Case Study

TTK WATER LEAK DETECTION SYSTEM

PROJECT BACKGROUND

HOULD LEAK DETECTION SYSTEMS

Synchrotron SOLEIL is a cutting-edge pluridisciplinary scientific research laboratory near Paris. More concretely, SOLEIL is a particle (electron) accelerator that produces the synchrotron radiation, an extremely powerful light that permits exploration of inert or living matter. Shareholding of two French national research agencies (CNRS and CEA), Synchrotron SOLEIL, the french national synchrotron facility, is a service platform open to scientific and industrial communities from France and abroad since 2006.

The experimental facilities of a synchrotron radiation laboratory are called "beamlines." They consist of one or several successive cabins where the light beam is propagated from the storage ring and directed toward the samples being studied.

Synchrotron SOLEIL Research Centre Photo source: https://www.synchrotron-soleil.fr/fr

PROJECT OVERVIEW

Project	Synchrotron SOLEIL
Location	Essonne, France
Application	Laboratory, Research Centre, Particle accelerator
Project Type	New Project and Extension
Project managed by	TTK France
Contract Scope	TTK assures engineering, material delivery, final testing & commissioning of the leak detection systems.
Completion Date	August 2022
Technology	Digital monitoring unit FG-NET, satellite device FG-RELAYS, chemical/water sensing cables from the FG-AC range.

PROJECT REQUIREMENT

The laboratory and the beamlines are critical infrastructure, very sensitive to the abnormal presence of water or any dangerous liquid. In order to be alerted and react as soon as possible in case of leakage, a TTK digital leak detection system was installed in 2016. Since then, new independent equipment and centralized apparatus have been added. Today, the client wishes to upgrade the existing TTK system to harmonize all.

TTK'S SOLUTIONS

FG-NET System Overview

TTK France recommended a fully digital leak detection system composed of a powerful monitoring panel (FG-NET) and a series of addressable chemical/water sensing cables (FG-AC).

Specifically designed for the laboratory application, the sensing cables are installed along each beamline. Every sensing cable communicates digitally its real-time status to the control panel, thanks to the embedded microcontroller on the cable.

In the event of a liquid leak detected on a sensing cable, an alarm is instantly triggered and displayed on a dynamic map on the monitoring panel. The latter pinpoints the precise location of the leak to 1 metre. At the same time, TTKweb®, the dedicated leak management software displays the details of the event on a security station computer. An alerting SMS, sent by the client's internal software, reaches all the hall coordinators.

Today, the client wishes to reduce even more intervention time. In the event of a leak, it is required now that a flash/buzzer on the affected beamline gives immediate visual and audible alert in addition to the existing alarms. Therefore, six external relay boxes (FG-RELAYS) are added to the existing system. They allow the system to light beacons, trigger buzzers, and other external devices. The extension work is simple, for the relay boxes are connected and managed by the central unit via Ethernet network and accessible via a web interface for setup.

Chemical/Water Sensing Cable FG-AC

Made of corrosion and abrasion resistant material, the FG-AC cable is designed to detect and locate acid liquid and water leaks for laboratory, fab plant and cleanroom applications. Its reusable feature makes it cost effective. It contains an embedded microcontroller on each cable, allowing simultaneous leak detection on a single circuit.

Digital External Relay Box FG-RELAYS

The FG-RELAYS works as a satellite device of the FG-NET Digital Unit. It adds a set of 24 configurable external relays to the FG-NET. It allows FG-NET to drive external devices such as solenoid valves, BMS signals, beacons and others, to react in case of leak or system alarms.



Interior of a laboratory in a beamline Photo source: https://www.synchrotron-soleil.fr/fr



The storage ring and beamline structure Photo source: https://www.synchrotron-soleil.fr/fr



TTK Chemical/Water Sensing Cable FG-AC



FG-NET monitoring control panel (left) and its satellite device FG-RELAYS (right)

