ASUA

Project ID: C2013/2-2

Start Date: 1 January 2015

Closure date: 31 December 2017

Partners:

Beia Consult International, Romania

Geodata Ziviltechnikergesellschaft mbH, Austria

Innovati Networks S.L., Spain

Karel Elektronik San. ve Tic. A.S., Turkey

Katholieke Universiteit Leuven, Belgium

Montanuniversitat Leoben, Austria

Netcad, Turkey

Option N.V., Belgium

Televic, Belgium

Co–ordinator:

Serkan Gazel

Netcad, Turkey

E-mail: serkan.gazel@netcad.com.tr

Project Website

https://www.celticplus.eu/project-asua

Advanced Sensing for Urban Automation

ASUA aims to develop and enhance the essential Information and Communication technologies, in order to support the applications of modern urban automation in various countries across Europe: Austria, Romania, Turkey, Spain and Belgium. ASUA will enable improvements in the areas of urban automation including building automation, resource management and energy metering. Specifically, the project intends to deliver, through cloud-based technologies and semantic data models to be able to analyse and store huge amount of data even when the data is heterogeneous and analyse is real time. Also, solutions will be developed for managing constrained devices in challenging environments, while enabling them to get connected by becoming parts of an advanced sensing system.

Main focus

ASUA is expected to solve the network infrastructure complexity dilemma, by designing and applying new self-configurable communication mechanisms for fully connected future cities.

The developed solutions will be on servers, on sensors or on network protocol level. The diversity and variety of these solutions brings the need for interoperability. ASUA will design an "Urban Automation Reference Platform" that is one of the key outcomes of the project besides 3 prototype applications based on this platform. The "Urban Automation Reference Platform" will provide an infrastructure for interoperability. All the technical solutions on server side or client side need to be compliant with each other and the "Urban Automation Reference Platform" will provide the schemas, contracts and rules to enable interoperability.

All devices composing the ASUA are relevant to achieve the final objective of creating a framework that intelligently retrieves and manages an enormous amount of data. Furthermore, ASUA will achieve energy savings in urban environments, by enabling sensing devices with severe resource constrictions and limited wireless range.

An important contribution of ASUA project is that it facilitates the addition of new
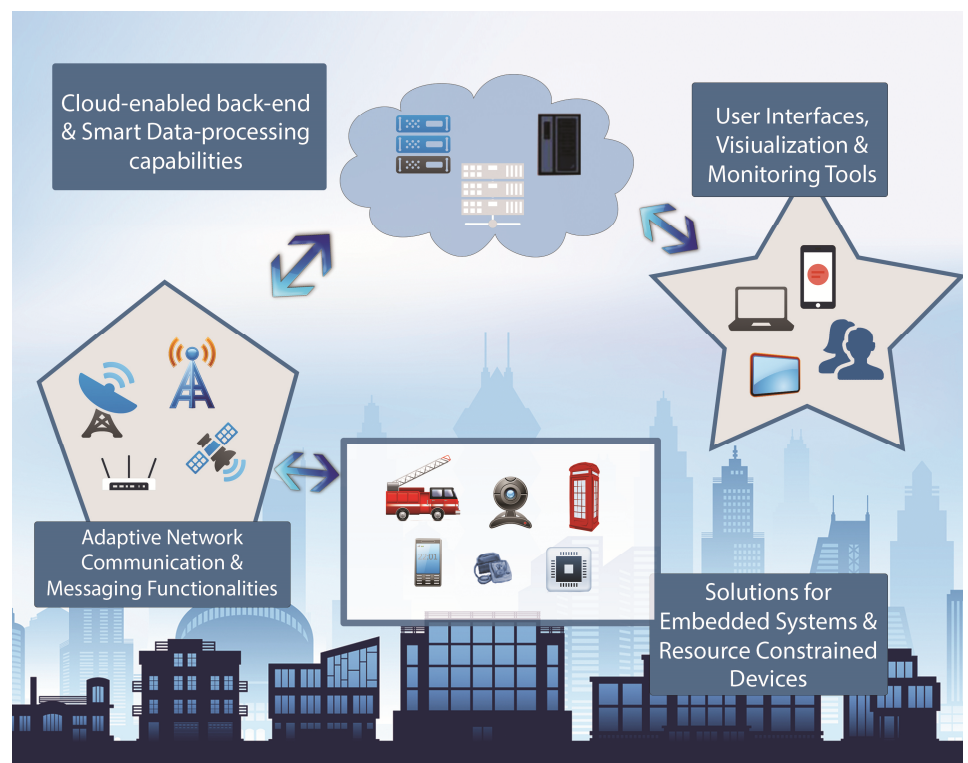
types of sensing devices to existing urban automation systems, by designing flexible interfaces and adaptive gateway mechanisms. Introducing novel types of cloud-enabled services based on an autonomic data-processing system, ASUA optimizes the management of raw data from asset devices and intelligently incorporates the information retrieved from them.

