

Intelligent Mobility Anywhere

New approaches for decongesting traffic and reducing the time needed to travel are under development through the creation of intelligent transport systems. Mobile and wireless technologies can contribute to the sustainable development of cities and to facilitate national and international transportation. At the same time, users desire to obtain as many services as possible during their travel to take advantage of the time used when travelling. We consider the following four key topics:

- **Urban and road traffic management:** The focus is on various applications and services in the transport industry, and primarily intelligent transport systems, including:

advanced vehicle control systems, travel information, traffic management systems, public transport applications, and communications technologies that enable applications to interact. Focus exists on integrating vehicle movement within the road and the transport environment.

- **Efficient trip management:**

Mobility can be enhanced via applications and services that focus on creating efficient travel. Providing efficient and cost effective public transport is considered a key objective of national transport policies in order to cope with the increasing mobility demands, energy prices and environmental pollution. One potential advance would be to use pervasive computing technologies to enable

users to better organise their travel needs.

- **Vehicle-to-Vehicle (V2V) and Vehicle-to-Infrastructure (V2I) communications:** They offer the ability to detect traffic problems through the dynamic exchange of position and speed information among nearby vehicles, and can improve traffic management through real-time exchange of data among vehicles and with road infrastructure. They are also a very attractive solution to improve road traffic management, thereby contributing to the European goal of safer, cleaner, and more efficient and sustainable traffic.

- **Mobile office:** Mobility adds flexibility for knowledge workers, and

new working environments across organisational boundaries have become important, if not imperative. Mobile terminals will need to access information in a simple, efficient and trustful manner, which needs different communication technologies, virtual interfaces, and ambient intelligent paradigms that, in an integrated way, will allow users to feel as they would be at their own personal office.

Juan Carlos Burguillo, Univ. Vigo, ES;
Susan Sweet, Mott MacDonald, UK

News from the Working Groups

Broadband Working Group

In the context of the Broadband Working Group a „Report on current usage of public funds (e.g. Structural Funds) to promote innovation and early take-up of R&D results“ has been developed (http://www.emobility-ca.eu/deliverables/D4.1_eMob_FINAL.pdf) and has also been published at the „The European Broadband Portal“ at the following link: <http://www.broadband-europe.eu/Pages/CompetencesList.aspx>.

This report is describing the instrument of Structural Funds including the objectives of cohesion policy, the applications for Structural Funds, the eligibility criteria and the regulatory framework and community strategic guidelines on cohesion policy. The Structural Fund

Budget during the financial period 2007 – 2013 is presented with an evaluation of different areas of investment based on the National Strategic Reference Frameworks. The need for investment for broadband in Europe follows from statistics and examples by considering the status of broadband deployment and the availability in the European Union and the availability of data throughput.

Based on this report a questionnaire has been launched towards regions, projects and other organisations in order to get a better understanding of success factors for the use of Structural Funds for broadband system deployment in Europe. The questionnaire is available at

<http://www.emobility-ca.eu/questionnaire/questionnaire.html>

Expert Advisory Group plan for 2009

The EAG members met in Feb 2009 to discuss the 2009 plans and SRA v8. It identified nine strategically important topics to be further deliberated upon and published in form of White papers initially and subsequently edited in SRA v8.

To facilitate this, nine Expert Working Groups (EWG) were established to carry forward the discussions and White Papers.

These are:

EG1: „Green Wireless Communications“

EG2: „Future Internet“; This is continuation of previous eMobility activities on Future Internet. This White Paper will have completely new and innovative approach to the FI. An „Evolutionary“ approach that is more economically pragmatic and

considers widespread availability of mobile/wireless networks. The adopted approach is complementary to the worldwide activities, whilst if adopted, makes Europe approach to FI unique and distinguishable.

EG3: „Mediation Bus for Ubiquitous Services“

EG4: „Optical Fibre technologies and Radio over Fibre“

EG5: „User-context and Technologies for User Profiling“

EG6: „Broadband Radio access and self-organising Networks“

EG7: „Cognitive Communications“

EG8: „M2M Communications“

EG9: „Heterogeneous Network Management“

The Expert Advisory Group next meeting is planned for 9th of June in conjunction with ICT Summit in Santander, Spain.

eMobility drives research linking applications to networks!

