3/2012

EURESCOM mess@ge

The magazine for telecom insiders

NEWS

Celtic-Plus
Smart Connected World

ICT in Horizon 2020

The Kennedy Perspective

An SME or not an SME – that is the question!

Events

NEM Summit 2012 in Istanbul

A bit beyond

Robots @ Home

Celtic-Plus will run its 8th annual conference, entitled "Celtic-Plus Event 2013 – Realising the Smart Connected World", in Kayseri/ Turkey, from 6 to 7 March 2013.

Interested researchers and high-level managers from industry and public authorities are invited to attend. The number of participants is limited to 200!

Highlights of the programme and the new Celtic-Plus research areas are in particular:

- New, infrastructural telecommunication challenges for secure, high-speed and ubiquitous networks
- New service challenges, like digital/smart home, digital/smart cities, e-Health, etc.
- Future Internet topics in complement to the EU FI-PPP initiative, e.g. to build up a Celtic-Plus "Use Case Factory", as well as new inter-disciplinary challenges related e.g. to smart energy, green ICT, and CleanTech "grand challenges"

The event will be complemented with an exhibition of project results from a selected number of important Celtic projects.

Further information and registration access are available on the Celtic-Plus Event web site at http://www.celticplus.eu/Events/Event-Kayseri-2013/default.asp

Heinz Brüggemann
Director Celtic Office
Wieblinger Weg 19/4
69123 Heidelberg/ Germany
Tel: +49 6221 989210
E-mail: brueggemann@celticplus.eu

www.celticplus.eu

Funding Opportunity for European R&D Projects

Celtic-Plus Spring Call for Proposals – Deadline: 23 April 2013

Celtic-Plus is a EUREKA Cluster dedicated to realising the vision of a smart connected world through an industry-driven R&D programme. There are two calls per year, in spring and in autumn, with a total funding of up to 100 million euro. The funding is orchestrated via the Celtic-Plus programme and provided by Public Authorities from 47 EUREKA member countries.

Eligible topical areas

Get Connected

- Infrastructure and connectivity aspects
- Fixed/Wireless, optics, energy-efficiency
- Network architecture, autonomic networks

While Connected

- End-to-end services and applications, like
  - Digital home, digital enterprises
  - Digital City (incl. digital school, digital transport)
  - E-Health
  - Security, privacy, identity

Future Internet relations

- Complement Future Internet (FI-PPP) programme by
  - Making the Internet a high-quality service platform
  - Introduce the 'Celtic-Plus Use-Case Factory'
    - Extend the program by additional use cases not covered in the FI-PPP program
    - Contribute to future internet capacity building and test cases/ platforms

Green-Internet relations

- Consider environmental issues in ICT
- Encourage better energy efficiency
- Consider Smart Grid, Water management & ICT
- Develop multi-disciplinary approach

User friendly call process

The Celtic-Plus programme gives proposers the opportunity to submit proposals twice in the year – Spring Call and the Autumn Call. **The Spring Call deadline will be 23 April 2013.** Celtic-Plus has an accelerated one-stage call process to ensure the shortest possible time between proposal submission and start of selected projects.

Celtic-Plus proposals should be complete and clearly present the technical objectives, timescales, participants, manpower, and expected results. These proposals are evaluated by independent evaluators. Proposals meeting the required standards will be retained and given the Celtic-Plus label. To be eligible for funding, project partners need to be located in EUREKA member countries.

Further information

Please visit the Celtic-Plus website at www.celticplus.eu for call details and the Celtic-Plus Purple Book for details on the R&D priorities of Celtic-Plus. For further information, please contact Heinz Brüggemann, director of the Celtic Office, at brueggemann@celticplus.eu

Celtic-Plus
Smart Connected World

www.celticplus.eu

Dear readers,

While we are now approaching the final year of the Seventh Framework Programme (FP7), negotiations on the directions and the budget of the new EU framework programme for research and innovation, Horizon 2020, have entered a decisive phase, as this issue went into print.

In view of the importance of the new framework programme for European research and innovation, the editorial team of Eurescom mess@ge considered the time right for dedicating a cover theme to Horizon 2020. We do this from the perspective of the ICT sector, focusing not so much on rules and budget, but rather on the content of the programme and the role ICT should and could play in it.

For this cover theme, we have asked a number of ICT industry players to present their views on the new framework programme. The result may not be representative for the whole industry. However, it shows what some of the key players in European ICT are thinking on the subject.

The first article in the cover theme provides an overview on Horizon 2020. The ensuing article by Brigitte Cardinael from Orange presents the position of the ETNO R & I Group on the new framework programme. The article is complemented by another telco contribution: Heinrich Arnold, Senior Vice President at Deutsche Telekom's Telekom Innovation Laboratories, presents his organisation's view on the new EU framework programme. In addition to these telco views we also present views from other branches of the ICT sector. Roger Kilian-Kehr and Stephan Fischer explain the vision of SAP Research for ICT in the new framework programme, and Werner Mohr writes about the Horizon 2020 views at NSN.

This issue also includes a variety of further articles on different, ICT-related topics, including an event report on the recent NEM Summit in Istanbul. See also the "The Kennedy Perspective" on SMEs and innovation as well as the "A bit beyond" article on home robots. I hope you enjoy reading our magazine.

My editorial colleagues and myself would appreciate your comments on the current issue as well as suggestions for future issues.

Milon Gupta
Editor-in-chief

Events calendar

3 – 14 December 2012
World Conference on International Telecommunications (WCIT)
Dubai, United Arab Emirates
http://www.itu.int/en/wcit-12

5 – 9 March 2013
CeBIT
Hanover, Germany
http://www.cebit.de/home

6 March 2013
ENVIROFI Day
co-located with First Eye on Earth User Conference (4–6 March 2013) and EUROGI Imagine Conference (7–8 March 2013)
Dublin, Ireland
http://www.envirofi.eu

6 – 7 March 2013
Celtic-Plus Event
Kayseri, Turkey
http://www.celticplus.eu

21 – 22 March 2013
EuroCPR 2013 – 28th European Communications Policy Research Conference
Brussels, Belgium
http://www.eurocpr.org

8 – 10 May 2013
Future Internet Assembly
Dublin, Ireland
http://www.future-internet.eu

13 – 15 May 2013
eHealth Week 2013
Dublin, Ireland
http://worldofhealthit.org/2013/

27 – 31 May 2013
IM 2013 – The 13th IFIP/IEEE Symposium on Integrated Network and Service Management
Ghent, Belgium
http://www.im2013.org

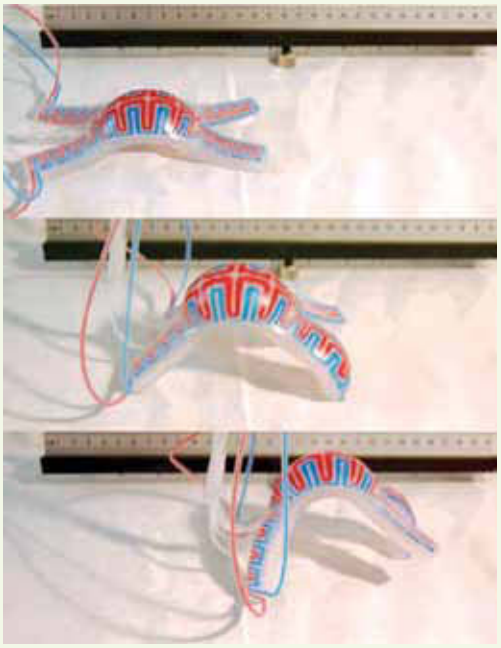
9 – 13 June 2013
ICC 2013 – IEEE International Conference on Communications
Budapest, Hungary
http://www.ieee-icc.org

3 – 5 July 2013
Future Network & Mobile Summit 2013
Lisbon, Portugal
http://www.futurenetworksummit.eu/2013/

Sn@pshot

Camouflage bendy robot

A robot that can change colour to either blend in with or stand out from its surroundings has been designed by researchers at Harvard University. The bendy robot was inspired by the camouflage skills of sea creatures such as octopuses, cuttlefish and squid.



Source:
Stephen A. Morin, Robert F. Shepherd, Sen Wai Kwok, Adam A. Stokes, Alex Nemiroski, George M. Whitesides: Camouflage and Display for Soft Machines, Science 337, 828 (2012), 17 August 2012

http://www.sciencemag.org/content/337/6096/828

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NEWS

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Eurescom mess@ge · Wieblinger Weg 19/4 · 69123 Heidelberg, Germany
Phone: + 49 6221 989-0 · Fax: + 49 6221 989-209 · E-mail: message@eurescom.de

Advertising: Luitgard Hauer, phone: +49 6221 989-405, e-mail: hauer@eurescom.eu
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An SME or not an SME – that is the question!

Why the EU innovation policy needs a broader perspective

David Kennedy
Director of Eurescom
kennedy@eurescom.eu

I often wonder when I see policies designed to favour one group or another, if they are based on facts, fears or even guilt. The current policies in favour of SMEs make me really question if we know what we are doing. Why do we declare what type of organisation must do the work before we even know what it is we want to do. Logic dictates we should assess the job and then select the right players, but we seem to be bypassing logic here.

We are told the European research programmes must be designed with small and medium-sized enterprises (SMEs) in mind. When enquiring as to why we have this bias towards SMEs, the answer is that they are the most innovative. Then there are rules to exclude many SMEs simply because one of the shareholders is large and holds more than 25% – even if they don't have a majority control of the company. Again the logic is questionable.

SMEs – the "true back-bone" of Europe's economy?

However, if I quote the DG Enterprise and Industry website, they highlight that "that more than 99% of all European businesses are, in fact, SMEs. They provide two out of three of the private sector jobs and contribute to more than half of the total value-added created by businesses in the EU. Moreover, SMEs are the true back-bone of the European economy, being primarily responsible for wealth and economic growth, next to their key role in innovation and R&D." *

When I read this, I immediately get concerned as to why, when designing research programmes, we are stressing special support for 99% of European industry. Should we be more worried about the tiny minority of the 1% of industry who are not SMEs? This 1% seem to be generating nearly half of the total value-added created by businesses in the EU.

Are we forgetting large enterprises? The EC SME observatory has noted that fewer than one in ten EU SMEs (8%) reported turnover from exports while more than one in four of large enterprises (28%) have turnover from exports. So if we want Europe exporting, then large enterprises have a key role to play.

Another problem I have with our approach to SMEs is the increasing European inferiority complex based on Silicon Valley envy. Why, in every discussion is there at least one participant who starts with "We should learn from Silicon Valley"? I would propose that Europe recognises that it is different from the rest of the world and stop wasting time pretending we can be Americans. We don't have the same cultures as others and we should play to our strengths of being able to collaborate and achieve consensus. The next person to say we should be Silicon Valley should be put out of the room.

America has a strong "Try, try, try" culture with the ambition to get big fast, and is very tolerant of failures, whereas Europe has a strong history of SMEs that are solid and happy being SMEs. Europe does not support failures generously, as people can get banned from company management for many years if they have a failure. European SMEs do not aspire to grow exponentially like any of the recent bubbles – rather they wish to maintain a stable business and have a long life. These SMEs in Europe are very often in a relationship with a larger enterprise to the benefit of both parties.

