

WP3 - Wireless Sensor Network Deployment for Environmental Monitoring

By Chee Yeew Yong, Hamid Asgari, Thales Research & Technology (TRT-UK)

Experimentation and demonstration activities are important aspects of any project. An initial proof-of-concept of an end-to-end Wireless Sensor Network architecture has been carried out by deploying it at TRT-UK premises. The real physical deployment requires sensor nodes to be placed at various locations and wirelessly connected to one or more gateways that are connected to the server either by wire or wireless means. Consequently, environmental data can be collected by WSN and made accessible to a user through the web services interface. Taking TRT offices as an example, Figure 1 is the floor plan of the South Technical Block at TRT premises and the location where the sensor nodes and the other components are placed. The description of zones and the type of nodes used in each zone are as follows:

Zone 1 – an open plan area: three sensor nodes each with three embedded temperature, humidity, and light sensors.

Zone 2 – three offices: each office has a sensor node with two attached CO₂, presence sensors;

Zone 3 – same three offices as Zone 2: three sensor nodes each with three embedded temperature, humidity, and light sensors. A client interface was implemented using the Adobe Flex® Builder™ 3 software to allow the user to interactively create simple sensor data queries that task the I3CON Web Services interface to retrieve the sensor data.

Figure 2 shows a screenshot of the results display tab of the client interface, which allows user to display a selection of sensor data. The left panel shown in this figure allows users to select several parameters in order to display desired sensor data, namely date, sensing mode, and location. Users can also select a second sensing mode to be displayed alongside the first, but bounded by the same date range and location.



Chee Yeew Yong

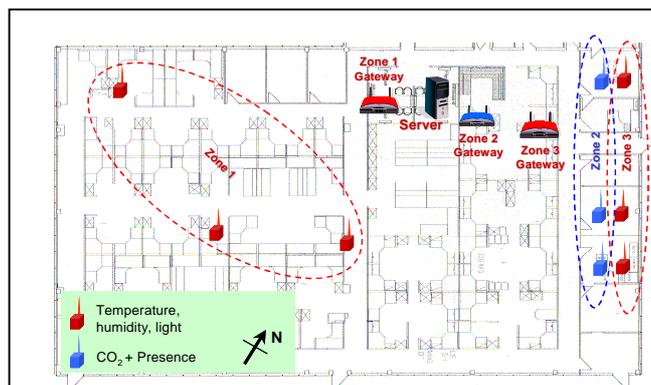


Hamid Asgari

Once the user has selected the parameters and submitted the query, a URL is formed.

This URL is then sent to the I3CON Web Services interface using a HTTP GET request. The URL is also displayed in the bottom panel of the tab. The results returned from the GET request is in the form of an XML stream.

The Client processes this stream and the results formatted into a Cartesian plot, then displayed to the user. The data measured by sensors can also be accessed by any other application from MySQL database.



TRT South Technical Block

Figure 1: WSN deployment environment.

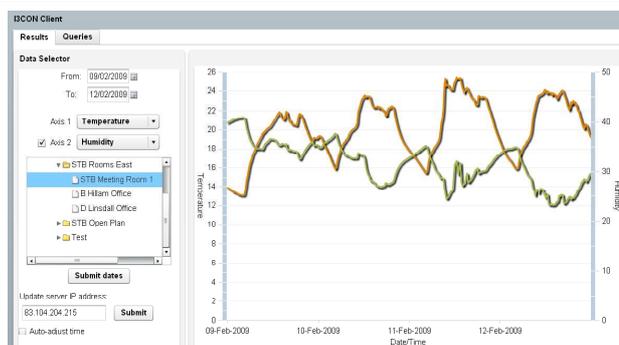


Figure 2: WSN user interface and visualisation.

WP8 – Demonstration

by *Christina González, EMVS, Spain.*

The focus of the work presented in this article is to demonstrate I3CON results in real building environments and through the use of virtual reality simulations. EMVS has, up until now, been developing an apartment building in Margaritas Street, in Madrid, in which some results will be demonstrated, in particular, Thales's Wireless Sensor Network (WSN).

