

WIRELESS TRANSMISSION TECHNOLOGY



IsyMap (Instrumentation SYstems for MAPping), a company located near the Marcoule nuclear site in France, has been developing technological bricks that can be embedded in systems for remote, wireless, all-terrain and real-time measurement.

Since 2016, their expertise has allowed them to successfully offer a wide range of radiological, chemical and physical measurement solutions to cater for the bespoke requirements of their customers from the nuclear, security and defence sectors. Covering monitoring, investigation as well as mapping purposes in a variety of environments and constraints, we are here focusing on one specific type of technology offered by IsyMap.

IS THIS YOUR CHALLENGE ?

Here's a common challenge across industrial sites...

How to wirelessly transmit near real-time data from existing detector with as little modification as possible to the current infrastructure?

A key business operation (and a requirement) within nuclear site is to ensure the availability of trustworthy and representative data. Rarely automated and sometimes setup in difficult environment, regularly manually retrieving data from sensors is demanding.

Often, retro-fitting solutions to give the ability to remotely interrogate and control devices do call for costly changes to infrastructure and layout.

Here, IsyMap technological bricks can be adapted to solve these challenges and provide cost-efficient solutions to extract, transmit and centralise data wirelessly from the most extreme or constrained environments found on a nuclear site. IsyMap is also setup to develop the radiological, electrical, mechanical and software part to offer a complete solution to your challenge.



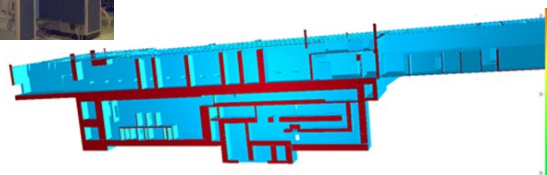
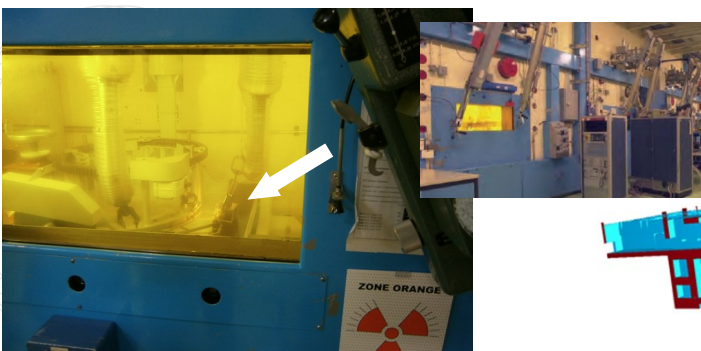
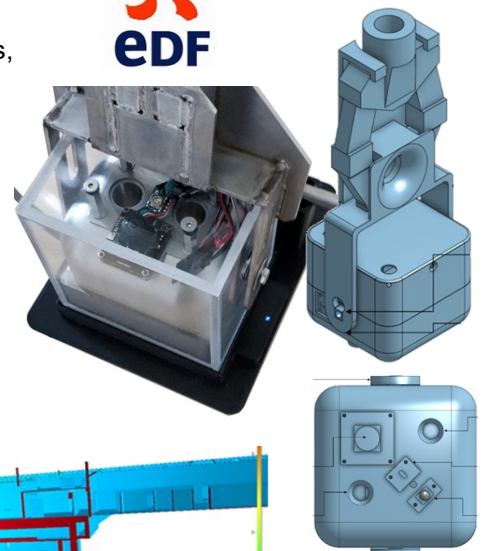
USER CASE 1

EDF - Remotely operated analysis and processing station - CHINON (FR)

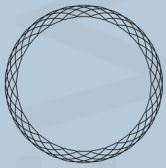
CHINON - HA Inspection Cell

CHINON - Deactivation pool inspection

- Mobile analysis and processing station for visual and radiometric analysis,
- Dose rate and gamma spectrometry,
- On-board telemetry and odometry,
- On-board camera and lighting,
- Positioning by telemetry and odometry visualised via 3D cartography modelling,
- Remote control of the probe and acquisitions,
- Corrections and real-time processing.



USER CASE 2



INTECHBREW

...another user case revealed in the March newsletter...

THE TECHNOLOGIES



Wireless transmission technologies which are at the heart of Isymap's products, from off-the-shelf (COTS) to bespoke solutions that can match your requirements.

Here are three examples of technologies often considered for data transmission (although Isymap has access to other wireless solutions to answer any project's specifications):

- BLE (2.4 GHz): short range (up to 20 m), very low consumption, usable without point-to-point infrastructure and compatible with many commercial devices.
- Wifi (2.4 GHz): medium range (up to 100 m), has the major advantage of being compatible with many existing infrastructures and a significant bandwidth.
- LoRa (860 to 1000 MHz): long range (up to 10 km), low consumption, limited bandwidth but very suitable for connected sensors.

In order to be able to adapt our solutions to the needs of customers, Isymap have optimised their electronic cards around these wireless transmission technologies to minimise their size (typically 40 x 40 x 5 mm) and power consumption. The autonomy of these systems ranges from a few hours to a few years depending on the constraints of the system.

But that's not all, Isymap nuclear expertise has allowed for their technologies to be use in many different types of environments. For instance:

High Activity Cells, e.g., Wifi communication for video investigation with relay in cell or LoRa communication for telemetry without relays with penetration through reinforced cement up to 3 meters thick.

Glove boxes, e.g., real-time (1 to 10 Hz) and wireless (LoRa) high reliability retransmission of data from existing battery-powered sensors.

Particle accelerator, e.g., deployment of a temporary LoRa network to connect fixed and mobile sensors within a shielded installation to achieve transmission through the concrete structure and complete coverage of the facility.

In-situ core analysis, e.g., LoRa transmission of gamma spectrometry data from coring hole through concrete wall (5 to 10m thick).

Isymap are also conscious of the concern for data security and all communications are end-to-end encrypted using AES256 encryption in order to guarantee the highest level of confidentiality of the data transmitted by our systems.

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