European industry eco-systems

Our European success model is more often than not based on a close working relationship between a large enterprise and a constellation of suppliers or customizers in an eco-system. These eco-systems sustain employment, stimulate growth and contribute significantly to the European economy.

The new European emphasis on innovation should not miss that these existing eco systems, incorporating large, medium and small enterprises, should be assisted in keeping their product portfolios relevant and therefore to continue to be major contributors to the European economy, rather than spending excessive resources pretending that some European start up can be the next Google.

Conclusion

Who knows, maybe one day we will see a shooting star from Europe emerging through EC funding. However, if this one bright spot would come at the expense of abandoning the mainstream industries we already have, it might be just too expensive. We would have missed that the essence of innovation is to make changes in something established especially by introducing new methods, ideas, or products. Europe can be innovative, if we recognise that you don't have to throw out the existing assets to be innovative, you just have to employ them better.

Come on Europe – look also after the established industries! They provide significant employment and a large part of the value created by businesses in Europe.

*Source: http://ec.europa.eu/enterprise/policies/sme/facts-figures-analysis/index_en.htm

Horizon 2020 and ICT

An overview

Milon Gupta
Eurescom
gupta@eurescom.eu

In 2014, the new seven-year EU Framework Programme for Research and Innovation, Horizon 2020, will start. It is of core importance for realising the Europe 2020 strategy for smart, sustainable and inclusive growth in Europe. The main goal of Horizon 2020 is to implement the Innovation Union, one of the EU2020 strategy's seven flagship initiatives. As in previous framework programmes, information and communication technologies (ICT) will be an important part. The exact topical scope of ICT in the new programme is, however, still open.

At the time of writing, a number of questions are open: Will Horizon 2020 make the whole process much simpler, as promised? How will the European Commission achieve this? Will the Commission's budget proposal of 80 billion euro for 2014 to 2020 be accepted by the European Parliament and the European Council? What share of the budget will be available for ICT? And which ICT topics will the first work programme include? These are just a few of the questions that are currently being discussed.

The scope of Horizon 2020

Let us start with the known facts: Horizon 2020 will be structured into three priorities: 1. Excellent science, 2. Industrial leadership, and 3. Societal challenges. These priorities will be applied across ten Themes: 1. Health, 2. Food, Agriculture and Fisheries, and Biotechnology, 3. Information and Communication Technologies, 4. Nano-science, nanotechnologies and new production technologies, 5. Energy, 6. Environment, 7. Transport (including Aeronautics), 8. Socio-economic science and humanities, 9. Space, 10. Security.

These Themes, basically the same as in the Seventh Framework Programme (FP7), are directly linked to EU policy goals in areas such as agriculture, energy, environment, transport and security. Compared with FP7, the Horizon 2020 approach suggested by the Commission will emphasise funding for projects that solve specified societal challenges, as opposed to prescribing the specific research topics to be addressed.

A more fundamental difference compared to FP7 is that Horizon 2020 will be designed to go beyond research and facilitate the step from research to innovation. For this purpose, Horizon 2020 will combine all research and innovation funding currently provided through the Framework Programmes for Research and Technical Development, the innovation related activities of the Competitiveness and Innovation Framework Programme (CIP) and the European Institute of Innovation and Technology (EIT).

Market-driven approach

Through Horizon 2020 the Commission aims to tackle societal challenges by helping to bridge the gap between research and the market. This market-driven approach will include creating partnerships with the private sector and Member States to bring together the resources needed. The goal is to enable activities closer to the market, including, for example, the provisioning of venture capital for start-ups emerging from European research projects.

In the context of partnerships, the role of international cooperation is likely to increase. In addition to Horizon 2020 being fully open to international participation, there will be targeted actions with key partner countries and regions focused on the EU's strategic priorities. Through a new strategy, the Commission aims to achieve a coherent approach to international cooperation in Horizon 2020.

The Commission has acknowledged that there is no success without risks. In this context Horizon 2020 will reach out also to non-traditional actors and allow failures in return for a certain percentage of good success stories.

The ICT sector in Horizon 2020

The ICT sector is of high importance for Europe. It represents 4.8% of the EU economy and generates 25% of total business expenditure in research and development (R&D). Investments in ICT account for 50% of all European productivity growth. Thus, the Commission plans to increase the funding for ICT in Horizon 2020. The plans are to increase EU investments in ICT by 46% under Horizon 2020 compared to FP7. This is in line with the Commission's proposed increase in funding across all themes. It appears that the share of ICT in the overall budget will remain more or less stable, as compared to FP7.

As distinguished from FP7, in Horizon 2020 the ICT sector will be distributed across three priorities: Scientific Excellence, Industrial Leadership, and Societal Challenges.

As things are currently proposed, the ICT budget will be 16 billion euros distributed across the priorities. It seems 4 billion euros will be dedicated to the Scientific Excellence priority with most of that going to FET actions. 8 billion euros will go to Industrial Leadership; some of this will be reserved for planned Public-Private Partnerships (PPPs) and 4 billion euros will be in the Societal Challenges nominally for ICT activities.

It is in the Societal Challenges that it may be difficult to actually isolate and exploit this nominal 4 billion euros for ICT, as the themes for Societal Challenges are sector based and have no explicit mention of ICT:

- Health, demographic change and well-being;
- Food security, sustainable agriculture, marine and maritime research, and the bio-economy;
- Secure, clean and efficient energy;
- Smart, green and integrated transport;
- Climate action, resource efficiency and raw materials;
- Inclusive, innovative and secure societies.

Experience has shown that it is very difficult for ICT players to integrate themselves into themes initiated by sector actors, as the sectors do not understand what the ICT players can bring to the endeavours. Furthermore, evaluators often do not recognise the contributions ICT players can make, as they judge them not to be appropriate to address the societal themes. Horizon 2020 offers the opportunity for strategically developing ICT in order for the EU industry to achieve a competitive advantage in the global marketplace.

What is needed now is a dedicated action on future networks and information systems to focus the European efforts and achieve maximum impact with the resources available.

Outlook

Horizon 2020 offers Europe the opportunity to increase its innovation levels and make public funding for research and innovation more effective than it has been up to now. In order to stay competitive towards other developed regions and emerging countries, Horizon 2020 will be crucial for the success of the Europe 2020 strategy. It can only be hoped that the Europe 2020 strategy will be more successful than the (over-)ambitious Lisbon strategy that preceded it. All actors, public and private, have now the responsibility to make it happen, in order to ensure the sustainable growth that Europe needs now more than ever.

Further information about Horizon 2020 is available on the EC website at http://ec.europa.eu/research/horizon2020

The vision of a smart connected future

The telcos' views on Horizon 2020

Brigitte Cardinaël
Chair of ETNO R&I Working Group
Orange – France Telecom group
brigitte.cardinael@orange.com

The European Commission is currently elaborating its RDI framework programme for 2014 – 2020, Horizon 2020. In this context, the ETNO R&I Working Group has expressed its vision and its priorities. This article aims to present the telcos' key R&D priorities and governance expectations for Horizon 2020.

Key R&D priorities

As measured since 2000, the impact of ICT on the economy goes much beyond the sector itself. Offering information management, communication, transaction, storage and simulation means, ICT contributes to increased productivity of many sectors. ICTs are intensively used in all aspects of the economy from mobility (traffic and route management), to aeronautics (3D design of planes) via wholesale (real-time goods management), health or energy control. The benefits of ICT apply also to government and non-profit organisations through on-line services (employment, taxes, culture, etc.).

ICT is a key driver to face societal challenges such as environmental risk management, climate change or ageing population. Thus, ICT is an important sector with its own market, but ICT is also a pervasive enabler in many sectors. It is critical to understand this dual nature of ICT when developing a strategy in order to fully capitalize on the potential of this area.

There are three major trends that will shape the world in the 2020 time horizon:

- Our world is becoming measured, instrumented, sensed
- Our world is becoming interconnected
- Our world is becoming analysed, processed, modeled

These trends will grow stronger over the coming ten years, and we do expect to live in 2020 in an ICT-enhanced world where Virtual meets Real.

Our expectation is that in 2020, the Internet will connect people, things, processes, content, knowledge, information, and goods, based on:

- a seamless, high data rate, full connectivity
- better performing and cost effective full IP networks
- open cloud IT
- performing big analytics
- a greater and greater proximity with sectors
- reliable and secure hardware, software and applications
- optimised energy consumption
-

Users will interact with the digital world through enhanced intuitive means such as:

- 3D interactions and immersions (virtual world, 3D vision, serious gaming, augmented reality, etc.),
- enhanced interfaces for devices (gesture, voice, etc.)
- efficient, contextual and personalised search engines

Telco issues for Horizon 2020

Based on past experiences and lessons learnt from previous European R&D programmes, ETNO members recommend to create Horizon 2020 in a way that encourages all players to participate and gain a lasting benefit from participation. In order to get there, we consider the following points as essential:

Getting the right emphasis in the programme
A key factor for the success of Horizon 2020 will be to address the subjects the industrial community have identified as critical as well as exploring other, more radical possibilities.

Involving the right players
Active industrial participation is essential to ensure the results will have a real impact in the market. An industrial participation level of 70% should be a target of the Horizon 2020 programme.

Building on results
There is a need within European research programmes to have a greater emphasis on using the results obtained and avoiding repeat investments in the same subjects.

Minimising the organisational overload
Telcos are willing to actively participate in determining the optimal community structures needed for Horizon 2020 and to work towards having this constituted by the time the programme starts.

Structure of programme operation
The grand challenges may be addressed through an evolution of the PPP structure. This could involve industry establishing a body to be the partner organisation of the Commission.

Conclusion: telcos' commitment to Horizon 2020

The clear statements of H2020 looking for European leadership as a direct result of this programme is very much appreciated by the European telecoms network operators and service providers. We agree that there is an opportunity now for the EU ICT industry to achieve a competitive advantage in the global marketplace by acting coherently to prepare the next generation of ecologically sensitive technologies and to lead the development of new innovative services.

To get the maximum benefits for Europe, the telcos propose that ICT research should be focused on a limited number of "ICT Grand Challenges" where Europe has both strength and opportunities and to which the EU ICT industry is committed. We see three grand challenges:

- providing capabilities for Big Data and innovative services
- providing fast, reliable and green networks and infrastructures
- providing an inclusive, trustworthy and secure digital world

We propose to assemble competences at European level into a focused ICT initiative within Horizon 2020 to develop the next generation of network and information systems that will lead European business, government and society into a bright future by 2020 and call other players to join us.

Information on Horizon 2020

EC website – http://ec.europa.eu/research/horizon2020/

EC fact sheet on ICT in Horizon 2020 – http://ec.europa.eu/research/horizon2020/pdf/press/fact_sheet_on_ict_in_horizon_2020.pdf

Deutsche Telekom's vision for Horizon 2020

Dr. Heinrich Arnold
Senior Vice President
Telekom Innovation Laboratories
Heinrich.Arnold@telekom.de

The economic and societal importance of communication infrastructures and services has never been higher than today. And it will further increase over the next years. In this context, the EU's new framework programme for research and innovation, Horizon 2020, will play a key role in keeping the European ICT industry competitive and in providing the communication infrastructures and services that Europe needs.