In recent years, consumer demand for Mobile and Wireless Communications (M&WCs) has become a global mass market business, from which European organisations have greatly benefited and Europe has consolidated its leading position. However, still much of the traffic flowing in cellular networks is voice, data and multimedia applications being still in their infancy. Within eMobility, much of the effort has been dedicated, as it should, to technical matters, the SRA (Strategic Research Agenda) being one of the major outcomes.

Nevertheless, a Working Group on Leading-Edge Applications has been formed, in order to address non-technological aspects related to services and applications, hence, enabling bridges with other sectors not directly related to M&WCs. The major outcome of the work of this Working Group is an SAA (Strategic Applications Agenda). This SAA is a very first effort to put together, in a unique document, ideas for applications of M&WCs. The basic idea developed from the need to show what applications one may have supported by this area of Telecommunications (with a broader view), so that it becomes apparent that, together with the work on new and (r)evolutionary approaches to systems and networks, there is also a world where they can be applied, for the benefit of users, and the society at large. Furthermore, the SAA intends to capture the M&WCs requirements of promising new applications in various areas, through the road-maps available in

these sectors, and identifying synergies between these road-maps and those of the M&WCs sectors, leading to the definition on new joint priorities for R&D.

This issue of the Newsletter is dedicated to the SAA, aiming at showing its key results, as well as contributing to disseminate the work of the Working Group. Some Focus Areas have been chosen upon which the SAA presents a vision, core topics, a state of the art, and assessment of future challenges. These Focus Areas are Health and Inclusion, Transport, Environment, Future internet, and Enabling Technologies (as a „supporting role“). For the first three, core topics have already been identified: Health and Inclusion - Future wireless diagnostic and disease management systems, Hospital consultation and emergency scenarios, Assistive technologies, and Well being and personalisation; Transport - Urban and road traffic management, Efficient trip management, Communication services and new applications for Vehicle-to-Vehicle (V2V) and Vehicle-to-Infrastructure (V2I) communications, Mobile office; Environment – Alarms, Monitoring, Efficient resources management, Technology waste.

Version 1 of the SAA, issued at the beginning of Jan. 2009, based on volunteer work from some members of eMobility (to whom I'm very grateful!), gathered contributions ranging from academia to industry, including SMEs. Ad-



ditionally, contacts have been established with other European Technological Platforms, projects within Framework Programmes 6 and 7, besides desk research and literature survey. Work will continue throughout 2009, with events already scheduled (detailed information is available at eMobility's website): 4th Workshop and 4th Meeting, in Madrid, Spain, hosted by Telefonica, on 2009-May-19/20; 5th Meeting in Brussels, in Brussels, Belgium, on 2009-Sep-04 (tentative).

The SAA will have a Version 2, to be issued by Dec. 2009. You're most welcome to participate in the WG and contribute to the SAA in one of the Focus Areas: please send your contributions to diana.ladeira@lx.it.pt. SAA Version 1 is available at eMobility's website, http://www.emobility.eu.org/WorkingGroups/Applications/documents/Strategic_Applications_Agenda_v1-0.pdf. Enjoy it.

Luis M. Correia,
IST/IT – Tech. Univ. Lisbon, PT.



Editorial

Is there anyone left in Europe who does not know that European society faces serious challenges when it comes to our environment, transport systems and the health systems we will need to support our ageing population? I don't think so. eMobility decided almost two years ago that communications technology could play a vital role in enabling and improving the functionality of applications systems for environment, transport and health systems and started planning the first edition of the eMobility Strategic Applications Research Agenda (SAA). This first edition is now available on our web site for download ([eMobility.eu.org](http://www.emobility.eu.org)) while work has started on the second edition, to be published in December 2009. This newsletter provides you with a glimpse of some of the many issues described in the SAA Version 1. **Enjoy reading it!**

Ms. Viviane Reding, European Commissioner for Information Society and Media, referred to the importance of working on research linking these applications to the Future Internet in her speech in Prague on May 11, 2009, showing that this topic is definitely moving up on the political agendas in Europe. If you want to get involved in this hot topic, join the eMobility Applications Working Group!

