EURO DOTS

EURO-DOTS (acronym for European Doctoral Training Support in micro/nano-electronics) is an FP7 project that started on 1 May 2010, with a duration of 2 years and that is coordinated by imec, Belgium (BE). The partners are the Katholieke Universiteit Leuven (BE), KTH - Royal Institute of Technology (SE), École Polytechnique Fédérale de Lausanne (CH), MEAD (CH), and the Slowak Technical University (SK). The main objective of EURO-DOTS is to create a delocalized (virtual) platform to serve the Doctoral Schools in Europe by improving the offering and the quality of training of European PhD students in the fields of micro- and nano-electronics. This platform will help PhD students in acquiring ECTS (European Credit Transfer System) credits, imposed by major European universities for obtaining the Doctoral (PhD) degree in Engineering.

EURO-DOTS addresses problems that exist today at Universities in Europe regarding the organization of high-level doctoral programs that cover several engineering fields at the state-of-the art level, i.e. in direct connection with research. Especially in view of the increasing multidisciplinary nature and content of the emerging research fields and the fast evolution of the nano-electronics and micro-systems domains in which disruptive developments are expected in the near future, a rapid and coherent response of the doctoral and/or continuous education courses has become indispensable. Though major European universities are at the top level in some specific research fields, they can hardly cover the whole domain of nano-electronics and micro-systems, both for scientific and financial reasons. The doctoral program they can offer is therefore restricted to some fields, and cannot cover all the special topics that could be requested by innovative PhD work. But moreover, PhD students are mainly restricted to these local courses for various reasons. Foreign courses are hardly accessible because most courses are spread on a full semester at a rate of 1 or 2 hours per week, the cost for attending the few existing modular, intensive courses is prohibitive for students and last but not least, ECTS credits are most of the time not offered today for these courses (no exam organized, no official recognition and 'accreditation' of the courses).

A coherent set of advanced courses in micro/nano-electronics, explicitly accredited by major European universities in the framework of their Doctoral Program, will therefore be made easily accessible to European PhD students by the EURO-DOTS initiative and platform, offering them the opportunity to collect these ECTS credits throughout Europe. The courses respect specific organization criteria (short, intensive one-week course modules with optional exam) that make them very flexible, accessible and attractive towards PhD students as well as engineers from industry. And most importantly, scholarships are made available to PhD students fulfilling specific selection criteria.

In order to offer a broad spectrum of relevant state-of-the-art courses, the consortium carries out a detailed study of the gap between existing training courses at universities and the future needs in industry. It also reviews existing initiatives, studies the requirements and accreditation policies in European academia and defines the criteria that courses need to fulfill in order to become eligible (and obtain the EURO-DOTS label). EURO-DOTS will launch a call and invitation to European universities that are willing to contribute to the platform by working out suited training modules in response to the recommendations of the gap analysis and in line with the mentioned criteria.

This EURO-DOTS platform is being established and its working principles and the rules for attribution of scholarships to PhD students are defined and made public (**www.eurodots.org**).

KTH

SEVENTH FRAMEWORK PROGRAMME

imec

KATHOLIEKE UNIVERSITEIT LEUVEN

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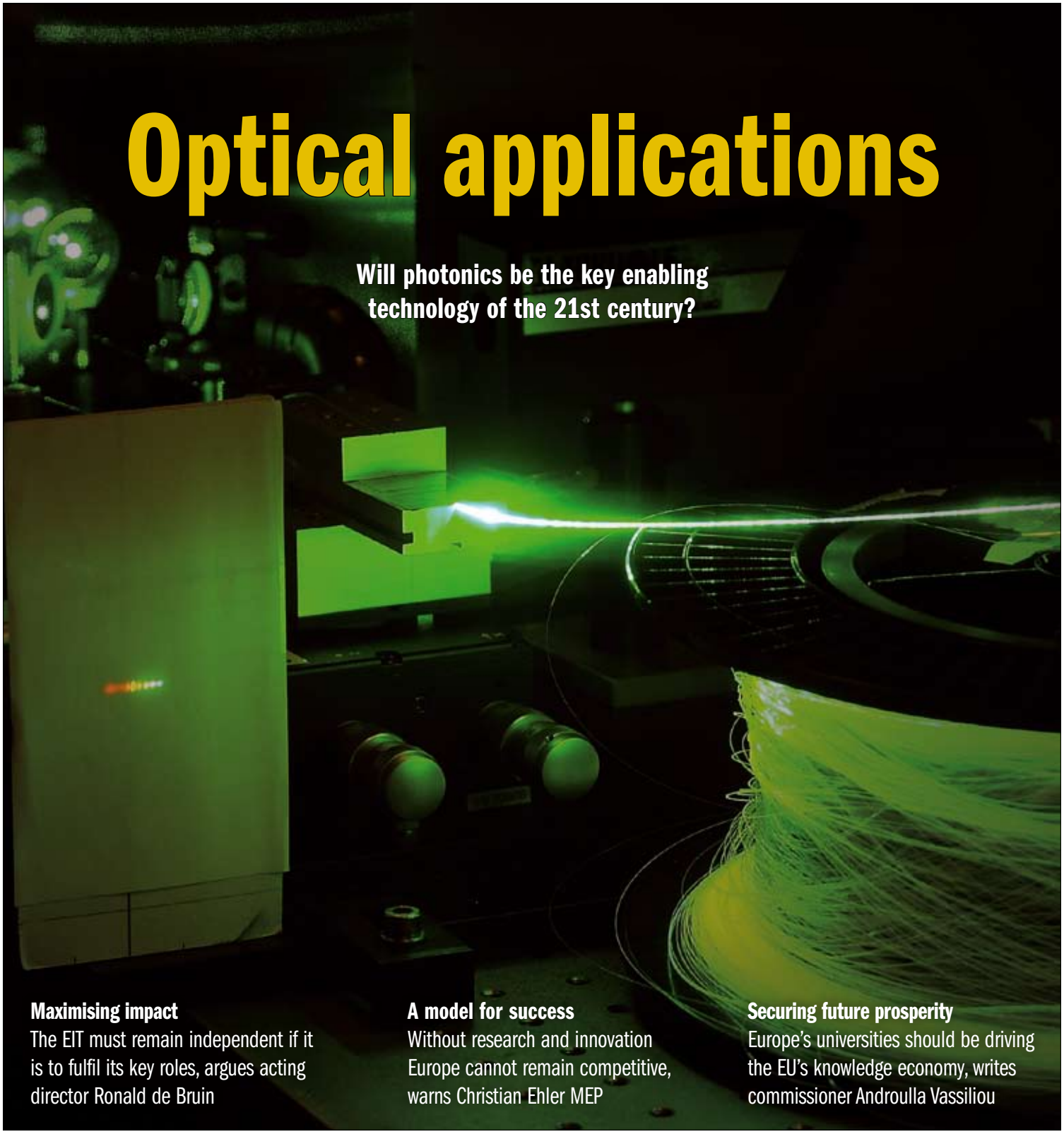
RESEARCH

EUROPEAN RESEARCH & INNOVATION REVIEW

Issue 16
April 2011



Optical applications

Will photonics be the key enabling technology of the 21st century?

Maximising impact
The EIT must remain independent if it is to fulfil its key roles, argues acting director Ronald de Bruin

A model for success
Without research and innovation Europe cannot remain competitive, warns Christian Ehler MEP

Securing future prosperity
Europe's universities should be driving the EU's knowledge economy, writes commissioner Androulla Vassiliou

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The European aeronautics industry is a world leader, meeting the needs of EU citizens and society. Technological leadership is the root of this success, and substantial and sustained investment in technology is required to maintain this position. The next EU programme for research will be a vital element in this continuing effort.

EU & the aeronautics sector: Working together to deliver benefit to European citizens

Jobs and growth

Air transport is a catalyst for growth and employment, and the aeronautics sector itself employs a highly skilled workforce of nearly 500,000 people in Europe.

Furthermore, aeronautics benefits adjacent sectors in its capacity as a growth-enhancing industry. Aeronautics R&D produces technologies that are not only incorporated in the industry's own products and systems, but often result in benefits for other sectors. A variety of studies show that the "spill-over" benefit of aerospace technology investment is larger than the manufacturing average.

Green, smart and safe mobility

The air transport sector represents a vector for mobility and exchange, supporting integration and cohesion between the regions of Europe. Through the delivery of innovative products and systems incorporating state-of-the-art technology with respect to the environment and safety, aeronautics contributes concretely to the European policy for green, smart and safe mobility.

Fact: thanks to the application of innovative technologies, an aircraft today produces 70% less CO2 emissions than its equivalent 40 years ago.

Aeronautics is dedicated to innovation

The European aeronautics sector dedicates an average of 12% of its revenues to R&D. Innovation drives the aeronautics sector with new technology being the major competitive differentiator in world markets, under fierce and increasing competition from new entrants - particularly emerging nations such as Brazil, Russia, China and India. The European industry cannot compete on price with emerging nations and has no choice but to innovate.

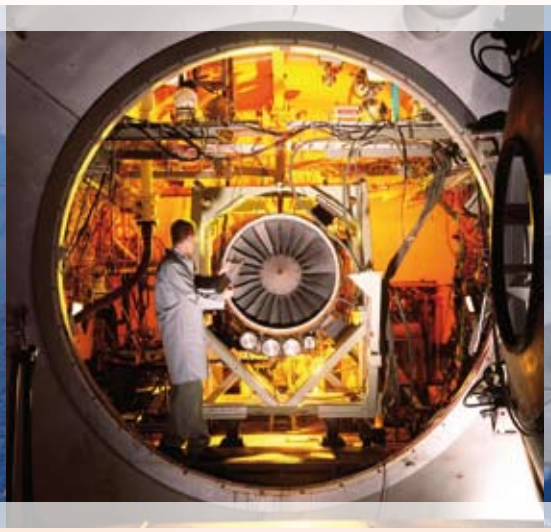
The Common Strategic Framework (CSF) for Research, Technological Development and Innovation: An essential tool for aeronautics

Aeronautics research is technology and capital intensive, and subject to very long cycles. Investments in technological innovation are therefore risky, and only bear fruit on a long-term basis. This is why financial markets are reluctant to fund aeronautics research, and why public sector support - which is common to all aeronautics powers worldwide - is essential both at European and national levels. Backed by this public support, the aeronautics sector is in a position to co-fund research and innovation activities.

In this context, the EU should:

- Support the aeronautics thematic within the future CSF for Research, with a dedicated funded aeronautics programme enabling Europe to meet its long-term objectives.
- Ensure the stability of instruments recently deployed in the 7th Framework Programme and which have proven their value (such as upstream pioneering research, technological integration projects as well as Public Private Partnerships and Joint Technology Initiatives), whilst improving their efficiency by simplifying their implementation.
- For European air transport, develop a standardisation and interoperability strategy which will strengthen Europe's competitiveness (e.g. Single European Sky, SESAR/NextGen).

Aeronautics is at the heart of EU policies, in particular the EUROPE 2020 strategy. The EU can facilitate the achievement of this strategy by supporting the aeronautics industry in FP8.



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Research driving Europe's economy

We begin this issue with German MEP Christian Ehler warning that "as long as the European budget is the cause of battles for allocation of agriculture and structural fund resources, the EU 2020 targets cannot be met." Without research and innovation, he warns Europe "cannot remain competitive."

Agreeing with Ehler, French MEP Jean-Pierre Audy, who was parliament's rapporteur for the report on strong European research for a globally competitive Europe, adds, "It is vital that we should combine our forces in order to come up with common European responses to the major social challenges".

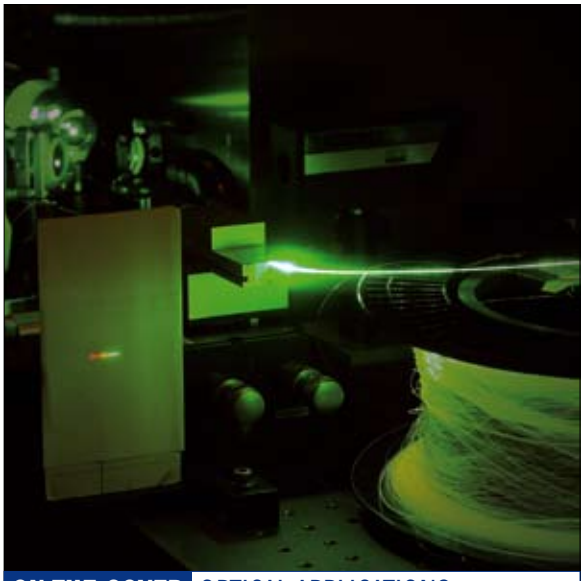
Meanwhile Dutch deputy Judith Merkies writes that "Resource efficiency should be the key driver and main focus of our efforts for more innovation," While parliament vice president Gunnar Hökmark calls for Europe to lead the process of change in the digital single market. "If we do not set ourselves ambitious targets now, and if we only aim to be the world's number three, the wireless revolution will happen outside the EU," he warns.

Lambert van Nistelrooij, a member of parliament's regional development committee, writes that the switchover from analogue to digital television broadcasting in Europe is "a great opportunity" and will free up "much needed" scarce radio spectrum.

Elsewhere, we take a close look at Europe's universities, with European education, culture, multilingualism and youth commissioner Androulla Vassiliou arguing that European universities "can, and should, be the drivers of the EU's knowledge economy". Universities, she says are "fundamental for securing Europe's future prosperity." Danuta Hübner, the chair of parliament's regional development committee highlights that Europe's regions are where universities and innovative funding schemes can come together. "It is important to further build on what we have built so far," she says.

Georgios Papanikolaou, parliament's EU youth strategy rapporteur sends the Research Review's readers a clear message, "Fewer skills mean fewer job opportunities". What is needed, he says are "skills and competences fully useful to the needs of society."

Ruth Marsden, Research Review editor



ON THE COVER OPTICAL APPLICATIONS

This issue includes a special feature on photonics, the science of optical applications.

EU digital agenda commissioner Neelie Kroes explains how the technology is expected to have major impact on society and industry in years to come.

She says, "When I think of photonics, I think of the importance of ICT research and innovation for our productivity growth."

Elsewhere, Martin Goetzeler, CEO of Osram and president of Photonics21, says the industry has arrived at a key point in its history, one which is moving from high-tech industry to mass production in a wide range of industries.

At the same time, securing future EU funding for continued research and innovation is a major challenge, he writes.

Also featured is Photonics4life, the European network of excellence for bio-photonics and part financed by the European commission.

Its coordinator Juergen Popp writes on how the benefits of optical technologies can be seen in many areas of our lives, not least in healthcare and life sciences.

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A model for success

Without research and innovation we cannot remain competitive, argues Christian Ehler

The European parliament is central to negotiations concerning the future eighth research framework programme, the report on the half term review of the seventh research programme and the position statement on the green paper FP8. These will play a crucial role in the EU 2020 targets.

In 2006 and 2007, the expenditure of EU member states on research and development was 1.85 per cent of Europe's GDP. This ranks it behind Japan with 3.40 per cent in 2006, and the USA with 2.67 per cent in 2007. If the EU is to remain globally competitive it is crucial that it will need to double the research volumes at European level from the €52.5bn, currently set aside, to €100bn in the financial period 2014 to 2020. The only way in which the EU can assert its competitiveness globally is to strive for the role of leader in research and development.

The EU has set itself ambitious targets as part of its 2020 strategy. The strategy provides for an increase in economic growth by promoting research and development, university education and lifelong learning. The aim of this is to overcome the sustained economic crisis by targeted promotion of the core sectors research and development and strengthening the economic potential of the member states in the long term.

However, as long as the European budget is the cause of battles for allocation of agricultural and structural fund resources and at the same time the readiness of the member states to finance the structures of the EU continues to fall, the EU 2020 targets cannot be implemented. The EU, and above all the parliament, must therefore speak out for a clear setting of priorities in the budget and for substantial growth in resources for competition, research and innovation to make it clear that research, innovation and competitiveness are the basis for the continuation of the European model for success.

However there are still serious differences between old and new member states in the sector of research and development, which weaken the competitiveness of part of Europe. Therefore it is the task of the EU to find a way which allows the new member states, and also other structurally weak regions in the Union, to increase their competitiveness through excellence in research.

One sensible approach here would be to strengthen the use of combined resources to promote research infrastructure, supplemented by a "stairway to excellence" initiative in the new eighth research framework programme. This would provide targeted support for member states and their capacity to take part in the excellence programme would be increased.

"The EU has set itself ambitious targets as part of its 2020 strategy"

Despite all efforts and initiatives, the participation of small and medium sized companies in the research framework programmes still leaves much to be desired. In order to guarantee the long term success of a European research policy the research within the eighth research framework programme must be promoted more clearly than ever among and for small and medium sized companies. Simplified application procedures, faster application processing and more small-sized projects could foster the inclusion of SMEs.

Also urgently required is a definition of the SME concept specific to sectors within the eighth research framework programme.

With the increase in global challenges we also need to expand the international dimension of the eighth research framework programme, making it more open to international collaboration with strategic partners.