Combining technological and socio-economic aspects

Deutsche Telekom and its research and innovation unit, Telekom Innovation Laboratories (T-Labs), have a long history of participating in collaborative European research, development and innovation (RDI) projects, and particularly in EU framework programmes up to the current Seventh Framework Programme (FP7). In all of our RDI activities, technical issues have never been the sole focus. At T-Labs we have always combined technical expertise with business thinking, legal aspects and societal issues. We believe that combining all these facets will be of critical importance for sustainable growth in Europe and the success of the upcoming Horizon 2020 programme.

In particular, we are convinced that Smart Cities will become an important nucleus for future research and innovation in Horizon 2020. The required RDI activities will need to go beyond technical research in order to be effective. Only the integration of relevant use cases and cooperation with use-case driven projects will provide a healthy mix, guaranteeing the success of the forthcoming framework programme. Initiatives such as the Future Internet Public-Private-Partnership (FI PPP) and EIT ICT Labs will contribute to relevant results.

Evolution of network infrastructure

Internet technologies have proven to help telecommunications network operators in setting-up a cost-optimized network infrastructure. However, this infrastructure is not yet fully developed to support all future demands. Customers will need more bandwidth for a multiplicity of services and applications. Past experience and future service scenarios show that bandwidth is never enough. New technologies and functionalities such as service-differentiation (quality of service), new transport and access technologies, context awareness and personalized mechanisms, as well as new architectures – which will not follow the traditional client-server philosophy – have to be researched and developed to support the performance of specific multimedia and communication offerings. This includes the proper handling of security and privacy issues.

Demographic changes and the integration of Smart City and smart home networks with many more networked devices add further complexities to telecommunications infrastructures. The evolution from traditional media and content delivery systems towards a unified cloud-based infrastructure is still a big challenge which will keep researchers busy. The possibility of integrating modular and combinable infrastructure components controlled by software (software-defined networking) and the virtualization of network functions will, in particular, provide telecommunications operators with the opportunity to produce connectivity and ICT services in a much more flexible manner and at lower cost.

Conclusion

Deutsche Telekom and T-Labs are committed to open innovation and research, development, and the international innovation ecosystem. In this context, we consider Horizon 2020 as an important opportunity for providing the necessary stimulus towards the networks of the future. We firmly believe that the success of Horizon 2020 requires that technological and socio-economic issues are not treated in isolation and that information and communication technologies will play an increasingly important role in laying the foundation of sustainable growth in Europe – to the benefit of citizens and businesses.

Telekom Innovation Laboratories

About Telekom Innovation Laboratories

Telekom Innovation Laboratories (T-Labs) is the research and innovation unit of Deutsche Telekom. Linking its research and innovation activities with the Technische Universität Berlin (TU) and the Ben Gurion University in Beer Sheva and several other universities, institutes, industry partners, and start-ups around the world ensures that science, business, and entrepreneurship are closely integrated. In Berlin, Darmstadt, Bonn, Beer Sheva (Israel), Tel Aviv (Israel), and Mountain View (USA), 360 experts and scientists create innovative services and solutions for Deutsche Telekom customers and for Deutsche Telekom's infrastructure.

Combining business modeling, regulatory issues, use cases, and technology aspects has a long history in T-Labs. The results have been successfully transferred into the different business units and have built the bases for new high-tech ventures, apart from the generation of IPRs and publications. 2012 has been the year with the richest output, with 20 pre-products and system components and 10 high-tech ventures created.

Further information is available on the T-Labs website at www.laboratories.telekom.com

Towards an eco-system perspective for ICT research and innovation

The vision of SAP Research for Horizon 2020

Stephan Fischer
SAP Research
s.fischer@sap.com

Roger Kilian-Kehr
SAP Research
roger.kilian-kehr@sap.com

In this article we present the ideas of SAP Research for shaping ICT research and innovation in Europe through the new framework programme Horizon 2020.

ICT research organisations and European Technology Platforms (ETPs) have welcomed the European Commission's intention to improve the integration of research and innovation activities within the new Horizon 2020 proposal for the next European framework programme. In particular the new programme pillar "Industrial Leadership" is of high interest for technology-centred industry research in ICT.

ICT industry in Horizon 2020

It is well known that new value-adding products and services in other sectors are increasingly fuelled by ICT. This leads to key question for players in the ICT domain, including telecommunication manufacturers and operators as well as software and service companies: How can we engage in Horizon 2020 and benefit from research, development and innovation (RDI) programmes to maintain and enhance industrial leadership and prepare for new global challenges and business opportunities ahead?

In order to meet the ambitious targets of the Horizon 2020 programme, new Work Programmes have to be defined and appropriate RDI instruments have to be put in place that enable research and innovation stakeholders not only to maintain or retain, but even more important, to increase industrial leadership. The ICT industry needs to explore these opportunities and find new approaches and ways for collaboration within and across previously perceived separate ICT domains.

The eco-system perspective

SAP has traditionally cultivated an eco-system of many businesses – large and small – which built specific flavours of SAP's core products in order to meet specific customer requirements. SAP's products essentially exhibit platform features on a technical as well as on a business best-practice level.

For the whole ICT sector it is essential to understand that future growth will not only come from corporations in established domains, but increasingly from new innovative businesses that identify emerging cross-sector business opportunities and develop and market solutions rapidly on top of existing technology stacks and platforms. Furthermore, the innovation cycles of these new business entrants typically have different characteristics that need to be synchronised with established players and platform providers in sectors like networks or software.

We are strongly convinced that any strategy to sustainable growth in any platform-based business has to co-develop future technology and the corresponding eco-systems. Therefore research and innovation activities in Horizon 2020 should consider the eco-system dimension from the very beginning, as it will play an increasingly important role in the successful adoption of new technologies and platforms.

Towards an innovation-enabling real-time platform for Europe

Building on research on Cloud computing, Future Internet and Business Webs, SAP Research has identified a trend in business computing which ICT players could develop into an overarching ICT research and innovation topic. From our perspective, the emerging requirements from a hyper-connected world linking businesses with people and things in real-time call for a broader vision for R&D within the context of Horizon 2020. Continuous, real-time data aggregation, processing and analysis of information streams from various sources within pan-European and global business networks are major opportunities for a European technology and business leadership in areas spanning public and urban infrastructures, advanced manufacturing, healthcare and transportation.

Such a vision of interoperable "Real-Time Intelligent Business Network Platforms" could be an overarching ICT research and innovation topic for Horizon 2020 with the following characteristics: (i) it involves strong and innovative European companies in all relevant areas including networks, infrastructures, platforms, services, and applications; (ii) it aims at long-term business potential which could lead to next-generation products for the European and global market; (iii) it aims at universal eco-system oriented platforms as a basis for innovative businesses to develop new applications and services.

Future Cloud infrastructures and platforms and adaptable, flexible networks would be two key elements in such a vision. The importance of Big Data and innovation regarding the combination and processing of continuous data streams from sources in different industry sectors in real time is another key element. Additionally, such a vision should lead to focused research activities that deliver results into appropriate "playgrounds" or SME workbenches ("testbeds") where mature platform technologies, research results, and information assets from various sectors such as advanced manufacturing including the ones addressed by societal challenges (e.g. healthcare) are brought together in an innovation-friendly framework.

The FIRE, FI-PPP and EIT initiatives are certainly going into the right direction but can only be considered as a first step so far, no overarching focused innovation vision exists among these initiatives. Furthermore, they do not yet embrace the eco-system perspective adequately, which should be a key element in the overall design of a research and innovation framework like Horizon 2020.

Conclusion

We at SAP Research have a very positive view on Horizon 2020 in general and appreciate the efforts the Commission put into setting up this programme. In order to fully leverage the framework in the ICT sector, however, we believe that the ICT industry needs to join forces and use the opportunities that Horizon 2020 offers by creating a bold and strong common vision and developing a common culture of collaboration in RDI projects across domains.

Significant industry participation needed

How Nokia Siemens Networks views Horizon 2020

Werner Mohr
Nokia Siemens Networks
werner.mohr@nsn.com

This article presents the views of data networking and telecoms equipment provider Nokia Siemens Networks on the European Union's forthcoming research framework programme Horizon 2020.

Nokia Siemens Networks and its founding companies Nokia and Siemens have been actively involved in collaborative research programmes for many years. Such programmes offer the opportunity – in particular in the ICT domain – to cooperate with other stakeholders on new technologies and solutions, create consensus on basic concepts and prepare future international standardisation. All in all, collaborative research speeds up time to market and enhances the quality of new product and service introductions, thus benefiting industry and consumers. Successful examples of collaborative research projects are contributions to the development of third generation mobile communications, LTE and IMT-Advanced as well as optical communications and broadband access.

Promising research topics

Horizon 2020 will provide three main Priorities: Excellent Science (basic research), Industrial Leadership (technology-driven research) and Societal Challenges (application-driven research). Nokia Siemens Networks welcomes the closer linkage of the different phases in the research and innovation process compared to former framework programmes, as it enables better exploitation of results including international standardisation.

As a communication networks vendor with a focused strategy around mobile broadband systems, the two Priorities – Industrial Leadership and Societal Challenges – are of particular interest for Nokia Siemens Networks. Activity Lines relevant to us include:

- The Activity Lines on "A new generation of components and systems: engineering of advanced and smart embedded components and systems" and "Micro- and nanoelectronics and photonics" will provide building blocks for components and optical communications for backbone and access networks.
- Communication networks are based to a major extent on software technology. Cloud computing requires ubiquitous, secure and reliable access with high reliability. Therefore the Activity Line on "Next generation computing: advanced computing systems and technologies" is of key interest.
- The Activity Line on "Future Internet: infrastructures, technologies and services" is in the core interest for research and development of next generation Internet, mobile networks, future radio systems, software defined networking and service infrastructures, which will also provide the basis for the Internet of Things.
- Security, privacy and trust are key elements of the design of future systems. Big data handling and analysis will be part of the Activity Line on "Content technologies and information management: ICT for digital content and creativity".

As a key enabler of critical infrastructures like energy, gas, water, traffic and health, communication networks are progress drivers for our society and economy. Their further development will thus provide the platform for many applications under the Societal Challenge priority. Given longer innovation cycles for communication networks, the necessary technologies, components and systems should be developed under the Industrial Leadership Priority and at the same time, collaborative research should be applied and exploited in application domains under the Societal Leadership Priority. A close cooperation between both priorities is necessary.

A combination of instruments like Public-Private Partnerships for bigger research areas, e.g. on future communication infrastructures, and smaller, more flexible projects for dedicated topics is desired to address different interests of stakeholders.