The system developed by Thales allows us to monitor temperature, humidity, light, carbon dioxide levels, and presence, and to collect weather data from the Internet. It can also be used to monitor other data such as outdoor temperature and humidity, rainfall, wind speed, noise levels and noxious odours levels, and to collect data from the electricity and hot water meters. All this data can be easily accessed through the Internet, with a username and password. Two dwellings in the Margaritas building have been chosen for demonstration purposes.

The Margaritas building, like all the buildings developed by the EMVS, is a social dwelling.

It will be a new type of property regime compared to what has been done up until now in social dwellings in Madrid, in that it is intended for young people, under 35, and the dwellings will be to let but in a regime similar to that of an apartment-hotel. This means that the users do not pay directly their electricity, water, or heating bills.

EMVS has great interest in trying to make the users aware of the importance of energy efficient habits, and therefore the WSN will be an important tool in the process of monitoring and displaying the monitoring data to the end users. We hope to be able to set up displays in the two dwellings that will show in real time the results of the data collected through the WSN, so that the users can see how their habits influence the increase or decrease in the use of energy. The aim is to influence their energy use habits.



Christina González

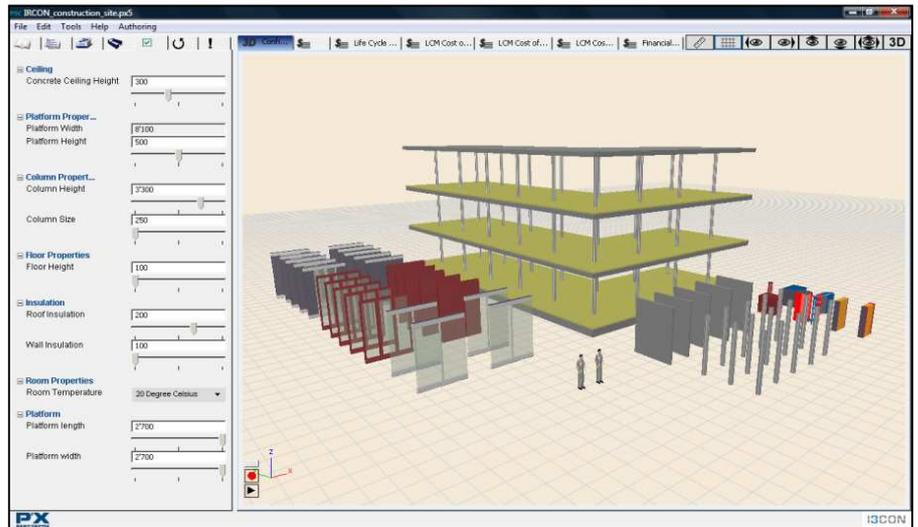


The Margaritas building

WP6 – Front-loading Early Design Phases

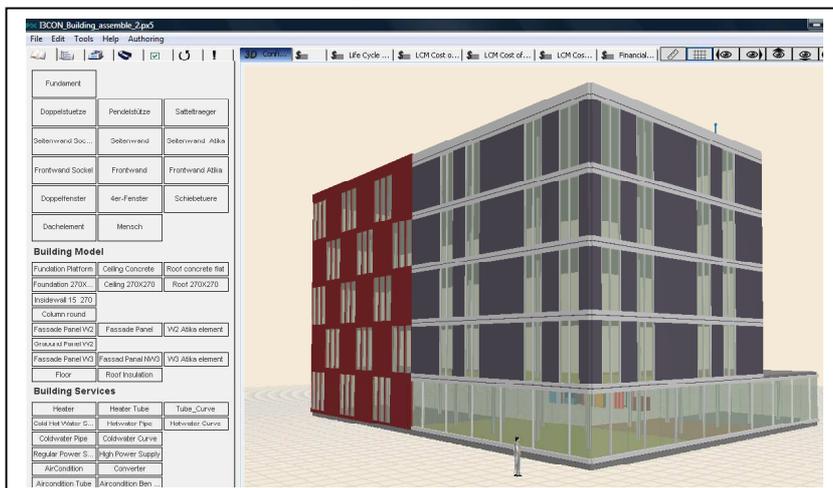
by Aurelius Berner, Perspectix AG

The concept of intelligent catalogues within I3CON addresses knowledge-driven automation for the early planning phase of buildings. While current catalogue approaches are focused on the parametric generation of geometric shapes with some part-internal configuration logic, we see a great advantage by applying rule-based logic that handles inter-part dependencies of "smart building modules". By enhancing the parameters of pre-defined parts with the combination of flexible arranged modules, knowledge-driven validation and automation will reduce routine work, enables the creation of more concept alternatives and even may foster correctness of planning work. The building configurator provides the user with 3D planning elements that are composed interactively. By integrating calculations for construction costs, energy consumption, as well as maintenance and repair forecasts, the validation of virtual models becomes more exact and profound by considering life-cycle costs. The coupling of modular building configuration and live calculation may lead to a more iterative work process in early concept phases, where design alternatives will be evaluated and validated in short cycles. The use of lightweight 3D visualization and a user-friendly graphical interface facilitates the collaboration and co-design of



