

PARACHUTE DEPLOYMENT AND DECELERATION TESTING

INDUSTRY: AEROSPACE / INDUSTRIAL AUTOMATION

SUMMARY

Customer Need / Challenge

Spacecraft landing on a lunar or planetary surface require parachutes to deploy at high speeds under high loads.

For example, NASA tested the Mars Science Laboratory parachute in an 80x120-foot wind tunnel at 80 mph speeds and loads up to 85,000 pounds.

Interface Solution

A 1000-series fatigue-rated LowProfile™ load cells with eccentric load compensation is employed to sustain and measure high loads with 300% overload protection.

Results

Load cells ensure accurate measurement of applied loads during parachute deployment testing.

Multiple tests allow engineers to test various parachute packing techniques.

MATERIALS

Interface Products

- 1000 Fatigue-Rated LowProfile™ Load Cells capacity up to 50K pounds-force (lbf)
- JB104SS Stainless Steel Junction Box
- SGA Signal Conditioner

Alternate Setup

- 480 Bidirectional Indicator
- 9860 High Speed Indicator

Additional Materials

- Wind tunnel
- Parachute package support structure
- Customer Data Acquisition System

HOW IT WORKS

1. Support structure capable of sustaining required loads is built inside wind tunnel.
2. If the calculated load is less than the load cell capacity, a single load cell is installed as part of the support structure and connected to the parachute deployment system.
3. Alternatively, multiple load cells are connected into an array and installed between the support structure and the parachute deployment system. A junction box connects the load cells to provide a single reading from the load cell array.
4. After the wind tunnel is brought up to speed, a mortar launches the parachute, aiming toward the upper middle portion of the tunnel where speeds are highest.
5. As the parachute canopy deploys, the load cell(s) measure the force applied with an accuracy of 0.03%.

