



The Luna **ODiSI A** saves test time and cost while adding an unprecedented spatial resolution to sensing measurements. Utilizing swept-wavelength interferometry, the ODiSI A simultaneously interrogates thousands of sensing locations along a single unaltered, inexpensive optical fiber. With a 50 meter maximum sensing length and sub-centimeter spatial resolution, the ODiSI A is the paramount tool for a variety of applications.

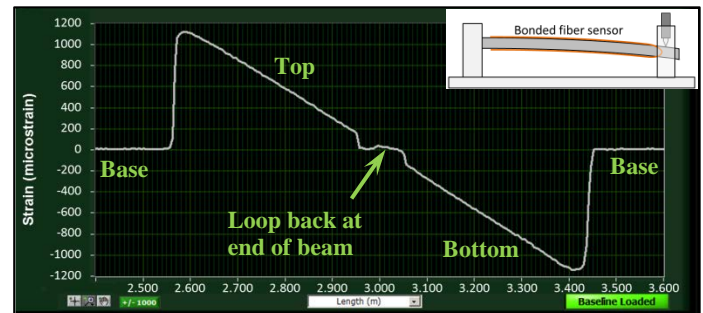
The Luna ODiSI A (Optical Distributed Sensor Interrogator) delivers fully distributed strain and temperature measurements with sub-cm spatial resolution.

KEY FEATURES AND PRODUCT HIGHLIGHTS

- Reduce material costs with inexpensive optical fiber sensors
- Save time and labor by instrumenting many sensing locations using a single optical fiber
- Interrogate entire fiber and all sensing locations with a single scan
- Control sensor locations and gage lengths in software
- Measure temperature or strain with a single fiber
- Realize industry-leading measurement range and repeatability with extraordinary spatial resolution
 - Measurement ranges of $\pm 13,000 \mu\text{Strain}$, -50 to $300 \text{ }^\circ\text{C}$
 - Repeatability of $\pm 2 \mu\text{Strain}$, $\pm 0.2 \text{ }^\circ\text{C}$
 - Sub-centimeter spatial resolution
 - Maximum sensing length of 50 meters

APPLICATIONS

- Load, fatigue, and mechanical testing
- Composite manufacturing and engineering
- Embedded sensing
- Temperature profile characterization
- Structural Health Monitoring
- Model and simulation validation



Demonstration of the ODiSI A recording distributed strain of an optical fiber bonded to the top and bottom surfaces of a cantilevered aluminum beam. Shown above with sensor spacing of 5 mm, each sensor with a 1-cm gage length.

PARAMETER	SPECIFICATION		UNITS
Performance			
Model	A10	A50	
Maximum Sensing Length	10	50	meters
Acquisition Rate ¹	5	2.5	Hz
Minimum Sensor Spacing	0.4		mm
Minimum Gage Length ²	1		mm
Wavelength Accuracy ³	1.5		pm
Strain:			
Range	± 13,000		µStrain
Single-scan repeatability ^{1,4,5}	± 2		µStrain
Temperature:			
Range ⁶	-50 to 300		°C
Single-scan repeatability ^{1,4,5}	± 0.2		°C
Physical			
Dimensions	14 x 12.5 x 6.75	(36 x 32 x 17)	in (cm)
Weight	17.5	(8)	lb (kg)
Power Consumption	50		W

- 1 For the default measurement range of ±1,250 µStrain or ±200 °C; see Page 3 for detailed timing information
- 2 Minimum gage length is achievable using the largest measurement range, having a single-scan repeatability of ±17.0 µStrain or ±2.0 °C
- 3 Accuracy maintained by an internal NIST-traceable HCN gas cell
- 4 Temperature and strain measurements are calculated from the spectral shift of scattered laser light. Using the default conversion coefficients of 1 GHz = 0.8 °C = 6.58 µStrain, the accuracy of temperature and strain are 0.15°C and 1.25 µStrain. [Othonos and K Kalli, Fiber Bragg Gratings (Artech House, Boston, 1999)].
- 5 For the default gage length of 1 cm
- 6 Based on material properties of the standard sensor: polyimide-coated, low-bend-loss optical fiber. For temperatures up to 800°C, contact Luna.

CLASS 1 LASER PRODUCT

MEASUREMENT TIMING INFORMATION

In the figures below, the acquisition times versus measurement ranges are compared for the ODiSI A10 and A50 instruments. A single acquisition acquires all the data necessary to calculate strain or temperature anywhere along the fiber sensor.

