

CASE STUDY

*Flexible Instrumentation System for  
Static and Dynamic Tests On Aerospace Structures*

► **Background**

An aerospace company based in India is involved in the design, development, manufacturing, and maintenance of fixed and rotary wing aircraft programs. The company has established its credibility through supplying high precision structural & composite work packages, assemblies, avionics, and other parts to major companies in the global aviation industry such as Airbus, Boeing, Rolls Royce, IAI, and more. To support the development and validation of a next-generation indigenous combat aircraft, the company has plans to build a new, large scale structural test facility.



► **The Challenge**

The strain data acquisition system required for this new facility was designed to cater to static, fatigue, and dynamic strain test requirements. In addition, the company needed the system to be synchronized uniformly, irrespective of instrument type, measurement types, or sampling rate. Since the instrumentation system was designed for various internal and external customers, the system was also expected to be flexible and scalable. The first phase of work included 1600+ channels, consisting of a mix of Quarter Bridge 120Ω, Quarter Bridge 350Ω, Poisson & Bending Half Bridges, Poisson and/or Bending Full Bridges, load cells, potentiometers, and laser distance measurement sensors. Because the system was needed to support a large number of channels, the ability to perform automatic health checks and provide visual indications were preferred to improve system test integrity and reduce testing errors. The integration of load control system and alarm/safety systems were required to be interfaced using discrete I/Os.



► **The Solution**

*The company purchased 102 units of the EX1403A 16-channel strain data acquisition instrument from VTI Instruments, and they were integrated into the new structural test facility. The EX1403A offers channel configuration flexibility and unparalleled scalability due to its LXI architecture, making it the company's preferred choice among a wide array of competitors. Each input channel can be configured individually for a wide variety of sensors, with 24 bits of resolution and simultaneous sampling rates ranging from 1 sample to 100kSa/sec/s. This prevented the company from having to use fixed sensor/sampling-based multi-instrument architecture. Another compelling selling point was VTI Instruments' commitment to long-term support of the purchased equipment.*