Dr. Fiona Williams

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A User Perspective

The Future Internet is receiving a great deal of attention in the research world. Personalisation, context-awareness, and Internet of Things, but also Internet of the People as evolution of Web 2.0, are often mentioned as examples of the capabilities that the networks of the future will have. While the potential and the key technologies of such network are not clearly addressed yet, there is also an emerging need to understand what services and applications can be provided to users.

At the same time, from a bottom-up approach, as technology evolves and the next generation of Internet becomes better defined and closer to reality, new opportunities for applications arise. Applications and services are the drivers for the development of the Future Internet, presenting requirements that need to be fulfilled.

Higher transmission rates, seamless connectivity, better reliability and higher security are just a few features that one expects from the Future Internet.

A series of scenarios with the possible future applications has been developed, to show requirements that go beyond the capabilities of the current networks. For each application, a look is taken at why they are not currently feasible and what kind of capabilities they require from Future Internet. Each application is also analysed from a business perspective, to understand the actual potential for driving innovation. Some of the scenarios taken into account refer to:

- *Everyday life with human environment interface – requiring, e.g., enhanced routing, security, and augmented reality, mobile 3D internet, context aware mobile web, and interactive context aware games;*
- *Future communities – requiring real time content, network content prosumers, and objects and ideas*

based information;

- *Home – addressing sensors and autonomous maintenance systems;*
- *Industry and Automation – reliability and fast connectivity playing a major role;*
- *Virtual reality – advanced video technologies, multisensing devices, animated and sensorised textiles technological aspects being considered;*
- *Real-time translation – requiring, e.g., language recognition, on-line translation, technology for lips reading, bandwidth and computing capacity enough to enable real time operation worldwide.*

The main challenges identified encompass: to understand the requirements for future applications and services; to drive research in the right technological direction, so that technology advancements may translate into business innovation.

Diana Ladeira, IST/IT – Tech. Univ. Lisbon, PT;
Luis M. Correia, IST/IT – Tech. Univ. Lisbon, PT.

A Safer and Greener Society

The environment is a constant consideration in our lives, including the development of technologies and their impact on the environment. Therefore the main vision when addressing this matter area can be described in the following statement: "We live surrounded by natural and man-made hazards that, with advances in technology, can be monitored, in order to provide the necessary alerts; but this technological evolution also translates into greater implications for our natural resources, requiring efficient technical solutions, so that we can live in a cleaner and safer environment".

The research conducted is focused on four domains where mobile and wireless communications can have a positive impact on our environment and lives: alarms (e.g., fire, floods); monitoring (e.g., radiation, pollution); efficient resources

management (e.g., energy); technology waste. There are several European projects that were/are focused on these different domains, and also several reports (e.g., ETNO and WWF report, GESI, the Climate group) that focus on the reduction of a carbon footprint through the use of ICTs.

These key areas are increasingly important, given global drivers, such as public safety and sustainable growth. All the solutions require investment and must show results that are measurable and economically viable in the long term, hence, the mix of solutions can potentially address a large commercial market on a global scale. The drivers for the various solutions derive their specifications from risks caused by natural phenomena (e.g., earthquakes), human activity (e.g., choice of materials and components) or an unforeseen hazard-

ous deviation causing a serious risk to human life (e.g., issues with safety in public places).

One of the main issues regarding environmental monitoring is to provide guidelines that facilitate critical information availability, usability and reliability playing a key role in new solutions design and implementation. It is also important to increase the collaboration among environmental organisations, the public sector and industry, in order to focus on the most imminent risks, allowing the technology to improve the security of the professionals involved and the way it affects their lives and work.

The "green" topic is surely one of the main focuses on applications and services in the next 10 – 15 years.

Diana Ladeira, IST/IT – Tech. Univ. Lisbon, PT; Kristiina Sunell, SESCA, FI.

A Better Life with ICTs

Recent changes in society demand for new advanced ICT services. Such changes include an ageing society and workforce, increasing life expectancy, and changing family forms with an increase in people living alone. New challenges relevant to these changes have to be faced in the area of health.