Experience from the seventh research framework programmes has also shown that internationalisation only makes sense when procedures are simplified, otherwise the structures are not internationally competitive. ★

Christian Ehler MEP is a member of the European parliament's industry, research and energy committee

Innovation boost

The EU needs its research now more than ever, writes Jean-Pierre Audy

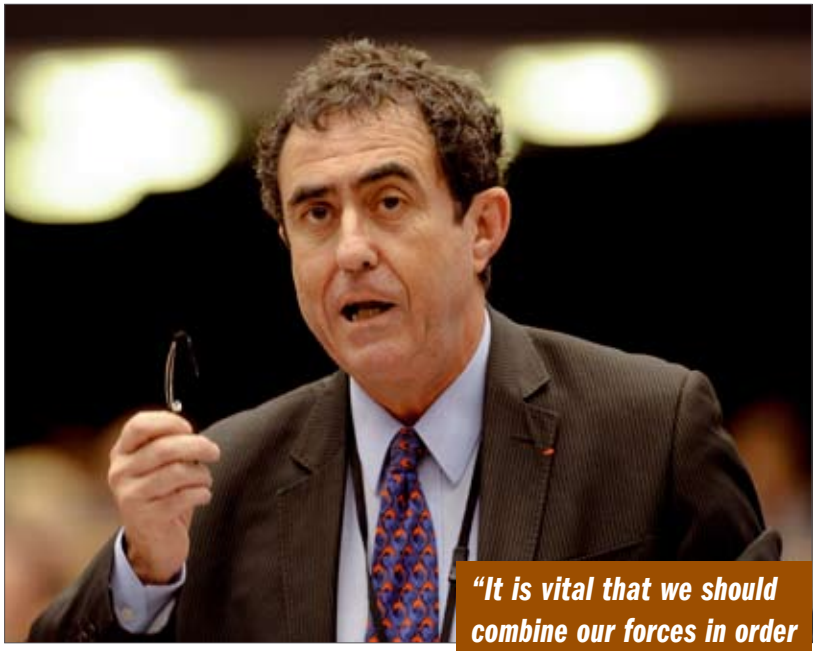
Research was identified by the heads of state and government leaders gathered at the Council of Europe summit in Lisbon, on 23-24 March 2000, as having a central role in achieving an ambitious strategic objective: to become, in 2010, the most competitive and dynamic knowledge economy. Unfortunately, this strategy failed to produce the anticipated results. In its defence, this last decade has been one of extraordinary complexity: failure on the part of member states to honour European commitments, certain states suffering budgetary inconsistencies, the difficult reunification of the continent, never ending institutional discussions and, to top it all, a worldwide financial crisis which has sorely tried European solidarity.

Nevertheless, we must not dwell on this, but examine instead how, by pooling our skills, we can forge this European destiny, conditioning as it does the peace, prosperity and fraternity which the people of our continent hold dear.

Today we are competing against such economic and political powers as the United States, China, India, Brazil, Australia and Russia, which are continents in themselves. Now we are not one nation, but a union of states. It is vital that we should combine our forces in order to come up with common European responses to the major social challenges we face and expand our knowledge so that our businesses will be able to innovate more and boost their competitiveness.

With this in mind the EU has a number of highly effective tools at its disposal, particularly the framework programmes for research and development. Over the years, these successive framework programmes have become the most important research support programmes in the world. They have provided the springboard for the EU to consolidate European research. The seventh framework programme (FP7), currently on-going, has a budget of around €54bn for the period 2007-2013, with €28.8bn remaining for 2011-2013. Within the European parliament, on the basis of a report, which I am the author, we have discussed the half way assessment of this framework programme and have identified certain priorities.

Firstly simplification. Reconciling the scientific world with Europe is a fundamental gamble. Administrative procedures are too long and too complicated. The financial regulations review will likewise be the time to provide this indispensable simplification with a legal basis.



"It is vital that we should combine our forces in order to come up with common European responses to the major social challenges"

Innovation is similarly at the forefront of this assessment. We should not be satisfied with undertaking basic research; as in the USA, we should also undertake innovative applied research, and once the specifications are issued, make provision for a marketing clause.

I also wanted to address the issue of the territorial demarcation of research. While expanding upon the principle of excellence, we should look into the matter of territorial cooperation: there is no telling where future European Nobel prize winners may come from.

Lastly, there is one topic which we must continue to discuss and where we must endeavour to find some political compromises: that of defence technology research in order to set up a European plan between the EU, its member states and the European defence agency, with a view to strengthening the industrial and technological basis of this sector while improving the efficacy of government military spending.

I will conclude by saying that now, more than ever, the EU needs its research. We must show that we are equal to the stakes of world competitiveness. ★

Jean-Pierre Audy was rapporteur for the Europeans parliament's report on strong European research for a globally competitive Europe

A helping hand

The ideal healthcare scenario is one where we all have more independence, writes Mike Biddle

People are living longer, and this is a cause for celebration and a testimony to the advances made during the last 50 years in healthcare and technology but major changes will be needed, due to the changing demographics and growth in those suffering from chronic conditions.

In the UK, €123bn was spent on healthcare in 2006/07, of which €38bn was spent on the over 65s, with over 50 per cent of this sum spent on older people in their last years of life. Rather than considering this as a threat, if we empower people to manage their own wellbeing it will actually be a market opportunity. To respond to this challenge, the technology strategy board launched the assisted living innovation platform (ALIP) in November 2007 – to promote independent living and improve quality of life by making technology better, cheaper and more desirable.

The ideal future scenario is one where we all have more independence. Technology developments can help to support this but they are only part of a solution that needs to work with the way we live our everyday lives. Active and healthy ageing was recently announced as the pilot European innovation partnership and it is a great opportunity to connect technology businesses with health and social care professionals, to innovate and find new solutions that benefit everybody.

"Technology is already pervasive but we need to recognise that technology in itself is not a solution"

Technology is already pervasive but we need to recognise that technology in itself is not a solution. Instead, we need to re-imagine the delivery of health and social care services for the future so that they are holistic with all relevant partners working together to enhance the life of the individual. This is not an easy task though, so the active and healthy aging innovation partnership (AHA-IP) needs to work across all of the relevant sectors and bodies to tackle the structural, regulatory and legal obstacles involved.

The assisted living innovation platform in the UK has shown that there is great value when multiple funding bodies coordinate their activities to address a common goal. In our programme we are working with the department of health, research councils, the design council, local authorities, academia, industry and third-sector organisations. If the AHA-IP could achieve this in a European context, it would be easier for new and existing organisations to engage and address the market opportunity across Europe.

The ambient assisted living joint programme (AAL-JP) has already started to do this from an ICT perspective, by bringing together various funders from 23 countries. The UK is a founder member of the AAL-JP, which recently announced a fourth call for proposals, with many businesses and charities already benefiting from the new connections they have made. It will be interesting to see how activities like this might develop within the context of the AHA-IP to further engage users and professionals.

Connecting the landscape will be beneficial as long as we make sure we pick the right tools and instruments for the right job. We also need to think about how public procurement can be used to encourage social innovation whilst managing the risks faced by all parties. Finally, as plans are developed for the AHA-IP the most important thing to remember is that whatever is done needs to work for real people. ★

Mike Biddle is the assisted living innovation platform leader of the Technology Strategy Board and vice president of the Ambient Assisted Living Association

COCIR

SUSTAINABLE COMPETENCE IN ADVANCING **HEALTHCARE**

EUROPEAN COORDINATION COMMITTEE OF THE RADIOLOGICAL, ELECTROMEDICAL AND HEALTHCARE IT INDUSTRY

INNOVATIVE MEDICAL TECHNOLOGY TO INCREASE HEALTHY LIFESPAN

Nicole Denjoy
COCIR Secretary General

Healthcare systems in the EU are facing many challenges today, which could undermine their sustainability: globalization, increased migration, demographic ageing, pandemic of life style related non-communicable diseases, changing healthcare needs and new health threats. The pressures we see today are set to rise. The current global financial and economic crises are both adding to the pressure.

At the same time, there is a convergence of innovations from across medical technologies, digitization and life-sciences that offer the potential to transform both the quality and efficiency of healthcare delivery.

COCIR represents the medical imaging, healthcare IT and electromedical industry. Its Member companies have been built around developing innovative technologies to advance medical care. The unique expertise and considerable knowledge that COCIR and its member companies have developed is instrumental in allowing people to live longer healthier and more independently to achieve the strategic objectives of the European Innovation Partnership.
In the context of active and healthy ageing, COCIR considers that major barriers to innovation remain.

COCIR believes that there is a need for action to remove those barriers and to improve the framework conditions for uptake of innovation by:

- Simplifying the European regulatory system.
- Creating efficient and tailored financial mechanisms.
- Development of new and innovative business models in care delivery.

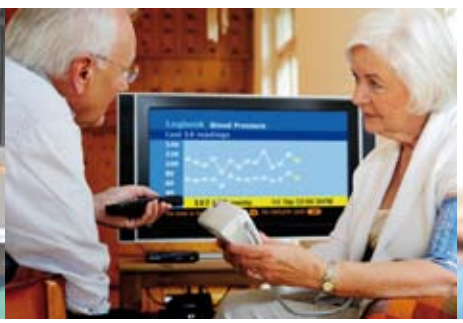
We are strongly in favour of boosting existing projects such as the eHealth Governance Initiative, to deploy eHealth tools and encourage Member States to work together towards pragmatic solutions at national and regional levels. In addition, COCIR supports initiatives in the field of telemedicine, recognised as a tool to empower and better monitor older citizens often in need of long-term healthcare.

COCIR members understand the drive for sustainable healthcare is an imperative in Europe[1]. People are living longer than ever before but, unfortunately, not always healthier. The projected increase in chronic age-related or lifestyle-related diseases is daunting. Already 70-80% of the resources in healthcare are devoted to symptom-based, advanced disease. In this context, COCIR believes that better management of chronic diseases must be a top priority.

COCIR innovative healthcare technologies are essential in allowing people to live longer, healthier and more independently.

The economics alone suggest the need for new approaches and innovative models to foster continuity and quality of care and increase access to healthcare while building cost-efficient systems overall. Our industry fully supports the European Commission and Member States as they push to identify and implement concrete solutions to face the demographic challenge.

It is key that all stakeholders (including Member States, insurers, patients, industry) explore how they can work together to instill a drive for innovation in the healthcare delivery and payment industry that will increase technology adoption and bring the benefits to patients and the economy sooner.



1 COCIR developed a White Paper ***"Towards a sustainable healthcare model"*** (*http://cocir.org/uploads/documents/-34-cocir_wp_on_sustainable_hc_-_released_on_19_nov._2008.pdf*)

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CENTRO NACIONAL DE ENERGÍAS RENOVABLES (CENER)
NATIONAL RENEWABLE ENERGY CENTRE (CENER)

The National Renewable Energy Centre of Spain is a technology centre, with excellent qualifications and international prestige, specialised in applied research and the development and promotion of renewable energies. CENER has more than 200 researchers, carrying out activities on the five continents. The Board of trustees is comprised of the Ministry of Industry, Tourism and Trade, the Ministry of Science and Innovation, CIEMAT (Research Centre for Energy, Environment and Technology), and the Government of Navarra.

CENER develops its activity in six work areas: wind, solar thermal and solar photovoltaic, biomass, bioclimatic architecture and renewable energy grid integration. Its head offices are located in Navarra, although it has offices elsewhere in Spain. It has modern, internationally accredited laboratories, and reference facilities, such as: a Wind Turbine Test Laboratory, a biofuel laboratory, a solar collector and photovoltaic module test laboratory, as well as a photovoltaic cell materials and processes laboratory. CENER has currently started up a Second Generation Biofuel pilot plant.

The Wind Turbine Test Laboratory (LEA) is a unique facility in the world both in terms of size and the power of the machinery it is capable of testing, as well as in terms of the extensive variety of technological services it offers. The LEA occupies a surface area of 30,000 sq.m., where we can find: Blade Test Laboratory, Powertrain Test Laboratory and a Compound Materials and Processes Laboratory. It also performs field tests and has a 30 MW experimental Wind Farm.

With reference to the Second Generation Biofuel Centre (CB2G) it is a semi-industrial pilot scale test facility able to develop biofuel production processes based on raw materials that are not competitive with the food industry. A wide range of biomasses (herbaceous and woody) can be processed at this facility, including suitable pre-treatments for the different biomasses and conversion processes, developing production processes for a wide range of 2nd generation biofuels and operating continuously with endurance tests, simulating industrial conditions.

Finally, it is important to highlight the execution of a Microgrid that combines several renewable technologies, a storage system with two types of batteries that will supply the industrial estate where it is located with energy. The project will analyse the aspects related to the control and management of the grid.

With an investment of around 95 million Euros in total, CENER manages important technological infrastructures with the aim of improving technical reliability and efficiency, as well as achieve a reduction in generation costs. Thus, R&D&I will continue to play an essential role in the development of renewable energy technologies and in ensuring that the European goals for 2020 are not just met but exceeded.

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BLADE TEST LABORATORY

CB2G BIOMASS PRE-TREATMENT UNIT INCLUDING BIOMASS TORREFACTION PILOT PLANT

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A brighter future

Medical technology took centre stage at the recent Innovation in healthcare conference, reports John Wilkinson

In a first major step in increasing its footprint on the European research and innovation agenda, medical technology and its specific research and innovation challenges and opportunities were presented at the important multi-stakeholder conference "Innovation in healthcare: from research to market", organised by the European commission.

Held this year on 30-31 March in Brussels, this conference is quickly becoming the European reference point for 'Innovation in healthcare'. Organised jointly by the European commission's DGs research and innovation, enterprise and industry and health and consumers, the event was addressed by no less than three EU commissioners and gathered over 500 international policymakers, research institutes, venture capitalists and entrepreneurs who heard the latest EU and global policy and thinking in healthcare research, innovation and funding.

With an eye to the significant potential in productivity and value that innovation in medical technology products, processes and services can offer to health systems, the European commission invited Guy Lebeau and myself, respectively chairman and chief executive of Eucomed, and a representative of a small medical technology to take an active role in the programme.

Speaking on behalf of the medical technology industry at the opening keynote session, Lebeau emphasised the power of medical technology to rapidly innovate and bring the changes needed not only to improve the quality of people's lives but also the changes needed to help build new models of healthcare delivery.

The conference heard about 'a multifaceted approach to responsible innovation in healthcare', opportunities to reorganise healthcare delivery by aiming for new holistic care models and how the medical technology industry can support them. Concrete examples of how certain medical technologies have contributed to improving patient satisfaction while reducing the length of hospital stay and improved quality of care with significant cost reductions where also highlighted.

"Medical technology is vital if we are to bring efficient, sustainable and equitable healthcare systems"

These views were echoed by senior policy makers and politicians at the event which can only be positive pointers to a bright future for medical technology. The health and consumer policy commissioner, John Dalli, and the Hungarian minister of state for health, Miklós Szócska, both signalled where society really needs to innovate. In the face of the enormous societal challenges ahead, John Dalli emphasised that innovation is the only way to have modern healthcare delivery and that this modern healthcare will mainly be →

technology enabled. Miklós Szócska spoke about the need to invest in the health systems of the future and the technology changes needed to help effect change in health systems.

Small and medium sized enterprises (SMEs) also received a special focus. Swedish medical technology association Swedish Medtech together with Eucomed were delighted that the European commission invited Torbjörn Kronander, mammography entrepreneur and CEO of Swedish SME Sectra, to talk about the specific challenges facing SMEs. Selling products in over 50 countries, Kronander echoed the pressing needs of European SMEs as laid out in Eucomed's recent survey into small medical technology businesses. He particularly expressed the difficulties that Europe's complex web of reimbursement systems played in getting his technologies into the hands of health professionals and patients. From a trade export point of view, he found, compared to the EU system, the US FDA system is a real barrier to innovation, adding delays and unnecessary bureaucracy with no patient or product improvement.

Rounding out the high-level EU engagement in healthcare innovation, European enterprise and industry commissioner Antonio Tajani, stated that we have to innovate to realise the full potential for Europe and its citizens.

Eloquently introducing her closing address in Gaelic, her native tongue, research and innovation commissioner Máire Geoghegan Quinn pledged increased funding to SMEs, surpassing the previous 15 per cent of the €6bn allocated to health research in the seventh framework programme. She encouraged engagement in the commission's active and healthy ageing project as a multiplier not only to gain an extra two years of active life but also to achieve economic growth and jobs. A particular emphasis was given within her speech on measures aimed at freeing up access to finance and the urgent need for a single EU patent system. Finally, the need to innovate and modify health systems and services was stated as key.

Eucomed is already looking forward to again working with the European commission DGs research and innovation, enterprise and industry and health and consumers on planning next year's conference especially, as recognised during the conference as innovation in medical technology is vital if we are to bring efficient, sustainable and equitable healthcare systems. ★

John Wilkinson is chief executive of the European Medical Technology Industry Association (Eucomed)

NECOBELAC project

NEtwork of COllaboration Between Europe and Latin American-Caribbean countries

www.necobelac.eu

A bridge between Europe and Latin America to promote the diffusion of health information

Background
Starting from the experience in information production and diffusion at the Istituto Superiore di Sanità, the National Institute of Health in Italy, NECOBELAC aggregates institutions working in the field of public health (Instituto de Salud Pública, Colombia), BIREME (Pan American Health Organization /WHO, seated in Brasil), and institutions having advanced experience in open access publishing, Consejo Superior de Investigaciones Científicas (Spain), Universidade do Minho (Portugal), University of Nottingham (UK).

