



ALMANAC

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Collaborating with state of the art

ALMANAC has met with the SmartSantander project to share knowledge and look for possible areas of collaboration. The first result is a live traffic data connection between the first ALMANAC prototype and the Santander Platform.

One of the aims of ALMANAC is to demonstrate open and accessible public data in a city context which can be used for applications aimed at citizens and other stakeholders. To gain more knowledge about the design of such applications and best practice, ALMANAC looks at experiences from existing Smart City projects such as the SmartSantander project.

- With more than 15,000 sensors and devices already installed in the city of Santander, the SmartSantander project provides a unique testbed and knowledge base for developing Smart City applications, explains Anders Skovbo Christensen, Senior Consultant from In-JeT.



Environmental monitoring and management in Santander city centre. Copyright and source: [The SmartSantander project](#)

The SmartSantander project envisions the deployment of more than 20,000 sensors in four different cities, exploiting a wide variety of technologies and several use cases. In Santander, use cases have been implemented in relation to environmental monitoring and management as well as to citizen oriented services such as guidance to available parking spaces, tagging points of interest as well as receiving and reporting special events.

To survey the main ideas and results of the Santander project and investigate opportunities for further collaboration, a couple of meetings were organised and held between the two projects in March 2014. ALMANAC was invited to the University of Cantabria where Dr Luis Munoz gave a presentation of the SmartSantander project followed by a demo tour of the city installations. ALMANAC also visited the SmartSantander control room at the University of Cantabria to see the gateway, sensor technology and overview screens, and to learn about the Santander experiences in installation and maintenance procedures.

- We also met with the Mayor of Santander, Iñigo de la Serna, who has been a prime initiating stakeholder of the Santander efforts in Smart City developments, says Anders Skovbo Christensen.

- All in all, ALMANAC was greatly inspired and educated by the meetings and several contacts have been established as a result. The first collaborative steps have already been taken by integrating live traffic data connections from the Santander platform into the first ALMANAC prototypes, he concludes.

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Meet ALMANAC

Water Ideas 2014

22-24 October 2014, Bologna, Italy
The aim of the conference is to present and discuss the latest developments, strategies, techniques and applications of international best practices in Innovative Water Networks Management. ALMANAC will be presented at the conference by partners Telecom Italia.

Deliverables released

The following deliverables have been completed:

- D1.1 Project Quality and Risk Management Plan (restricted)
- D1.3 Plan for Managing Knowledge and Intellectual Property (confidential)
- D2.1 Scenarios for Smart City applications (public)
- D3.1.1 System Architecture Analysis and Design Specification 1 (public)
- D5.1.1 Design of the Abstraction Framework and Models 1 (restricted)
- D6.1 A Scalable Data Management Architecture for Smart City Environments (public)
- D7.1 Test And Integration Plan (public)
- D8.2 Application Definition – Water Management (public)
- D8.4 Application Definition – Waste Management (public)
- D9.1 Project Website (public)

Public deliverables can be downloaded from the project website after they have been reviewed and approved by the EC:
www.almanac-project.eu



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User perspectives on waste and water: The service provider

How are waste and water handled in the City of Turin today? What are the key challenges and how do you envision the future?

Knowledge of existing city structures, services and challenges is crucial when developing sustainable Smart City solutions. Drawing on both existing knowledge from other projects and new insights, partners have gained a strong sense of the Turin context and challenges when it comes to handling waste and water.

During the first year of the project, ALMANAC has held several meetings with the Municipality of Turin, the Azienda Multiservizi Igiene Ambientale Torino (AMIAT) which is the company responsible for collecting waste in Turin, and the water utility Società Metropolitana Acque Torino (SMAT). Meetings have been combined with field visits to plants and treatment facilities to experience some of the processes first hand.

For waste management, the general picture from these meetings was that the challenges lie in optimising the collection of waste and achieving a better recycling percentage. In the water domain, the quest is to make water management more efficient, implementing real-time monitoring technologies which can be used for detecting problem areas in the infrastructure, forecasting consumption or for reading meters automatically.



