SENSOR ®
NETWORKS, INC
Inspection, Testing & Asset-Integrity Solutions

smart
PIMS ® 2.0
Permanently Installed Monitoring System

Wired or Wireless Non-Intrusive UT Sensors for Corrosion/Erosion Monitoring

Sensor Networks' smartPIMS® 2.0 is the next generation system for non-intrusive ultrasonic corrosion/erosion monitoring of critical assets. The smartPIMS 2.0 boasts a variety of connectivity options for optimal utilization of thickness data via local PC, SCADA/DCS , or wireless transmission to IoT analysis systems.

Choose from:

- Mod-Bus
- Datalogger
- LoRaWAN
- Cellular

Gateway & Antenna

From Left:
RS-485 Cable, Armored Temp-Sensor Cable, 8 Armored UT Sensor Cables

Monitor Corrosion Rates

With resolution to 0.001" (0.025mm) • of high-risk areas where entry and access is difficult and costly • of historically problematic locations

Monitor Low Spots

From post-NDE screening of pits to monitor remaining thickness for fitness for service • of thickness down to 0.040"

Replace/Augment Intrusive Methods

With validation of coupons, ER probes, and other types of systems • With time stamped thickness data for process change correlation

Reduce Costs

With elimination of continued scaffolding maintenance and repeating insulation removal and refitting • Per reading with increased frequency of data at no additional cost

Rugged design for outdoor use and installation in harsh industrial environments.

Use in Upstream, Midstream or Downstream environments.

Supports up to 8 dual element sensors (up to 275°F/135°C) or up to 16 Ultra-High-Temp (up to 932°F/500°C) sensors per system.

Optional single thermocouple connection for measuring surface temperatures and post-calculation temperature-compensated thickness readings.

Highly stable readings as sensors do not move and thickness measurements made at same exact location time and time again.

UL/CSA C1D2, ATEX / IECEx Zone 2 and Japanese hazardous-area certified.

Modbus

smartPIMS 2.0 Modbus system connects directly to a PC or laptop to take on-demand thickness readings, store them on the local PC in SNI dataPIMS software and optionally upload to SNI webPIMS backend application for databasing of data and predictive analysis.

The system can also be wired directly into a SCADA/DCS system for polling at any user defined time integral. New thickness data can be read via standard Modbus commands and displayed on local consoles or ported to company backend systems. Use Modbus for:

- Infrequent data collection (mid-stream applications).
- Hardwiring to a plant's control system (downstream or offshore).
- Service companies collecting data (refineries).
- Manual data collection (power generation).

Datalogger

smartPIMS 2.0 Datalogger system is equipped with an onboard battery and system memory enabling the storage of up to 3,000 thickness readings. The system can be programmed to obtain thickness values on a user defined schedule and store all the data onboard. Users connect to the unit's sealed military style connector via DIU adapter and tablet/PC using dataPIMS software.

Data is downloaded to the tablet/PC where it is stored and available in XML or CSV (Excel) file format. Data can also be uploaded to SNI webPIMS backend application for databasing of data and predictive analysis. Use Datalogger for:

- Applications where frequent measurements are required, but wireless infrastructure is not available.
- Scheduled measurements are required, and access is difficult or remote.

Connects via Modbus (RS-485) **to tablet/PC or SCADA/DCS.**

dataPIMS software outputs data to XML or CSV file, or can be uploaded to webPIMS

Maintains 1 mil (0.001" / 0.025mm) **precision for minimun wall thickness of 0.040"** (1mm**) for duals and 0.125"** (3mm) **for delay-line.**

Offers 16 single- or 8 dual-element UT probe channels.

Dual-Element UT Sensors

Ultra-High-Temp UT Sensors attached with stud welded clamp

Modbus

|	
model no.	smartPIMS® Modbus
protocol/communication	Modbus / RS-485, 2-wire, max. 1000' (305m)
power	10-24 VDC

Datalogger

model no.	smartPIMS® Datalogger
protocol/communication	Modbus / RS-485, 2-wire, max. 1000' (305m)
battery type	Li D-cell, 3.6 VDC, qty. 2
battery life	2 years (typical, based on 1 readying/day)
storage capacity	3000 readings (FIFO)

Enclosures

type	instrumentation housing
material	cast aluminum
rating	NEMA 4X, IP66
temperature range	-40°F to + 158°F (-40°C to +70°C)
weight	5.5 lbs. (2.5 kg)