Focus
NECOBELAC is focused on health and is part of the global commitment to abate barriers limiting the free circulation and proper use of information.

The project acts through a two-level training program (train-the-trainers and local training) to maximize its impact, create major involvement of local institutions, be sustainable in time.

Objectives
Spreading know-how in scientific writing and Open Access publication models in European and Latin American academic and research institutions working in the field of public health and related disciplines and fostering scientific collaboration among the institutions involved.

Training activity
A flexible training program and a network of supporting scientific institutions collaborating to promote a cultural change in health dissemination practices has been developed. NECOBELAC network currently includes 138 institutions from 15 countries: 4 in Europe and 11 in Latin America (involving 59 and 79 institutions respectively).

Eight courses for trainers were planned: 4 realized (Brazil, Colombia, Italy, Spain), attended by over 120 participants from 14 countries; 4 to be realized within 2011 (Argentina, Portugal Mexico, UK). The participants in NECOBELAC courses commit to realize training activities in their countries. Online and printed materials in four languages (English, Spanish, Portuguese, Italian) are available to support training and guarantee wider understanding, easy dissemination and appropriate use of the project contents at local level.

Sustainability and impact
The replication of the training program, based on flexibility and adaptability to local needs and priorities, guarantees the medium – long term sustainability of the project goals towards an equal distribution of global information resources in public health. This approach allows extensive training in the project geographical areas and favors the development of international scientific cooperation also outside the current areas; in particular, some initiatives are starting in Africa.

In this framework, the increased local awareness of NECOBELAC objectives and the use of its training tools contributes to create a capacity building process in the long run.
A wide impact is guaranteed by the focus on public health and the involvement of different stakeholders at international, national, and local level (researchers, librarians, editors, policy makers, etc.) according to a methodology based on cooperation and training.

NECOBELAC in Brief

Project coordinator :
Istituto Superiore di Sanità

Project duration:
Three years (February 2009-January 2012)

Project Languages:
English, Italian, Portuguese, Spanish

EC Contribution:
800,000 Euros

Project Number:
230583

FP7 - Science in Society

Partners

Istituto Superiore di Sanità
Universidade do Minho
The University of Nottingham
CSIC
BIREME • PAHO • WHO
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EUROPEAN COMMISSION

Expanding creativity

Innovation is not a special policy, it is mindset, writes Judith Merkies

The European Steve Jobs and Bill Gates exist, but why don't we know their names? We need to boost a culture of excellence, risk taking, creativity and entrepreneurship. Europe has had technological breakthroughs and claimed academic success. However, the Americans were much more prosperous by carrying these breakthroughs to the market and claiming business success. We have to merge Einstein with Steve Jobs and keep him or her on European soil.

Europe should put serious effort into bringing about a mindset change towards innovative and curiosity-driven thinking as well as risk-taking, and allow for a more permissive attitude towards failure. We must recognise that every citizen is a possible innovator and by boosting creativity throughout Europe we can increase this potential. The European parliament is likely to support the focus on citizen-centered innovation, during the vote on May 12, making a call for more social innovation at the workplace and proposing measures to stimulate a more risk-taking attitude for business.

Judith Merkies is a member of the European parliament's industry, research and energy committee

Red tape is the enemy of creativity. Application procedures for financial support have to be simplified and take a more trust-based approach. More visibility and simplification would be created by setting up an easily accessible 'one-stop shop'. A central point with service for stakeholders to direct them to the right support programme and network with potential partners.

Innovation is not a special policy, it is a goal, a mindset, a reason why all EU programmes and policies must serve innovation. This implies that the funds under the new common strategic framework for research and innovation, but also the common agricultural policy, the structural funds and the cohesion fund must be aimed at stimulating innovation. In addition the commission must shift the funds more towards the risk shared finance facility, to stimulate especially start-ups. I have the impression that innovative SMEs are far ahead of policy makers in terms of vision and it is about time for policy makers to support these smart visions.

Innovation is not just about technological or product development or recovering from the economic crisis. It is also about more dynamic workplaces, about empowering employees to improve processes and about facing our societal challenges – including the ageing population and our ever scarcer resources. Targeted policy by the EU and the member states could stimulate businesses to adapt their workplace and become more employee driven, as this contributes to 75 per cent to technological innovation.

Why would other continents have the more visionary leaders on resource efficiency than Europe? Europe has to wake itself out of its hundred years sleep. For far too long our large industries have stuck to the old ways. They should follow the example of innovative SMEs and spark a strategy for a complete resource overhaul before 2020.

"Resource efficiency should be the key driver and main focus of our efforts for more innovation"

Moreover, with our creative and innovative capacity in Europe as well as our import dependency on raw materials, resource efficiency should be the key driver and main focus of our efforts for more innovation. Not only the future of our industry but our future jobs depend upon it. ★

Access all areas

internet access is "a fundamental right" for all EU citizens, argues Niki Tzavela

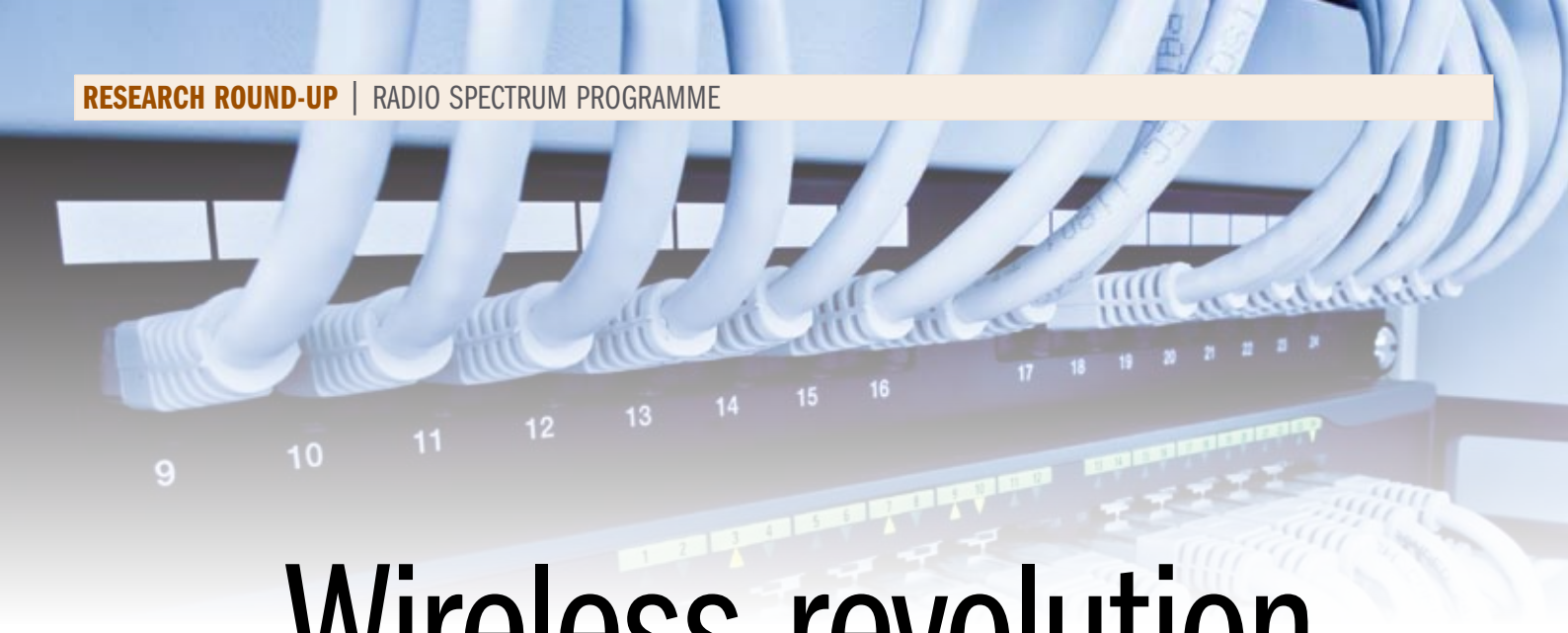
In 2003, the European commission stated that internet access had become, "a fundamental right for all citizens". The last decade has seen an extraordinary growth in broadband roll out and uptake. Most recently, in July 2010 Finland became the first EU member state to make broadband a legal right, alike to health and education. Similar discussions are being held in Spain, where network providers are being encouraged to set reasonable prices for basic broadband by 2013.

The commission communication on broadband stipulates that by 2013, all EU citizens should have access to broadband services, and that by 2020, all Europeans should have access to internet of above 30megabits per second (Mbps) and 50 per cent or more of European households have subscriptions above 100Mbps. Undoubtedly, one of the biggest issues in the European parliament's report on broadband will be the issue of financing and state aid. It was reported that last year, state aid was a record €1.8bn. In addition, it is estimated that next generation access roll out above 100Mbps will cost around €200-300bn and that an estimated €38-58bn will be needed to achieve 100 per cent broadband coverage at 30Mbps. Furthermore, 80 per cent of the costs of deploying new infrastructures are civil engineering costs.

Taking all of the above into consideration, the EU institutions, along with the member states and relevant stakeholders need to come up with innovative methods of financing to fund these mega projects. Since the issue of state aid has been the subject of criticism and the state aid guidelines are set to be reviewed in 2012, we must also turn our attention to the role of EU project bonds in financing the roll out of broadband and next generation networks. The creation of an EU project bonds system which in collaboration with the European Investment Bank and the guarantee of the EU budget will respond to the current financing gap due to the reluctance of the private investors and the serious constraints of national budgets. For this reason, the broadband report will urge the commission to move forward as soon as possible with concrete legislative proposals for the implementation of this alternative source of financing for big infrastructure projects carrying a European added value.

Furthermore, given the time frames set by the commission, the "basic broadband" target for 2013 is both chronologically and realistically, the first step. The objective must be to establish EU global leadership in ICT infrastructure by 2013 by delivering 100 per cent basic broadband coverage, giving at least 2Mbps service to all users in rural areas. The EU's policy should endeavour to eradicate the digital divide that exists between urban and rural areas. In order to do this, we have to acknowledge that broadband access is enabled over many platforms (copper, cable, fibre, fixed and mobile wireless, satellite, etc.) and take advantage of all available technologies at our disposal while also taking into account geographic specificities of rural areas, such as mountainous regions and islands. The report will also invite member states in close cooperation with all stakeholders, to set national broadband plans and adopt operational plans with concrete measures to implement the 2013 and 2020 targets set in the European digital agenda; calling on the commission to study these plans, to propose optimal solutions and to coordinate their implementation. ★

Niki Tzavela was the European parliament's rapporteur on the 'European broadband: investing in digitally driven growth' report



Wireless revolution

Gunnar Hökmark wants Europe to lead the process of change

Mobile internet solutions and wireless technologies are rapidly transforming our societies and economies. The demand for mobile data traffic has recently exploded, growing by over 100 per cent every year, and new services within the telecommunications, healthcare, energy and logistics sectors are improving the lives of billions of people. We can only try to imagine the societal and economic opportunities that future technologies such as cloud computing and the internet will bring in the wireless revolution.

My ambition with the radio spectrum policy programme is to make Europe the home of this wireless revolution. I want Europe to lead the process of change, creating the best opportunities for a competitive European knowledge economy characterised by vitality, change and innovation.

The spectrum programme should lay the foundations for a development whereby the Union can take the lead in issues relating to broadband speeds, mobility, coverage and capacity. Global leadership is essential to establish a competitive digital single market which will serve to open up the internal market for all EU citizens. A European market with nearly 500 million people connected to high-speed broadband would act as a catalyst for the development of the internal market, giving each user increased value and the Union the capacity to be a world leading knowledge-based economy.

I have raised the ambitions in the spectrum programme because I want Europe to be the best. And in order to be the best we must secure we give the best opportunities for industry, entrepreneurs, customers and users. We cannot make a change without a change.

First of all, I have proposed that member states adhere to the 2013 deadline for opening up the 800 MHz band for electronic communications services. The 800 MHz band must get cleared for mobile broadband services and derogations should therefore only be authorised in exceptional cases.

Secondly, I propose to free up additional spectrum for wireless broadband services, amounting to at least 1200 MHz by 2015. To achieve this ambitious target I suggest opening up additional spectrum bands for wireless broadband services in the 1.5 GHz and 2.3 GHz band.

Thirdly, I have initiated a debate around the 700 MHz band asking theEuropean commission to monitor the capacity requirements for mobile broadband in order to assess if further spectrum harmonisations will be needed.

"Global leadership is essential to establish a competitive digital single market which will serve to open up the internal market for all EU citizens"

Finally, I have proposed to extend the allocations of unlicensed spectrum in the higher frequency bands in order to stimulate the use of wifi.

All political groups in the European parliament's industry committee supported my proposals when the spectrum report was voted in April. Courageous political decisions are now needed if we want Europe to become a global leader in the digital economy and it is now up to member states to show in negotiations with parliament that they are able to contribute to the change we need in order to make Europe the best and the home for the next telecom revolution.

If we do not set ourselves ambitious targets now, and if we only aim to be the world's number three, the wireless revolution will happen outside the EU. New services, innovations and knowledge will instead come from China, India or other emerging countries. The radio spectrum programme will then be a lost opportunity for Europe to regain its global leadership in the ICT sector. This would be very bad news for our efforts to create the world's most competitive knowledge economy. We can make the change we need. ★

Gunnar Hökmark is a vice president of the EPP group and responsible for the European parliament's report on the Radio Spectrum programme

Safety first

Radio spectrum is a scarce and expensive resource, writes Lambert van Nistelrooij

The switchover from analogue to digital television broadcasting in Europe is a great opportunity. It frees up scarce radio spectrum that is much needed to accommodate the ever increasing demand for more and faster wireless connections, according to European digital agenda commissioner Neelie Kroes. Much is at stake: 4.3 per cent of our yearly European economic growth depends on it. Coordinating spectrum allocation on the European level brings €80bn extra. It is important though to find a balance between commercial and public interests. Emergency services for example should always have enough bandwidth to communicate.

The ether is increasingly congested. More and more people and applications make use of wireless connections. In particular 'machine to machine' communication shows a steep increase. If the current year on year growth of 32 per cent persists, there will be 50 billion in 2020. Think of for example the refrigerator that monitors its stock and automatically orders products from the local supermarket when needed, or radio frequency identification (RFID) chips that keep track of the location and quality of products in realtime. At the same time, in 2015 mobile data traffic will be 26 times higher compared to 2010, according to network provider Cisco Systems, mainly caused by the use of mobile video services.

The current growth cannot be maintained if no additional spectrum will be released. Compare it with a motorway: if too many cars want to make use of it at the same time, a traffic jam will occur. You will need to expand it to deal with the increasing demand, or restrict access to it. We have seen this happening in the Netherlands: some big telco's that used to offer unlimited mobile internet plans, don't do so anymore. This illustrates the need for more spectrum and at the same time its efficient use. The Netherlands will auction, apart from the current GSM frequencies, 2x30 Mhz in the 800 Mhz band. 2x10 Mhz is foreseen for new entrants. This will stimulate innovation, competition and lower prices.

> ***"Coordinating spectrum allocation on the European level will bring the single market forward"***

Coordinating spectrum allocation on the European level will bring the single market forward, which will result in savings worth €80bn and practical advantages. Of course, thanks to prior European coordination, your mobile phone will work in Greece. But at present, this is not the case with many other wireless devices, because they use different frequencies across the EU. More EU coordination on spectrum allocation can help to solve this problem.

Radio spectrum is a scarce and because of that expensive resource. Some governments like to take profit from that. However, our security and our health are not for sale and may not be compromised. Therefore I have tabled an amendment to the radio spectrum policy programme that aims at guaranteeing that there will always be enough spectrum available for the communication of public services like police, ambulance, customs and the army. Safety first. ★

Lambert van Nistelrooij is a member of the European parliament's regional development committee

Well established

RTOs have been making a major contribution to social progress across Europe for more than half a century, argues Christopher John Hull

Technopolis Group, a leading consultancy specialised in designing and evaluating research and innovation policies and programmes, has recently completed a study – the first of its kind – on the economic and social impact of research and technology organisations (RTOs). This independent study was commissioned by the European association of research and technology organisations (Earto), which represents the interests of more than 350 RTOs from across the continent.

RTOs bring together a rare and long-established array of capabilities and activities, from basic and applied research to advanced engineering, design and development, measurements, tests and prototype production, and industrial exploitation through contract research, licensing and spin-outs. They serve both public and private clients, including many SMEs. Their typical business model is a mixed one combining public core funding, public competitive funding and enterprise income in roughly equal proportion. Underpinning all they do is a pragmatic focus on solving real world problems and delivering innovations that have real world value.

The study demonstrates that RTOs are key actors in the European innovation system, with a combined annual turnover of around €20bn annually, which would put them in the top 100 of the FT European 500 if they were organised as a European multinational. Their annual economic impact is estimated to total between €40 and €50bn – and up to €100bn when account is taken of cumulative social returns (spillover effects). These figures are only estimates but clearly demonstrate that RTOs make a major contribution to economic competitiveness in Europe.