Key factors for success of Horizon 2020

Significant industry participation in Horizon 2020 is essential for successful collaborative research, apart from facilitating the objective of improved competitiveness of European economy that generates future growth, highly skilled jobs and creates knowledge in Europe. Therefore, Horizon 2020 should provide suitable rules and conditions fostering industry participation. Some key aspects to consider include:

- Shortening the time to grant compared to former framework programmes in order to keep topics relevant at project start, especially for areas with short innovation cycles.
- Offering an attractive environment for beneficiaries on IPR handling, access rights for affiliates, reciprocity for international cooperation, reasonable requirements on open access to publications that respect IPRs and strategies of project participants, and limited administrative overheads.
- Investing adequately in research and innovation to foster knowledge and knowledge creation, which is the major "raw material" of Europe. Our recommendation regarding the research budget proposal by the EU Commission is that it may be enhanced compared to Framework Programme 7 and the Competitiveness and Innovation Programme, both of which will basically be continued in Horizon 2020.

Nokia Siemens Networks strongly believes that Horizon 2020 offers great opportunities for contributing to the economic growth in Europe, provided overall conditions are equitable and advantageous for all stakeholders.

Implementing the Future Media Internet

NEM Summit 2012 in Istanbul

Halid Hrasnica
Eurescom
hrasnica@eurescom.eu

Peter Stollenmayer
Eurescom
stollenmayer@eurescom.eu

Following the success of the NEM (Networked Media) Summits in Saint-Malo (2008 and 2009), Barcelona (2010), and Torino (2011), the 5th NEM Summit took place in Istanbul, Turkey, on 16-18 October 2012. Around 300 registered participants discussed the impact of media on the future Internet and how the resulting challenges could be met.

The conference included presentations from more than 35 highly recognised speakers, an exhibition with about 20 exhibitors from various projects and organisations and six co-located workshops. The conference was organised by the NEM Initiative under the aegis of the European Commission (DG Connect), supported by Sigma Orionis and Eurescom. The main local support for The NEM Summit 2012 was provided by Turk Telekom.

The NEM Summit offered participants an opportunity to share information and viewpoints on the R&D status in the area of future media Internet and get up-to-date and reliable information on the technology and market perspectives in the sector. The NEM Summit brought together representatives of the NEM community from Europe and worldwide, major manufacturers and service companies, start-ups and SMEs, research centres and institutions, industry associations and groups as well as standardization and regulation bodies. David Kennedy, Director of Eurescom, said about the Summit: “I was very impressed about the excellent opportunities for networking with the media and content communities and to understand their requirements for content delivery”.

Opening message by Robert Madelin, Director General, DG Connect, European Commission

Networking in the exhibition area

The conference

The Fifth NEM Summit 2012 was dedicated to the theme "Implementing Future Media Internet towards New Horizons". The Summit included 27 peer reviewed papers, selected by the Programme Committee among more than 50 submitted papers, five keynote talks, and several welcoming and technical addresses. The main topics addressed at the Fifth NEM Summit in the scope of its scientific and technical tracks were New Digital Media Content (Generation, Transmission, and Consumption), New Networked Media Experience, and New Connected Media Worlds. Furthermore, the Summit programme included an Application and Experimentation track as well as a round table discussion on the innovation system in Europe and how the NEM community can strengthen innovation. David Wortley, Founder and CEO of Immersive Technology Strategies, argued that “NEM technologies are capable of personalising their responses and behaviours to the capabilities, wants and desires of their human users. The implications of this are profound and unpredictable”.

Celtic-Plus
Smart Connected World

Editorial

Dear reader,

Celtic-Plus has recently finished its autumn call 2012. This year, we received 12 proposals with a total budget of around 127 million euro. At the same time, 7 of the spring call proposals received already the Celtic-Plus label. Compared to previous calls the spring call 2012 was one of the best after call 4 and call 5. Despite the current economic problems in several European countries we are quite optimistic that we will again be able to launch most of the labelled projects. Regarding the upcoming calls in 2013, see our website at www.celticplus.org.

The Celtic-Plus Event 2013 will take place in Kayseri, Turkey, from 6 to 7 March 2013. The event will be held under the Turkish EUREKA Chairmanship in conjunction with the EUREKA meeting of National Project Coordinators (NPC) and the High-Level Group (HLG). On this occasion, we interviewed Okan Kara, the current Chairman of EUREKA, for this issue.

Under 'Celtic Project Highlights', we give the floor to four interesting Celtic projects that are approaching their closure:

- 4 GBB, which initiated a brand-new standard for G.Fast (up to 1 Gb/s for last mile)
- ENGINE on enabling next generation networks for broadcast services
- HOMESNET on the use of Femtocells for home base stations beyond coverage
- MEVICO on Wireless Mesh Networks

Finally, we report on the Spanish Smart City event in Seville, to which Celtic-Plus contributed.

Enjoy reading this issue.

Heinz Brüggemann
Director Celtic Office

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The value of co-opetition and Clusters

Interview with Okan Kara, Chairman of EUREKA

From July 2012 to June 2013, Turkey has the EUREKA Chairmanship. In order to learn more about the priorities and activities of Turkey for their term, Celtic-News editor Milon Gupta interviewed Okan Kara, the Chairman of EUREKA.

Mr. Kara, Turkey plans to make EUREKA a global platform for co-opetitive innovation. What exactly do you mean by this?

Okan Kara: Under the pressure of the market, competitive companies dealing with innovative solutions need to mobilize mutual resources for innovation needs; this is, as we all know, the basis for the cooperation option. Creating these cooperative networks in competition refers to knowledge sharing which creates a real economic value, and this is co-opetition. Within this scope, our vision for the future of EUREKA is to be a preferred and flexible platform for co-opetitive innovation.

Depending on the economic, social and political developments in the last two decades, the EUREKA network realized a clear need for international expansion. In the building process of EUREKA's future, we think that it is necessary to cooperate with countries having growing innovation capacity not only via formal membership affiliations but also through closer relations. During our chairmanship we will tackle with the international cooperation activities and the future of EUREKA within this scope.

How do you see the role of EUREKA Clusters for enabling co-opetitive innovation?

Okan Kara: EUREKA clusters were established according to the needs, demand and vision of the European industry. They present a unique platform for the realization of co-opetitive innovation. In line with the European leadership vision on thematic technology areas, EUREKA Clusters create a significant added value for European competitors to compete on global markets. In order to carry the success of EUREKA clusters into the future and set them as preferred platforms for co-opetition, we need to deal with the issue of synchronization and time-to-contract in the short and medium term.

Okan Kara, Chairman of EUREKA

The Celtic-Plus Event 2013 will be held next March under the Turkish EUREKA Chairmanship in conjunction with the EUREKA meeting of National Project Coordinators (NPC) and the High-Level Group (HLG). What are your expectations towards the Celtic-Plus Event in Kayseri and the co-located EUREKA meeting?

Okan Kara: The Celtic-Plus Event is an important platform which brings telecommunications stakeholders together and provides fruitful discussions on new challenges for the telecommunications world. One of the most valuable parts of the Celtic-Plus Event is the project exhibition where project demos and results are discussed.

In our opinion, this exhibition will be a great opportunity to provide the High-Level Group and the National Project Coordinators with a better understanding of achievements provided through coordination and cooperation of national research funding. They will also better understand how Celtic-Plus contributes to the ICT industry through successful and impressive projects. This is an important showcase for demonstrating the high impact and achievements of Celtic-Plus projects which have significant outputs and new products enabling new markets and new business.

Potential Celtic-Plus projects suffer from varying commitment of Public Authorities to provide funding and from a lack of synchronisation of funding decisions; a similar situation exists for the other EUREKA Clusters. How do you envisage improving this situation?

Okan Kara: In order to have better synchronisation of funding decisions, the first aspect should be to have funding agencies' call timeline and project timetables to be in sync. In most of the cases, timing of national calls is incompatible with the timing of international calls.

The second aspect should be to shorten the time between idea and project start. Speeding up the application and decision-making processes will enable a significant time reduction which leads to reducing time-to-contract. In addition, more information should be shared among the public authorities and clusters about the national programmes and current ongoing processes to better align national applications. In conclusion, it is obvious that cluster projects need more flexible national funding processes and more budget commitment. This message has to be communicated to high level representatives on ministerial level in EUREKA countries to ensure high-level commitment and synchronization.

Which innovation goals in which industry sectors would you like to see achieved in Turkey and in Europe as a whole within the next five years?

Okan Kara: In the National Science, Technology and Innovation Strategy of Turkey for the period 2011 to 2016, the ICT sector is identified as one of the key sectors where Turkey has a strong RDI capacity and a focal point for mission-oriented approaches. Within the next five years Turkey wants to facilitate multi-disciplined, multi-national and inter-sectoral research for market-oriented R&D activities which highlight SMEs and adopt a more innovative and strategic human resources approach by putting some more effort to the area of telecommunications, new media, future Internet, and applications and services. For sectors gaining acceleration from a national perspective such as the energy, water and food sectors; more "needs-oriented" measures will be taken in accordance with the strategies to boost R&D.

The Key Enabling Technologies strategy of the EU defines the nanotechnology, micro- and nano electronics, advanced materials and biotechnology sectors as the most strategically relevant technology fields in regard to their impact on societal challenges and knowledge intensity as well as their economic potential. The challenges faced and the goals set by the European Union are similar in nature to those of Turkey: transforming R&D results into capital, raising public awareness of the sectors in focus, laying out coordinated roadmaps among funding mechanisms of different countries, and undertaking a multi-disciplinary and human resource centred approach to enhance and exploit skilled labour.

I would like to conclude by emphasizing that Europe is confronting new "Grand Challenges" and new "Societal Needs", Clusters provide a platform to address these challenges and needs by supporting multi-disciplinary projects through their flexible bottom-up approach.

4GBB

Enabling 4th generation broadband systems via the last copper drop

Stefan Höst
Lund University
stefan.host@eit.lth.se

Per Ödling
Lund University
per.odling@eit.lth.se

Rob van den Brink
TNO
rob.vandenbrink@tno.nl

Henrik Almeida
Ericsson AB
henrik.almeida@
ericsson.com

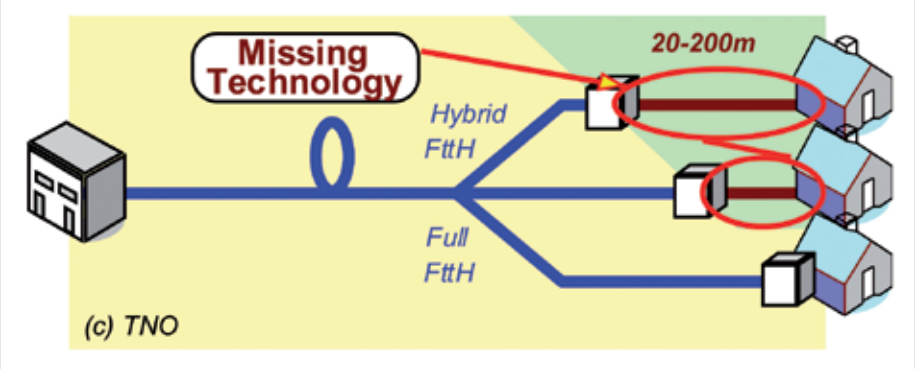


Figure 1: Hybrid copper fibre solutions to achieve Gb/s rates.

