The Eagle Array
Pipeline Integrity: Remote Condition Monitoring

Tradition

We specialize in the fabrication of innovative ultrasonic sensors and multi-paramenter sensor networks for monitoring the mechanical integrity of piping, tanks, pressure vessels, and pipelines. We bring innovative technologies to the market that provide a positive environmental beneft, protect personnel, and ehance current and future energy resources. 35 years of worldwide commerical NDT services, installations, and applications.

Overview

Eagle Array™ systems are configured in single or multi-sensor, low-profile packages that operate above or below ground, submerged and in harsh environments. In addition to condition monitoring, the Eagle Sentry™ system provides the user with a host of environmental monitoring variables. Unprecedented performance flexibiity allows the Eagle arrays to accomodate a wide range of user communication requirements and data management demands.

Our rugged and reliable ultrasound sensors monitor unusual events, remotely, on pipelines and piping components, pressure vessels, heat exchangers and tanks. We allow the user to focus on analysis and prediction: material integrity, environmental variables and process operations. The Eagle Array™ represents cutting edge technology, easily accessible with features that significantly reduce cost, improve facility safety and ease the burden on the operator. Benefits that are compounded daily.

Power

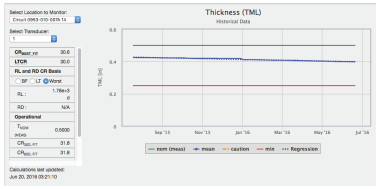
Our clients have the opportunity to choose between the following power options:

- 110/240 VAC
- Instrumentation DC power
- Solar power/battery
- Power over Ethernet (POE)

Connection

Two ways to connect:

- Plug-n-play
- Wireless:
  - Wi-Fi
  - Cellular Network
  - Local Mesh Network



Location

Our sensors can be configured in the following types of areas:

- Above/below ground
- Challenging data connection and transferlocations
- High elevations
- Hazardous locations
- Off-shore/On-shore

Implementation

No pipe size limitations; elbows, transitions, valves, reducers can all be monitored

Sensor Tasks

- Monitor material thickness
- Monitor pit growth
- Track flaws and cracks
- Identify and track corrosion rates
- Measurement accuracy of +/- 0.0004 inches
- Store measurement history of A- and B-scans, always accessible to the user
- Capture readings on demand or on an established reporting schedule

© 2016 Berkeley Springs Instruments LLC.
14901 Uhl Hwy, SE Cumberland, Maryland 21502 | (301) 722-2260
bsisentry.com | sales2@bsisentry.com

The Eagle Array
Pipeline Integrity: Remote Condition Monitoring

Temperature

Measurement:
-40°C - 232°C
-40°F - 450°F
Storage:
-40°C - 125°C
-40°F - 257°F
Operating Enclosure:
-10°C - 60°C
14°F - 140°F
Humidity: 5% - 90%
Altitude: 12,000 feet (3657.6 m)

Electrical

- **Solar powered/battery backup (Model 1000):** Two 6V, 13 AH batteries.
- **120 VAC powered (Model 3000):** 15 AmpLithium battery options available
- **Normal Operating Current:** 240 milliamp @ 12 volts DC
- **UT Current:** <20 milliamp per UT pulse
- **Temp/Humidity Current:** 180 uA
- **Vibration Sensor Current:** 1000 uA - 46mA
- **Wi-Fi Communications current:** 250 mA

Vibration Monitoring

- **Measurement Range:** -70 - +70g
- **Sensitivity:** 19.073 microg/LSB (Least Significant Bit)
- 22 kHz Resonance Frequency
- 100.2 Thousand Samples per Second Sample Rate
- 2-Axes Data Transmission

Dimensions

- **Transducer Mount:**
  Length: 2.0 in. | 50.8 mm
  Width: .75 in. | 19.05 mm
  Height: 1.0 in. | 25.4 mm
- **Transducer Diameter:**
  .375-0.5 in | 9.525-12.7 mm
- **Array Shroud:**
  Length: 2-18 in | 50.8-457.2 mm
  Diameter: dependent on pipe diameter
  Weight: 1-3 lbs. | 453.6.6-1,360.8 grams
- **Enclosure:**
  Length: 15.75 in. | 400.05 mm
  Width: 15.75 in. | 400.5 mm
  Diameter: 7.87 in | 199.898 mm
  Mounting Post (Di.): 4 in. | 101.6 mm
- **Solar Panel:**
  Length: 21.02 in. | 533.908 mm
  Width: 26.57 in | 674.878 mm
  Height: 1.18 in | 29.972 mm
  Weight: 10.25 lbs. | 4.649 kg

Safety Certification

- Model 1000 (Battery/Solar) is suitable for use in Class 1, Division 2, Group D or unclassified locations
- Model 3000 (120 VAC) is suitable for use in Class 1, Division 2, Group A, B, C, D & unclassified areas
- UL 60950-1
- CSA 22.2 No. 60950--1
- EN 60950

Thickness Measurement

Material Thickness Measurement Modality: Ultrasound
Ultrasound Center Frequency: 500kHz - 5 mHz
Pulse: Broadband or narrow band pulse echo
Transducer Type: Piezocomposite, Lead Zirconate Titanate, or Lead Metaniobate
Thickness Resolution: Approx. +/- 0.001 in. (frequency dependent)
Ultrasonic Imaging Area: .250 - .625 in. per transducer (size dependent)
Sensor Population: 8 typical - 100+
Transducer to Metallic Surface Coupling: Elastic Non-conductive silicon
Sampling Rate: 35 - 140 MHz
A-Scan Samples: 2,500

Connectivity

Wired Internet Protocal: TCP/IP
Wireless RF Mesh Protocol: DigiMesh (2.4 gHz/900 mHz)
Max Data Rate: 54 Mbps
Wi-Fi Protocol: 802.11 a/n or 802.15.4
Wi-Fi Range: <=400 feet w/ repeaters
900 mHz Range: 40 miles (line of sight)

Encryption

All networks can be equipped with the following security protocols:

- Wireless Equivalent Privacy (WEP)
- Wi-Fi Protected Area (WPA)
- Wi-Fi Protected Area II (WPA2)
- Wi-Fi Protected Area Enterprise (WPA E)

© 2016 Berkeley Springs Instruments LLC.
14901 Uhl Hwy, SE Cumberland, Maryland 21502 | (301) 722-2260
bsisentry.com | sales2@bsisentry.com