RTOs have been making a major contribution to social progress across Europe for more than half a century. But while their track record is undeniable, it goes largely unrecognised, and their unique position in the European innovation system is poorly understood. The study states unequivocally that it is time for policymakers to take account of RTOs' ability to deliver practical and cost-effective innovative solutions.

To make RTOs more visible, Technopolis recommends that the European commission should ask Eurostat to collect statistics about RTOs, as is done for the university sector or business R&D, and should encourage the OECD to act in a similar way.

Against a backdrop of fiscal austerity, pressing grand challenges and ERA objectives, Technopolis also says European and national governments must look to leverage existing proven innovation strengths. This could be achieved by fully unleashing the power of RTOs so that they can make an even greater innovation impact than they do already, notably in tackling the grand challenges. RTOs have a unique set of skills and a multidisciplinary outlook which could be well put to use in forming strategic alliances to address grand challenges such as climate change or ageing. They have continuously demonstrated their ability to pool resources and knowhow transnationally for the purposes of long term, ambitious programmes. One example is the SET-plan's European energy research alliance (EERA), and the EERA model could be replicated in the new European innovation partnerships.

More generally, says the report, the commission should recognise that the present RTO landscape in Europe is sub-optimal because RTOs are to some degree locked into their national markets by the fact of their national core funding. This results in duplication of similar activities in different countries. A gradual substitution of European funds for national core funding would break down the barriers and encourage RTOs to specialise and differentiate themselves through a controlled process of cooperation and competition. Another solution would be to create a European common market for knowledge services. Finally, the commission should provide further competitive funding for shared infrastructures for applied research and demonstration activities. The end result would be a more joined-up and still more cost-efficient RTO sector. ★

Christopher John Hull is the secretary general of the European association of research and technology organisations (Earto)

Playing it safe

Internet safety can only be improved if we know what the risks are, warns Damien O'Sullivan

At a policy level, internet safety is a thorny issue. Those who need to create policy in this area must balance the need to allow individuals the freedom to benefit from an increasingly essential communication and information resource with the need to protect the vulnerable from those who will inevitably exploit this level of connectivity.

The issue of protecting minors, the most vulnerable online group, generates its own specific challenges for policy makers in the EU. European children are now using the internet for longer periods and with greater frequency than ever before – not just for surfing the web, but for accessing schoolwork assignments, developing their personal interests, and contributing to the web's diversity through activities such as, social networking and sharing video content. Younger users will drive the growth of the internet and will inevitably become its guardians, but in the meantime they need to be protected online to learn good practice.

The EU has taken certain actions, such as investing €55m into awareness-raising projects aimed at making the internet safer for children. Despite this investment, a recent survey conducted by the London School of Economics has shown that nearly half of the participating children did not know how to change the privacy settings of their social networking sites, and in another complementary EU-wide survey, only 14 per cent of parents surveyed said that they had set up parental web-filtering software to protect their children.

The combined findings of these two independent studies suggest, that more emphasis needs to be placed on modifying the online behaviour of the internet's end users; that of minors, but more importantly that of the adults who influence their online behaviour. The issue of minors' critical evaluation of information, which is essentially a cornerstone of all education, is linked to instruction by adults. This is no different in the online world. In her speech commemorating safer internet day in February, European commission vice president Neelie Kroes spoke of the difficulty of policing harmful online content, and of stakeholders' self-regulatory approach to enforcing recommended industry's standards, such as the commission's suggested safer social networking principles.

> ***"Only 14 per cent of parents surveyed said that they had set up parental web-filtering software to protect their children"***

The European Computer Driving Licence (ECDL) foundation, the not-for-profit certifying authority of the leading international computer skills certification programme ECDL / ICDL, promotes and develops digital literacy globally. We advocate that to significantly improve minors' online safety, it is adults' lack of digital literacy that first needs to be addressed. Children's online safety can only be significantly improved if they, as a group, are made aware of the pitfalls and risks associated with using the internet. This will not happen unless the adults in their lives – both parents and teachers – possess the skills and knowledge to guide them around what is an increasingly complex online world. ★

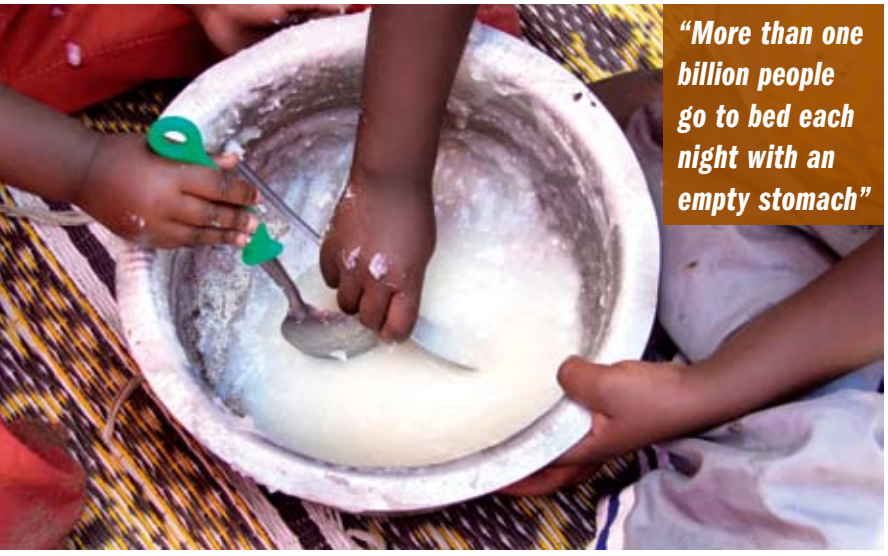
Damien O'Sullivan is CEO of the European Computer Driving Licence (ECDL) Foundation-Dubin

Crisis monitoring

Where will the next food crisis strike and how will the EU face it? This, as Martin Banks reports, is one of key issues currently being tackled by the Joint Research Centre (JRC)

The 2007-2008 global food crisis that saw food riots erupt in various African countries provided graphic evidence of the significant number of countries now under threat of famine. Satellite observation is seen as the key instrument that will allow the number of countries monitored in "real time" for detecting the first indications of adverse agricultural outcomes to double this year.

And the European commission's JRC, whose 2,750-strong workforce is located in five countries, is at the forefront of efforts to improve the response to such crises. The centre, which has an annual budget of some €330m from the seventh framework programme, is working to innovate and reinforce its food security monitoring systems and develop more efficient early warning tools. One good example is the new "integrated phase classification (IPC) system that facilitates and accelerates the reaction time to food security crises by allowing a common and internationally recognised classification of their severity.



"More than one billion people go to bed each night with an empty stomach"

Experts from the fields of science and industry joined EU officials in Brussels recently for a seminar on how science and research can help support food security. The aim of the event, jointly organised by the commission, was to identify the stresses on the food system and what kind of solutions can be deployed by spreading knowledge and technology. According to the food and agriculture organisation, more than one billion people go to bed each night with an empty stomach. In addition, the latest global food crisis resulted in more countries being added to the list of food insecure populations.

JRC director general Dominique Ristori said, "This is probably the most urgent and dramatic problem that mankind faces today. Food security is not only a crucial issue for developing countries and their more vulnerable inhabitants; it is also key to building a more stable, equal, wealthier and safer world." He points out that special programmes are run and "significant" funds are mobilised every year by the international community in an effort to combat the increasing number of food insecure populations. "Identifying the times and places where aid is required is crucial to deliver targeted and effective responses. Here is where the scientific community comes into play by developing methodologies and tools to provide timely information and objective assessments of the food requirements, thus supporting the decision-making process with solid evidence." He underlines the power of satellite imagery, saying that several organisations dealing with food security both in Europe and in the United States traditionally rely on satellite observations to support their assessment activities.

"Satellite-based forecasting systems will take on increased importance in the next years, allowing organisations to monitor a larger number of countries than it is currently possible to do with in-country offices," he said. The JRC, whose job is to provide technical support for implementation of EU policies, has recently extended the real time monitoring system it has developed to forecast food crises. It will cover not only the Horn of Africa, but all the most food insecure countries in sub-Saharan Africa.

As the earth observation and agroclimatic data regularly received by the JRC are global, other countries outside Africa can also be monitored in case of food security crises. The JRC system for regional crop monitoring and forecasting is based on satellite data and innovative agro-climatic models. More than 40 regional bulletins provide each year quantitative and qualitative yield forecasts for food insecure countries around the world, with a particular emphasis in Africa. In 2009, JRC provided, for instance, an early warning of the drought affecting Kenya, and correctly predicted a 15 per cent below average maize yield one month before harvest.

Many see the case for urgent action in the global food system as compelling and it is hoped that such technology can increasingly be used to help. ★

Reaching new heights

James King says SKA will be the world's largest astronomy facility and one of the most significant scientific instruments

Radio astronomy partnerships between Africa and Europe received a boost lrecently following the hosting of a square kilometre array (SKA) Africa lunch in the European parliament on Tuesday 12 April. Representatives from Microsoft, Clyde & Co and Nokia Siemens Networks, along with MEP António Fernando Correia De Campos, discussed a range of issues relating to such cooperation, including opportunities for investment, regional development and scientific collaboration.

Expected to be operational by 2024, the SKA will be the world's largest astronomy facility and one of the most significant scientific instruments ever constructed. South Africa, in partnership with several African countries, is bidding to host the telescope, an initiative endorsed by the heads of state of the African union. Composed of 3000 receiver antennae and built over a continent-sized baseline, the SKA will provide unparalleled insights into the early development of the universe, put Einstein's theory of general relativity to the ultimate test and discover up to a billion new galaxies during its operational life-span.

With an estimated cost of €1.5bn, the project will also represent a substantial investment on the part of countries participating in the consortium to construct the array. European countries active in the project's preparation include Germany, France, the Netherlands, Italy and the UK, with the Jodrell Bank Observatory in Manchester recently selected to host the SKA project development office. In this context, the SKA Africa lunch provided a platform for discussions related not only to the further development of the SKA project but also regarding the broader potential for radio astronomy partnerships between Africa and Europe.

The SKA's development comes at a time of increasing activity in astronomy across Africa, with the ongoing roll out of South Africa's MeerKAT demonstrator array and encouraging signs for an African very long baseline interferometry (VLBI) array. These newer instruments have emerged from a strong heritage of astronomical excellence; notably through the world-renowned HESS telescope in Namibia and the southern African large telescope (SALT) in South Africa.

While a formal decision on the SKA's location will be taken in early 2012, the case for the African site bid remains compelling; sharing many of the geographical advantages as its site-competitor Australia, the SKA Africa's envisaged construction will span nine countries and deliver numerous opportunities for education, employment and development. The project will become a powerful driver of socioeconomic growth across the continent and will boost the region's human capital by training a new generation of highly qualified scientists, technicians and professionals, and create diverse possibilities for international collaboration with the region's industry.

"The SKA will provide unparalleled insights into the early development of the universe"

Moreover, the SKA will also need remote power generation with low running costs, unaffected by fluctuations in global fuel prices. Its energy strategy will accelerate technology development in the areas of scalable energy generation and storage, distribution, efficiency and demand reduction, and provide a testbed for innovative green energy technologies that can later be transferred to the market.

The lunch concluded that cooperation in science and technology, especially in areas such as radio astronomy, where African enjoys a comparative geographic advantage, offers immense potential to enrich Africa's various international partnerships, not only by accelerating the continent's own development, but also through harnessing research and innovation to address shared global challenges. The SKA Africa lunch will be followed by further engagement with stakeholders in the European parliament and other international forums to consider how such cooperation could best be advanced. ★

James King is a policy analyst at Intelligence in Science

Immune deficiency societies join forces with patients

Leading immune deficiency societies have joined forces with patients, nurses and health professionals to raise awareness about primary immunodeficiences (PI).

The aim is to achieve the earliest possible diagnosis for sufferers and ensure treatment of what is described as a "devastating" group of diseases.

Primary immunodeficiencies are hereditary and genetic defects in the immune system that cause increased susceptibility to a wide range of infections, affecting the skin, the ears, the lungs, the intestines and other parts of the body. These infections are often chronic, persistent, recurring, debilitating, and in some cases, fatal.

It is estimated that 10 million people suffer worldwide. In Europe, PI is classified as a rare disease and, currently, around one in 10,000 people have a genetic PI.

Speaking during World PI week, which concluded on 29 April, Israeli pediatrician Amos Etzioni, said, "Increased awareness for primary immunodeficiencies can save many lives of infants who can live a normal life after appropriate therapy. Children with recurrent infections or with severe unusual infections should be checked for defects in their immune system."

EU urged to consider updated blood cells research

EU policymakers have been urged to "take into account" updated research in the current controversial debate about the storage of cord blood cells. Latest data from the European association of family cord blood banks shows that only 11.7 per cent of pregnant women are willing to store their child's cord blood cells in a private bank.

But the organisation says that family cord blood banks have a "major contribution" to make to European cord blood stem cell reserves.

A total number of 349,774 of such samples were stored across Europe by the end of 2010. Research has shown that the number of transplants with umbilical cord blood exceeds 19,000, which is about 30 per cent of all transplants with hematopoietic cells.

Cord blood contains very young and healthy stem cells which are currently used in the treatment of over 80 diseases.

Other treatments are expected in the future with the completion of some 15 clinical trials on the therapeutic benefits of own cord blood stored at birth.

In a recent discussion on the issue in the European parliament, representatives of French and Italian public stem cell banks called for either a restriction or ban on private cord blood banks. But Dr Eberhard Lampeter, president of Cord Blood Europe, said, "In view of the discussion we strongly encourage decision-makers to take into account updated evidence coming from a variety of sources for an open and inclusive debate."

Robotics researchers raise profile

Robotics researchers from all over Europe have launched a campaign to raise awareness of the work they do. Nearly 350 experts from 26 countries launched the initiative at the annual European robotics forum in Västerås, Sweden on 6 April.

They pledged to extend cooperation between the worlds of academia and industry in order to further strengthen the development of European robotics. In a number of workshops and seminars prominent robotics researchers and developers shared their knowledge with other key players in the field. Meeting new business and research contacts was an essential part of the event and 22 companies presented their new products and innovations. Several products were displayed, such as the bin-picking device, SensActive, the surveillance robot, Rotundus, and RobCab - an autonomous, mobile robot that transports cargo and pulls carts in hospitals and similar environments, safely maneuvering around people.

The forum is a joint annual conference organized by EUROP (European Robotics Technology Platform) and EURON (European Robotics Research Network).

Bernd Liepert, president for EUROP, said, "One of the major goals for us is to create awareness. Academia must become better at meeting industrial needs and the industry must become more aware of the robotics research already underway."

European commission proposes major changes to EU research funding

The European commission has proposed major changes to EU research and innovation funding, with the aim being to make participation easier, increase the scientific and economic impact and provide better value for money. The changes, contained in a green paper, will be introduced in the next EU budget after 2013 and the commission is currently seeking the views of all interested individuals and organisations.

The deadline for contributions is 20 May and there are a number of ways to contribute, including an online questionnaire which has been designed to be quick to complete. It is not necessary to answer all questions. Submissions can also be made in writing, in particular for associations and large organisations that wish to provide in-depth views. Responses will be published immediately following their submission.

An interactive blog will also be posted on a regular basis for open comment, debate and ideas while a range of events are being organised by countries and organisations during the consultation period. The responses received will then be analysed by the commission.

Drivers to get a better ride

Car drivers are about to get a better quality of ride thanks to a new electromagnetic suspension system developed at Eindhoven university of technology in the Netherlands. The system also makes vehicles safer because they no longer roll on turns.

According to the Dutch researchers, the wheels of the car can rise and fall very quickly, one of the special features of the system. While active suspension systems are already in place, they are hydraulic and are not as quick to negate the quick vibrations triggered by road surface irregularities. According to the researchers, the wheels of a car fitted with the new system can rise and fall very quickly, which is one of its special features.

Ambulances would probably be particularly interested in acquiring this system.

"An ambulance fitted with this system will be able to transport patients quickly and free of disturbing road-surface vibrations," said team member Bart Gysen.

On the system's energy consumption, Gysen says: 'If you install this suspension system on all four wheels, the peak consumption is 500 watt. This is half of what an air-conditioned system uses. Hydraulic suspension systems use four times as much power. The consumption of our system can probably be reduced still further by optimisation. And remember, this is only the first version."

Gysen said that manufacturing more comfortable and safer cars is possible due to improved road holding. He says cars equipped with this suspension system will have a much harder time flipping over, triggered by abrupt steering manoeuvres.

On cloud nine?

Martha Moss reports on the challenges and opportunities presented by cloud computing, the technology buzzword seen as key to Europe's ICT revolution

"I see lots of opportunities but we won't be able to explore them because there's the trust issue and emotional difficulties in changing consumer behaviour"
Eva Lichtenberger, the vice-chair of the parliament's Greens/EFA group

Europe must take advantage of the opportunities offered by cloud computing if it is to rise to the challenges presented by climate change and realise the economic vision contained in its Europe 2020 strategy. So heard participants in a recent roundtable discussion which looked at how a revolution in the ICT sector could help the EU maintain a competitive edge while protecting citizens' data and reducing Europe's climate and energy footprint.