The 4GBB project shows how great engineering ideas can build the networked society, merging economic realities and political ambition. The project created a standard and a discussion platform for engineers, policymakers and researchers with the vision of a connected Europe.

The vision of economic prosperity, democratic participation and a sustainable society led the European Commission to formulate the Digital Agenda. The idea of bringing broadband connections to the citizens of Europe is an ambition shared by many of us. It inspired telecommunication companies and engineers to establish the 4GBB project to create an economically realistic path towards fulfiling this vision.

While political speeches often advocate optical fibre to every home, operators realized that, in most cases, fibre deployment will lead to very high costs. All agree that a fibre to the home (FttH) broadband network would be a great asset and many agree that a large-scale European roll-out will take place as soon as we have services requiring fibre, which end-customers are willing to pay for.

The problem with an FttH network does not lie in the technology, but rather in the investment and deployment cost, which is a too large bite to chew all at once.

The purpose of the 4GBB project is to allow us to evolve the network in smaller pieces, developing and standardising a system with fibre almost all the way, keeping only the last piece of copper. Such a technology will also support future mobile backhauling capacity demands, and therefore has the potential to become a very important enabler for the massive roll-out of mobile broadband. The new standard for this, G.fast, was initiated in ITU-T, February 2011, and its first release is expected in 2013.

Technological and economic challenges

The 4GBB project started with the technological challenge to achieve the connectivity in pair with fibre technology. The best known connectivity today is achieved by FttH taking fibre all the way to the customer. However, there are two economic barriers exploiting the technology. First, the cost of fibre deployment, which increases as the fibre termination is moved closer to the customer. Each section of installed fibre serves fewer customers, and the likelihood of utilizing ducts decreases, if ducts are available at all. Therefore the final drop of 20-200m is the most expensive part of the access section, normally meaning digging along individual paths to each customer. Secondly, the cost of installing new fibre inside the customer premises is higher than utilizing existing wires. Such an installation impacts not only the interior work, but also exterior, requiring permission for digging etc. If instead the last 20-200 meters of the existing telephone grid is used to transmit the signals, these inconveniences and expenses can be avoided (see Figure 1). At such short ranges, bandwidths of up to 200 MHz can be used on the copper, achieving service rates in the range of 1 Gb/s.

At the launch of the project, little was known about how the telephone wires behave at these high frequencies, much higher than what is used for VDSL2, i.e. above 30 MHz. Throughout the project there has been a lot of effort in measuring and modelling cables up to 200 MHz or more, both for the direct customer wire and the cross-talk channels between neighbouring wires. With this newfound knowledge we have shown by capacity calculations, simulations and a series of demonstrators that it is possible to reach Gigabit rates at distances between 20-200 meters. The technical study has been complemented by a techno-economic study showing that the foreseen economic incentives indeed are realistic.

Standardisation

As the desired technology seemed plausible, one of the main goals of the project has been to get the ideas into standardisation. The project has been a platform for coordination of the ITU-T G.fast standard, the embodiment of the 4GBB system that started in February 2011. A standard is necessary as a basis for regulation and system compatibility as well as to achieve necessary mass-market benefits. Standardisation processes themselves are based on a flow of voluntary technical contributions reaching a critical mass. The project partners initiated the G.fast standard and since then provided enough material to make it progress at a fast pace and attract a large interest from parties outside the project. While the contributions from the 4GBB project have kept a more or less steady pace, totalling 87

until July 2012, contributions from other parties are increasing exponentially as the standard gains global interest and support (see Figure 2).

Continuation of the project

In the forthcoming Celtic-Plus project HFCC/G.fast, starting in January 2013, the system development for the concept studied in 4GBB will be adressed. We have distinguished three main goals. The first is to drive the standardisation process home and ensure that the G.fast standard is completed. The second is to maintain a European technology lead and laying the foundation for continued export successes, including providing a new backhaul technology for wireless broadband systems. The third goal is to address, at an early stage, the path from completed standard to a commercial success and widespread deployment in Europe, giving the Digital Agenda a boost.

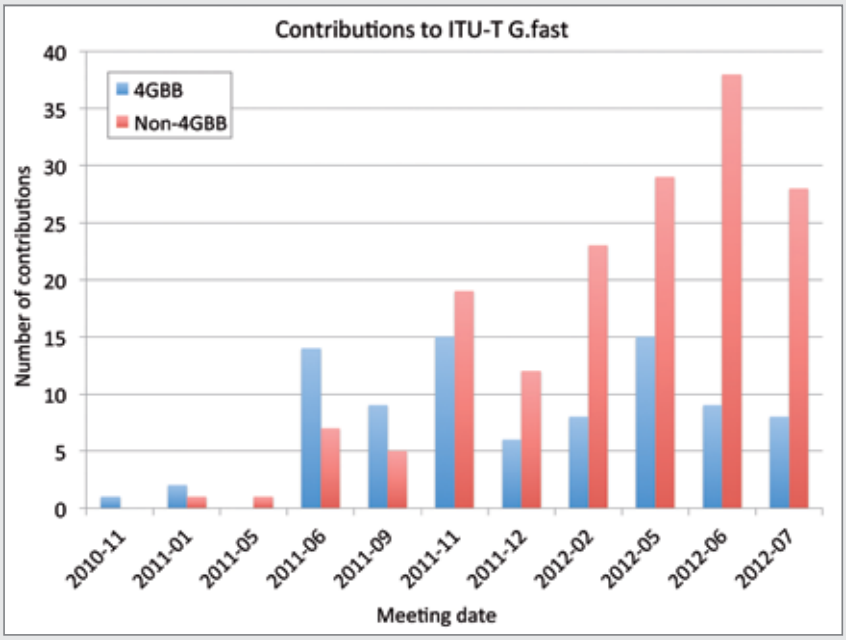


Figure 2: Contributions to ITU-T G.fast until July 2012.

Conclusion

There are two major achievements of the 4GBB project. Firstly, during the project it has been shown that the concept and the project ideas are both technologically and economically feasible. Secondly, the project has successfully initiated the G.fast standardisation project within ITU-T and shared material to bring the process towards a complete standard with global support. At the outset of the project this seemed a distant dream, but it has met with outstanding success.

Furthermore, the project partners have gained increased knowledge and contact networks, new market positions, and a number of pre-standard prototype products that are evaluated and tried in labs and in the field.

Further information is available at www.4gbb.eu

ENGINES

Enabling next generation networks for broadcast services

Dr. Jani Väre
Nokia Corporation
jani.vare@nokia.com

Second Generation Digital Terrestrial Broadcasting (DVB-T2) and Next Generation Handheld (DVB-NGH) are the latest state-of-the-art standards provided by the DVB organization. DVB-T2, adopted or deployed already in some 50 countries globally, was recently extended with the DVB-T2-Lite profile tailored for mobile reception. The DVB-NGH physical layer specification was recently endorsed by the DVB technical module and is now on the way for ETSI standardisation. The remaining specifications are about to be completed soon. The ENGINES project had an important role in the various stages of the development of the two standards.

When the ENGINES project was launched in the beginning of 2010, DVB-T2 was well under way to its current status as a global terrestrial digital television standard. Respectively, DVB-NGH was in its infancy, and the call for technologies had just been launched a few months before. The scope for the ENGINES project was easy to be defined by combining these two rather big topics.

The work related to DVB-T2 Lite profile came as additional 'extra-flavour' when DVB technical module decided to develop this extension for the DVB-T2. The verification and validation of DVB-T2 was a large part of the ENGINES project.

Another major element in the ENGINES project was the focus on contributing to the technical work of DVB-NGH. The third major topic in the project, cognitive radio, was focusing mostly on regulation efforts at the European Conference of Postal and Telecommunications Administrations

(CEPT) as well as on laboratory and field tests. Finally, there is yet another topic in ENGINES, which was decided to be added as a six-month extension. This was the investigation of the harmonization of 3GPP and DVB standards.

DVB-T2 and DVB-T2-Lite

The verification and validation of DVB-T2 has been a living process within the ENGINES project with various field trials and laboratory tests. However, today it can be said that DVB-T2 is already at a very mature stage. The adoption/deployment in 50 countries is a good proof of maturity. The DVB-T2-Lite profile was smoothly taken as extension to ENGINES. The partners of the ENGINES project were heavily involved in the technical work done for DVB-T2-Lite. Now, verification and validation are in the process, with recent laboratory tests and field trials, including measurements in the mobile environment.

DVB-NGH

While promoting the acceptance of the DVB-NGH physical specification at a Geneva meeting in September 2012, the chairman of the DVB's technical module, Dr. Nick Wells, put it well when he congratulated the TM-H group on the finalization of the 'ever-lasting' work on the DVB-NGH specification. He said that the DVB-NGH is by far 'the most complex specification in the history of DVB'. This is indeed the understanding acknowledged by the ENGINES partners. As the ENGINES project has done many technical contributions now included in the DVB-NGH specification, it can be said that the decision of taking DVB-NGH as one of the main topics in the project was the right one. Finally, there is also a book on the works, again heavily contributed to by the ENGINES partners. The book is very impressive, also in size, with more than 700 pages.

Cognitive radio

The development of cognitive radio in ENGINES was focusing on CEPT contributions, field and laboratory trials. There was significant synergy with the Finnish national project WISE, which focused also extensively on CEPT. It is also worth mentioning that ENGINES partner Turku University of Applied Sciences (TUAS) holds now the world's first trial network license to cognitive radio. The network is established in Turku, Finland.

Harmonization between DVB and 3GPP

The harmonization between 3GPP and DVB was an additional topic adopted into the ENGINES project late 2011. Due to the adoption of this topic, the project was extended by another six months. The dialogue between DVB and 3GPP has been on-going for a while regarding possible harmonization of the two. So far, no concept has been found. However, the indication of the regulatory actions globally indicate that at some point harmonization in some level is unavoidable. How and at which level it is done, still needs to be seen.

Conclusion

The ENGINES project has gone through challenging stages with very challenging technologies. However, mostly due to partners with state-of-the-art know-how about the related technologies, the project was destined to succeed. The DVB-NGH standard will be finalized rather soon after the completion of the ENGINES project. It remains to be seen, whether there will be any future projects providing a continuation for ENGINES as well as its predecessor B21C.

You can find more information on ENGINES at www.celtic-engines.org

HOMESNET

Home base station: an emerging network paradigm

Olivier Marcé
Alcatel-Lucent Bell Labs France
Olivier.Marce@alcatel-lucent.com

A Femtocell is a small, inexpensive, low-power cellular base station, typically designed for use in a home or small business, which can be deployed autonomously by subscribers in residential or enterprise premises. The HOMESNET project developed a complete analysis and a full set of innovations for for the femtocell market.

Although already on the market, the deployment of femtocells is still limited to coverage enhancement in places where the macro base station signal is badly received. The exact number of femtocells for operators and users is still under study, depending on the context and operators' choices. HOMESNET conducted an in-depth analysis of technical solutions for the integration of femtocells in the operators' business. The consortium then designed, developed, and demonstrated several innovative solutions that increase the added value of femtocells.