Biosensors and other new technologies reduce costs dramatically, and lead to do-it-yourself home care. Recent advances in image and video wireless transmission will enable remote diagnosis also in mobile scenarios (e.g., ambulances). Such emerging technologies have the potential to enable new services that could lead to a dramatic change in health organisations and healthcare delivery practices, prolonging the period during which people with cognitive and health problems are capable of living independently

away from medical centres, while alleviating the burden of caregivers. Furthermore, mobile services can have a massive impact on all aspects of healthcare, from delivering the information people need to lead a healthy lifestyle to making healthcare systems more efficient and responsive and providing 'in the home' and mobile healthcare technologies.

„Health informatics and telemedicine“ as such is one of the key areas of change in the health and social services sector. Within the SAA, the concept of m-health is defined as "the emerging mobile communication and network technologies for healthcare systems". Regardless of technology advances, the health sector currently lags behind other sectors in the use of recent advances in information and communications technology. This is due to technical barriers, to

a limited professionals' adoption of mobile technologies for healthcare, as well as to a lack of efficient business models that could support such services. An analysis of the main factors having an impact on health professionals' adoption of mobile technologies is provided, which will result in great potential for rapid sustained growth.

Four key areas of particular interest were identified: future wireless diagnostic and disease management systems; hospital consultation and emergency scenarios; assistive technologies; well being and personalisation. We believe that this effort will promote our core vision: "to support individuals and professionals via future mobile applications to enhance healthcare delivery, clinical performance and lifestyle".

Maria Martini, Kingston Univ., UK;
Homer Papadopoulos, Demokritos, GR

Services Anywhere, Anytime, Any Format

In recent years, we have witnessed rapid advances in enabling technologies for mobile and ubiquitous communication, such as the increasing pervasive communication paradigm, embedded sensor technologies and a wide range of wired and wireless protocols. Context-aware communication is emerging as the next communication paradigm in which infrastructure and services are seamlessly available anywhere, anytime and in any format. In order to engineer context-aware communication systems, it is of high importance to understand, apprehend, and define the constituent components of context from an engineering perspective, as well as, from a model-theoretic perspective.

Context-aware communication is a mobile communication paradigm in which applications can discover and take advantage of contextual

information (such as user location, time of day, nearby people and devices, and user activity). Context-aware applications (or the system infrastructure to support them), however, have been widely available to everyday users. There are several research challenges, e.g.:

- *Context discovery: mobile applications require on the fly discovery of devices and resources in networks with the ability to check whether these devices provide the required capabilities.*
- *Context state capture and transfer: for seamless service relocation, the state of a mobile application should be preserved while the user is moving from one system to another to ensure that contextual information is not lost during transfer.*
- *Context adaptation: the mobile application should be deployable on different hardware platforms, ranging from desktop systems to mobile*

handheld devices, which should be possible without any modification or manual reconfiguration of the service by the user.

Challenging issues have emerged in the deployment of mobile services over heterogeneous networks using different wireless access technologies; in this context, it is essential to optimise handover and interworking mechanisms to be able to maintain service continuity and quality of applications running in mobile devices. Additionally, other aspects, like the suitability of the layered protocol architecture for wireless networks, and cross layer design issues, focusing on the cross layer adaptation, are of importance as well.

Diana Ladeira, IST/IT – Tech. Univ. Lisbon, PT;
Luis M. Correia, IST/IT – Tech. Univ. Lisbon, PT.

Meetings

May

2009 05 19
Madrid, Spain
Applications Workshop

2009 05 20
Madrid, Spain
Applications Working Group Meeting

June

2009 06 02/03
Vancouver, Canada
eMobility Future Networks workshop

2009 06 10/12
Santander, Spain
ICT Mobile Summit 2009

2009 06 14/18
Dresden, Germany
IEEE International Conference on Communications

September

2009 09 03
Brussels, Belgium
General Assembly

2009 09 28/29
Orhid, Macedonia
MASIT Open Days
(Macedonian Chamber of Commerce)
Presentations on eMobility activities as an Open Session in the event

October

2009 10 19
Beijing, China
Future Networks Workshop
Event in colocation with the WWRP conference - open to representatives of fora