cable stay bridge. "It caused more than $2M in repairs and a possible catastrophic bridge failure. An on-line AE system could have easily detected the start of a cable cutting and could have alerted authorities through wireless or internet based communication technology" states Tamutus. "We have the technology for Bridge Health Monitoring now and are ready to team up with bridge operators in order to prevent catastrophic failures from naturally occurring structural flaws that are the result of an aging infrastructure" concludes Dr. Vahaviolos.

MISTRAS Group Inc. provides nondestructive testing products and services under the well known brand names of CONAM Inspection and Engineering Services Inc., Physical Acoustics Corporation, Code Services, Quality Services Laboratories Inc., Caliber Inspection, PRI, NDT Automation, and Vibra-Metrics. MISTRAS Group provides mechanical asset inspection and integrity solutions to the energy, aerospace, manufacturing and gas & oil sectors as well as strategic on-line instrumentation that facilitates plant asset management decisions. In addition, MISTRAS is a leading provider of enterprise solution software that aids in the safe and profitable operation of industrial facilities worldwide.

For more information on bridge monitoring or other PAC products, please visit the company's website at www.mistrasgroup.com.