UT Systems

channels	16 ultrasonic, 1 temperature
pulser voltage	±5V bipolar square wave
analog frequency	1–10 MHz (-3dB)
gain	-10dB to +70dB
digitizer frequency	40 Msps

[10.24in] 260mm

[11.81in] 300mm [6.30in] 160mm

[3.49in] 88.6mm

[4.60in] 116.8mm
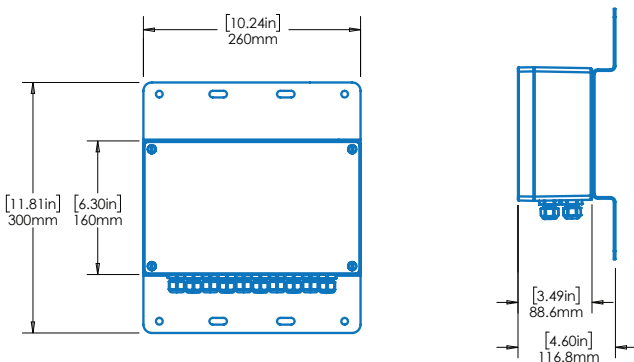
LoRaWAN

Coming Soon

smartPIMS 2.0 LoRaWAN system is equiped with an onboard battery and LoRaWAN radio modem for data transfer to a LoRaWAN Server via ~900MHz wireless transmission. Sensors can be placed over 1 mile from LoRaWAN gateway receivers in most industrial settings. The system can be programmed to obtain thickness values on a user-defined schedule and transmit data through an SNI supplied LoRaWAN gateway to SNI webPIMS cloud-based backend application for databasing of data and predictive analysis or using an on-prem data collection webPIMS system. The system also can be connected to customer provided LoRaWAN systems and networks where data can be routed, decoded, and displayed/stored on corporate systems. Use LoRaWAN for:

- Facilities where multiple systems are used.
- Installations having existing LoRaWAN networks and/or corporate data systems in place.
- Situations where data is to be kept locally using a secure on-prem data management system.

Dual-Element UT sensors with optional SS cable jacket
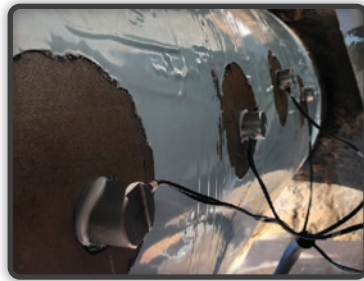
Dual-Element UT sensors on buried pipeline

Cellular

smartPIMS 2.0 Cellular system is equipped with an onboard battery and an LTE-M/Cat M1 cellular modem for data transfer to the interenet via cellular data connectivity. The system can be programmed to obtain thickness values on a user defined schedule and transmit data to SNI webPIMS backend application for databasing of data and predictive analysis. *Adequate cellular network coverage is required. Use Cellular for:

- Frequent data collection to resolve corrosion-rate or pitting issues.
- Quick, easy installation—termporary or permanent.
- Areas difficult or expensive to access and not conducive to manual data collection.

Cellularly transmits data to webPIMS™.

Operates on battery (5-7 years at 1 reading/day).

Maintains 1 mil (0.001" / 0.025mm) **precision for minimun wall thickness of 0.040"** (1mm) **for duals and 0.125"** (3.2mm) **for delay-line.**

Easy integration into existing LoRaWAN infrastructure.

LoRaWAN

model No.	smartPIMS LoRaWan
type	Standard LoRaWAN communication protocol
loRa channel bands	US/EU/AS/AU/JP and others
connectivity	Gateway to cloud
loRaWAN Networks	SNI webPIMS, On-Prem, or private LoRaWAN network
battery Life	5yrs @ 1 reading/day (68°F/20°C)

