



# Automation at the new Progea headquarters.

*In early 2016, Progea opened its new headquarters, marking in the most appropriate way its 25 years in the business. The new head offices are set on a 28,000 sq ft plot close to the Modena highway, just a few hundred yards from Modena North junction.*

*The distinctly practical and contemporary building was designed to meet the latest requirements in terms of form and function. Technology is used extensively, as all systems are connected to the new-generation Movicon.NExT supervision unit.*

Established in early 1991 as a software house for automation, Progea now celebrates its 25<sup>th</sup> year of growth and success. The best way to mark such a milestone was the opening of the new company headquarters, a building which was specifically designed both to meet the

company needs and to effectively convey the image of a dynamic, reliable company driven by technological innovation.

The Progea Group now consists of the main headquarters in Modena plus two branches in Italy, and Switzerland-based Progea

International for international distribution, managing approximately 35 distributors worldwide, including Progea Deutschland in Germany for the German market and Progea USA for the North American market. Progea employs about 45 people at the various branches, for production, distribution and support of the company's software technology, with Movicon constituting the core-business product. Movicon is a renowned SCADA/HMI platform, used by a whole community of automation professionals, leading entities and multinationals in every sector of automation, thanks to a particularly innovative, flexible and user-friendly technology.

The company's constant growth in latest years has brought about the need for new spaces, in a context more suited to the company's image. Planning got underway for the new headquarters starting with the purchase of the plot in a strategic location. An established Modena-based architecture firm was entrusted with the project of a contemporary building conveying an image of strength and contemporary style through a clean, minimalist, ergonomic, spacious and bright design. Once the project was approved, construction work started in mid-2014 and the new company building was officially opened in March 2016.



*The new Progea headquarters, as seen from the northwest side*

### **Architectural work**

"I am extremely happy with the result. The structure was built with painstaking attention to detail. Its design is particularly modern and outstandingly bright, while boasting top energy efficiency and soundproofing" commented Corrado Piccinini, design architect and planning supervisor.

The new building, set on a 28,000-sq-ft plot with large green areas, includes 16,000 sq ft of contemporary office space set on two levels, with an

extensive central hall, naturally lit by a stunning 1,000 sq ft skylight. On the contemporary interior of the building, glass and steel are featured extensively, with matching minimalist fittings. Undoubtedly, the goal of conveying the image of a contemporary, design-focused company has been reached. "It was a crucial objective for us, not only to have a functional space that would meet our needs, but more importantly for a software design company, to convey the image of a business with a clear-cut style and a modern, high-quality, reliable character" states Paolo Fiorani, who founded the company along with brother Claudio. Beside design, great attention was devoted to protecting the environment. Indeed, the building is virtually self-sufficient in terms of energy requirements. The use of highly-insulating materials, the large photovoltaic panels placed on the roof and the heat-pump-based air conditioning system make the building a producer of energy rather than a consumer. Which is another main feature of the company's DNA.

### **Technology**

From a technological standpoint, the project of the new headquarters has required hard work from Progea technicians, who outlined technical elements based on the company's essential needs. The management had in mind a monitoring system for tech devices using the best bus-based systems, in order to monitor and optimize both resources and security.



*Main entrance at the Progea's offices.*

Also, all system needed to be connected to the supervision system, therefore Progea technical staff designed a project based on the cutting-edge Movicon.NExT supervision system.

The supervisor unit collects data from the lighting system, the air conditioning system, UTAs (Air Treatment Units), security systems, energy production data from photovoltaic panels, and power consumption data from multimeters fitted in electric panels.

KNX (Konnex-EIB) buses were used for all lighting, security and access control services, for a total of about 800 points.

For the air conditioning and ATU system, LG heat pump systems were used, connected to a BacNET/ip bus, for a total 45 air conditioning units and 6 ATUs.

