

# interface

FORCE MEASUREMENT SOLUTIONS.

## CASE STUDY

### Airplane Static Testing



#### About

Force measurement is a critical component in a wide variety of tests in the aerospace industry. This is because, force measurement tests are used from the design and development process, all the way into real time monitoring of aerospace vehicles in use. One of the most vital tests, and the topic of today's case study, is a static rig test outfitted with load cells designed to measure the structural integrity of the vehicle, as well as the vehicles ability to hold up to hazardous conditions over extended periods of time. We will bring you through the challenges that aerospace customers are dealing with and provide force measurement solutions and real-world application examples.

#### Challenge

To design and build an aircraft, there are incredibly strict standards to meet to ensure the vehicle is safe and can hold up to regular use and the elements over time. Structural tests play a critical role in ensuring the aircraft is approved for flight. Aerospace manufacturers utilize a wide variety of tests to develop various components involved in the aircraft, one of which is static rig testing. The static test is the most basic and important one of all structural tests. It is the safety verification of a test specimen's structural design, and it is an important basis of test specimen's modification.

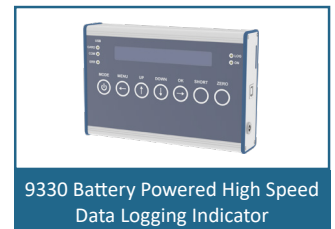
To perform a static test, a variety of equipment is necessary including high-reliability and very high accuracy load cells. Load cells can be used to test frame structure integrity, endurance, and life cycles, with the goal generally being to validate aircraft design and ensure specified criteria are met. The strict accuracy is necessary because in aerospace, every micrometer and gram make a difference in both the performance and safety of an aircraft design.



1000 High Capacity Fatigue-Rated  
LowProfile™ Load Cell



WTS 1200 Standard Precision  
LowProfile® Wireless Load Cell



9330 Battery Powered High Speed  
Data Logging Indicator



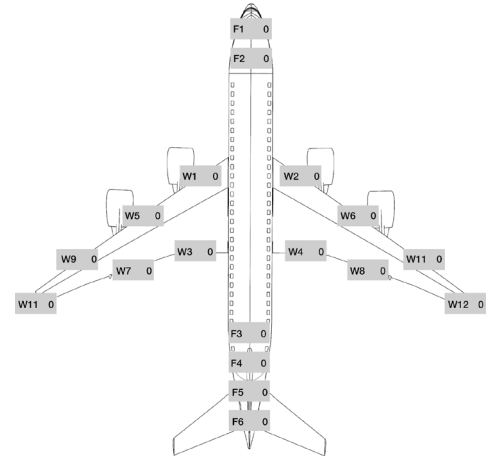
BX8 8-Channel Data Acquisition  
and Amplifier

## Interface Solutions

The types of sensors we provide to the aerospace industry, specifically for flight-related vehicle testing, include load cells of all capacities and sizes, load pins, instrumentation, torque transducers and more. These are used in flight simulations, aircraft production, and structural, static, and fatigue testing on fuselages and wings. We help to design or integrate into a variety of static rig testing. To conduct this test, engineers will often simulate the effects of various forces on the aircraft and wings with actuators which act as wind, weather, debris and more. Hundreds of Interface load cells are used to measure those forces to either validate the simulations or find errors in order to adjust the simulation and design accordingly. Sensors are also used on machines controlling these forces in the test environment to ensure the actuators are simulating the right amount of force.

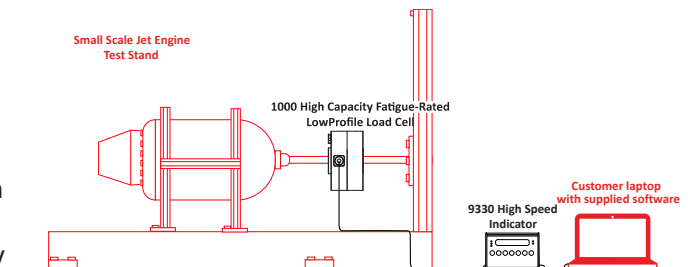
### Airplane Jacking System

Many aerospace companies tend to rebuild their planes or aircrafts by stripping the skins off the wings. The first step of this process is to completely jack the plane on a jacking system, where the force applied to the jacks need to be measured and monitored. Interface sensors are mapped throughout the aircraft for vehicle static testing. Our Interface WTS 1200 LowProfile® Wireless Load Cells are placed on jack points measuring weights and forces on an aircraft. Our advanced wireless telemetry system provided instrumentation to capture real-time data, such as the individual load cells attached to each jack point, or any set alarms that may go off if it has exceeded a certain amount of force. Using the Log100 software, the customer was able to graph all the data for various analysis, logging and storage of required data. This system is also completely portable, so this jacking system can be put away when it is not in use.



### Jet Engine Thrust Test

A customer needs to conduct a static jet engine thrust test that accurately determines the engine's thrust, burn time, chamber pressure, and other parameters. The purpose is to provide invaluable data to propellant chemists and engineers. They needed a high accuracy load cell with excellent repeatability to withstand thrust forces in very harsh environments. From ignition to burn-out, Interface's 1000 High Capacity Fatigue-Rated LowProfile™ Load Cell was ideally suited based for this static testing. The load cell reacted to the thrust forces produced by the jet engine and the signals were collected and recorded to create a "thrust curve" of the engine. The performance Interface's LowProfile™ Load Cell allowed engineers to be confident in the data acquired from the static testing. Additionally, the repeatability of the load cell resulted in reduced time between tests.



### Learn More

Call to speak with our application engineers about solutions we offer to the aerospace industry for static testing.