Architecture

HOMESNET studied the femtocell evolution in regard to wireless technologies (3G, WiMAX, LTE), and deployment cases: indoor vs outdoor, closed vs open. The consortium proposed an innovative architecture to interface high numbers of femtocells with the core network to provide security and high performance mobility.

Advances in femtocell design focused on energy reduction among different directions. Off-the-shelf femtocells have been provided with wake-up on demand solutions which are switched on only when needed. Two new hardware solutions also have been designed. One allows transporting radio signals over fibre up to a photonic antenna, allowing to lower indoor radio emission. The other allows flexible radio coverage thanks to a dynamic antenna that focuses energy at places when it is needed for communication.

Algorithms for mobility prediction and its exploitation in the context of frequent handovers due to small coverage have been designed and evaluated, showing gains in performance.

Overview on the concept of HOMESNET

Performance

With an expected huge number of femtocells deployed, the traditional operation and management processes do not apply anymore. Self-organizing solutions are required to provide expected quality of service to the end users. HOMESNET partners developed different algorithms to optimize resource allocations in a femtocells context, including the following:

- A game-theory based mechanism for spectrum sharing that does not require communication between femtocells.
- An efficient self-organized off-load mechanism, i.e. performing a hand-over from a macro cell to a femtocell, to improve the network capacity. A simulator has been developed to demonstrate how the algorithm performs.
- An efficient solution to ensure LTE related identifiers (Physical Cell Identifier) separation between macro and femtocells, avoiding hard-to-fix conflicts.

Services

Two innovative services have been proposed, prototyped and analyzed. A business model has been proposed for both of them, identifying actors and money flows.

The patented Friendly Femto concept makes a link between social network platform and femtocells access control, showing the first example ever of local and social based services. This opens the door to new approaches of exploiting femtocells for personal networks.

The added value of utilizing femtocells for various public safety communications situations has been analysed. Simulations carried out for an UTRAN and E-UTRAN environment demonstrated significant improvements in terms of achievable throughput for the emergency response personnel when access to private femtocells available in the indoor emergency sites is allowed, compared to the conventional option of accessing only operator-owned macro base stations. A prototype including real telemedicine systems has been demonstrated in several public events.

Conclusion

The HOMESNET project produced very important results, far beyond the state of the art, in all the fields relevant to femtocell technologies.

Thanks to the collaborative work, partners got the tools and results, including prototypes, that allow them to evaluate the value and performances of femtocells, for different technologies (3G, LTE, WiMAX) in different deployment contexts (standalone, in macro networks, etc.) as well as directions for new innovative services.

All these results are especially valuable in terms of novelty with respect to the current femtocell market which is growing. These prototypes are key elements to develop “next generation” femtocells that will go beyond coverage extension only.

Further information is available at http://www.celtic-initiative.org/Projects/Celtic-projects/Call6/HOMESNET/homesnet-default.asp

MEVICO

Wireless Mesh Network as self-organizing backhaul solution for small cells

Pekka Wainio
Nokia Siemens Networks
pekka.wainio@nsn.com

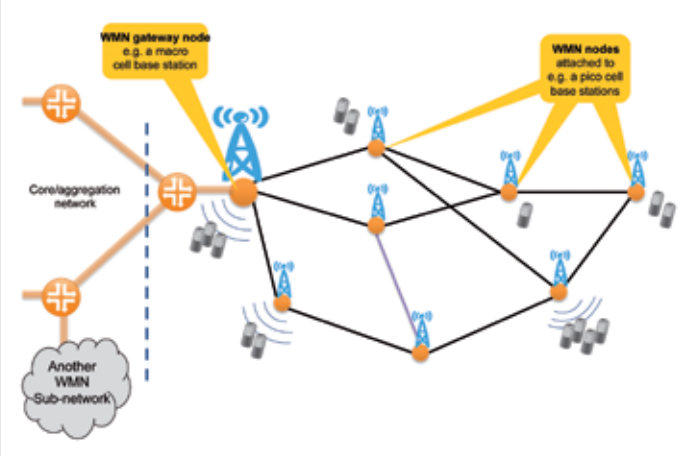
This article describes research done in the MEVICO project on advanced mobile transport solutions for future mobile systems, especially targeted for LTE and LTE-Advanced small cells deployments. The project introduced a networking concept with inherent self-healing, self-optimization and self-configuration capabilities based on mesh topology utilizing millimeter wave radio links.

Challenges in small cell deployments

As mobile traffic volumes keep increasing, mobile networks have evolved respectively to match this growth. The fourth-generation cellular network standard introduced a set of innovations for mobile communications, including support for heterogeneous networks and small cell deployments. In heterogeneous networks the coverage area of a macro cell base station is complemented with smaller coverage base stations, i.e. small cells, to better target high-data rate demand hot spot areas, such as city centers, by offloading some of the macro data traffic to these small cells.

However, the concept of small cells itself introduces a set of challenges. One of the most outstanding issues is the backhaul network, i.e. how to efficiently transport the small cell access traffic to the core network. Every small cell base station needs to have a high-capacity last-hop backhaul connection, thus the sheer amount of backhaul connections will increase heavily.

In addition, as the deployment places for small cells, and subsequently backhaul units, move closer to street level, factors that have traditionally not affected transport equipment will have larger impact. These include, among others, increased blocking risk (e.g. tall vehicles and trees) and increased pole sway (lamp posts vs. broadcast masts). Even so, the small cell backhaul should still be able to fulfill the LTE-Advanced requirements with decent quality of service (QoS), availability, capacity etc. Yet, the installation and operational costs should be as low as possible. Therefore, there is a need for investigating smart and flexible transport solutions for small cells.



Example of a Wireless Mesh Network

Wireless Mesh Network

An innovative new solution called Wireless Mesh Network (WMN) has been developed as part of the MEVICO project to tackle these challenges. The main research partners have been Nokia Siemens Networks (NSN) and Valtion Tieteellinen Tutkimuskeskus VTT (Technical Research Centre of Finland) in co-operation with Aalto University during the concept validation.

The WMN system consists of a set of wireless mesh backhaul nodes partially meshed with each other forming an independent transport sub-network as is illustrated in the figure. The WMN backhaul elements are connected to each other via directional point-to-point millimeter wave radio links. Other types of communications media can also be used, such as fiber.

The WMN nodes offer a Layer 2 transport service for the client systems, e.g. small cell base stations or fixed broadband equipment. The WMN sub-network is connected to external transport networks through special gateway elements. All traffic coming in and out of the WMN sub-network will traverse these gateways.

The WMN employs a comprehensive and automated resiliency scheme that aims to reduce the overall impact of link and equipment failures on the backhaul network caused for example by rain outages or other line-of-sight blockages.

In addition, the WMN system offers a wide array of self-optimization features, for example a flexible quality-of-service scheme, congestion control and management mechanisms as well as extensive load balancing and traffic management features. These mechanisms allow a highly flexible control and steering of the traffic flows inside the mesh network, thus enabling automated QoS aware optimization of the traffic at any given time so that the entire transport capacity of the mesh network can be optimally utilized.

Finally, the WMN system offers a set of self-configuration mechanisms, automating everything spanning from smart adjustment of the point-to-point wireless links to complete network startup.

Conclusions

A proof-of-concept validation system was built to demonstrate the main functionality of the developed concept and to validate the feasibility of the invented self-organising network (SON) mechanisms for a last-mile access backhaul solution in future mobile systems. Furthermore, the validation process was used to prove that the WMN concept performs satisfactorily under realistic traffic, load and network conditions on a system level.

Based on the results of this verification testing and validation work, all the above objectives were reached. All in all, the developed WMN proof-of-concept system performed strongly throughout the validation process. The different functionalities, including the mesh network algorithms and the wireless millimeter wave link, were proven to work satisfactorily together. With some further development and enhancement, the WMN system concept displays extreme potential for a state-of-the-art small cell access backhaul transport technology.

Further information is available at www.celtic-initiative.org/Projects/Celtic-projects/Call7/MEVICO/mevico-default.asp

Celtic-Plus at Spanish Smart City event in Seville

On 6 November 2012, a Smart City event as part of the Spanish Smart City initiative was held in Seville, Spain. The event was jointly organised by the Spanish government, the City of Seville, and Spain's major telecoms network operator, Telefónica.

About 150 Spanish entrepreneurs participated in the event and witnessed a number of insightful presentations on the Smart Cities of the future. The mayor of Seville, Juan Ignacio Zoido, opened the event in the city hall. The day continued with presentations by Juan Corro, state secretary at the Spanish ministry of industry, and Maria Jesús Almasor, president of Telefónica for Southern Spain.

The Spanish Smart City initiative has been realised in collaboration with the European Future Internet Public-Private Partnership (FI-PPP) and the Celtic-Plus bottom-up programme, which helps enterprises from Spain and other EUREKA countries get access to innovation and market opportunities in Europe. Peter Herrmann, programme coordinator at Celtic-Plus, explained to the audience the major goals of the Celtic-Plus Cluster and how to successfully launch a project under this programme.

From left to right: Peter Herrmann, Celtic Office; Jesus Cañadas, Ministry of Industry, Commerce and Tourism; Jesus Maza Burgos, EMASESA; Rebeca Frías Antolín, CDTI and Tomás de Miguel, Red.es

IMPRINT
Editor-in-Chief:
Heinz Brüggemann
brueggemann@celticplus.eu

Contact:
Celtic Office
c/o Eurescom GmbH
Wieblinger Weg 19
69123 Heidelberg, Germany
Tel: +49 6221 989 405
Fax: +49 6221 989 451

About Celtic-Plus

Celtic-Plus is an industry-driven European research initiative to define, perform and finance through public and private funding common research projects in the area of telecommunications, new media, future Internet, and applications & services focusing on a new "Smart Connected World" paradigm. Celtic-Plus is a EUREKA ICT cluster and belongs to the inter-governmental EUREKA network. Celtic-Plus is open to any type of company covering the Celtic-Plus research areas, large industry as well as small companies or universities and research organisations. Even companies outside the EUREKA countries may get some possibilities to join a Celtic-Plus project under certain conditions.

The exhibition

The exhibition at the NEM Summit 2012 comprised about 20 stands presenting the activities and results of FP7 projects, companies and organisations. Among them were three Eurescom members – Orange, Telecom Italia, and Türk Telekom. This year the exhibition area was a bit smaller than in previous years, but this did not lower the great interest and the good discussions at the stands. Amongst the FP7 project stands were Ideal-IST, Experimedia and Vconect, which is being coordinated by Eurescom.

Vconect presented the results of their first art-performance related use case trials and pointed out the importance of orchestrated video presentation at the receivers' sides. Orchestration takes care that the remote sides automatically and in real-time get the most appropriate context-related presentation in the best possible audio/video quality. Vconect is a three-year STREP project in the Networked Media area.

Vconect at NEM Summit

NEM art exhibition

SMARD workshop at NEM Summit

Among seven co-located workshops, a very constructive SMARD Workshop on commercialising FP7 project results was held. SMARD is a Support Action designed to fill the existing gap within the exploitation chain between successful networked media research and the commercialisation by SMEs. The workshop organisers had invited about 30 representatives of SMEs, the EC, and FP7 projects Vconect, FascinatE and Beaming as case studies to explore how to successfully commercialise networked media R&D results.