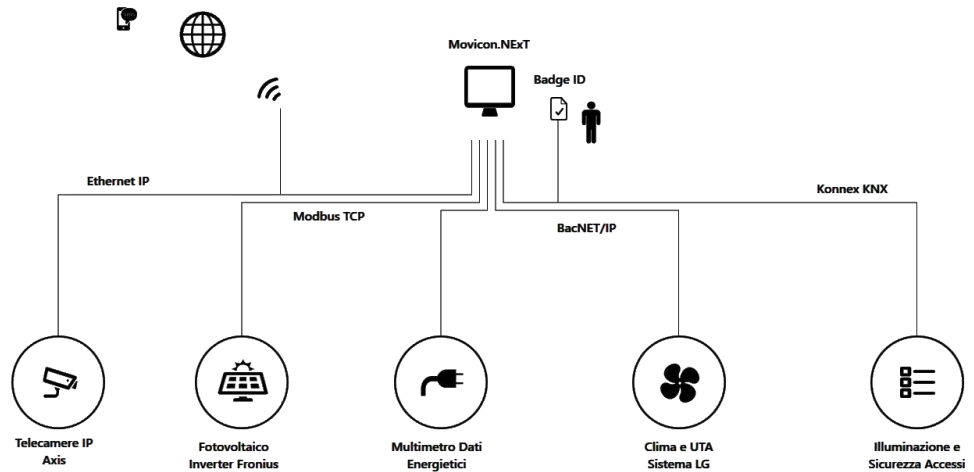
The power production inverter from photovoltaic source is connected via TCP Modbus, along with multimeters embedded in electric panels.

Lastly, the building is also fitted with surveillance cameras, connected via LAN to the supervision system and to the Security Office.

All systems are connected to the integrated supervision system based on Movicon.NExT and located in the main hall by the Reception desk. The interface consists of a large touchscreen PC, and the system can also be accessed from remote via Web – through a secure connection – using any browser, smartphone or tablet running the Movicon.NExT's HTML5 Web Client.

### KNX System

The whole building is connected via KNX, which fully controls the LED-powered interior and exterior lighting. Desk lighting is equipped with a dimmer function in all offices, and services are powered depending on the actual presence of personnel, based on the badge-operated access control system, which is also KNX-



*Layout of technical systems connected to the Movicon.NexT integrated supervision system.*

based.

The access system controls the activation of desks on the basis of the number of employees entering or exiting the premises. Based on the number of employees in the building, individual desks and common services are activated.

The access system is also equipped with a fingerprint scanners at the main door and for enabling or disabling the anti-intrusion system connected to Security.

Other access points include the vehicle gate and pedestrian access, both of which are automated on KNX bus via schedulers managed by the supervision system.

Using the access control system, the supervision unit manages automation as needed, only enabling services where they are actually needed, and thus cutting down costs.

The same bus is used for managing all alerts related to power systems and to the electric panel room.

The Emergency Lighting system is

managed via a dedicated line equipped with LED markings. It sends an alert to the supervision system via the bus system whenever battery maintenance is needed.

Also, a weather station is connected to the KNX system, providing useful information for running the structure, e.g. rain sensors

preventing the activation of the irrigation system, a daylight sensor for assisting in dimming lighting or for monitoring the status of the production of electricity from photovoltaic panels, a wind sensor for managing any alerts and the outer temperature for monitoring internal temperature, or for activating such functions as de-icing cables under the outdoor walkway.

Even the water fountain in the garden is controlled by the KNX system, which therefore constitutes the backbone of the whole building.

The I/O reading on the bus is essentially based on two different methods: some data is fed directly to the PC in broadcast mode, so that as soon as a field node detects a status variation, it sends it directly to the supervision PC, without the latter having to poll for it. For instance, safety switch alerts are directly connected to the PC, therefore as soon as a switch goes OFF (or ON),



*The lighting system is fully LED-powered and is connected to the supervisor unit via KNX bus.*

that status is sent directly to the PC. This way, there is no need to have network traffic due to the PC continuously polling for such statuses, and the alert is instantaneous. Because an alert is only sent to the PC when a variation is detected, lost alerts – if at that specific moment the PC is switched off or disconnected – are avoided by using the polling mode. This consists in setting autonomous alerts at defined time intervals, for example every minute or every 30 seconds. The communication driver allows for the selection of either mode, or of both modes simultaneously.

