Eddyfi Technologies
Beyond current

SMARTPIMS 2.0

Multi-Point. Non-Intrusive. Robust.

smartPIMS® 2.0 is the next-generation system for non-intrusive ultrasonic corrosion/erosion monitoring of critical assets.

ENHANCED CONNECTIVITY AND MULTI-POINT MONITORING

The smartPIMS 2.0 offers a variety of connectivity options designed to provide an optimized solution for any application. Each multi-point monitoring system can connect up to 16 ultrasonic sensors to provide enhanced coverage of known critical and problematic locations. Data can be collected manually or cellularly to webPIMS™ software for databasing, trending, and analysis.

Features and benefits:

- Rugged design for outdoor use and installation in harsh idustrial environments.
- Use in upstream, midstream or downstream environments.
- Supports up to 8 dual element sensors (up to 135°C/275°F) or up to 16 Ultra-High-Temp (up to 500°C/932°F) sensors.
- 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.

smartPIMS is a multi-point, corrosion and erosion monitoring system. Using traditional ultrasonic technology, smartPIMS sensors take thickness measurements at user-defined intervals, down to 1 mil (0.025mm/0.001in) accuracy, providing consistent and accurate data for critical and known at-risk locations.

CONNECTIVITY OPTIONS

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

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 Eddyfi Technologies dataPIMS software and optionally upload to 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 schedule. New data can be read via standard Modbus commands and displayed on local consoles or ported to company backend management systems. Use Modbus for:

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

DATALOGGER

Datalogger 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 data on a user-defined schedule and store all the data onboard. Users connect to the unit via DIU adapter and table/PC using dataPIMS software. Data is downloaded and available in XML or CSV (Excel) file format or uploaded to webPIMS backend software for databasing, trending, and 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.

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 internet via cellular data connectivity. The system can be programmed to obtain thickness values on a user-defined schedule and transmit data to 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 — temporary or permanent.
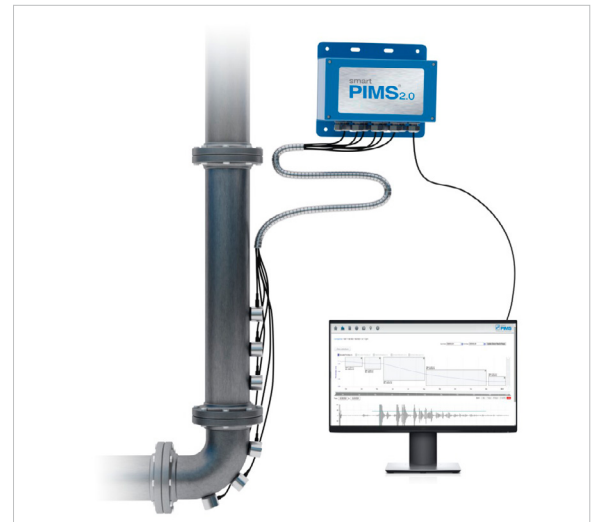- Areas difficult or expensive to access and not conducive to manual data collection.

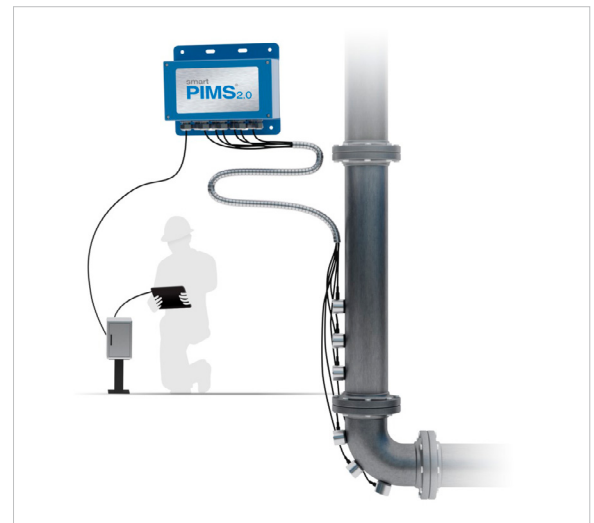**Figure 1:** smartPIMS 2.0 connected via Modbus (RS-485) to table/PC or SCADA/DCS.

Figure 2: User connecting to smartPIMS Datalogger via DIU adapter and table/PC using dataPIMS software.

Figure 3: smartPIMS 2.0 Cellular transmits data directly to webPIMS.

DISCOVER THE ADVANTAGES OF SMARTPIMS

Efficient, cost-effective solutions for enhanced data collection

Eddyfi 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 as shown in **Figure 4**. 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.
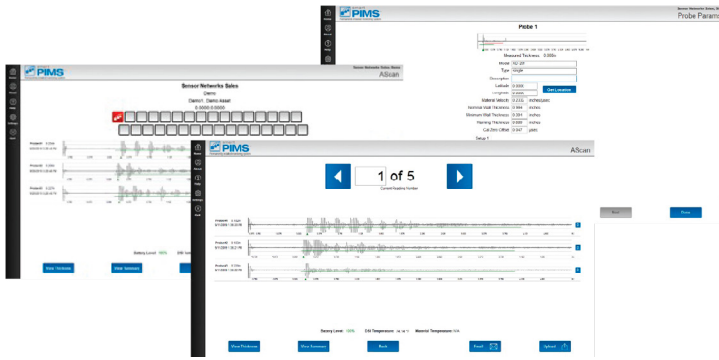

Figure 5: Dual element UT sensors.