Feeling of ownership = better recycling

A comparison between the three different ways of collecting waste in Turin shows that waste collected from waste bins located on ones property and thus in close proximity offers the best recycling quality compared to waste from underground containers or bins at the street corner.

- Part of the explanation is that citizens feel a higher degree of ownership when the bin is associated with their name and property and they therefore pay more attention to the way they sort their waste. Moreover, they get fined if they do not meet the requirements to sort their waste in the prescribed manner, says anthropologist Mia Kruse Rasmussen from the Alexandra Institute.

This door-to-door system, however, is only used by around half of the population of Turin mainly due to practical problems. Some areas are difficult to reach; others consist of large apartment buildings which lack space for bins. To solve these issues, Turin is experimenting with underground containers that have a large storage capacity.

- Even though they do not offer as good quality of waste as the door-to-door system with only 32-33% being recycled, the containers seem to have a positive effect, generating a higher quality of waste and a higher degree of ownership than the regular street bins, Mia Kruse Rasmussen says.

The poorest quality of waste comes from the street collection system, 'stradale', which are regular waste bins located at the side of the streets. Most of the waste collected from these bins cannot be recycled and therefore ends up as unsorted waste at the incineration plant or landfill.

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The ALMANAC project is co-funded by the European Union's Seventh Framework Programme for research, technological development and demonstration under grant agreement no 609081, objective ICT-2013.1.4 'A reliable, smart and secure Internet of Things for Smart Cities'. Duration: 1st September 2013 to 31st August 2016.

Read more at:

www.almanac-project.eu

The challenge is to find ways to somehow increase the percentage of recycled waste.

- There is a desire to reduce the cost of final treatment at landfills, incinerators and recycling plants. Turin, as well as other cities, has an interest in developing solutions that can help increase the percentage of recyclable waste by creating awareness and trying to affect people's behaviour, Mia Kruse Rasmussen says.

Optimising the waste collection and creating awareness

Another issue concerns the actual collection of waste. Cars parked in front of the waste receptacle make it difficult for the waste lorry to get close enough to the bin, and as a result the bin has to be left for the next shift. This type of double collection means additional time and cost, and there is also a risk that it will lead to overfilled bins.

- Solutions should aim at optimising the collection to save time and money, giving information and feedback to the citizens that will potentially enable them to make more sustainable decisions and also allow the citizens to provide feedback to the municipality or AMIAT in relation to different waste issues, Mia Kruse Rasmussen says,

Automated meter reading and fast leakage detection

Achieving a sustainable management of the water supply in and around urban areas is a key issue all over Europe. In Turin it is the Associazione d'Ambito Torinese authorities who organise and control the water service which includes everything from collection, transportation and distribution of water for domestic use to sewage and waste water treatment. The actual services are carried out by the utility SMAT.



A number one priority is automated meter reading: Today, meters are placed at building level and are read by employees periodically. With 360,000 buildings and 2 Euros per manual reading 2-4 times a year, the cost and potential savings are considerable if substituted by automated meter readings. In ALMANAC, a capillary network infrastructure will be developed to enable automatic collection of data from smart meters via a gateway to the ALMANAC platform.

Another point of interest is in developing and deploying pervasive technologies to detect water leakages faster; In Turin there is a 24% loss of water on average. By deploying sensors, the network can be monitored and water leaks can be identified based on real-time data.

