

Position Statement for the 2nd Usage Area Workshop “Towards a Future Internet Public Private Partnership”, Brussels, 21st to 22nd June 2010

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The number of usage areas of the Future Internet is clearly extensive. Any of the usage areas has high applicability and importance for the work towards the Future Internet.

It is the authors' position that experimentation environments to support as many usage areas as possible under realistic conditions is of utmost importance to avoid the pitfall of designing disjointed *Future Internets* serving predominantly one or few usage areas.

Important hosts for such experimentation environments are for example cities. Cities offer a unique playing field for designing, testing and validating approaches. They offer:

- A high density of real end users with diverse but real user needs/wants and
- a relatively uncomplicated governance model with high suitability for a PPP model.

Apart from their unique framework of real users and uncomplicated governance, cities face problems in many usage areas. More than 50% of the world's population lives in cities. This proportion is continuously increasing. As urban environments are becoming denser and more complex, efficiency and sustainability become increasingly difficult for a number of reasons, e.g.:

- Inadequate transport systems, e.g. leading to congestion and increased emissions and encouraging e.g. working from home.
- Inadequate utility services, e.g. leading to grid black-outs, water shortages, energy management and garbage disposal or recycling bottlenecks.
- Social structures, e.g. insufficient housing and drop in housing quality, increase in crime and fall of family values.
- Inadequate city services, e.g. healthcare, environmental monitoring, policing and government facilities.
- Demand for public interfaces in terms of software and hardware, e.g. to support transparency, journalism and civic use of sensors.

City models of the future are systems of the people, by the people and for the people anchored around sustainability, liveability and social equity that are powered by technological and design innovation. These

can be seen as systems of systems with emerging opportunities to introduce digital nervous systems, intelligent responsiveness, and optimisation at every level of system integration - from individual devices and appliances, to buildings, and ultimately to complete cities and urban regions. Also, and through interoperation of the many digital nervous systems – for example mobility systems and its energy systems – it becomes possible to coordinate operation and goals to achieve significant efficiencies and sustainability benefits. The vision is thus of integrated and adaptive complex systems for the design, management and operation of such Smart Cities of the future.

The SmartSantander project (FP7-ICT-2009-5) is a project that embraces the opportunities cities offer and has proposed a smart city experimental test platform to be deployed in Santander, Spain. The target is specifically on the Internet of Things angle towards the Future Internet. The project will kick off in September 2010 and will provide a proving ground for similar platforms to be established under the PPP umbrella. This would allow for the possible extension of several interconnected smart city experimental test platforms offering a tremendous playing field for Future Internet experimentation.

Role of authors' organisations:

The **Alexandra Instituttet** has research activities spanning several of the Future Internet usage areas, including infrastructure, enabling technologies and applications, e.g. cultural events and entertainment citizen services, urban location based services, positioning and navigation services, smart health, smart energy (smart and/or super grids) and smart transport. In addition the Institute offers experience on user driven innovation, a key factor when working in living lab environments which cities essentially provide, in a multidisciplinary team of researchers. The Institute also provides matchmaking and networking services to Danish organisations that are interested in Future Internet and has bid for a national EU networking grant to link Danish companies and research organisations to the Future Internet PPP. As such, we see our role as a key contributor to smart city experimental facility platforms in the PPP and to linking key actors to the PPP activities in the usage areas.

The **Centre for Communications Systems Research (CCSR)** is a Research Centre in the EE department of the Faculty of Engineering and Physical Sciences (FEPS) at the University of Surrey, UK. In the previous two UK HEFCE Research Assessment Exercises, RAE2001 and RAE2008, it has been ranked top among the Universities in the UK. With more than 100 actively researching members, CCSR hosts one of the largest European academic research groups in mobile communications, covering holistically the entire spectrum of communication systems from lower layers up to mobile service delivery platforms and applications. The centre has a wide collaboration with industry both inside and outside the UK and been extensively involved in the definition and execution of EU FP4, 5, 6 and 7 projects in the ICT domain. In the past 5 years, CCSR has been technically leading several research projects targeting the creation of systems for real world awareness based on Internet of Things technologies. These systems serve as key enablers for smartness in future service environments. CCSR is co-ordinating the Internet of Things initiative (IoT-i) and has been instrumental in the creation of the upcoming SmartSantander and the Internet of Things Architecture (IoT-A) projects.

The **University of Cantabria** is the technical coordinator of the SmartSantander project. Recently, it was identified as one of the nine poles of excellence, due to its research and innovation activities. The

University of Cantabria is collaborating with several Regional and National institutions providing support in both technical and strategic projects. Furthermore, a strategic alliance with the Bank of Santander was agreed more than 20 years ago. An example of this successful collaboration is the design of smart card applications running on more than 4,000,000 devices around the world.

