



Industrial Asset Surveillance System

Polaris

PaneraTech Inc.

Tel +1 (703)719-9666

Email: info@paneratech.com

www.paneratech.com

4125 Lafayette Center Drive, Ste 200 Chantilly, VA 20151 USA | p: +1 . 703 . 719 . 9666

paneratech.com



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IMPORTANT NOTICES

Copyright Notice

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Compliance

FCC Compliance Statement

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by PaneraTech, Inc. could void the user's authority to operate the equipment.

This UWB device may not be employed for the operation of toys. Operation onboard an aircraft, a ship or a satellite is prohibited.

Supplier's Declaration of Conformity 47 CFR § 2.1077 Compliance Information

Products: Industrial Asset Surveillance System Polaris

Responsible Party:

PaneraTech, Inc.

4125 Lafayette Center Drive, Suite 200

Chantilly, VA, 20151, USA

paneratech.com, +1 (703) 719-9666

FCC 15.105 Statement:

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.



RF Exposure Statement:

1. This Transmitter must not be colocated or operating in conjunction with any other antenna or transmitter. 2. This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 centimeters between the radiator and your body or nearby persons.

General

This instrument, or family of instruments, will not be permanently damaged by reasonable electrostatic discharge and has been tested in accordance with EN 301 489-33. However, in extreme cases temporary malfunction may occur. If this happens, the unit will indicate equipment failure error and alert PaneraTech, Inc. staff.

ETSI Regulations for the EC

In the European Community (EC), UWB wall imaging radar instruments must conform to ETSI (European Technical Standards Institute) standard EN302066. Details on individual country requirements for licensing are coordinated with this standard. This product is tested to ETSI standards and found to comply with EN302 066 and EN 301 489.



Industrial Asset Surveillance System Polaris

The Industrial Asset Surveillance System, Polaris, by PaneraTech, Inc. is used to monitor the security and safety of industrial assets such as glass furnaces, steel melting furnaces and other assets using fixed ultrawideband sensors attached to the asset walls. The system regularly performs surveillance of the assets to determine if there is any molten material penetrating through the walls of these furnaces, how much remaining wall thickness and alert operators for any potential leaks which may result in dangerous conditions at the factory and major disruptions in production.

Features

- Continuous surveillance of refractory anywhere on the asset using UWB sensors installed on the refractory.
- Sensors operate at higher temperatures (1000 °C and higher) indefinitely.
- Can be installed anytime during the asset campaign.
- Online asset monitoring via PaneraTech's XSight asset monitoring system.

All hardware components are supplied and installed by PaneraTech, Inc. There is no customer interaction with the devices. All results are analyzed and reported via the XSight platform.

Devices

The complete system consists of a control unit, optional external switch modules to multiply the total number of attached sensors, and the sensors installed on the refractory which are connected to the control unit using high temperature coaxial cables.



Control Unit (CCU)



Switch Module (SSM)



Routing Cables



RTS Sensor



INS Sensor



Installation of System

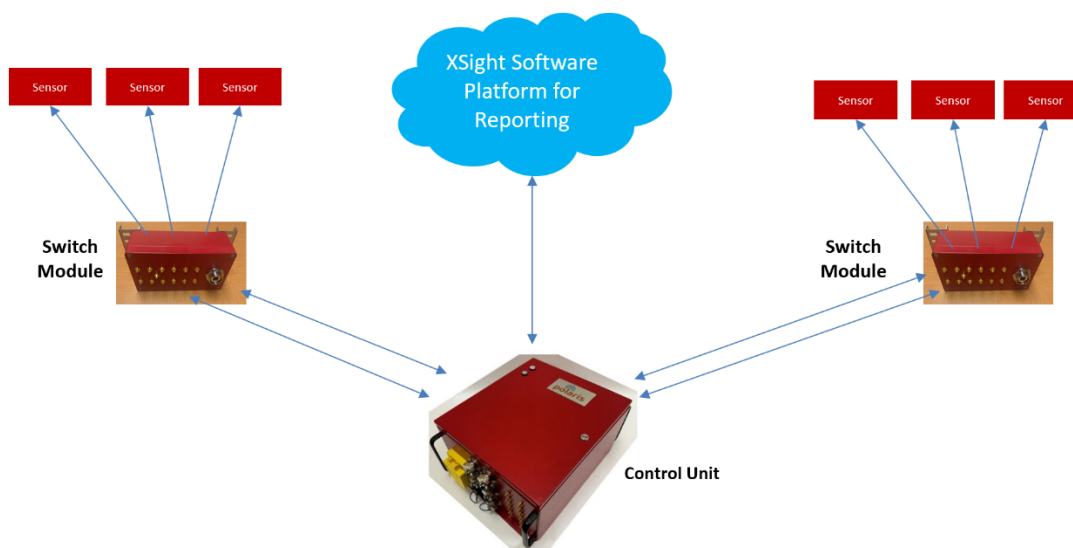
All equipment is supplied by PaneraTech, Inc. and installed by the professional installation team. Exact locations of each component and mounting requirements will be determined by the PaneraTech team.