The event, organised by the Brussels-based think-tank Friends of Europe, brought together business leaders, EU officials, environmental campaigners and academics. Discussions looked at the opportunities and challenges of cloud computing, which involves turning information technology into a utility, consumed like electricity or outsourced payroll services. As Microsoft's Niels Soelberg explained, "It's about the physical storage of information… [and] what cloud computing can do to cut down resources in business. The cloud will help move forward with the low-carbon economy."

Robert Madelin, the European commission's director general for information, society and media, is cautiously optimistic over the opportunities presented by cloud computing. However, he warns that the technology will fail to reduce emissions if policymakers and business view it as a simple solution to a complex problem. "The opportunity is survival and the challenge is helping citizens be able to act," he said. "If you look at the big picture in terms of the environmental footprint of humanity on the planet we are in that territory. One of the big challenges is getting people to believe that, and helping individuals in society make the right choices. If we take a 'lie back and wait' approach, we will fail the survival test."

However, there are some concerns over security and European policymakers are being urged to work with businesses to put tough regulatory structures in place if they are to present cloud computing as a viable business option. For Eva Lichtenberger, the vice-chair of the parliament's Greens/EFA group, it is a question of addressing the "simple human factors" which are crucial to changing behaviour. "Cloud will be attractive as soon as people start trusting it," she said. The MEP added, "I see lots of opportunities but we won't be able to explore them because there's the trust issue and emotional difficulties in changing consumer behaviour."

Another key theme running through the debate was the need for Europe to invest in innovation and make the most of the economic opportunities presented by ICT. This is seen as more important than ever given the growing competition in a globalised market, not to mention the uncertain financial climate. Soelberg pointed to a report from Milan university, which estimated that cloud help EU generate more than 300,000 to 400,000 SMEs. This would translate into about one million jobs, leading to a half per cent drop in unemployment. Indeed, it is crucial for SMEs, which make up over 95 per cent of European companies, to be fully on board if this is going to happen.

Bernd Welz, senior vice-president of SAP Cloud Services, said convincing small firms of the benefits of the cloud would require something of an ICT revolution involving close partnership between policymakers and businesses. The main issue preventing SMEs moving to cloud services was trust, Welz argued, adding, "Do businesses trust a service provider that the can professionally and reliably provide a service and that their data is safe? That's where we have to collaborate. Both cloud service providers and governments need to set a framework, including a common and visible framework for data privacy." ★

National Institute for Research and Development in Microtechologies
IMT-Bucharest, Romania

Microphotonics Laboratory

The Microphotonics Lab is member of ***"European Centre of Excellence in Microwave, Millimetre Wave and Optical Devices, based on Micro-Electro-Mechanical Systems for Advanced Communication Systems and Sensors" (MIMOMEMS)***, funded (2008-2011) through the "Regional potential" – FP7 REGPOT call 2007-1.

Mission: Research, development and education in **micro and nanophotonics**

■ **Main areas of expertise**

- o **modelling and simulation** of micro and nano photonic structures;,
- o **new materials** for micro/nano opto-electro-mechanical systems integration (functional polymer, hybrid organic-inorganic nano-composites, transparent semiconducting oxides, graphene)
- o **passive and active micro-nano-photonic structures** for sensing applications
- o **organic optoelectronics**
- o **Micro-optics** - design and fabrication based on replication techniques for DOEs, micro and opto-fluidics
- o optical and electrical **characterization** of materials and devices

■ **European Projects:**

FP7: Flexible Patterning of Complex Micro Structures using Adaptive Embossing Technology ***(FLEXPAET***), IP - NMP; European Centre of Excellence ***MIMOMEMS*** (CSA-Capacities)

MNT EraNet Project: Multifunctional Zinc-Oxide based nanostructures

FP6: ***WAPITI***- STReP (ICT-Photonics), ***4M*** (NoE- NMP), ***ASSEMIC*** (Marie Curie Training Network)

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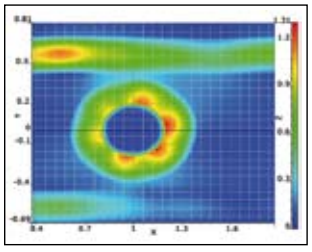
■ **Specific facilities:**

Modeling and simulation:

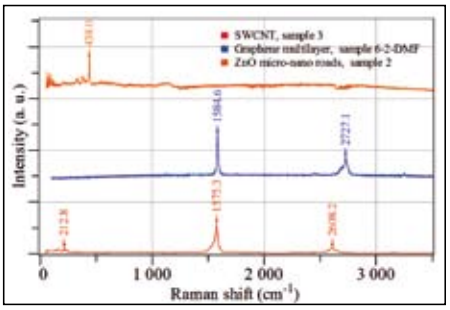
- **Opti FDTD 10.0** - design and simulation of advanced passive and nonlinear photonic devices
- **OptiBPM 11.0**- design of complex photonic integrated circuits for guiding, coupling, switching, splitting, multiplexing and demultiplexing of optical signals.
- **OptiGrating**- design software for modelling integrated and fiber optical devices that incorporate optical gratings
- **LaserMod** - analysis of optoelectronic devices
- 3Lit – design of 3D micro-optical elements
- **Zemax** – optical design



Finite difference time domain (FDTD) simulation of a subwavelength plasmonic ring resonator for biosensensing applications.

Characterization:

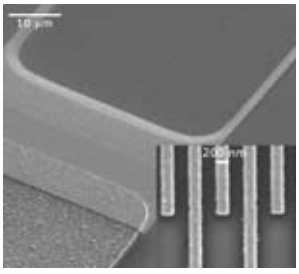
- spectrophotometers for UV-VIS-NIR and IR spectral range;
- spectroscopic ellipsometer
- High Resolution Raman Spectrometers LabRAM HR
- Alpha300 S System –Scanning Near-field Optical Microscope, Confocal Microscopy and Atomic Force Microscopy
- experimental set-up for optoelectric characterization in UV-VIS-IR spectral range



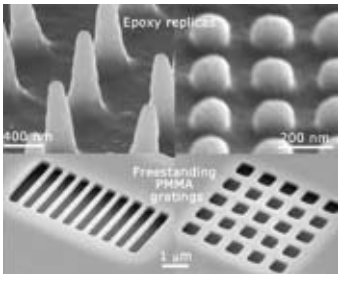
Raman spectra of the single wall carbon nanotubes (SWCNT) network grown by catalytic CVD, (excitation at 632 nm), graphene multilayer a (514 nm laser excitation) and ZnO micro/nano roads grown by MOCVD at 632 nm

Technology

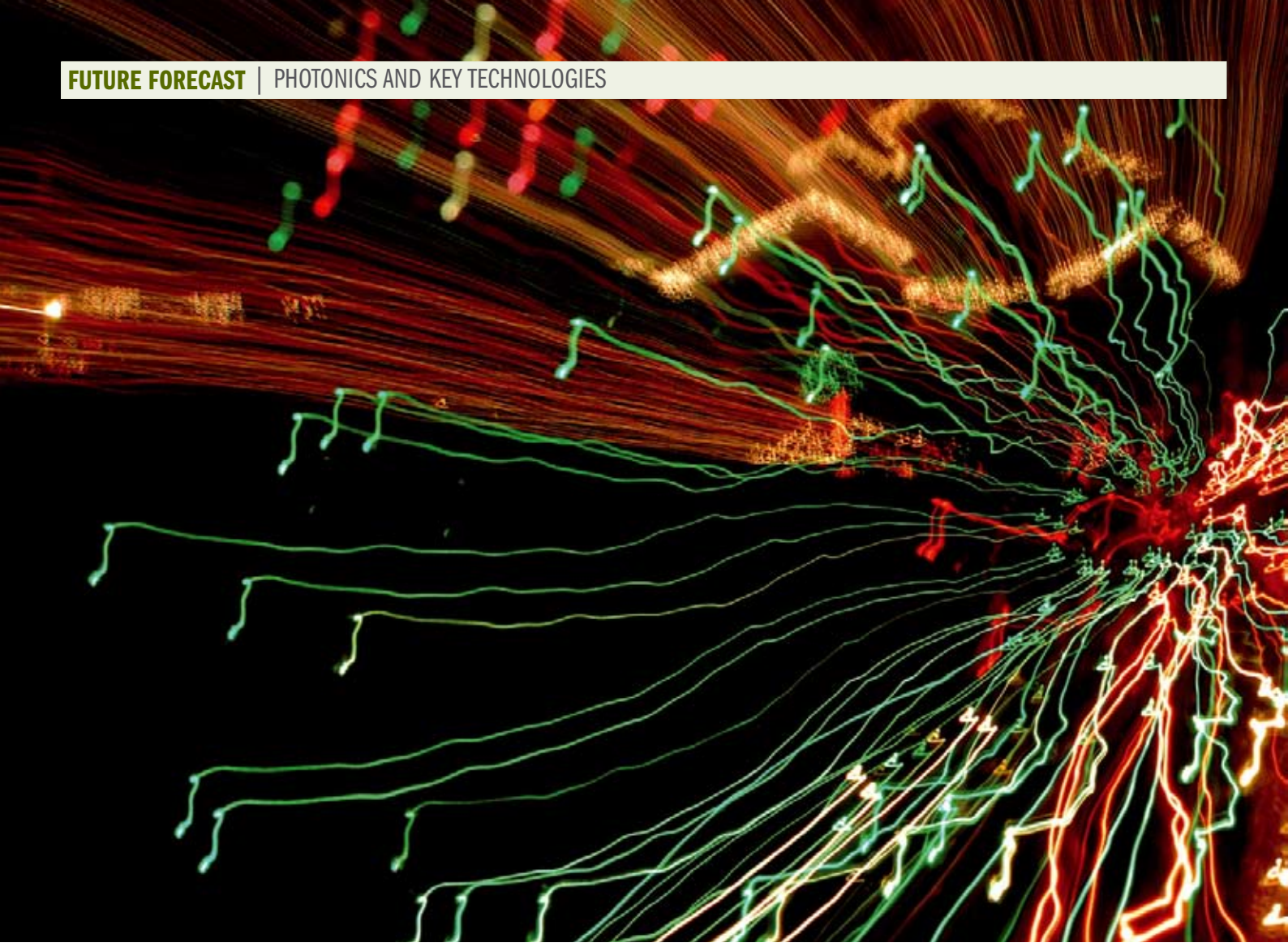
- glove box for preparation and deposition of nanocomposites and organic layers
- access to the IMT's clean-room micro- and nanofabrication facilities.



Silicon MSM photodetector with sub-wavelength interdigitated electrodes, 100 GHz bandwidth



DOEs with sub-micron feature size replicated in polymers (epoxy resin, PMMA).



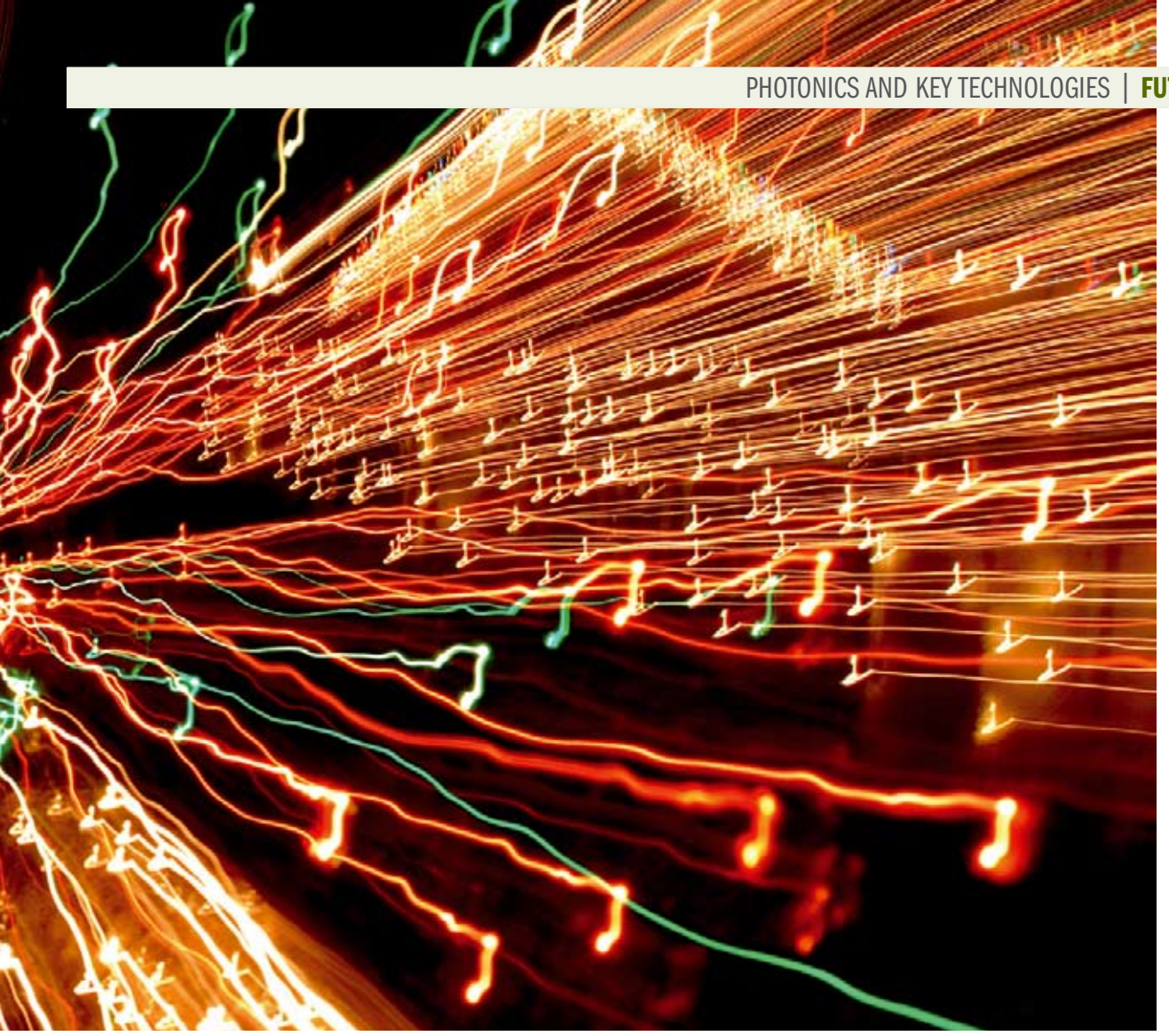
Optical applications

Many are predicting that the 21st century will be the century of the photon, much as the 20th century was the century of the electron. Martin Banks reports

Photonics – the science of optical applications – may be unfamiliar to some of us but it is expected to have an increasingly major impact on society and industry in Europe and throughout the world.

Important R&D achievements have now led the photonics industry to a key point in its history, one which is moving from high-tech industry to mass production in a wide range of industries. One of the future challenges will be to stimulate and accelerate deployment of the results of photonics research. At the same time, securing future EU funding for continued research and innovation will be another challenge.

Experts recently held the industry's annual meeting in Brussels where its "visions for photonics" – a blueprint for the future of the sector – was unveiled. They hope that its recommendations will be taken on board in the drafting of the EU's eighth framework programme (FP8). The main objective of FP8 is to make a step change in European R&D strategy in light of the 'Europe 2020' objectives. It is hoped this can be achieved by putting more focus on innovation and promoting public and private partnerships.



At the same time securing future EU funding for continued research and innovation will be a key challenge of FP8.

The EU identifies photonics as a key enabling technology that will help meet the European societal challenges of the 21st century, such as aging population, sustainability, energy efficiency and security. The fifth general assembly of Photonics21 in March put special emphasis on future research and innovation funding concepts within the EU.

Photonics21 is an EU-wide platform representing some 1700 industry representatives. Leading companies and research units have joined together to further advance Europe's position in optical technologies. Photonics experts from industry and research are working in seven teams to develop research priorities and recommended procedures for the commission as well as strategies and issues to promote European cooperation.

At the assembly, Martin Goetzeler, CEO of OSRAM and president of Photonics21, and Giorgio Anania, chairman of Cube Optics and vice president of Photonics21, presented their vision on how photonics can boost innovation in a much quicker and more effective way than electronics ever achieved in the 20th century.

Goetzeler emphasised the "great contributions" photonics already make in most areas of life, saying, "As light is such a versatile tool, photonics will have an even larger impact on future lives and will be able to revolutionise societies and industries around the globe." However, he cautioned, "We must work on bridging the gap in the innovation chain between research results and actual market deployment of innovations." He said the industry welcomed and "fully supported" the commission's green paper – "From challenges to opportunities: towards a common strategic framework for EU Research and Innovation funding" – and its goals for making European future funding more effective".

"One of the future challenges will be to stimulate and accelerate deployment of the results of photonics research"

The conference was told that photonics applications include everything from optical fibres and modern luminaries such as LEDs and OLEDs, to bio-photonics in healthcare →

An EU-funded network is helping to promote excellence in the world of photonics.