Last but not least, the University of Cantabria, both the Regional and National Government and Santander City Council are collaborating closely to position Santander in a privileged position in terms of the smart city scenario by supporting European Future Internet actions, in particular those related to the PPP. As an example, a national collaborative project with a budget of around 28 M€ has been submitted whose central topic is the city of Santander in the 2020.

Telefonica I+D is the coordinator of the SmartSantander project, besides of taking a leading role in the definition of the industrial approach of the FI-PPP. This demonstrates the company's commitment with the development of a FI able to improve the quality of live of the citizens with the utilization of the IoT technologies.

The **Center for Digital Urban Living (DUL)** is a national research centre hosted by Aarhus University. It addresses five domains within urban life: Civic Communication, Cultural Heritage, Digital Art, Media façades and New Urban Areas. In partnerships with public and private partners, DUL initiates research, development and test of systems to support activities in a networked urban setting. The projects are highly experimental and often take the form of large-scale semi-permanent installations, e.g. Aarhus by Light and the Danish World EXPO pavilion in Shanghai. DUL has a focus on innovative interaction technologies and user-centred design, often combining existing infrastructure (e.g. screens, advertising stands) and personal media (mobile phones, web) with newly developed I/O devices.

The **UNINOVA** institute is a multidisciplinary, independent, and non-profit research institute employing around 180 persons, located in the metropolitan area of Lisbon, Portugal. The main aim of UNINOVA is to pursue excellence in scientific research, technical development and advanced training and education. The staff works closely with industry and universities, technological innovations being transferred to profitable business concepts and, existing products, further developed to match new industrial requirements. UNINOVA contains various centres of excellence that expose a wide variety of competences. In particular the CTS - Centre of Technology and Systems (formerly known as CRI - Centre for Intelligent Robotics) presents well-known competences in systems' modelling, conception and design of architectures, development of toolkits for standards-based platforms, methodologies for design and implementation of open systems. UNINOVA has managed and participated in many national and international research programmes (ESPRIT, BRITE, IMS, IST, NMP, etc.) with RTD expertise in interoperability, industrial integration, middleware technologies and standards-based activities. UNINOVA research team currently participates and has participated during the last few years in key European and national projects that build the knowledge and technological foundations to the work of smart-cities. Of particular interest and relevance is the following set: FP7-ICT-216420 CuteLoop (www.cuteloop.eu) on-going research project directed at using Networked Devices enabled Intelligence for a Proactive Customers Integration as Drivers of the Integrated Enterprise, especially focusing on food-chains and craftsmen maintenance work. In the CuteLoop effort, UNINOVA is majorly

responsible for the architectural design and development of a solution that, by combining the key strengths of Event-Driven Architectures and Service-Oriented Architectures, can establish a base platform for integration and communication of CuteLoop processing and service components.

CEA-LETI is one of the major European research centres for applied electronics. More than 85% of its activity is dedicated to research finalised with external partners. Nearly 1,600 men and women are serving innovation and the transfer of technology in key domains. As the preferred contact of the industrial world, Leti has sparked the creation of nearly thirty high-technology start-ups. The laboratory secures more than 170 patents every year and implements a dynamic strategy in managing its patent portfolio. A significant part of LETI is focusing on ICT, wireless communications and security, including some laboratories dedicated to creativity and usage of news technologies.

CEA-LETI is today one of the main contributors to EC FP7 projects on future networks, and security, and is involved in several projects in the area of Internet of Things, cognitive radio, 4G systems, sensor networks, etc. In the area of Internet of Things and Future Internet, LETI is coordinating the SENSEI integrated project dealing with the integration of sensor and actuator networks in the Internet. LETI is involved in new projects on IoT such as IOT-A, IOT-I, SMART-SANTANDER, and EXALTED.

Santander City Council prioritises more efficient city management and engagement with the citizen through the use of new technologies. The City Council has participated in many projects, including: medium to large scale deployment of corporate networks for data transmission, traffic surveillance systems using TV Cameras; monitoring and management of urban public transport using GPS positioning; Mapping of a catalogue of urban resources through the GIS project; management of payment systems on public transport through RFID tags and Multilanguage Information System for Blind Persons (SIO). We can offer a vast amount of experience in actual deployments as well as existing infrastructures (such as mentioned above) to enable future internet research to be shaped by actual needs and wants. This will to a certain degree already happen in the SmartSantander project, but further activities are needed to build up a large scale future internet platform across sectors, cities and actors.