According to Alexandra Rudl from the SMARD project, it is high time that Europe makes more commercial use of their excellent R&D results. The SMARD team provided a useful canvas which helps projects to check and plan their commercial exploitation potential. Some of the main conclusions were:

- The current procedures of FP7 projects do not provide enough incentives for commercialising the results. Better mechanisms are required for Horizon 2020.
- One of the most reliable ways of commercialisation is if project partners are enhancing existing or marketing new products/services.
- There is a natural tension between industry and academic partners. Whilst industry wants to make money from results, academic partners often want to publish and improve their academic reputation without commercial interests.
- The entrepreneurial environment in Europe is far from being satisfactory; there is a lot to be done educationally, legally and regulatorily.

More information about NEM Initiative and NEM Summit can be found at www.nem-initiative.org and nem-summit.eu.

Future Internet Research and Experimentation

FIRE Engineering Workshop in Ghent

Anastasius Gavras
Eurescom
gavras@eurescom.eu

On 6–7 November 2012, the FIRE workshop on engineering experimental Future Internet research was held at the Creative Media Days in Ghent, Belgium. The workshop attracted many old and new members of the FIRE community.

Following the demands of the FIRE community to organise a successor workshop of the very successful FIRE research workshop that was held in 2011 at the Future Internet Assembly in Budapest, FP7 project FIRESTATION took the initiative to organise the FIRE engineering workshop in Ghent.

The workshop offered a broad spectrum of contributions. The main sessions of the workshop were based on a call for abstracts with a specific focus on results of Future Internet experimentation. In addition the workshop gave the floor to the new FIRE research projects that were accepted following FP7 call 8 to present their initial concepts and plans. Finally the existing facility projects presented their recent advances in terms of new capabilities and functionality.

Per Blixt, head of the Experimental Platforms unit (E4) at the European Commission's DG Connect, welcomed the workshop participants. In his opening presentation he gave an outlook on the future role of FIRE in the next framework programme, Horizon 2020.

Per Blixt, head of the Experimental Platforms unit at DG Connect

Wide variety of Future Internet experiments

The first two sessions were focused on the new research projects and offered an insight into a wide variety of Future Internet experiments. These experiments will range from deep network oriented issues like recursive inter-network architecture and programmable networks, including OpenFlow experiments with many dynamic invocations or its application in edutainment. Another type of experiments covers social interactions of various forms, such as social housekeeping through communicating appliances, cloud computing in community networks, social telemedia applications and 3D live interaction in visual environments. Finally specialised new projects will cover indoor radio frequency localisation, environmental aware cloud computing and dependability for the Internet of Things.

In the afternoon sessions of the first day the experimental facilities presented new capabilities, such as experimental services for research and industry, service experimentation in cloud environments, experimentation in federated wireless/wired testbeds, new experiment opportunities with OpenFlow and experimental research in community networks. In this session Thanasis Korakis from the University of Thessaly, Greece, presented the progress of the international collaboration of FIRE with Brazil in the context of the FIBRE project. Piet Demeester from iMinds, Belgium, presented the work of the new FIRE flagship project, Fed4FIRE, which aims to consolidate most control and management frameworks as well as the monitoring options of the current FIRE facilities.

Sustainability of experimental facilities

A highlight of the afternoon sessions was the invited presentation by Dr. Udo Bub, managing director of EIT ICT Labs Germany, who offered to support wide collaboration activities between the FIRE community and his organisation. EIT ICT Labs (www.eitictlabs.eu) is one of the Knowledge and Innovation Communities (KICs) under the umbrella of the European Institute of Innovation & Technology (EIT).

Dr. Udo Bub, managing director of EIT ICT Labs Germany

The core of the questions and discussion in the afternoon sessions was related to the sustainability of the experimental facilities. Although no concrete model has been identified yet, it is evident that progress is being made. Dr. Bub proposed options for sustainability that should be discussed in detail with all stakeholders.

Thematic sessions

During the second day of the FIRE engineering workshop, the selected contributions following the call for abstracts were presented. The four sessions were thematically grouped in general networking, cloud computing and related services, wireless experiments as well as federation mechanisms and applications. Similar to the previous day, the variety of topics that were discussed was very broad, underlining the utility of the FIRE facilities to support almost any Future Internet related experiment.

Further information is available at http://www.ict-fire.eu/events/fire-engineering-workshop.html

Towards Horizon 2020

Net!Works event 2012 in Brussels

Uwe Herzog
Eurescom
herzog@eurescom.eu

The annual event of the European Technology Platform Net!Works was dedicated this year to the approaching new EC Framework Programme Horizon 2020. The event took place in Brussels on 13 November 2012 and attracted more than 70 participants. Besides members of the Net!Works platform from industry, network operators and academia, the event also attracted a number of representatives from the European Commission and the European Parliament. After a report about the platform's activities and achievements, the further presentations and two parallel workshops addressed the Horizon 2020 programme.

Net!Works activities and growing membership

In his opening speech, Dr. Werner Mohr, the chairman of Net!Works, informed the audience about the activities during the last 12 months. He reported that the Net!Works membership has continued to grow and is now at 863 members. The focus of activities has been on preparing success story papers, e.g. on mobile and optical communication and broadband access, to highlight the innovation coming from collaborative research. In addition, a number of White Papers have been prepared which became part of the new version of the Strategic Research Agenda (SRA), released in August this year. There have also been discussions between the EC and the ETPs on Horizon 2020.

European policies and Horizon 2020

Mario Campolargo, Head of the Net Futures Directorate at the EC's DG Connect, gave a keynote on European policies and the role of ICT in Horizon 2020. He mentioned three main objectives: 1. investment in infrastructures, e.g. via the planned Connecting Europe Facility; 2. investing in human capital; 3. supporting digital entrepreneurship. He stated that many jobs are created by innovative new firms, but these are less located in Europe than elsewhere in the world. The EC therefore plans a number of measures focusing on web entrepreneurship in the context of the Future Internet. Regarding Horizon 2020, he said that ICT will receive about 20% of the planned total budget of 80 billion euro.

Mario Campolargo, Head of the Net Futures Directorate at DG Connect. In the background on the right: Dr. Werner Mohr, chairman of Net!Works

Mr Campolargo explained that the emphasis on innovation will be the main difference to FP7, aiming to maximise the economic impact: Quoting Neelie Kroes, European Commissioner for the Digital Agenda, and her '3 Cs' he said that we need to be more challenging, more coherent, and better in boosting competitiveness. The exploitation of research has been successful in the past, but we need to strengthen it in future, and there are tremendous opportunities with cross sector activities in areas like transport or health. It is also intended to involve the users and non-ICT players, enabling bottom-up activities to flourish. 5% of the funds are reserved for the support of such activities, to support out-of-the-box activities of innovators.

Regarding the ICT ETPs, they are asked to look beyond pure research: innovation, education, standardisation. Clear industrial initiatives in support of innovation are needed, and Smart Cities are a key area, maximising collaboration with non-ICT areas, encouraging the inclusion of a large scope of stakeholders. This may require refreshing the ETPs' governance models. The speech by Mario Campolargo was complemented by a detailed report on the status of the Horizon 2020 discussion, presented by Herbert von Bose, Director for DG Research & Innovation at Directorate G – Industrial Technologies.

Industry requirements for ICT in Horizon 2020

Representatives from the ICT industry, including network operators, presented their views on the relevance of networking technologies for the European economy. Rainer Fechner, Member of the Board of Alcatel-Lucent Germany, pointed to both financial and technological aspects that need to be addressed.

The growth of operators' revenues is not as big as the explosion of data, mainly caused by flat-rate tariffs, which is an issue for operators. If the growth in bandwidth continues at the current pace, then the spectral efficiency in optical networking will have reached its physical limits already in 2016 according to Shannon. This highlights that further research is urgently needed in order to satisfy demand in the near future. Furthermore, an investment-friendly regulation is needed to foster research and to better exploit developed products in Europe, said Mr Fechner.

"Trends in applications are driving innovation in networks", and "potential solutions are driving research priorities". This was the starting point for identifying research priorities in Horizon 2020 from the view of the Net!Works ETP prepared by Hendrik Berndt from NTT DoCoMo Eurolabs and Fiona Williams from Ericsson. There is a changing role of networks, and topics like, for example, Service Aware Networks, Virtualisation, Elastic Networking or Software Defined Networking, require research in Horizon 2020.

Net!Works activities in 2013

In the closing session Werner Mohr gave an overview on the planned activities of Net!Works in 2013. Net!Works will continue cooperation with other ICT ETPs to promote ICT topics in Horizon 2020, and to position ICT topics as strongly as possible. Further topics will be the development of a governance model for revised ETPs, the involvement of the members of today's ICT ETPs in the restructuring, and the establishment of a closer cooperation with ETPs from application sectors outside of ICT.

More information about the event and the presented slides are available on the Net!Works website at http://www.networks-etp.eu

News in brief

Eurobarometer survey: Europeans like robots

There is still a wide gap regarding individual computer skills and usage in the European Union, according to data by Eurostat, the statistical office of the European Union. In the EU27, the share of individuals aged 16–74 who have used a PC in 2011 varies between 50% in Romania and 96% in Sweden. The group of countries at the top in regard to PC usage also includes Denmark, Luxembourg and the Netherlands (all 94%). At the bottom Bulgaria (55%) and Greece (59%) are only slightly ahead of Romania.

In addition to geographical differences in computer usage and skills, there are also significant differences related to age. In 2011, more than 75% of those aged 16–74 in the EU27 had used a computer, while this share was 96% amongst those aged 16–24. The share of individuals in the EU27 having written a computer programme was 10% among those aged 16–74 and 20% among the younger age group.

http://europa.eu/rapid/pressReleasesAction.do?reference=STAT/12/47&format=HTML&aged=0&language=EN&guiLanguage=en

ENISA report on cyber incidents in the EU

In October, ENISA, the European Network and Information Security Agency, presented its first annual report of cyber incidents in the EU. According to the report, 11 EU countries reported 51 severe outages of electronic communication networks or services in 2011. The number of only 11 Member States having submitted their incident reports is due to the fact that many countries had implemented national reporting schemes only towards the end of 2011.

In the annual report for 2011, ENISA analyses the 51 reported incidents. Most of the reported incidents occurred in mobile telephony and the mobile Internet (60%), affecting around 300.000 users. The reported incidents underline that communication services, both fixed and mobile, strongly depend on power supply. Natural phenomena like storms, floods and heavy snow have a big impact on the power supply of providers, causing longer lasting incidents of around 45 hours on average.

According to ENISA, this year all Member States have reported on past cyber security incidents to the ENISA and the European Commission so that the next annual report will cover the whole European Union. The Annual Incidents Report 2012 will be published in spring 2013.

The Annual Incidents Report 2011 is available for download at http://www.enisa.europa.eu/activities/Resilience-and-CIIP/Incidents-reporting/annual-reports/annual-incident-reports-2011

Norton cybercrime report

According to Symantec's 2012 Norton Cybercrime Report, worldwide, private individuals have suffered approximately 100 billion US dollars, which is more than 78 billion euros, in financial losses as a result of cybercrime. In the period from July 2011 to July 2012, losses averaged 197 US dollars (154 euros) per victim.