Photonics4life, the European network of excellence for bio-photonics which is part financed by the commission, helps to improve knowledge about the potential of photonic technologies.

Bio-photonics is an ambitious, multidisciplinary research area that utilises light-based technologies in medicine and the life sciences.

It plays a crucial role for better and improved health care in reducing health-care costs and helps approach the challenges of an ageing society.

The enormous annual growth of industries in this field reflects the economic and socio-political importance of bio-photonics.

One such "centre of excellence" is St Andrews university in Scotland which has established strong and vibrant bio-photonics collaboration between researchers in physics, biology, medicine and chemistry.

According to Juergen Popp, coordinator of the German-based network, "the core focus is to exploit novel emerging photonics techniques in the study and treatment of disease processes at the cellular and molecular levels."

He said the commitment to the integration of these disciplines can be seen in the recent opening of the university's medical and biological sciences building, one of the first medical schools in the UK to fully integrate research facilities across the sciences.

Light is used in the treatment of many diseases and the organic semi-conductor centre at St Andrews, working with the department of dermatology at Ninewells Hospital in Dundee, has developed a 'wearable light source' for medicine for use in the treatment of many skin cancers.

Elsewhere, Imperial College in London is working closely with the photonics industry in addressing the application of photonics technology, particularly fluorescence imaging and metrology.

Photonics4life recently took part in the world's leading medical fair at Dusseldorf where it showcased the benefits of optical technologies for use in medicine and biology in the form of custom-made, hands-on displays.

Visitors to its stand included German chancellor Angela Merkel.

Popp said, "With our exhibition we intended to strengthen the dialogue between medical and natural scientists, as we found that a lot of doctors do not know about the possibilities optical technologies hold. On the other hand the natural scientists are often not aware of the requirements of the actual practitioner and user of photonic technologies."

Popp says the "unique" abilities of light make optical technologies versatile tools in many areas, but recent developments especially benefit their application in medicine and biology.

Breakthroughs in laser microscopy allow scientists to detect more and more components of diseases at an early stage.

One future goal is the detection of early stages of Alzheimer's disease in the eye.

Furthermore, light adds to the therapeutic repertoire of doctors as special endoscopes can detect cancerous from normal tissue during surgery.

Forty-six members of the Photonics4life network recently joined forces to advance the use of light in biology and medicine.

Their subject – bio-photonics – is a multidisciplinary research area that addresses a wide range of medical and biological questions: from the early diagnosis and treatment of diseases to the understanding of fundamental life processes.

"This field promises a big impact on modern health care but requires us, the involved scientists to overcome interdisciplinary borders", says Popp.

One of the biggest events for the industry this year will be the World of Photonics congress in Munich from May 22 to 26 where Photonics4Life will be among the exhibitors.

Popp says, "The aim is to demonstrate how barriers between biomedical end users and technology can be overcome by improving the knowledge about the possibilities of photonic technologies and components among companies."

and disease prevention, sensors and surveillance technologies for safety, security and environmental control.

Photonics also leads the way in high-tech laser technologies used in many manufacturing processes. "Photonics is, and will increasingly become, a key driver for sustainable economic growth in Europe," said Goetzeler.

"Photonics also leads the way in high-tech laser technologies used in many manufacturing processes"

Currently about 10 per cent of turnover of the photonics industry is spent on R&D and more than 40,000 jobs have been created in Europe in the past three years. Goetzeler said, "The photonics industry has now reached an inflection point from an emerging high-tech industry towards mass production and industrialisation – very much comparable to what happened to electronics when the transistor was invented in the 1940s. "However, it is crucial to make the step from development towards application in market solutions. Larger and bolder demonstration projects supported by public procurement are now needed to bring photonics to the next level."

He said that R&D successes of the European photonics industry can be a "driving force for many segments" in European economic life, adding, "However, there is a gap in the innovation chain between the research results in the area of applied research on one hand and commercialisation and market deployment on the other hand. We miss out on the opportunity to sufficiently exploit R&D successes in terms of growth, jobs and prosperity for Europe's society." said Goetzeler.

"What we need is a comprehensive, fully fledged research and innovation strategy which allows us to translate scientific excellence into innovative future products, processes and applications faster, more focused and more market oriented." In September 2009, the commission defined photonics as one of five European "key enabling technologies and one of the keynote speakers at the general assembly was EU digital agenda commissioner Neelie Kroes. She said, "When I think of photonics, I think of the importance of ICT research and innovation for our productivity growth."

She saw many "areas where photonics is delivering the digital agenda and, thereby, "transforming our world."

"For example, in health care, photonics will allow very early and very accurate detection of diseases like cancer, sometimes even before there are any symptoms, allowing more effective and less invasive treatment." While the "vision paper" had addressed all of these areas, Kroes challenged the European photonics industry as a whole to "consider engaging in a public-private partnership with us in the area of photonics R&I." ★

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Company Profile

Research and development of microelectronic systems, integrated systems, digital and analog circuit design, technology of semiconductors, sensors, semiconductor lasers, radiation detectors. Small scale manufacturing of application specific MEMS, MOEMS, various types of detectors.

One of the Institute key research area is photonics. This activity is conducted in the Centre of Nanophotonics, which carries out research in the fields of physics and technology of photonic nanostructures. A long-term goal of the Centre is research and practical implementation of the results in areas such as environmental protection, industry, medicine, and application in the field of military and national security. The Centre has been founded by the European Regional Development Fund.

The Centre is coordinated by the ITE. The consortium also consists of the Institute of Physics of the Polish Academy of Sciences, The Institute of Microelectronics & Optoelectronics of Warsaw University of Technology, the Institute of Physics of the Technical University of Łódź, and VIGO System S.A.

The Centre constantly seeks new partners interested in the research and implementation in the following fields:

- advanced devices and systems operating in infrared and mid-infrared,
- lasers employing photonic crystals and structures,
- visible and ultraviolet light sources employing wide bandgap semiconductors, biophotonics and applications in medicine.

The Centre has a highly qualified research staff and advanced equipment, which enables the successful development of photonic devices. There are several installations especially worthy of note: two molecular beam epitaxy reactors, x-ray diffractometer, Fourier infrared spectrometer, equipment for microscale spectroscopic analysis and a complete line for the processing of $A_{III}B_{V}$ compounds, which allows fast prototyping of the developed structures. The Centre consists of laboratories which have been created since 2002 on the basis of the European Centre of Excellence CEPHONA. It features cleanrooms, among which the photolithographic cleanroom has the cleanliness class of 100. The equipment used for processing, assembling, and testing of III-V semiconductor devices constitutes a complete technological line for the fabrication of nanostructure photonic devices.

The second specialized research group, being a part of the Centre of Nanophotonics, is The Department of Micro- and Nanotechnology of Wide Bandgap Semiconductors. Its main goal is to develop novel technological and constructional solutions and, on the basis of these solutions, to design new devices and sub-assemblies made from the group III nitrides, zinc oxide, and silicon carbide. The technological is equipped with a new generation of equipment to produce semiconductor, dielectric and metallic thin films using the techniques of reactive sputtering, the technique of atomic layer deposition and plasma-enhanced chemical vapor deposition, as well as the equipment used for patterning of thin-film materials and structures by means of DUV photolithography, laser lithography, the nanoimprint technique, reactors for reactive ion etching and inductively coupled plasma etching. As a part of the Centre, the Department works on the sources and detectors of visible and near ultraviolet radiation.

Another research group within the Centre forms the Department of Materials and Semiconductor Structures Research. The research carried out in the Department enables obtaining of microscopic images of the materials and devices, produced in the technological laboratories, as well as etching with focused ion beam (FIB) to produce the preparations.

Photonics in Wildau

The Technical University of Applied Sciences Wildau (Technische Hochschule Wildau - THWi) situated in the south-east of Berlin is educating engineers in Bachelor and Master courses (http://www.th-wildau.de). This year THWi is celebrating its 20th anniversary. After its foundation in 1991, THWi grew up to become the largest university of applied sciences in the Federal State of Brandenburg, as well as being a strong partner in research and development.

PHOTONICS technology plays an important role in research and education. In cooperation with the University of Applied Sciences Brandenburg, the THWi offers a two-year course "Master of Engineering in Photonics (M. Eng.)".

Education in photonics is supported by strong research efforts based on projects funded by German, European and international funding organizations or by industrial partners. Central issues are: New materials, device concepts and technologies related to photonics, opto-electronics, micro- and nano-electronics with emphasis to information and communication technologies, sensorics and related fields.

In previous projects, funded by the European Commission in the 4th, 5th, and 6th Framework Program, researchers at THWi were involved in research and development of organic light-emitting devices (EUROLED, project no. ERB FMRX-CT97-0106), organic field-effect transistors and printed electronic circuits (EUROFET, project no. HPRN-CT-2002-00327), fast organic and organic/inorganic electro-optic modulators (ODEON, project no. FP6-505478-1), and plastic optical fibres with embedded active polymers for data communications (POLYCOM, project no. FP6-026365-2).

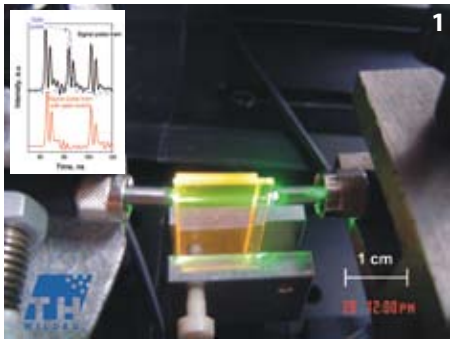
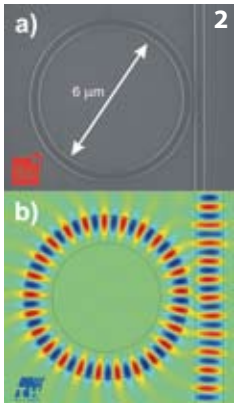
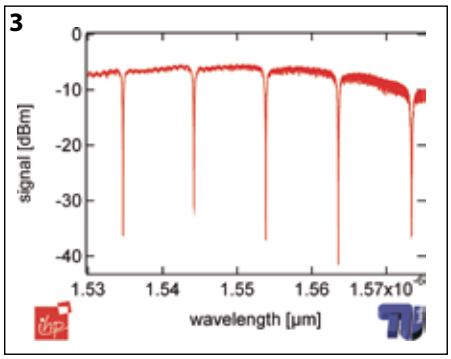


Fig. 1 shows an operating organic all-optical thin film modulator for ultra-fast data transfer developed by THWi within the framework of the POLYCOM project. In a newly developed material and device an optical pulse train, as shown in the inset, is influenced by an optical gate pulse which completely switches off selected bits. Such devices can form the core of future, ultra-fast opto-optical data communication systems.



Silicon photonics is another important field of research and development at THWi and this technology is expected to enable reliable, high band-width information and communication at low costs. Fig. 2a shows the electron micrograph of a silicon-on-oxide (SOI) integrated optical channel waveguide with ring resonator, and Fig. 2b the calculated electrical field distribution in this structure at resonance.

Fig. 3 presents the light intensity at output of the channel waveguide as function of input wavelength. At certain wavelengths near to the communication wavelength light couples into the (lossy) ring resonator. This causes a strong decrease of transmitted intensity at resonance wavelengths.



Those and other devices are developed in the framework of the project "SiliconLight" which is dealing with improvement of the base technology for silicon photonics. This project is currently funded by the German Ministry of Education and Research (BMBF) under contract no. 13N9731, and is coordinated by THWi. The project partner "Leibniz-Institute of Innovative Microelectronics" Frankfurt/Oder (IHP) is developing the technology and constructs devices, while the Technical University Berlin (TUB), Joint Lab IHP / Brandenburg University of Technology Cottbus, and THWi together with other partners are working on device design, characterisation and materials research.

These and other current research projects at THWi involve European small and medium size enterprises to enhance their R&D potential.

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Technical University of Applied Sciences
WILDAU

Key to success

The European commission has defined photonics as one of five European "key enabling technologies". Martin Banks explains why

Photonics can be the "key driver" in achieving the EU 2020 targets on innovation with today's youngsters the "entrepreneurs of tomorrow." That was the keynote message from Neelie Kroes, the EU commissioner for the digital agenda, at a recent conference in Brussels.

The Dutch official told the "Photonics21" event, which brought together key players in the photonics industry, that new lighting technologies will have an increasingly important role to play in growth and prosperity in Europe. She said, "There are of course many other areas where photonics is delivering the digital agenda and, thereby, transforming our world."

One example, said Kroes, is in future use of the internet where photonics-based communications are expected to create new markets and new ways of doing business by supporting huge traffic demands and highly sophisticated services. In healthcare, she said photonics will allow "very early and very accurate" detection of diseases like cancer, sometimes even before there are any symptoms, allowing more effective and less invasive treatment. "Can you imagine the joy that progress will be greeted by?"

Kroes said the conference was timely as comes as discussion of the next research framework programme reaches a "critical juncture."

The commission vice president said, "The need for change is urgent. Europe needs growth, and the growth needs to be smart. In the absence of any policy changes, the average projected annual growth for the EU27 from 2011-2020 will be only 1.5 per cent. The policy changes have started. In 2010, we have put in place a number of relevant initiatives and in all these there is one single ambition: to create the conditions for smart growth.

In the coming years she says it is clear where the emphasis needs to be. "First, on technologies which drive industrial leadership and competitiveness in Europe. Second, on addressing major societal challenges. I am thinking of energy efficiency, healthy ageing of the population, climate change or security. This is research and innovation that serves the daily needs of our people. Third, on simplification. We need new thinking on how to accelerate the entrepreneurial capacity and innovativeness of high tech SMEs."

"It is not enough to do excellent research. We have seen that in the past with flat panel displays where Europe was strong in research but in the end lost most of the production to Asia. We are facing the same danger now with solid state lighting. We need to create a market which is friendlier to innovation. The projects we will launch in solid state lighting will showcase what can be done. Our main role at the commission, aside from funding, will be to put the right framework conditions in place to speed up the path from lab to market."

Kroes told the event that she is "convinced" that research and innovation "must be at the heart" of new growth in Europe.

She added, "I believe that photonics is a major opportunity for Europe and I know that we can make it in Europe but we must act together and be ambitious.

She concluded by challenging the photonics industry to consider engaging in a public-private partnership with the commission in the area of photonics R&I.

"You can count on me to do my bit and to make sure photonics gets the support it needs." ★

"The need for change is urgent. Europe needs growth, and the growth needs to be smart"

High impact

All EU member states have significant photonics industrial and research activity, says John Lincoln

John Lincoln is a project member of the South of England Photonics Network and the founder of Harlin, a specialist consultancy focussing on leveraging the power of advanced photonic technologies

An extensive study of the "The leverage effect of photonics technologies: the European perspective" assessing the contribution of photonics to the European economy was recently completed for the European commission, DG information society and media (SMART 2009/0066).

Photonics incorporates all the technologies of emitting, detecting and processing light; from lasers to domestic lighting, cameras to solar panels and optical fibre and enables vast arrays of products and manufacturing processes.

Using a new experimental methodology, the study concludes that photonics 'leverages' at least 10 per cent of the European economy, as much as €3 trillion of EU trade and touches around 30 million jobs. Defined as the contribution photonics makes to the value of an end product or service through enabling its functionality or manufacture, this leverage is generated by a European photonics industry worth €58.5bn (21 per cent of world market) employing 290,000 people in less than 5000 companies and 1000 research organisations across Europe. Updates on previous studies indicate that Germany, the United Kingdom and France account for over 50 per cent of European photonics activity. However all EU member states have significant photonics industrial and research activity.

"The study concludes that photonics 'leverages' at least 10 per cent of the European economy"

The study identified strong positive photonics impact on growth and competitiveness in a diverse range of substantial markets including retail, medical and healthcare, the manufacture of electronics and vehicles and telecommunications. A strong positive environmental impact also stemmed from the reduction of energy consumption photonics enables. Photonics markets show consistent annual growth of over 10 per cent and have rapidly recovered from the recent recession. The recovery in photonics manufacturing technologies has been particularly strong indicating its pivotal role in increasing manufacturing efficiency.

The study concludes that the photonics leverage will increase significantly in the next decade especially in areas where photonics currently has modest impact. The biggest change will occur in construction, with the increasing use of photovoltaic solar panels and solid state LED lighting. Photonics leverage will also increase rapidly in retail, with new lighting and display technologies, and in the increasing application of diverse photonics technologies in medical and healthcare. Alongside these growing impacts, photonics will maintain its high impact on, and support for innovation and growth in, telecommunications and scientific research and development (R&D).

Analysis of six key photonics value chains revealed strong European R&D in all. Europe was also found to be strong in high value globally exported photonics based products, including the design and production of manufacturing equipment and scientific instrumentation. However, high volume manufacturing was absent in areas such as displays and some low value camera components with European economic gain in these areas coming mainly though sales of manufacturing equipment. One highlight was the strength of the European high performance laser and laser systems industry which contains many significant global players. ★

The Department of Electronics is part of the Faculty of Electrical Engineering and Computer Science at Lublin University of Technology. Its research activities in the area of photonics encompass 5 main fields:

- Acquisition of light signals from large area sources (e.g. flames) and design of light sensors for industrial purposes,
- Photovoltaics and transmission of high power light in optical fibres,
- Modelling of microphotonic devices, in particular fibre optic Bragg gratings for sensing applications,
- Research on light transmission, absorption and scattering in gases applied in gas concentration sensing,
- Research on effects of propagation phenomena in optical fibres on optical communication systems.