Figure 7: High-temp dual element sensors.

Figure 4: Screenshot of dataPIMS software where thickness, temperature, and other data is stored.

UNLOCKING THE BENEFITS OF SMARTPIMS

- **Fast and consistent data readings:** For applications where frequent data is required to monitor corrosion/erosion rates.

- **Corrosion monitoring:** smartPIMS can be installed permanently or temporarily, allowing for short or long term data collection and monitoring.

- **Automatic and hands-free monitoring:** Once installed, smartPIMS can take thickness readings at user-defined intervals, allowing for more frequent data without the cost of manual inspections.

- **Easy installations:** With magnetic and clamp-style attachment options available, smartPIMS are easy to install - without sacrificing performance and accuracy.

- **Reduced costs:** Minimize scaffolding and insulation removal/refitting costs for internal corrosion monitoring.

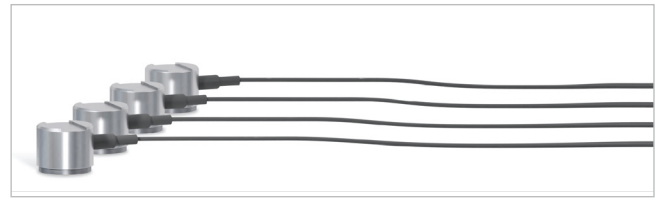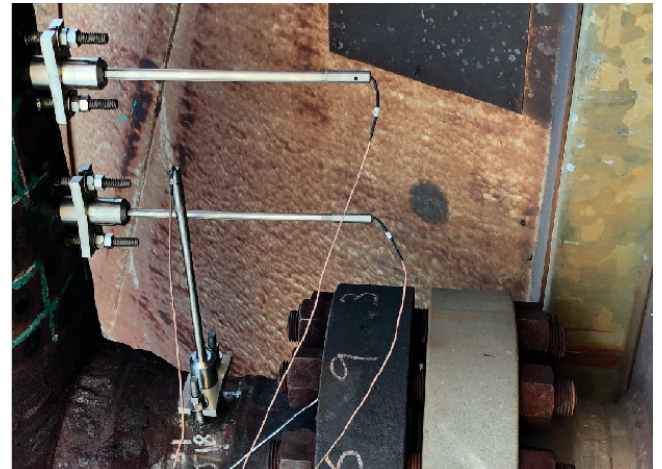**Figure 8:** Ultra-High-Temp UT Sensors attached with stud welded clamp.

Figure 9: Dual-Element UT sensors with optional SS cable jacket.

SPECIFICATIONS

TRANSDUCERS		XD-301 (DUAL-ELEMENT)	XD-201 (DELAY-LINE)
Application		Severe pitting	Ultra-high-temp
Frequency		5 MHz	7 MHz
Active area (dia.)		10 mm (0.375 in)	10 mm (0.375 in)
Overall (W x H)		19 x 19 mm (0.75 x 0.75 in)	20.3 x 57.2 mm (0.8 x 2.25 in)
Number of transducers		1-8	1-16
Resolution		0.025 mm (0.001 in)	0.025 mm (0.001 in)
Thickness range*		1.0-100 mm (0.040-4.0 in)	3.0-25 mm (0.125-1.0in)
Temperature range		-40 to +132°C (-40 to +275°F)	-40 to +500°C (-40 to +932°F)
Attachement		Magnet/adhesive or temporary	Mechanical clamp/gold foil
Transducer cable	Type	Coaxial, 3.18 mm (0.125 in) in dia. or dual coax cable 6.35 mm (0.25 in) in dia.	
	Maximum length to transducer	Standard 3.0 m (10 ft) and 7.6 m (25 ft), custom to 15.2 m (50 ft), SS armor jacket optional	

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

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

MODBUS

Model number	smartPIMS® Modbus
Protocol/communication	Modbus/RS-485, 2-wire, max. 305 m (1000 ft)
Power	10-24 VDC

DATALOGGER

Model number	smartPIMS® Datalogger
Protocol/communication	Modbus/RS-485, 2-wire, max. 305 m (1000 ft)
Battery type	Li D-cell, 3.6 VDC, qty. 2
Battery life	2 years (typical, based on 1 reading/day)
Storage capacity	3000 readings (FIFO)

CELLULAR

Model number	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 (20°C/68°F)

ENCLOSURE

Type	Instrumentation housing
Material	Cast aluminum
Rating	NEMA 4X, IP66
Temperature range	-40°C to 70°C (-40°F to 158°F)
Weight	2.5 kg (5.5 lbs)

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

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

NRTL LISTED MET c us
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 ▬ ▪ ▬ ▪

Eddyfi Technologies
Beyond current