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Proof of concept prototype of a Capillary Network

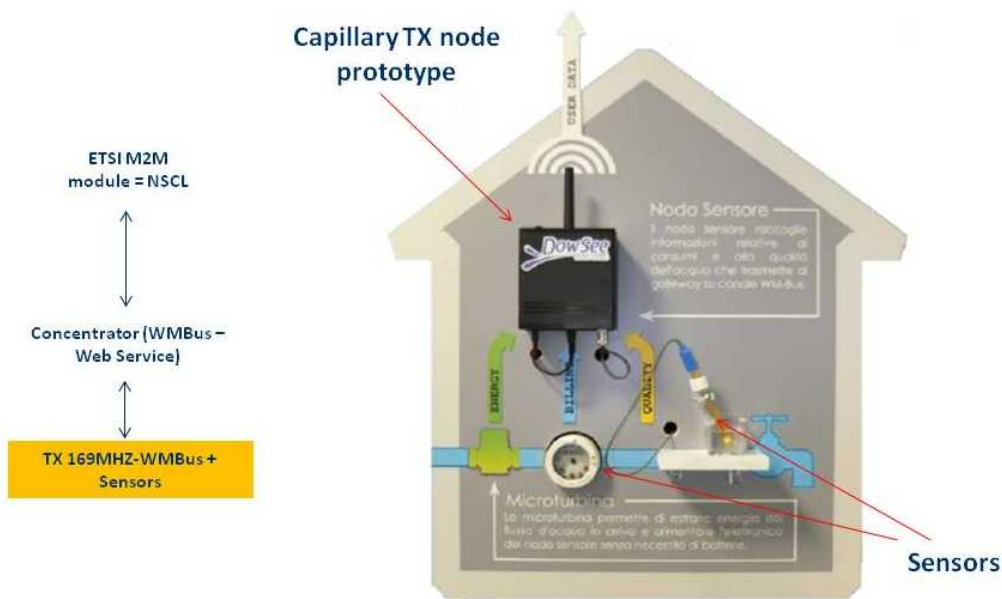
ALMANAC has defined an initial Capillary Network infrastructure for collecting data from different devices and ensuring their collection in an ETSI M2M compliant service platform. The prototype has been demonstrated with water sensors.

The term Capillary Network refers to an infrastructure which realises a dedicated network that connects many devices like meters, actuators and sensors. It is especially deployed in areas which cannot be reached by existing telecommunication networks such as sewers and basements where meters and actuators are often installed by utilities.

A Capillary Network is developed for the ALMANAC platform to achieve the necessary infrastructure to link sensors and actuators and connect to them via a gateway. Partner Telecom Italia, who is leading the work on the network infrastructure, has defined a first adaptation of the Capillary Network and demonstrated the concept using water sensors.

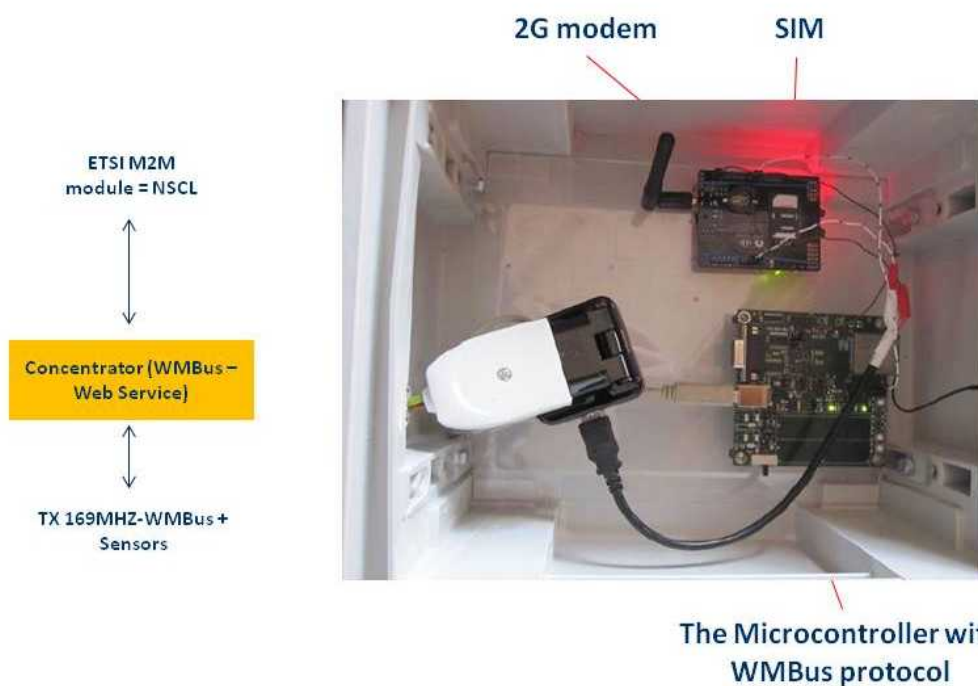
Roberto Gavazzi, Senior Product Leader from Telecom Italia explains:

In ALMANAC, the Capillary Network is composed of a transmitter component (TX) as shown in Figure 1 and a Concentrator/Gateway as shown in Figure 2.



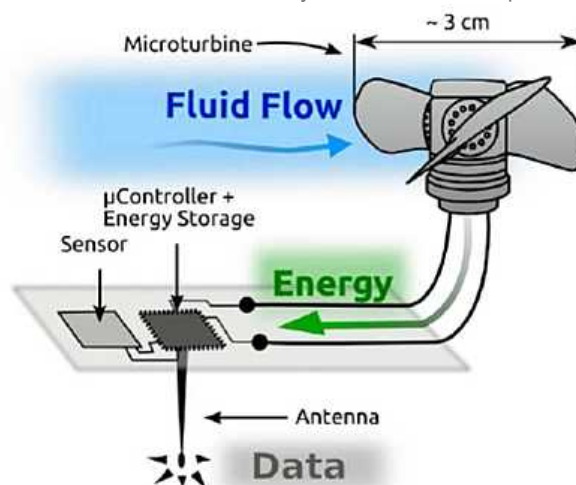
To be compliant with standards suggested by the Municipality of Torino and adopted by the utilities, the prototype includes the ETSI M2M standard and the Wireless M-Bus protocols.

The ETSI M2M Network Service Capability Layer (NSCL) platform provides a standard way to manage devices and data according to the ETSI M2M standards. ETSI standardised the definition of a M2M Platform and issued a second release of the specifications at the end of December 2013.



In the prototype, the Capillary Network is connected to real smart water sensors as shown in Figure 1 measuring flow and pH so that real data are sent to the Almanac Smart City Platform. The setup includes a water pump and a water loop enabling the meter to measure the current water consumption.

Embedded in the TX component are two super capacitors, which are directly powered by a micro turbine, as shown in Figure 3. This is an interesting solution of energy harvesting that can be used for water metering services, eliminating the need for batteries in the transmitters. Consequently no battery replacement work or costs are incurred.



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ALMANAC at the IoT Week 16-20 June

ALMANAC exhibited and organised a session on IoT technologies for Smart Cities at the event which attracted 400 participants from more than 20 countries.

The IoT Week originated in the European IoT Research Cluster to become the pre-eminent event attracting industry and researchers from around the world. IoT Week 2014 was the third of its kind and ALMANAC was present, both as a session organiser and an exhibitor.



The workshop organised by ALMANAC dealt with the uptake of IoT technologies for Smart City infrastructures, moving from technological novelty and piloting to prominent business takeover. Presentations and discussions were on public-private partnerships, water utility solutions, reliability and security in smart city networks.



At the exhibition, ALMANAC partners demonstrated the first workings of the ALMANAC platform with focus on gathering data related to water consumption and waste capacity. The setting included a water network and smart bin, capillary network devices and GUIs for data management and virtualization layer.

- The ALMANAC stand had a good number of visitors and interest was shown towards everything from the application domains, the technical components as well as deployment plans and the possibility to replicate in other cities. Questions also concerned the kind of middleware and API/Models that ALMANAC uses to access sensors as well as standards for management and communication in the capillary network prototype, explains Riccardo Tomasi, Head of Research Unit: Internet of Things Service Management at Istituto Superiore Mario Boella and continues:

- They all reacted quite well to the demonstrator and especially the two toy set-ups (bin + water tower) and GUIs provided a good way of engaging people passing by.



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