Research within the first area is aimed at developing and implementing photonic or optoelectronic technologies in monitoring of individual PC burners or gas turbine burners to provide for more rapid and efficient control of entire system.

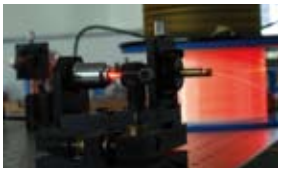
The second area is animated by research in remote optical powering via light transmitted in fibres. It includes modelling of photovoltaic devices and high power transmission effects in fibres, connectors, splitters and wavelength multiplexers.

The **Bragg gratings** are modelled with respect to their accuracy in reproducing strain distribution in a Bragg grating sensor. Strains induced by mechanical force or temperature are being considered. The studies on light propagation in gases are predominantly motivated by the idea of remote sensing of CO and NOx in industrial boilers.

Research in the last field concerns methods to estimate the throughput limits due to polarisation mode dispersion in an optical fibre and methods to monitor dispersion and to mitigate its effects.

Research in photonics is supported by advanced numerical analysis like the Finite Element Method (FEM) and the Boundary Element Method (BEM). Artificial Intelligence methods are applied as well. Inverse Problems of Electromagnetic Field Theory, Optimal Shape Design, Shape Reconstruction and Image Reconstruction, Diffusive Optical Tomography (DOT), Level Set Method application to Inverse Problems of Electromagnetic Field and particularly to tomography are also of our interest. The Department of Electronics has modern, well-equipped laboratory.

The Laboratory of Optoelectronics and Laser Technology is designed for teaching and research activities related to optoelectronic sensors, wideband teleinformatic systems, diagnostics systems, and their applications in various branches of industry. It has a number of prototype fibre optic sensors of miscellaneous values, and also a unique laboratory set using the fibre optic Bragg gratings for the investigation of strain and temperature distribution. The laboratory equipment includes: light sources, optical power meters, optical attenuators, radiation detectors, spectrum analysers, fibre optic and free space spectrophotometers, OTDR, an opto-electric converter, a telecom links tester, models of telecom links, opto-mechanic hardware, etc.



The Laboratory of Computer Systems for Thermal Processes Diagnostics and Control is being set-up. It will facilitate the intensification and widening of the scope of research conducted in the Department, oriented towards closer cooperation with power-plants and thermal-electric power stations in the field of algorithms for diagnostics and control. The hardware basis for this lab has already been formed by: the PIV / LIF / LII setup, an optical spectrum analyser, a Fourier spectroscopy analyser, a thermal imaging camera, a high-temperature camera, and other instruments.

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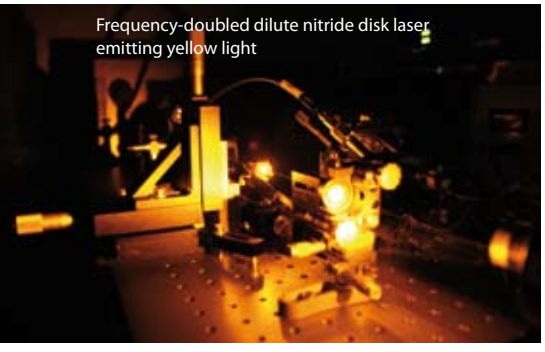
Optoelectronics Research Centre
Tampere University of Technology

Optoelectronics Research Centre **Finnish Cradle of Photonics**

High-efficiency multijunction solar cells are grown by MBE –reactor at ORC

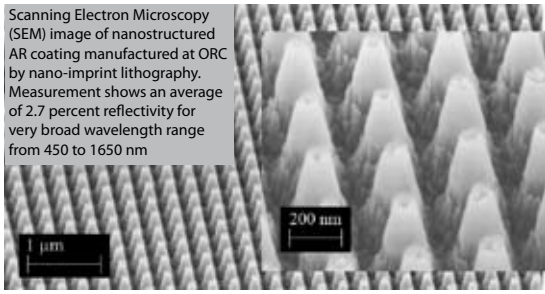
The Optoelectronics Research Centre (ORC) of Tampere University of Technology is the leading nanophotonics and optoelectronics research centre in Finland. The core business of ORC is to study and develop novel epitaxial compound semiconductor heterostructures, light emitting and light modulating devices, and ultrashort pulse and cw high-power fibre lasers. ORC also develops thin film and nanoparticle deposition methods based on the use of ultrafast fibre lasers, and novel nanofabrication techniques based on UV nanoimprint lithography (UV-NIL).



Frequency-doubled dilute nitride disk laser emitting yellow light

The most recent research areas are concerned with development of dilute nitride compounds for high-power vertical external cavity surface emitting lasers (VECSELs) and high-efficiency III-V multijunction solar cells, and with the development of antimonide-based compounds for long-wavelength optoelectronics. For the optics area we could mention a new research program in the field of atto-second pulsed lasers and carrier-envelope phase synchronization as well as the leading edge development of novel fiber lasers. The ultimate goal of the research conducted at ORC is to transfer knowledge and technology to society. In this respect we should note that ORC has played a seminal role in creating a new laser manufacturing industry in Finland. Five spin-off companies – Coherent-Finland, Modulight, EpiCrystals, Corelase, and RefleKron – have been established based on the research done at ORC.

The expertise of the semiconductor technology group has been the core for many multidisciplinary research activities at ORC. With five molecular beam epitaxy reactors we have possibility to fabricate desired optoelectronic heterostructures based on GaAs, InP, and GaSb material systems, operating in a broad spectral range from the visible wavelengths to 3 µm. In the field of nanotechnologies we focus on cost-effective site-controlled epitaxial method, which enable an accurate fabrication of quantum-regime objects, such as single quantum-dots and chains of quantum-dots deposited onto pre-determined locations. We have developed UV-NIL based processing techniques for cost effective fabrication of laser sources, metallic nanostructures, and bio-mimicked optical coatings, some of them representing the first demonstrations in the world; nearly all nano-structure requirements of compound semiconductors can be realized down to a feature size of sub-100 nm. Many of these developments have been made as part of European Commission framework 6 and 7 programs (projects FastAccess, URANUS, NATAL, Delila, Fast-Dot, Delight).



Scanning Electron Microscopy (SEM) image of nanostructured AR coating manufactured at ORC by nano-imprint lithography. Measurement shows an average of 2.7 percent reflectivity for very broad wavelength range from 450 to 1650 nm

Our interaction with companies is supported by new research directions related to use of lasers in biophotonics and specialized applications, such as laser guide stars. Recently, we have also established a comprehensive development chain for fabrication and characterization of high efficiency solar cells required in concentrated photovoltaic systems (CPV); this would enable us to engage even more in advance research related to solar energy harvesting.

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Photon shop

Martin Banks discusses the facts behind photonics

Photonics is the science and technology of the harnessing of light. It has the same relationship to light and photons as electrons do to electricity and electronics.

In September 2009, the European commission named photonics as one of five key enabling technologies. Globally, the photonics market is estimated to be worth €300bn, of which Europe has an overall market share of 20 per cent. This rises to as much as 45 per cent in some key photonic sectors such as production technology or lighting.

Around 10 per cent of turnover of the photonics industry is spent on R&D.

Europe employs about 300,000 people directly in photonics, creating more than 40,000 jobs in the sector in the last three years, with the industry based largely on SMEs.

The growth rate of the photonics sector is around 10 per cent, two-three times faster than the overall growth of European's GDP.

"The benefits of optical technologies can be seen in many areas of our lives, not least in healthcare and life sciences"

The benefits of optical technologies can be seen in many areas of our lives, not least in healthcare and life sciences.

For example, lasers vaporise material when carrying out operations and provide insights into genetics and the regulation of complex cellular metabolisms.

They also enable the individual building blocks of life in cells to be observed meaning, for instance, that a single flu virus, which has an approximate diameter of only 100 nanometers, can be seen.

In the future, photonics will enable radical new approaches to healthcare from current, cost-intensive treatment after the onset of a disease, to the detection and prevention of the disease at the earliest possible stage.

This will offer greater chances of a patient surviving, less intensive treatment regimes and significantly reduced post-treatment care costs.

Gentler, less-invasive surgical methods using automated tools will be able to locate and entirely remove tumors.

Non-invasive or minimally invasive, but highly targeted treatments based on light, used in combination with other targeted therapeutic approaches or coupled with real-time photonic-based diagnostics during treatment, will greatly improve the effectiveness of healing and recovery.

The application of light technology can be used in other areas.

As a key enabling technology, photonics plays an important role for the development of a sustainable economy.

Photonic solutions support generating power, increase energy efficiency and reduce energy greenhouse gas emissions. The technology also contributes to reducing pollution and supports the substitution of hazardous materials. Laser technology enables lightweight design and sensors contribute to cleaner and energy efficient manufacturing by advanced pollution detection.

Looking to the future, thinner solar cells will increase the efficiency further and reduce the cost of solar energy to the level of conventionally produced electricity at the same time. ★

Heavenly Communication by Light

Carl Weinert and Ronald Freund,
Fraunhofer Heinrich Hertz Institute, Berlin

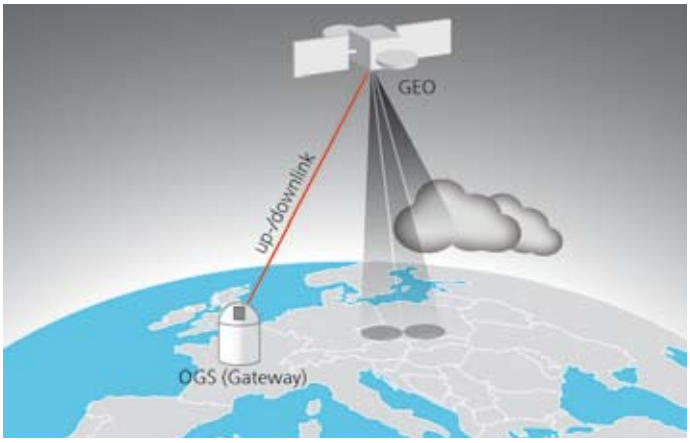
Off the shelf technologies for high capacity free space optical communication

In the last decades, exponential increase of internet traffic has led to an ever increasing demand for bandwidth which is accommodated by development of optical technologies and terrestrial fibre networks. On the other hand, free space optical (FSO) connections are receiving growing attention.

Why free-space optics? The application of FSO - for satellite, access or in-house networks - is an additional way to increase speed, transparency, availability, and security in the network. In addition, its role as a backup network in case of emergency situations might be of uttermost importance.

Application areas for high speed FSO links are:

- high speed communication (s. Fig. 1) between geostationary satellites (GEO) and optical ground stations (OGS) for multimedia services;
- temporary communication in case of an emergency after natural disasters when standard communication links have broken down;
- secure high-speed links for special operations forces, encampment, temporary control rooms as well as quantum-key distribution links;
- emergency networks in the case of cyber attacks;
- connection for temporary communication capacity during mass events;
- high density TV-transmission from specific locations (mass events, observation);
- inter-aircraft communications and observation-satellites.



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Why optics? At present, free-space technology is mainly based on classical radio frequency (RF). Increasing the capacity of future free space links requires reliable high data rates (10 Gb/s), e.g. between terrestrial gateways and geostationary telecom satellites which can be achieved by optics. In addition, an optical beam has a divergence which is a factor of 10,000 less with respect to RF. Thus much smaller antennas are possible, which is a huge cost argument in favour of optics for satellite application.

Why 1550 nm wavelength? 1550 nm is the predominant optical wavelength for terrestrial fibre communication technology. A large and expanding global market exists for 1550 nm optical components, subsystems and systems which could favourably be exploited and extended for FSO. Fraunhofer Heinrich Hertz Institute (HHI) has long standing research and development activities in the field of advanced optical components, some of which have already been applied for optical satellite communication systems. Drawing on our core competence in photonic networks and systems, we predict that the challenges of building optical satellite links and satellite networks can best be mastered at 1550 nm wavelength.

What are the main goals for future FSO? The main goal is the development of optically based concepts, systems, subsystems and components to replace existing RF satellite links by high capacity optical links at 1550 nm wavelength with bit rates of 10 Gb/s and beyond. The use of wavelength division multiplexing offers a flexible capacity increase by adding new wavelength channels. FSO in the 1550 nm window offers the possibility of developing FSO technologies utilising the main concepts and technologies available from terrestrial fibre communication.

What are the main challenges? The main challenges for FSO development are beam degradation due to weather conditions. The atmospheric wavelength windows mentioned above are clear sky windows and the path becomes blocked in the presence of clouds, rain or fog. The main concepts to overcome this problem are:

- maintaining an additional (low bit rate) RF channel to sustain the connection;
- spatial diversity, i.e. utilisation of different transmission paths, thus avoiding cloud coverage (optical satellite communication systems require a network of ground stations and satellites);
- dynamically variable bit rate, i.e. lower bit rates can be transmitted with increased laser power so that poor transmission conditions can be overcome.

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"Semiconductors are for ICT what grain is for agriculture, and iron and steel are for the manufacturing industry"
Neelie Kroes

Grand challenges

Semiconductors are an enabling engine for other European industries and can help secure the EU's global economic competitiveness, a conference has heard. Desmond Hinton-Beales reports

Certain key enabling technologies, such as semiconductors, are the key to securing Europe's competitiveness, the SEMI industry strategy symposium (ISS) was told. The ISS, held in Grenoble, is the high-level annual meeting of the European semiconductor industry's leading decision-makers. The symposium was opened by EU digital agenda commissioner Neelie Kroes in a recorded presentation where she outlined the importance of semiconductors for Europe's response to the challenges of a "rapidly globalising economy".

Semiconductors are materials that have a resistivity between that of insulators and conductors. Their ability to conduct electricity can be changed through light, heat, or an electric or magnetic field and they are used in the construction of transistors and diodes. Europe "can't solve its problems without ICT", Kroes told participants in the event organised by SEMI, an international association of semiconductor manufacturers. The "right framework conditions" must be created if the EU is to compete successfully with the US and China, she added. "Semiconductors are for ICT what grain is for agriculture, and iron and steel are for the manufacturing industry," she said.

The commission vice president said that "Europe must retain and strengthen its R&D capabilities", and that as well as investment, this requires industries to "work for the future, instead of milking the past". Semiconductors, Kroes explained, are one of several key enabling technologies (KETs) identified →

by the commission as driving all other aspects of European innovation, adding that "concrete actions" should be identified and that Europe "must improve implementation".

The five KETs outlined by the commission are: nanotechnology, micro and nano-electronics, advanced materials, biotechnology, and photonics, all of which are directly linked to, and dependent on, advanced manufacturing. She also cited Eniac and Artemis as commission projects which aim to serve the semiconductor industry. These programmes, she said, pool research support from member states and implement strategic research agendas developed with industry.

The chair of SEMI Europe Heinz Kundert said that semiconductors are "alive in Europe" and that "there is no innovation without silicon" – one of the principle materials from which semiconductors are manufactured – and that the commission has launched the KETs to address this issue. Kundert cited growth figures of 32 per cent for the semiconducting industry in 2010, adding that the KETs are worth up to €855bn to Europe and are hugely "important for the entire industrial base and vital for competitiveness".

> ***"There is no innovation without silicon"***
> ***Heinz Kundert***

Soitec president André-Jacques Auberton-Hervé, said that the "focus of EU policy in innovation" is the "three pillars" of technological research, product development, and competitive manufacturing. Auberton-Hervé said that while Europe is strong in R&D and in the introduction of products to the marketplace, the high-level expert group on key enabling technologies had concluded that advanced manufacturing is underdeveloped compared to these other areas. "Europe has strong leaders, but must be supported to bring products to market," he said, adding that Europe has realised that "whatever the industry, KETs are as important as access to natural resources".

President and CEO of STMicroelectronics Carlo Bozotti highlighted the many partnership programmes which Europe undertakes saying, "Europe has a partnership culture with no equal in the world". However, he warned that "when R&D goes, manufacturing follows". He said that if Europe reinforces its global competitive position it can succeed, but there is need for "serious investment". He called for the EU to recognise the "ubiquitous nature" of the semiconductor industry as an "enabling engine for other industries", adding that every 70 cents spent on semiconductors results in €24 of added value.

While Asia holds 70 per cent of global semiconductor production and 55 per cent of sales, it only controls 30 per cent of design activity. SEMI Europe members are lobbying to try and deal with the distorted manufacturing conditions that mean that 80 per cent of the world's new semiconductor plants will be built in Asia. Tackling this unfair competition is vital to the European semiconductor industry's ability to compete globally.

Alain Astier, a member of the SEMI Europe advisory board, said that Europe's strengths lay in its "proven expertise and leadership in technological research". This combined with the excellent partnerships between its several clusters "truly sets Europe apart" and is an idea which could be successfully exported to the rest of the globe.