System and Operational Overview

The Polaris system is designed to have no user operational controls or adjustments except by PaneraTech professional staff. The complete system and configuration as installed on the asset is designed by PaneraTech.

In the system, the control unit houses all control electronics for the system to operate and perform the surveillance functions. The electromagnetics-based sensors are placed on the asset refractory or insulation. During operation, the control unit communicates with each sensor to obtain surveillance data about the refractory health of the asset on a regular basis. This communication is done either directly via cables to the sensors or via switch modules that expand the number of possible connected sensors to the control unit. The regularity of which the control unit obtains asset information is configured only by PaneraTech staff.

After the data is collected, it is sent to the XSight servers for processing and reporting. The user may review the results for the asset on this platform.

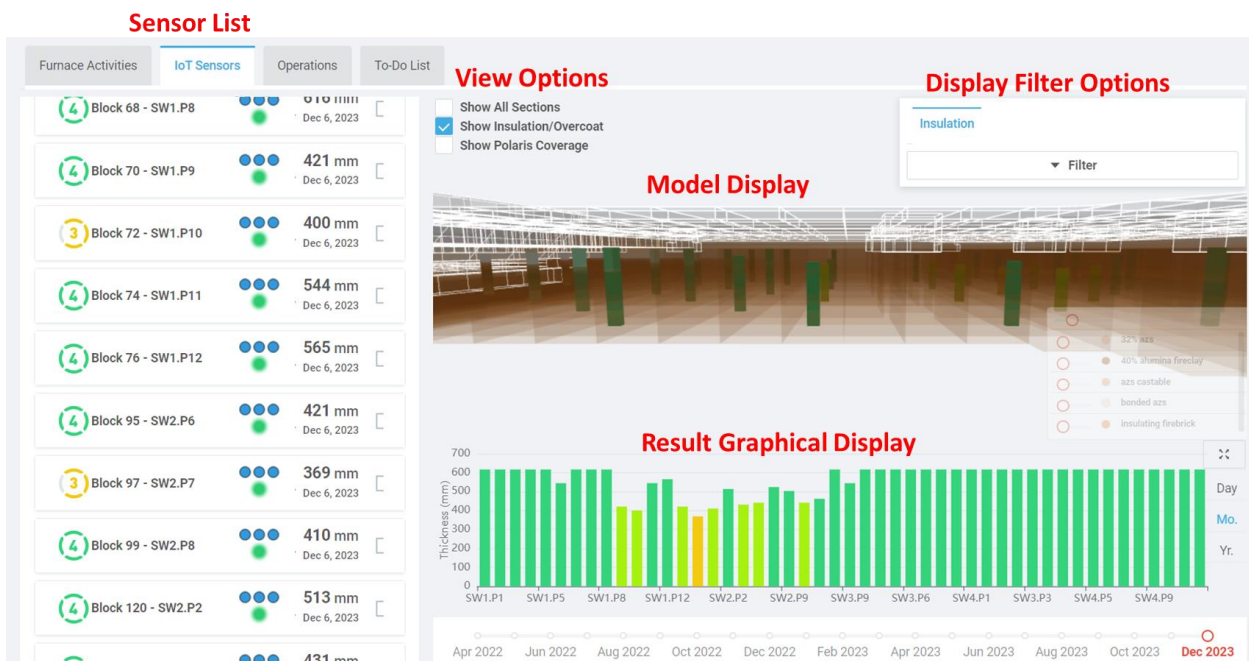




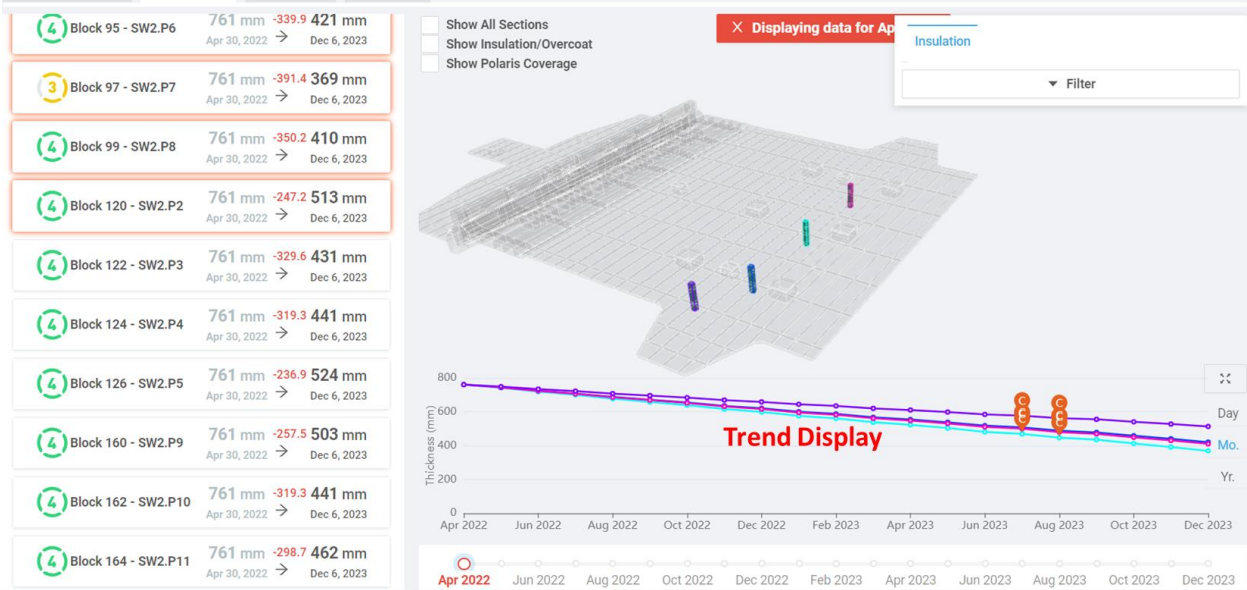
XSight For Viewing Results

The Industrial Asset Surveillance System results are viewed in PaneraTech’s XSight system. This is where the end-user will interact with the results. The end-user has the capability to view these results in different ways and will not control how the surveillance data is obtained. The site is accessible, with proper user credentials which will be set up between PaneraTech and the end-user, at <https://xsight.paneratech.com>.

The actual results are shown on a three-dimensional model of the asset under surveillance. This display for a demonstration asset is shown below. On the left, the sensor list contains a listing of all the sensors in a selected area of the asset. Each sensor will show the thickness of the refractory that it is currently observing and if there is any molten material that is penetrating through these walls. On the right side of the screen, the model display shows all locations and graphically shows the results of the surveillance and if there is any penetration through the walls. Current results are also shown in the graphical display on the lower side, where all sensor results are shown together. The way the results are observed in this mode can be changed in the display filter options area and the view options area.



By click on one or several sensors, trending data can also be shown, as demonstrated below. Sensors can be selected by clicking them on the list, or on the model itself. The trends and changes will then be shown in the results graphic display on the bottom as trend lines for each sensor.



Different areas, including asset bottom and sides may be selected in the tab at the top of the screen as shown below. The results are presented in a similar fashion as the bottom results shown above.