Approach

ASUA project addresses the challenge of enhancing our everyday lives and make European cities better, safer and more energy efficient places for everyone, through advanced ICT-technologies and a modern urban automation approach.

The technical research and development efforts of ASUA can be divided into three key elements: constrained devices (techniques for coping with extremely resource-constrained embedded devices even in challenging environments), communication networks (adaptive communication mechanisms and flexible interfaces for secure and reliable message dissemination) and information management (cloud-based technologies and semantic data models for distributed storage, autonomic decision making and multidisciplinary information management).

ASUA project is built on several prototypes focusing on concrete application scenarios and based

on the same reference platform, aimed to validate the technological outcomes of the project and demonstrate their usefulness and real-world applicability in the context of modern urban automation in Europe.

The project addresses the following systems, part of the three cases which are to be developed in Europe:

♦ In Austria, a web-based Urban Monitoring Information and Control System will be prototyped and validated at a running urban construction project. Its main benefit will be the integration and control of complex geotechnical monitoring sensors via a wireless sensor network;

♦ In Romania, a prototype for a remote telemetry platform will be developed for use in urban environments, to demonstrate the effects of environmental parameters: temperature, precipitation, wind speed etc.;

♦ In Belgium, a cloud-based nurse call model will enable a company to create a new strategy in building nurse calling systems and enhance the efficiency of future healthcare systems.

Main results

The technology developed within ASUA project will be applied by the participating organizations, leading to outstanding results for all consortium members. The add-

ed value brought by ASUA consists of the "Urban Automation Reference Platform", a conceptual platform design which will include the main functionalities and mechanisms that are identified as critical by the partners during the project for sensing applications in the domain of urban automation.

One of the essential project outcomes, bringing an innovative perspective, is the prototype of a web based Urban Monitoring Information and Control System, that will allow integrating and controlling complex geotechnical monitoring sensors such as robotic total stations or vibration sensors in a wireless sensor network. Therefore, the sensors will be connected to a developed multi-functional device, able to store and process the data locally by embedded computing power and to transmit the data to other sensors, to a local data management and information system.

Another important result is the map-based interface for real-time sensor data monitoring & autonomic sensor control, suitable for challenging environments and serving as a united platform for future smart city applications.

Impact

The business impact of the project mainly focuses on new products and ICT solutions, developed for the benefit of different urban business domains in modern cities in Europe. The influence of ASUA also derives from the fact that it proposes ways through which the Cloud and Sensors/IoT concepts can be used in the context of Urban Automation.

Another important outcome of ASUA project is that it provides predictive capability to optimize the performance of urban structures (buildings, roof, roads etc.) and understand or prevent failures. By applying new knowledge and technologies resulting from ASUA, urban structure design and repair techniques will be developed.

Last but not least, scientific articles published in specialized journals are expected from ASUA. Other channels for the dissemination of ASUA's results are through participation in conferences and workshops both at national and international level.

EUREKA