



Project Results

FUSE-IT

Enhanced connectivity and security for building management at lower cost

EXECUTIVE SUMMARY

The ITEA project FUSE-IT has developed a Smart Secured Building System, one that can be deployed as standalone components, as a fully integrated system or as a service. The impact on the end-user can be measured by huge savings on equipment, maintenance costs and energy consumption along with enhanced connectivity and resilience to cyber-threats.

PROJECT ORIGINS

Commercial and government buildings are subject to increasingly stringent regulations and policies in terms of safety, energy efficiency, facility management, information systems and security. Five challenges have to be overcome in order to optimise, federate and rationalise the legacy building management chains. These are 1) identifying the limitations of existing sensor chains, 2) optimising the network infrastructure, 3) enabling cross-domain building model and analytics, 4) unifying building management interfaces and 5) enabling cyber-physical security management. The answer lies in stimulating cross-domain innovation between activities that are traditionally much segmented and the key lies in advanced data processing and analysis; a key that the FUSE-IT project used to unlock the business potential of its solution.

FUSE-IT developed a Core Building Data Processing & Analysis module that processes data reported by secured shared sensors, effectors and devices that are robustly interconnected through trusted federated energy and information networks. It addressed the need for sustainable, reliable, user-friendly, efficient, safe and secure Building Management Systems in the context of Smart Critical Sites. From a site management perspective, it solves the dilemma between efficiency and security in intelligent buildings. At the user level, a smart unified building management interface enables daily monitoring and control of buildings, while a full security management interface enables



Smart Critical Building

supervision of both physical and logical security throughout the premises and corporate network. Innovation is fostered by horizontal expertise sharing to create impact at sensor, network, management and security management levels.

TECHNOLOGY APPLIED

A cross-domain approach was taken by combining Building Management Systems (BMS) with Security Management Systems (SMS). Multiple innovations were achieved at different levels, such as face recognition, multi-criteria optimisation and a multi-agent platform for managing the micro-grid. The system architecture took account of building management, physical and cyber security as well as legacy systems.

The technology achieved encompassed smart sensor networks, core building ontology and ontology-based anomaly detection, smart building

efficiency management, smart building security management and the need for a unified view. The technology was implemented in a number of demonstrators and prototypes. The Turkish demonstrator at Gazi Teknopark, one of the first and largest installations producing electricity from renewable sources, specifically solar energy, focused on the demonstration of an immersive Building Management Interface. The French demonstrator at the Airbus Defence and Space site in Elancourt focused largely on the Unified Security of Buildings, using as much information as possible from the four main domains of site supervision, including energy forecast capabilities, to detect any threat to the building physical and cyber assets, and to have a better understanding of the attack final objectives. The Belgian demonstrator at Imec Homelab provided a residential and home office test environment for flexible and reconfigurable buildings in the context

of 'flexible offices'. It also acted as an innovation incubator for the relevant FUSE-IT capabilities with a focus on applicability to temporary building configuration. Finally in Portugal the demonstrator at the Centro Hospitalar São João (CHSJ) addressed FUSE-IT innovations for the management of a complex and safety critical building. The old CHSJ building presented interoperability challenges (like the involvement of legacy equipment from diverse providers) along with severe constraints and criticality of equipment and zones coupled with the need to be able to integrate the most advanced clinical technologies.

MAKING THE DIFFERENCE

A measure of the impact that the FUSE-IT project has had on the smart innovation community is evident in it being awarded the 'Special Prize' for innovation and territorial impact by the Grand Commun of Saint-Quentin-en-Yvelines. The project has also been featured in Smart Grid-CRE (Commission de Régulation de l'Energie) since January 2017 and on the back of the project results, Airbus has filed a patent for a method for securing and authenticating telecommunication. The Turkish consortium members have acquired

a contract for monitoring buildings as well as for remote monitoring of several solar plants. Contract negotiations are ongoing with a hospital and pilot installations are being tested for several government organisations. Airbus Cybersecurity has been awarded a € 740,000 contract to fulfil risk assessment surveys on 14 sites of Airbus Defence and Space in Spain, France, the UK and Germany and a contract worth € 500,000 to secure a data centre organisation against cyber and physical threats. Building on the FUSE-IT results, VTREEM is launching a new SaaS product named "BIMValue" in Q2 2018 to enhance, control and manage sensitive data using semantic BIM. From the Belgian consortium, Niko has created NHC 2.0, a platform for future open domotics systems. The first product has already been launched. The Portuguese consortium will continue in a national project, with exploitation projected to come at a later stage.

FUSE-IT has delivered many quantified results that enable the partners to optimise efficiency and security in smart buildings and there is potential to create a substantial impact on the market in addition to the impact already delivered.

MAJOR PROJECT OUTCOMES

Dissemination

- 9 journal papers, 37 conference papers, Newsletter in IEEE Communications Society
- 5 conferences: FPS 2015, GIIS 2016, ICIN 2017, DCAI/PAAMS 2017, IEEE PES GM 2017
- 5 international fairs: ITEA 2015, EUREKA 2016, IBS 2016, DIF 2017, EUW 2017

Exploitation (so far)

- € 740,000 contract to fulfil risk assessment surveys on 14 sites of Airbus Defence and Space in Spain, France, UK and Germany
- € 500,000 contract to secure data centre organisation against cyber and physical threats
- BIMValue: new commercial SaaS platform to enhance, control and manage sensitive data using semantic BIM (VTREEM)
- AKIK: a new smart monitoring and control software tool for industrial sites and buildings. Currently deployed to a solar energy harvesting infrastructure and in the process of being deployed to a government building for ICT infrastructure and building monitoring purposes
- MAS platform for optimisation and control of microgrids. Composed by two main components (optimisation and control), and relying in software agents technology, the system was used to control the resources of a building located in GECAD premises

Standardisation

- Contributions to CEN/buildingSMART, CoAP, LWM2M, IPSO, oneM2M, Zigbee, Z-wave, Wirepas, Enocean, Alljoyn, semantic BIM and IFC data formats
- Interoperability with BACNET, KNX, MODBUS

Patents and Spin-offs

- 3 patent applications filed for secure IoT authentication
- 1 patent application in preparation
- 1 spin-off projected

ITEA is a transnational and industry-driven R&D&I programme in the domain of software innovation. ITEA is a EUREKA Cluster programme, enabling a global and knowledgeable community of large industry, SMEs, start-ups, academia and customer organisations, to collaborate in funded projects that turn innovative ideas into new businesses, jobs, economic growth and benefits for society.

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Partners

Belgium

Imec
linkID
Niko

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ARC Informatique
Cassidian Cybersecurity
CEA LIST
Icam
Institut Mines-Télécom
Sogeti High Tech
Thales
Thales ThereSIS
University of Burgundy
University of La Rochelle
VTREEM

Portugal

Centro Hospitalar São João
Evoleo Technologies
IP BRICK
ISEP/IPP-GECAD

Turkey

CTech
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Project start

October 2014

Project end

December 2017

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