comprehensive projects between manufacturers, architects, general contractors, real estate managers and customers. This fosters a more optimal solution between different stakeholders and between different design dimensions such as aesthetics, functional fitness, economical as well as ecological efficiency. Within the I3CON research project, Perspectix applied their P'X5 software for creating a building configuration model. A component library as an intelligent catalogue of building objects was conceptualised and implemented. The application is focused to illustrate IT-based and knowledge-driven automation in the building industry. Components have different behaviors and modifiable parameters, module interfaces and interaction handles. Tools to change

dimensions and attributes are bonded. It is very easy to modify the design and complete buildings. In a few minutes a design concept is done out of reusable and flexible module components which connect to each other according to certain rules. The freedom of design is constrained by classified module interfaces (connection points, docks), geometric conditions and logical rules. The building configuration model supports design processes where buildings have to be designed fast and information about material consumption, construction costs, energy efficiency, services, and life cycle costs is needed immediately.



Forthcoming Events

Date	Title	Format	Location
1-4 April 2009	ASC 2009 Annual International Conference	International Conference	Florida, USA
1st April 2009	Technology for Urban Frameworks ECOPOLIS 2009	Conference + Exhibition	Rome, Italy
1st April 2009	International Exhibition for Construction Machinery CONSTRUCT EXPO	Exhibition	Bucharest, Romania
3rd April 2009	Building Fair, EDIL TERRENO EXPO	Exhibition	Carrara, Italy
7th April 2009	Construction & Renovation - RESTA	Exhibition	Vilnius, Estonia
9th April 2009	International Exhibition of the Lift Industry	Exhibition and Conference	Istanbul
10th April 2009	Construction Exhibition - Construction Expo 2009	Exhibition	Mumbai, India
14th April 2009	International exhibition for Building Companies and Manufacturers	Exhibition	Kiev, Ukraine
20th April 2009	Construmat	Exhibition	Barcelona, Spain
27th April 2009	Building Construction Environmental Technology PROJECT QATAR	Exhibition and Conference	Doha, Qatar
30th April 2009	Architecture Construction Design - FORM & FUNCTION	Exhibition and Conference	Melbourne Exhibition and Convention Centre, Australia
4th May 2009	Iraq Reconstruction - Rebuild Iraq	Exhibition	Amman, Jordan
5th May 2009	Building Exhibition for an Eco-friendly Future BEX ASIA	Exhibition and Conference	Suntec Singapore
12th May 2009	The Facilities Show	Exhibition	NEC Birmingham UK
12th May 2009	Commercial Building Sustainable Forum	Conference and Exhibition	Toronto, Canada
16th May 2009	Scottish Homebuilding and Renovating Show	Exhibition	SECC Glasgow, Scotland
3rd June 2009	Building and Construction Exhibition - Southern Building Show	Exhibition	Atlanta GA, USA
15-19 June 2009	3rd CIB International Conference on Smart and Sustainable Built Environment (SASBE 2009)	International Conference	Delft, Netherlands
22nd September 2009	Building - BYGG REIS DEG	Exhibition	Lillestrom, Norway
23rd September 2009	Machine Building Construction of Equipment	Exhibition	Helsinki, Finland
24th September 2009	Energy Efficient Construction and Renovation RECONSTRUCT 2009	Exhibition	AFAG Augsburg, Germany
25th October 2009	Building Construction - INTERBUILD 2009	International Exhibition	NEC Birmingham UK

I3CON Newsletter

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