



SUCCESS STORY

PROFILE

- Subject : SCADA / HMI
- Process : Nuclear
- Client : Groupe INTRA
- Date : 2009
- Installed base :
 - Panorama E²
 - 1 development workstation
 - 4 HMI workstations
 - OPC server
 - Serial link
 - Modbus protocol
 - DVB-T video
 - Military authorized broadcast frequency

Robotic Accident INTervention Group



ERASE external response machine
of the EDF Chinon
nuclear power plant site

OBJECTIVES

To remotely control robotic machines in the event of a major nuclear accident

Decision support and dashboards for the operators

BENEFITS

Personnel safety

Control post ergonomics

Help with remote operations

Geolocation

Longevity and Scalability

Based at the EDF Chinon nuclear power plant site in Avoine, INTRA's task is to take the place of human beings in the event of a major nuclear accident, within 24 hours. To this end, among its assets, the group has a fleet of machines operated remotely from a control post (control console, dashboard, transmission, visualization, etc.). The control HMI, Human-Machine Interface, is based on Codra's Panorama E² SCADA software.

INTRA has robots able to operate on a nuclear site following an accident. These machines are utilized once the radiological environment becomes hostile to human beings.

Their missions are to:

Establish the condition of the locations (inspections and reconnaissance, contamination values,

take samples),

Monitor the equipment (pumps, valves, measuring devices, etc.),

Make adjustments (valves, airlocks, actuators, etc.),

Carry out earthworks (access for reconnaissance, access roads, dig trenches, etc.).

INTRA's ERASE outdoor machines are operated remotely using an auto-



Panorama HMI:
3G control post dashboard

nomous vehicle fitted with all the equipment required for control (control console, dashboard, transmission, visualization, etc.). They operate over rough ground both day and night and have the equipment required for remote operation (video cameras, lighting, GPS, communications, etc.). They can be controlled from as far away as 5 km. The indoor robots (EROS and EOLE), are wire-guided with a 350 m on-board reel which broadcasts video to 4 screens simultaneously. These robots are able to

travel up or down stairs and cross obstacles representative of situations that actually exist in nuclear installations.

“An open and customizable solution, a Panorama E² application can expand progressively to meet the Group’s growing needs ”

The project

The INTRA managers responsible for crisis and response management were seeking to modernize their previous HMI, which dated from the 1990s, and took the decision to design a 3G (3rd Generation) control post, including a redesign of the HMI based on the Panorama E² SCADA solution. The previous application, developed by

computer engineers, did not consider the “user” aspect. Real time data was recorded but operation and dashboard analysis were unsuitable. The control post was designed for use by an operator and an assistant operator, with the operator concentrating on operating a machine and delegating general surveillance and machine technical parameter operations to the assistant. The assistant therefore needed quick and easy access to dashboard information to help the operator with their task.

The characteristics of the new HMI were defined in 2008 in collaboration with INTRA operators. This would give them the opportunity to view the machine’s status, configure communications and select videos. It would give the assistant operator a map of the response site on a video screen, showing the robot’s position in its environment by using the machine’s on-board GPS. All data would be sent to the control post using a satellite aerial, and then supplied to the French Institute for Radiological Protection and Reactor Safety (IRSN) or the operators.

The choice of the Panorama SCADA solution

Following an evaluation, Groupe INTRA chose the Panorama E² SCADA solution as part of the redesign of its HMI. "We are called upon to manage crisis situations following a nuclear accident, we therefore chose the best technical solution" affirmed Pascal Izydorczyk, Technical Operations Attaché at Groupe INTRA. Operating in a "niche" sector with what is considered to be a "sensitive" application, INTRA trusted Codra for this type of application.

An open and customizable solution, a Panorama E² application can expand progressively to meet the Group's growing needs. To begin with, Panorama was simply an interface for the control post dashboard. Once they had seen the product's capabilities, INTRA decided to expand their application and to manage other equipment such as the aerial support mast, data transmission, video system modems, etc., and therefore to optimize the dashboard whilst having a uniform fleet of hardware.

INTRA also chose Panorama for its GEO-SCADA capabilities.

Panorama E² offers, as standard, the tools required to integrate Google Maps, Google Earth or Open Street Map mapping interfaces integrated with other sources. The mapping solution developed enables the robot's path within the response area to be plotted, or to recreate the task by transcribing historical data on a map.

Feedback

Panorama E² is simple to use, and quick and easy to learn. "It's a real advantage for Groupe INTRA, who are independent and are able to configure the application internally. We have control of our own equipment." declared Pascal IZYDORCZYK.

The application can be expanded to meet the Group's new requirements. For example, operators can now access startup procedures through the Panorama HMI. In terms of decision

support, scenarios are developed according to the types of accidents possible. In the event of a crisis, these avoid forgetting procedural steps and save time, for example, by pre-programming camera control and display. Maintenance tools are also included in the application. It is possible to define diagnostics for the machines to plan maintenance or updates. "Since the equipment has a life expectancy of 10 to 15 years, we need to manage fleet obsolescence", explained Fabien Dekeyser, Engineer with Groupe INTRA. The group also has three public works machines (dumper truck, mechanical shovel, bulldozer) remotely operated by a 2G control post. Following the Fukushima nuclear accident, INTRA plans over time to control these public works machines using a 3G control post with a Panorama HMI up to a distance of ten kilometers away.



3G control post fitted to a utility vehicle

KEY FIGURES

Groupe INTRA

- Personnel at the EDF Chinon site :
- 20 people, including 8 operators (personnel on detachment from EDF, CEA, AREVA)
- 24 external operators
- Shareholder structure: EDF 50%, CEA 37.5% and AREVA 12.5%
- Budget: 4 to 5 Million €

EROS/EOLE Concept (internal response)

- Autonomy: 8 hours (Lithium Ion batteries)
- Remote control distance up to: 350 m
- Vision: 6 cameras
- Maximum integrated dose: 104 Gy*
- Gripper payload:
 - 5 to 16 daN **
- Mass: 300 to 400 kg
-

ERASE Concept (external response)

- Autonomy: 10 hr (diesel)
- Remote control distance up to: 5 km
- Vision: 5 cameras
- Maximum integrated dose: 103 Gy
- Arm payload:
 - 300 daN
- Mass: 5 to 8 t

* Gy : the Gray is the derived absorbed dose unit in the International System of units (SI).

** daN: designates 1 Decanewton, or 10 N.



EROS/EOLE Concept :
Remotely operated
reconnaissance and
light response vehicles for
use inside buildings



GRUPE INTRA

G.I.E. INTRA was founded in 1988, 2 years after the Chernobyl nuclear accident, by the three leading French nuclear companies EDF, CEA and AREVA. The group has twenty staff, all on detachment from these three companies.

Its main tasks are to:

Design, implement, operate and maintain a fleet of specific remote-controlled equipment able to respond in place of human beings in the event of a major nuclear accident in and around one of its members' industrial buildings,

Be able to respond within 24 hours to any site in France.

Its areas of operation are EDF nuclear production sites (CNPE), CEA civilian centers, AREVA's sites at La Hague and Pierrelatte.

International partnerships have been established with various countries, in areas such as technical exchanges, joint projects, mutual support agreements in the event of an incident, presentation days, etc.

From industrial SCADA to a global information system

Panorama 
E2

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