### **BacNet/IP system**

Air conditioning in the building is powered by an LG heat pump system, installed on the roof. The system is controlled by a single unit located in the electric panel room and connected

to the supervisor via BacNet/IP network. The system feeds 45 ceiling air conditioning units, which adjust the temperature and comfort settings at every workstation and in communal areas. The same network connects ATUs (Air Treatment Units), which ensure constant air circulation in all areas of the building, while adjusting the temperature settings of the same ceiling units. In each office the air conditioning settings can be modified locally, however the system is still managed by the supervising unit, turning on or off each unit based on the presence of employees in each room, and setting the units based on local conditions. At any rate, not only can the employees adjust parameters and functions for their own workspace via Web, they can also change settings manually using the small control panel fitted in each room. The Movicon.NExT unit constantly shows the status of the air conditioning in the building on specific maps. Moreover, the system features an optimizing function: for instance, when an open window is detected by a sensor on the KNX bus, the supervisor unit disables the air conditioning in that room, preventing



*The energy management is based on a photovoltaic production, and the whole efficiency is managed by Pro.Energy*

any cooling power to go to waste.

### **Energy management with Pro.Energy**

The Progea headquarters building is equipped with a roof-installed photovoltaic system, which can output up to 20 kW under ideal conditions. The company can source most of the energy it needs from a clean, renewable source, thus contributing to eco-sustainability and environment protection.

The photovoltaic system feeds any energy surplus into the national power grid, and the production of electricity is managed by a Fronius inverter connected to the supervisor via Modbus TCP network. The supervisor records the daily production of electricity and monitors the system's operational parameters,

such as the ideal ratio of natural lighting and kW output. However, electric panels include multimeters for monitoring all power parameters. They are connected to the supervisor via the same Modbus TCP network, and record all electricity parameters, such as power, active and reactive energy, current, tension, etc. The supervisor unit can monitor resource consumption and analyze any waste of energy, pointed out by specific alerts based on external parameters such as number of people in the building, exterior temperature and daylight. Movicon.NExT's Pro.Energy operational module is a software component which automatically saves consumption data and operational parameters of the building in specific SQL Server tables, so as to show a real-time dashboard of the energy consumption status and various ready-to-use reports displaying a detailed analysis of power consumption, by sector or by time period, also related to working hours, presence of employees and weather conditions, along with a detailed expense chart.

### **Security**

Security systems include access control and number of employees on the premises by user ID. Based on the employees present on the premises, the supervisor unit can suitably manage the employee presence sensors, the sensors fitted to doors and windows and the Anti-Intrusion system.



*A view from the internal. The Progea's building is based on two floor, and in the middle there is a big central space illuminated by a skylight of about 110 square meters.*

Indeed, the anti-intrusion ICU switches on as soon as the last employee vacates the building, so that employee presence sensors and sensors fitted to doors and windows can send alerts the Security personnel.

A system of IP cameras monitors the premises, sending video feed to the local unit and to connections via Web Client, as well as to the Security personnel.

A fingerprint scanner allows to disable the anti-intrusion system and open the main entrance door.

Along with the Anti-Intrusion system, the building is equipped with a fire protection system and a LED-powered emergency lighting system.

**Supervision:  
Movicon.NExT**

In the main hall, by the Reception desk, a TouchScreen PC and a badge reader for personnel entering or exiting the premises are installed.

The PC features the latest version of the new-generation Movicon.NExT platform. Nothing less, as the new Progea headquarters could only be monitored by Movicon.NExT, our cutting-edge Scada/HMI software based on the latest, most innovative software technology.