Cellular

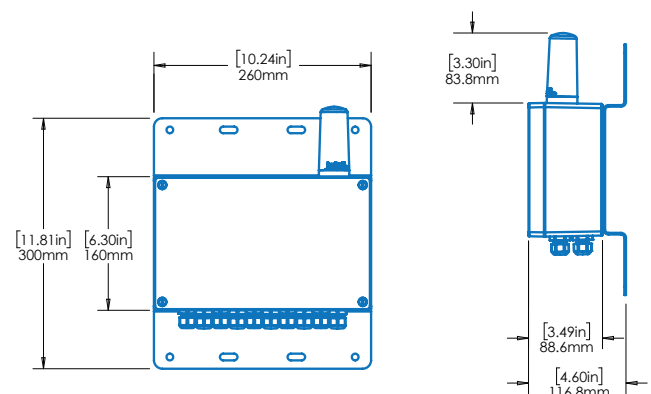|	
model no.	smartPIMS® Cellular
type	cellular (3G/CAT M1-LTE)
encryption type	secure socket layer (SSL)
battery type	Li D-cell, 3.6 VDC, qty. 2
battery life	5yrs @ 1 reading/day (68°F/20°C)

CE ⟨Ex⟩ II3G Ex ec ic IIC T4 Gc, Ta = -40°C to +70°C
CML 17ATEX3309X | IECEx CML17.0172X

MET NRTL LISTED
Class I, Div 2, T4, Grps A-D
Class I, Zone 2, AEx/Ex ec ic IIC T4 Gc
Ambient Range -40°C to +70°C
E114158 - Hazardous Location

WARNING: USE ONLY TADIRAN TL-5930, SL-2780 OR XENO XL-205F BATTERIES
WARNING: SPECIAL CONDITIONS FOR SAFE USE, SEE INSTRUCTIONS
WARNING: DO NOT OPEN WHEN AN EXPLOSIVE ATMOSPHERE IS PRESENT
AVERTISSEMENT: UTILISEZ UNIQUEMENT DES ACCUMULATEURS TADIRAN TL-5930, SL-2780 OU XENO XL-205F
AVERTISSEMENT: CONDITIONS PARTICULIÈRES POUR UNE UTILISATION SÉCURISÉE, VOIR LES DIRECTIVES
AVERTISSEMENT: NE PAS OUVRIR LORSQU'UNE ATMOSPHÉRE EXPLOSIVE EST PRÉSENTE

IP 66
DC POWER OPTIONS: 10-30 Vdc ▬ ▬ 2W
BATTERY OPTION: 7.2Vdc ▬ ▬ ▬

[10.24in] 260mm

[3.30in] 83.8mm

[11.81in] 300mm

[6.30in] 160mm

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[4.60in] 116.8mm

Sensor Networks dataPIMS software connects to the smartPIMS instrument and provides users the ability to commission the system for accurate ultrasonic thickness measurements, setting shot time intervals and system hierarchy naming. dataPIMS also includes basic data management capabilities for modbus and datalogger smartPIMS units with storing of thickness data in XML or common CSV file format for easy use in MS-Excel software.

PC/Tablet Requirements

performance	processor	Intel i5-4200U 1.6GHz w/ 3MB L3 cache (dual-core)
	memory / storage	8 GB RAM / M2-SATA SSD, 64 GB
	operating system	Windows 10/11
connections	. . . .	network power, data via RS-485-to-USB adapter
physical	drop/shock resistance	MIL-STD-810G

UT Sensors

Temperature Sensor

Ultra-High-Temp Delay Line

transducer cable

type . . . . coaxial, ⅛" dia. or dual coax cable ¼" dia.
maximum length to transducer . . . . standard 10' (3.0m) and 25' (7.6m), custom to 50' (15.2m), SS armor jacket optional

sensor specifications

	dual-element contact	delay-line contact	temperature sensor
model	XD-301	XD-201	
application	severe pitting	ultra-high-temp	N/A
frequency	5 MHz	7 MHz	N/A
active area (dia.)	0.375"/10mm	0.375"/10mm	N/A
overall (dia. x h)	0.75 × 0.75" 19 × 19 mm	0.8 × 2.25" 20.3 × 57.2 mm	0.062" × 18" 1.57 × 457.2 mm
# of transducers	1–8	1–16	N/A
resolution	0.001"/0.025mm	0.001"/0.025mm	N/A
thickness range†	0.040–4.0" 1.0–100mm	0.125–1.0" 3.0–25.0mm	N/A
temp range	-40 to +275°F -40 to +132°C	-40 to +932°F -40 to +500°C	-40 to +932°F -40 to +500°C
attachment	magnet/adhesive or temporary	mechanical clamp/ gold foil	

†minimum resolutions stated as typical values, but will vary with pipe condition

High-Temp Dual Element

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