

AUTOMATION AND CONTROL OF ISOLATED HYDRAULIC INFRASTRUCTURES

Within the hydraulic infrastructure business sector, SICE provides engineering, construction, conservation, operation and maintenance services, as well as other highly qualified services resulting from extensive knowledge of these systems and long-lasting presence on these markets. Its activity is based on the Integral Water Cycle, including catchment, treatment, purification and reuse of water, before finally returning it to its natural environment.

Within SICE's portfolio of technological services, it carries out the execution of "EPC" projects (Engineering, Procurement and Construction) for the remote control and automation of all processes for the Integral Water Cycle. The company contributes knowledge and experience of its own personnel, built up over 25 years of experience on the market and applied to all areas, from the integral design of control architecture to the supply and assembly of all hardware, on-site sensors, analysers, meters and PLC as well as programming the SCADA control system and the communications system.

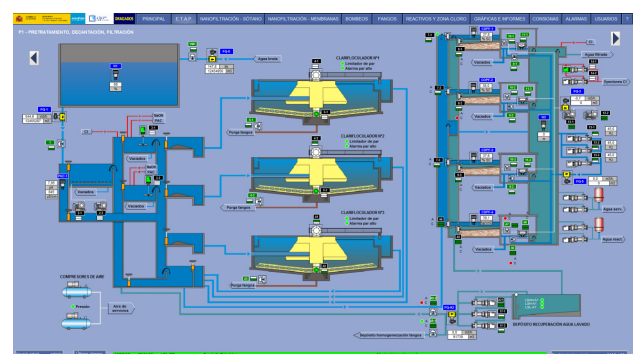
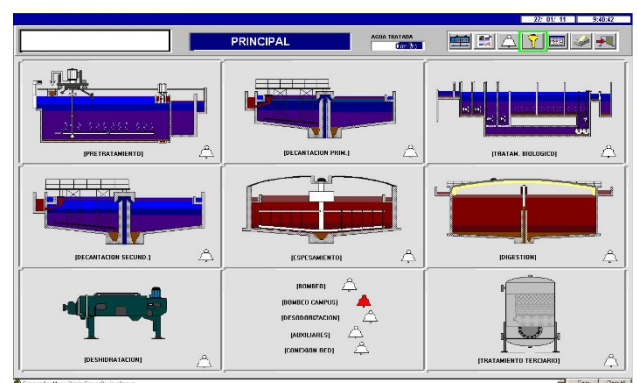
SICE executes the automation of hydraulic infrastructures proving a comprehensive service to its customers in design and development of control systems as well as improvements and optimization of existing systems. SICE has a Technical Department for Software and Programming of over 75 people, expert on all kind of SCADA and automation systems.

AUTOMATION SOLUTIONS

A wide knowledge and experience in hydraulic infrastructures allow SICE to ensure a complete management of the automation projects with innovative and competitive solutions.

From the original design and development to the installation and maintenance, SICE provides complete solutions for the automation of hydraulic infrastructures based on PLC, PCS, SCADA and DCS (Distributed Control System) integrating any system of the leading industry manufacturers.

- Process analysis and design of the best tailored control solution for the customer needs.
- Development of the automation project (PLC & HMI).
- Human-Machine Interfaces based in SCADA.
- Assembly and commissioning of process and analytical instrumentation.
- FAT/SAT (Factory & Site Acceptance Test).



CONTROL ARCHITECTURES

Due to the large diversity of the hydraulic infrastructures configurations, there are adaptive control solutions. Thus, when thinking about a control project, it is important to know which is the most suitable design and if only the automation is necessary (basic actuations or lower level ones) or to realize an advanced automatic control too.

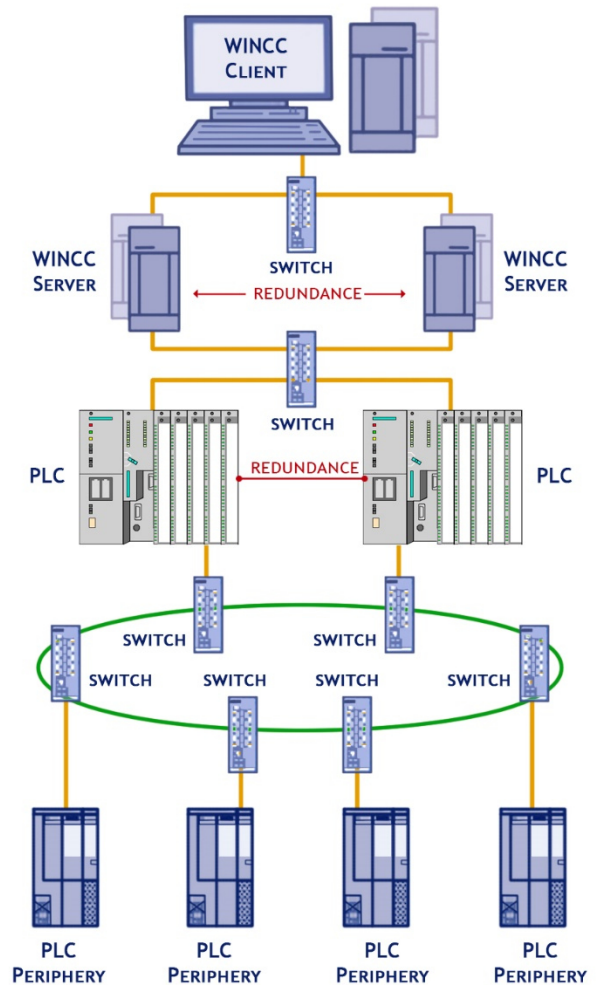
Architecture is designed in order to integrate, interconnect and coordinate the automation functions required by an installation for the purpose of optimizing the process and ensure the security.

There is a limited number of architectures which comply with the minimal automation requirements demanded by SICE, which could be summarized in the following list:

- **Single device:** the most compact structure, with all the functions in a single product.
- **Single board:** with the automation functions centralized in a single place having a unique control function. This is the most common architecture.
- **Distributed periphery:** this architecture has a single central automation device which controls several automated distribution boards. It is built according to the machines and the proceedings of every plant, normally connected by a fieldbus.
- **Collaborative control:** various machines or parts of a process have their own controllers. All are linked and collaborate in the system operation. This is the best architecture for large water treatment plants.



ALI MENDJELI WWTP ARCHITECTURE (ALGERIA)



OPTIMIZATION IN ELECTRIC CONSUMPTION

The energetic consumption of a common hydraulic infrastructure represents a high percentage of the total operation costs, between 20-25% in purification, 55-60% in water treatment and 75% in desalination.

The process control is based on a set of programmable set-points of the equipment operation that do not consider energy aspects nor energy efficiency, ie, there is no control system for electricity consumption or any other energy parameter.

SICE includes on its automation and control portfolio, energy audits as a basis for optimizing and reducing both consumption and costs through:

- Energy optimization software, based on the different periods of electricity bills, capable of moving power loads to the most economic periods.
- Hardware: frequency converters, voltage transformers, etc.