The monitoring server is installed on one of the company servers in a redundant configuration. The server communicates with technical systems in the building via KNX, BacNet/IP and Modbus TCP drivers, and manages the address space with a total 2500 tags. The server also manages and records all alerts and process information such as temperatures, power-related data, operational statuses and maintenance-related data.

The touchscreen PC installed by the Reception is a Client unit, just like any PC in the building can be. The touchscreen unit can display all



*Screens of the Movicon.NExT supervisor are well designed and easy-to-use.*

synoptic pages showing the status of systems in the whole building, using clear, pleasing graphics thanks to the new WPF- and XAML-based graphic rendering engine.

The main page shows the building and all its basic operational parameters. A navigation menu allows browsing to lighting management, air conditioning, access control, anti-intrusion system, energy management, maintenance, historical data, alerts and command and scheduler configuration.

Using the supervisor is particularly easy and intuitive. Pages clearly show all systems, laid out on 3D maps of the building levels or of the exterior. Through specific dynamic symbols, the status of systems is shown and systems can be adjusted using touch or multi-touch functions as needed. Each view allows the user or the visitor to use clear, simple



information, so as to keep everything under control.

Any 'sensitive' commands require suitable passwords, based on the user/password system management, to prevent unauthorized instructions or commands. All sensitive actions are audited, so that it is possible to later verify what happened and who was involved.

Beside showing the status of all managed systems, the system processes information in order to manage error messages or alerts. Alerts are shown and logged, and whenever no-one is present in the building they are notified to personnel on remote duty, who can connect via web client and evaluate how to proceed.

Also, the supervisor's logic allows to manage the building's smart functions: using the integrated language – based either on Function Blocks or on VB.NET scripts – the system enables or disables individual systems, switches lights on or off, adjusts the air conditioning system, notifies power-related information or sends alerts. Schedulers perform time-based actions, such as enabling access points for vehicles or pedestrians, switching the irrigation system or the water fountain.



*The air conditioning system is connected to the Movicon.NExT supervisor via BacNet/IP bus.*

Operating times of the various systems are logged so as to manage preventive maintenance activities. Alerts are logged as well, in order to evaluate the most frequent alerts or the longest-lasting alerts in a specific timeframe.

Movicon.NExT's Historian logging software keeps track of the main operational parameters such as temperatures in the building based on weather conditions, or all energy-related parameters, filtered by number of employees present in the building, for improved data monitoring and analysis. Data is logged by the Movicon.NExT server on an SQL Server database. Lastly, more automation features have been added for managing specific system scenarios or generic commands. For instance, in the Conference Room, before starting a presentation using the video

projector, the operator may launch a preset scenario by pressing a key on the PC, and the supervisor unit will dim the lights as needed. Another example, specific automation commands shut off the whole building or a whole floor, or disable specific systems which were left on although all employees have vacated the building, thus contributing to energy efficiency.

### **HTML5 Web Client**

Thanks to Movicon.NExT's Web Client technology, the building can be fully monitored and managed from remote, in total security. The Web Server displays on HTML5 technology all synoptic pages, which are accessible from any browser, tablet or smartphone by personnel on remote duty, by security personnel or by management. At any time, regardless of any alert notifications, users may authenticate and view operational statuses, from wherever they are. They can execute commands, view alerts, interact and analyze historical data and data reports and view live video feeds from cameras located inside or outside the building. Full control functions from remote constitute a big benefit for our personnel. Web Client technology is

also used within the building, as our personnel can activate systems from any workstation or from their smartphone, just as if they were using a remote control.

### **Final notes:**

Progea's new headquarters are the perfect expression of the company image: a contemporary, comfortable building, equipped with the best technology for Building Automation, the essence of which, of course, is the Movicon system.

The management's goal is to show its clientele – right at the company headquarters – all the potential and ease of use of software products developed by the company itself. The use of the Movicon supervisor improves comfort and optimizes energy resources, and at the same time constitutes a big dynamic workshop, showing how a company on the cutting edge of technology like Progea wishes to make its know-how available to its customers.

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