A total of 556 million adults worldwide are reported to have fallen victim to malware, phishing, or similar virtual crimes. The report claims that there are 1.5 million victims of cybercrime each day, or about 18 per second.

Losses within the EU are reported to amount to 16 billion US dollars (over 12 billion euros). China emerges as the country whose citizens have suffered the greatest financial loss – 46 billion US dollars (nearly 36 billion euros) – while Russia has the largest number of victims, with 92 percent of users surveyed in the country having experienced problems with cybercrime.

The results reveal that many of those affected are victims of their own carelessness. Around 40 percent of the victims do not use complex passwords or do not change their passwords regularly.

There appears to be a clear trend of cybercriminals targeting social networks and mobile devices, with around 20 percent of users having suffered losses as a result of such attacks. The study also claims that 15 percent of social media accounts have been compromised and that 10 percent of users have fallen for fake links and scams on social networks. A total of 75 percent of those surveyed believe that cybercriminals are increasingly targeting social networking services.

The report surveyed more than 13,000 online adults aged 18 to 64 in 24 different countries.

http://www.norton.com/2012cybercrimereport

Robots @ Home

How machines will change our domestic life

Milon Gupta
Eurescom
gupta@eurescom.eu

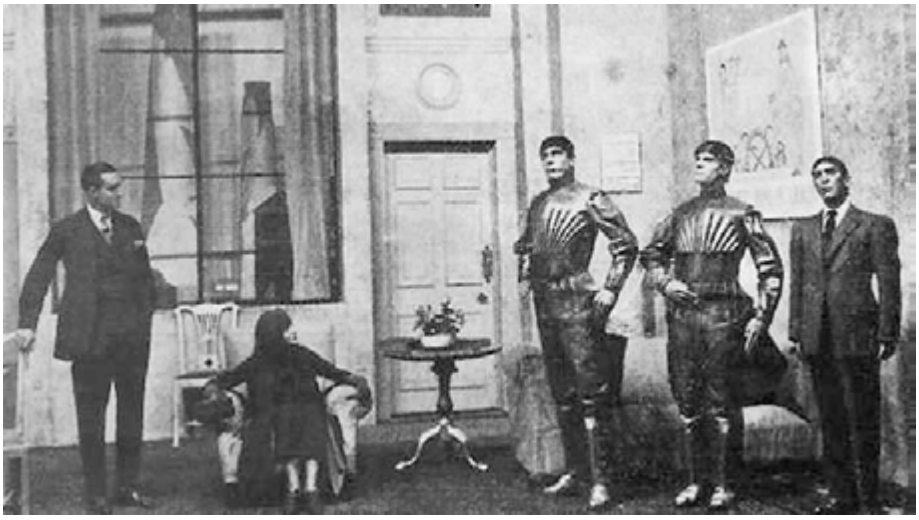
Industrial robots have been dominating the world's factory work floors for several years. Now their little brothers and sisters are about to conquer our homes. Robots already vacuum carpets and mow lawns. And this is just the beginning. Machines will take care of almost any task to be performed in a household, from kitchen to living room – and beyond.

The idea of robots serving in the household is not new and goes back to the origins of the term "robot". The word was introduced to the public in 1920 by the Czech writer Karel Čapek in his play "R.U.R.", which stands for "Rossum's Universal Robots". The play is about artificial people, called robots, who are made of synthetic organic matter and who can plainly think for themselves, although they seem happy to serve.

Fact and fiction of household robots

Ever since Čapek's play, the image of household robots in fiction has been dominated by universally capable, human-like machines. The reality of household robots so far is exactly the opposite. Machines like, for example, self-driven vacuum cleaners and lawn mowers are specialised on a single purpose and do not look or behave human, but more like a remote-controlled box. There are good reasons for this. The pragmatic reasons for having small specialised robots are related to cost and space. Designing a universal robot that could do all the household chores would result in a bulky and expensive product that only a few billionaires might care to have in their spacious estates.

Even if money and space were not an issue, most people would have reservations about having human-like robots around. This is even true for the world's most robot-loving country, Japan. At the beginning of the millennium, Japanese car makers who are behind some of the more advanced domestic robots had suggested that there would be a robot in every Japanese home. A decade later, the euphoria about humanoid-style care robots has vanished.



Scene from the play R.U.R. – Rossum's Universal Robots (1920)

Elderly Japanese people confronted with humanoid-style nursing robots like Ri-Man were not enthusiastic and understandably preferred human care personnel instead. Due to the rapid ageing of the population and the restrictive immigration policy in Japan, human care, however, will not be an option available to every elderly Japanese. Thus, Japan's government and industry are researching more acceptable technological solutions. After years of spending billions of yen on humanoid robot research, they have increasingly focused on simpler, more practical robot platforms that can perform simple tasks.

In 2009, the Japanese government had launched a five-year project called Home-use Robot Practical Application, which seeks to build a robot that can be used as both a wheelchair and bed; a cleaning robot; a security robot; a wearable robot suit that assists daily activities; and a two-wheeled robot on which an elderly person can ride. However, even these machines – practical as they may appear – seem to put patients off, as they do not provide emotional support.

Mechanical pets

In order to provide elderly people with emotional support, Japanese researchers developed mechanical pets, like, for example, the therapeutic robot baby harp seal Paro. Developed at the Intelligent System Research Institute of Japan's AIST it has been commercially offered since 2004. The cuddly seal is intended to elicit emotional responses in patients of hospitals and nursing homes. The robot has tactile sensors and responds to petting by moving its tail and opening and closing its eyes. It also responds to sounds and can learn a name. It can show emotions such as surprise, happiness or anger, and produces sounds similar to a real baby seal.

Paro, the cuddly robot seal

Roxxxy, the cuddly sexbot, with its developer, Douglas Hines

Another type of companion

For mostly male people whose needs go a bit beyond cuddling with a robot seal, Douglas Hines, a former artificial intelligence engineer at Bell Labs, has developed Roxxxy, which had its public debut in 2010.

Roxxxy is a so-called sexbot, allegedly the world's first full-size interactive sex doll with synthetic skin and artificial intelligence. According to the website of Hines' company, TrueCcompanion, Roxxxy is not limited to sexual uses; it is supposed to be capable of talking, listening and responding to touch. Roxxxy's vocabulary for romantic conversations can be updated, and its appearance can be customised according to the owner's personal preferences.

Unobtrusive robot helpers in the Smart Home

Neither Paro nor Roxxxy are representative for the main development trends of robots in home environments. Instead of humanoid servants, robots will be rather moving extensions of the Smart Home, in which residents interact via sensors with smart devices, whether it is the lighting or heating system or the robot vacuuming the carpet. A home environment where robots will permanently buzz around has some technological challenges. A major challenge is safety.

Recently, the EU-funded research project CHRIS (Cooperative Human Robot Interaction Systems – www.chrisfp7.eu), which ended in February 2012, explored the fundamental issues which enable safe Human Robot Interaction (HRI). The CHRIS project assessed the safety of human-robot interactions from the aspect of physical safety, behavioural safety, and cognitive understanding, and investigated ways of implementing these as robust features in robotic platforms.

Already in the 1940s, science fiction writer Isaac Asimov postulated his three laws of robotics, which are still a valid guideline for robot development: 1. a robot may not injure a human being or, through inaction, allow a human being to come to harm; 2. a robot must obey orders given to it by human beings, except where such orders would conflict with the First Law; and 3. a robot must protect its own existence as long as such protection does not conflict with the First or Second Law.

Although straightforward and easy to understand, implementing these three laws in home robots will pose increasing challenges, the more tasks robots will perform.

Brave new home

The sneaky invasion of diligent robots in our homes, which can be expected for the coming decade, implies not only feasibility issues, but also triggers ethical, societal, and political questions. How will our individual lives and society as a whole change, when we live in homes where all the chores, not to speak of leisure- and pleasure-related tasks, are performed by robots? Apart from making human cleaners redundant, what else will change, if our homes are fully automated? Looking at the slow pace at which even non-spectacular home robots, like, for example, robot lawn mowers, have been adopted, we may still have a number of years to answer these questions. However, we should ask these questions early enough to make sure we get the home environments we really want.

CHRIS – not as pretty as Roxxy, but probably more skilled in doing the filing

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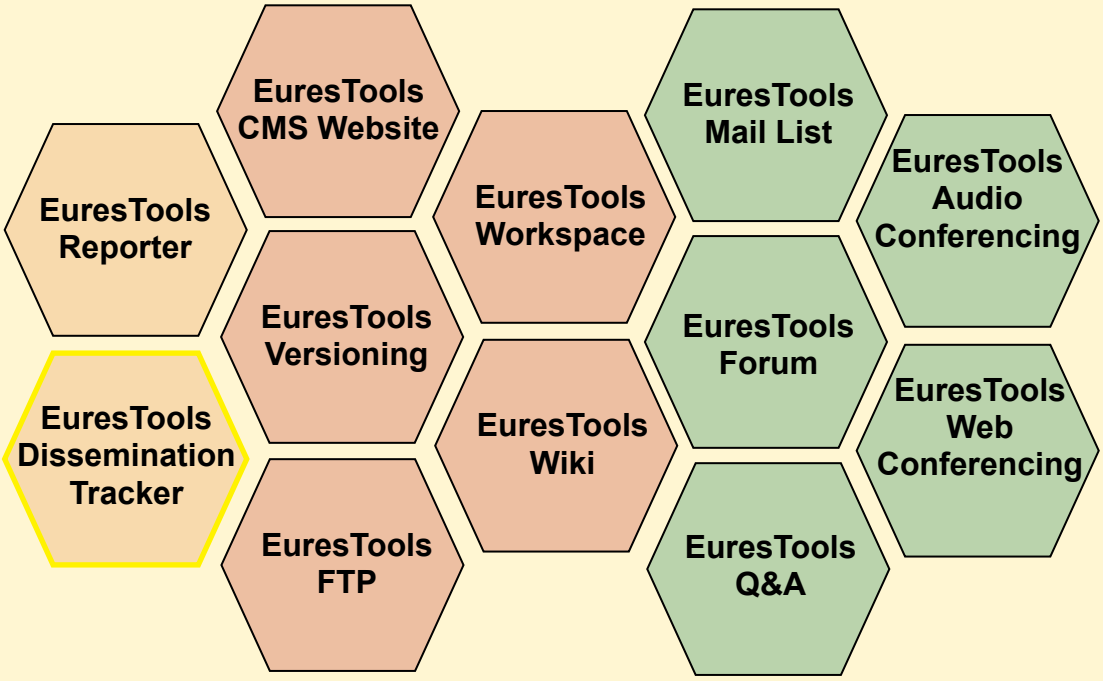

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EURESCOM

European Institute for Research
and Strategic Studies
in Telecommunications GmbH
Wieblinger Weg 19/4
69123 Heidelberg, Germany
Tel.: +49 6221 989-0
Fax: +49 6221 989 209
E-mail: info@eurescom.eu
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