Kundert underlined the success SEMI has enjoyed in lobbying the commission and EU member states to officially acknowledge the strategic importance of Europe's semiconductor industry. He said that SEMI would continue to promote the industry's importance through the European commission's key enabling technologies high-level group. ★

Photonics research, measurements and testing at the National Institute of Telecommunications

BASIC RESEARCH AND ITS APPLICATIONS

Photonics research at the National Institute of Telecommunications focuses on a few selected areas. One of them is modeling of photonic devices based on 1D and 2D photonic crystals as well as 1D quasi-periodic crystal stacks, which supports design and manufacturing processes. For example, active (coherent light sources) and passive (optical filters, omni-directional reflectors) devices are numerically analyzed mainly for telecom applications. In this case, the multi-wavelength transfer matrix method and semi-classical theory, which describe the interaction between light and matter, were developed.

Another area of interest are diffractive optical elements for photonic purposes. In particular, the new kind of diffractive optical elements (DOE) were simulated and designed for fibre Bragg gratings (FBG) inscription. In collaboration with other research units, the new technologies of phase masks with variable diffraction efficiency fabrication for apodized Bragg gratings (AFBG) manufacturing were developed. AFBG are used in telecom (for example as optical filters or for chromatic dispersion compensation) and for sensing (discriminators) applications.

In the area of optical signals transmission the modeling and optimization of high-capacity optical core networks, in particular carrying 40 Gbit/s and 100 Gbit/s streams is carried out. This work in particular takes into account signal impairments like nonlinear optical effects and polarization mode dispersion (PMD). In addition, the research on time standard signals transmission in optical fibres is conducted.

We also focus on fibre optic metrology. In our laboratories we have developed very accurate measurement set-ups, for example optical length measurement systems and high-speed optical detector characterization systems.

MEASUREMENT AND TESTING

The second area of activity is measurement and testing for R&D and industry. Well-equipped laboratories allow for characterization of special optical fibres, primarily photonic crystal fibres (PCF). This includes testing of polarization parameters, attenuation and optical uniformity, as well as influence of temperature and mechanical strain on fibre parameters. Another area of research is fusion splicing of such fibres [Fig 1].

Moreover, optical fibre sensors, in particular strain and temperature sensors with fibre Bragg gratings, are developed and characterized.

Based on installed GEPON test-bed the new concepts and functionalities of access optical link are worked out. The applications of novel optical fibres (such as bending resistant, PCF, POF) [Fig 2] and fibre optic components for support proposed solutions as well as monitoring systems in analyzed access network are tested.

FOR INDUSTRY

Products testing is performed in several accredited laboratories. Such work includes optical fibre cables and passive devices for manufacturers and operators in communications, IT and power sectors. Another, rapidly expanding activity is calibration and verification of measuring instruments for industrial users, especially equipment for optical fibre communications. The calibration laboratory operates according to ISO17025, has the largest scope of accreditation and the best measurement accuracies in Poland.

Since 2002, several projects, such as NEMO, Future Internet Engineering, COST Actions 270, 299, 291, P2 and TD1001 were carried out.

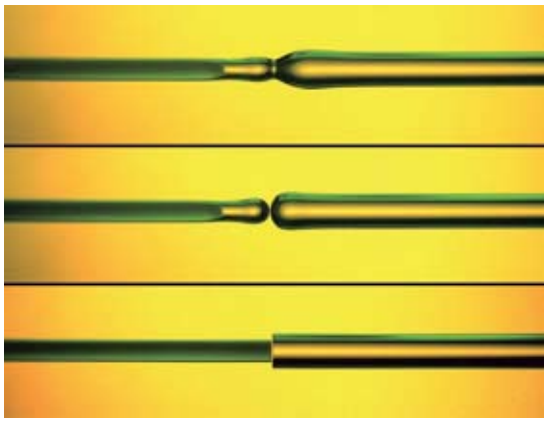

Fig 1 Fusion splicing of photonic crystal fibre to conventional single mode fibre (COST-299)

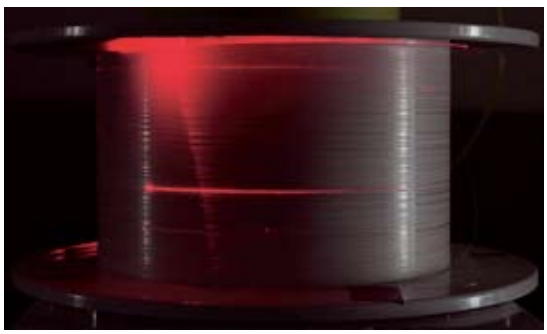

Fig 2 Light scattered by defects in prototype photonic crystal fibre

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AIMS OF THE PROJECT:
- To enhance quality and relevance of higher education in engineering area in partner countries
- To reach the integration of partner country universities into the European university system by international accreditation of engineering studies.

ACTIVITIES:
- Three Consortium meetings with seminars:
- 2009, April 2-5, Belgrade, University of Belgrade, Faculty of Mechanical Engineering
- 2010, April 26-30, Munich TUM and Karlsruhe KIT
- 2010, June 15-17, Cairo GUC
- Seminar of German Rectors' Conference, HRK. International Quality Assurance Networks in Higher Education 29-30 October 2009 in Belgrade, Serbia, hosted by the Commission for Accreditation and Quality Assurance Republic of Serbia.
- Two certificates of international accreditation already approved:
  - University of Belgrade, Faculty of Mechanical Engineering for the study program in Naval Architecture Engineering (MSc level), by The Royal Institution of Naval Architects, London, UK
  - German University in Cairo for the study program Engineering and Materials Science (BSc and MSc levels), by ACQUIN, Germany
- Review of current standards in engineering education (EE) and contemporary qualifications frameworks.
- Quality assurance (QA) and enhancement system for EE based on the best international practice.
- Selection, procurement and installation of laboratory software and equipment.

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FOR MORE INFORMATION:
Prof. Dr Milos Nedeljkovic, mob.tel. +381-62-295-295, **mnedeljkovic@mas.bg.ac.rs**
For follow up and more information visit the Project website: **http://tempus.mas.bg.ac.rs**

Securing future prosperity

Europe's universities can, and should, be the drivers of the EU's knowledge economy, writes Androulla Vassiliou

Jan Amos Comenius, the 17th century educator and philosopher after whom our schools exchange programme is named, described education establishments as "workshops of humanity" in his seminal work, Didactica magna (The great didactic). He recognised that education and knowledge is the foundation for discovering the world around us. Europe's universities, dating back to Bologna and Oxford in the 11th century, have long been a driving force for modernisation in our society. In more recent times they have gradually opened their doors to a larger cross-section of people and invested in both "hard" and "soft" infrastructure to meet the needs of a fast developing global society and economy.

Today, at a time when higher education is facing growing financial challenges and cutbacks, it is crucial that the European Union acts collectively to ensure that our universities and other learning institutions continue to play this vital societal role. In doing so, they must prepare our young people to be successful in a sustainable and inclusive knowledge based society. In June last year, European leaders endorsed the European commission's Europe 2020 strategy for achieving smart, sustainable and inclusive growth in the coming decade.

The role of education – and higher education in particular – is central to this strategy, which involves making better use of knowledge to drive up productivity and competitiveness, while radically improving Europe's resource efficiency and promoting greater equity and cohesion. Achieving this vision will be no easy task and many obstacles must be overcome. In the short to medium term, re-establishing macro-economic and fiscal stability is a priority.

But Europe's long term wealth, sustainability and inclusiveness will ultimately depend on our ability to deliver smart growth. In today's interdependent global economy, Europe can only hope to compete on the basis of better use of our human resources. This will depend on our ability to develop and acquire new knowledge, skills and capacity for innovation. Labour market projections point to a steady increase in the proportion of jobs requiring high level skills in the years to come, as knowledge-intensive sectors expand. These sectors hold the key to the core challenges we face, while opening up new growth opportunities in less developed parts of the EU.

"The European institute of technology (EIT) is a good example of an EU initiative which supports the development of new and innovative higher education programmes"

Responding to the demands of the knowledge economy has clear implications for higher education institutions and systems. Universities are fundamental for securing Europe's future prosperity, both through developing the knowledge, skills and competences of individuals and in cooperating with the labour market in the wider European innovation system. In →

"New programmes should aim to strike a balance between the societal role of higher education and the relevance of education in meeting the needs of the knowledge based society"

both these areas, policy makers and institutional leaders must do more to help our universities realise their full potential.

First, we must ensure a sufficient proportion of the population has access to high quality higher education. Young people who benefit from acquiring the knowledge and competences needed by high skilled professions are key to converting this "privilege" to the benefit of the whole of society. This is of the basis of our vision for smart, sustainable and inclusive growth. As part of the 2020 strategy, European leaders have set a target for at least 40 per cent of 30-34 year olds to have a higher education qualification within a decade (up from 32 per cent today).

Achieving this target will require a particular effort in central and southern European countries where current attainment rates are lowest. It also implies widening access to higher education among under-represented groups. While the 40 per cent target is a strong signal of the importance the EU attaches to higher education, such a quantitative target is not sufficient on its own. The quality and relevance of higher education are of paramount importance. European cooperation has brought progress in establishing compatible and robust quality assurance systems.

However, more needs to be done to ensure university teaching focuses on learning outcomes – the knowledge and skills that students actually gain from their studies. New programmes should aim to strike a balance between the societal role of higher education and the relevance of education in meeting the needs of the knowledge based society. The European institute of technology (EIT) is a good example of an EU initiative which supports the development of new and innovative higher education programmes. It draws on expertise from business and research to ensure students gain access to the latest scientific knowledge and have the opportunity to apply this knowledge in a business environment.

We hope the experience of the "knowledge and innovation communities", the hubs at the heart of the EIT, will provide a valuable insight for higher education providers throughout Europe. By bringing together education, research and business – the three parts of the so-called "knowledge triangle" – the EIT also seeks to strengthen the contribution of university research to business creation and economic development. This is something the EU has long supported as part of its regional development agenda – in particular by deploying resources from the structural funds.

The new generation of European funding programmes beyond 2013 will be an opportunity to enhance the support the EU can bring in this area. In order to provide a policy framework in support of the development of Europe's universities, I will present an updated reform agenda for higher education in the autumn. This will set out our shared goals for the sector, for teaching, research, innovation and cohesion, as well as the tools the European commission will use to support institutions and governments across the Union. ★

Androulla Vassiliou is European education, culture, multilingualism and youth commissioner

TRAINING AND EDUCATION FOR A MORE COMPETITIVE AND INNOVATIVE RAILWAY SECTOR

THE PURPOSE

The SKILLRAIL project aims to contribute to the enhancement of the transport sector by fostering a better match between the human resources needs and the offer of skills to make railways a more competitive and innovative sector.

A partnership for innovation, skills development and jobs is envisaged to mobilize support and getting the different players to work together in a collective effort to spread ownership and excellence.

Figure 1 highlights the institutional scope where authorities, regulators, operators, suppliers, etc., have all to be engaged, and identifies the gap where SKILLRAIL is acting by matching demand and supply of the required skills and competencies to foster the development of the sector and consequently of more job opportunities and faster incorporation of young talents in the sector.

The development of the European Railway sector needs well managed and collaborative research and targeted research lead education. The SKILLRAIL project will devote a significant effort to design and launch a sustainable framework, EURAIL "European University of Railway", for creation, dissemination and transfer of knowledge within the railway sector.

Based on knowledge, experience and people from "real" universities in Europe, EURail is virtual in nature and aspires to foster at European level excellence by gathering and networking the different relevant organizations and institutions around an educational project suitable to the needs of the European Rail sector. EURail's unique feature is this concentration of high-level knowledge and expertise in one single sector/problem-oriented institution.

By addressing the needs of the sector the European University of Railway- EURail will provide the conditions to disseminate the social and industrial benefits of training and education in the railway sector and to develop, at European level, high quality training and education activities for the railway community of tomorrow.

TRAINING NEEDS AND REQUIREMENTS

European railways are facing fundamental legal, technological, demographic and market changes that the railways need to deal with in the coming years. The main changes include: Introduction of new European legislation promoting cross-border interoperability

Technological developments affecting the professional requirements related to the operation of trains and networks as well as the maintenance of rolling stock and infrastructures.

The demographic situation implying that a significant number of railway staff has to be replaced in the coming years creating a need to recruit a considerable number of staff for the railway sector.

Such changes create a 'skills gap' that European railways need to bridge in order to stay in business. However, there is a lack of knowledge about future training needs, i.e., what types of professional skills will be needed in the coming years. An intensive activity has been carried out for the identification of the stakeholders' needs [2]. This work comprised the following: Design of a questionnaire to target railway stakeholders; Collection of stakeholders' contacts and responses and an analysis of stakeholders needs.

STRATEGIC IMPACT

A number of impacts are expected in the fulfillment of SKILLRAIL's mission, namely:

- Disseminate the vision and the intense on-going change process in the railway sector with the aim to contribute for the change of the public image of railways
- Highlight the social and industrial benefits accumulated from rail
- Provide new concepts and skills for young people by offering disciplines based on recent research results
- Demonstrate and disseminate the need of advanced high technology engineering in the future of railways
- Demonstrate and disseminate the need of additional domains of knowledge that should complement engineering, such as economics, management, sociology, human factors.

THE SKILLRAIL CONSORTIUM

The SKILLRAIL consortium involves 10 organizations from 8 Member States. The added strength of this consortium is its strong and balanced industrial participation. The consortium involves an integrated transport system technology manager TSB-FAV, the academic organizations IST, NITEL, UPCE and UPCH, the industrial partners ALSTOM, BANVERKET and the UIC, UNIFE and EURNEX associations. These organizations with their different profiles offer an optimal combination of expertise and experience to achieve the SKILLRAIL objectives

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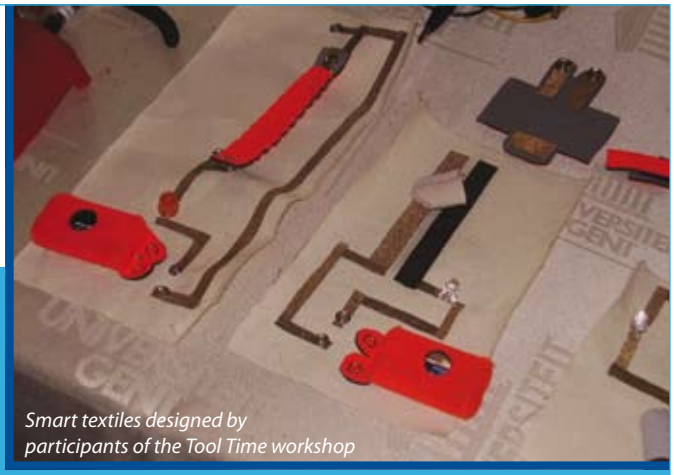
systex

Smart textile systems have been around for more than a decade. In spite of huge RTD effort the breakthrough is rather slow. SYSTEX is a European coordination action that wants to find out what needs to be done to enhance this breakthrough. A web based platform offers information on research worldwide, markets, events, training and education, stakeholders, contacts, standardisation etc.. SYSTEX has established a vision paper for medical applications and another one for fire fighters will be available soon. A roadmap on medical and protective applications will merge all information collected in the various activities. System thinking methodology is applied for mapping the factors that affect the breakthrough of smart textiles for a selection of users. For fire fighters this activity will be continued up to the drawing of an action plan.

SYSTEX supports training and education activities in the area of smart textile systems. The STS Smart Textile Saloon is the annual event where demonstrations are held of various developments in the area of smart textiles. In the Tool Time activity participants experience how it is to make their own smart textile product. SYSTEX organises academic education on smart textiles as well as workshops for SME's. Inter project cooperation is a unique task of SYSTEX. The RTD activities show numerous overlaps as well as complementarities. Inter project cooperation must avoid overlaps so that more impact can be reached with the same RTD effort; exchange between complementary activities ultimately must lead to better products. SYSTEX provides templates for various forms of cooperation as well as legal support in organising so.



Smart textiles designed by participants of the Tool Time workshop

SYSTEX will soon end as an EU funded project. It will be continued as a spin off activity supported by a range of private and public funds.

Contact details:
SYSTEX project FP7-ICT-2007.3.6- 224386
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"The EIT's mission to act as a catalyst within the European innovation landscape is clear"

Maximising impact

The EIT must remain independent if it is to fulfil its role of driving innovation and entrepreneurship, argues Ronald de Bruin

The European institute of innovation and technology (EIT) was set up in March 2008 by the European parliament and council with a view of increasing Europe's innovation impact and of becoming a key driver of sustainable European growth and competitiveness. The EIT is driving and promoting innovation and entrepreneurship in Europe through the integration of the knowledge triangle (business, higher education and research) via its three knowledge and innovation communities (KICs).

The KICs are highly integrated partnerships that are driven by entrepreneurship to provide higher innovation impact in the form of new products and services for existing industry, new businesses – including SMEs – and more entrepreneurially minded and educated people. The EIT and the KICs are designed to continuously learn from each other. Whilst addressing long term EU societal challenges, they are establishing and facilitating a culture that helps unlock Europe's underused potential to leverage people, technology and business innovation for greater innovation impact.

Further reinforcement of Europe's innovation landscape beyond the current important policy strengthening of the 2020 innovation union target, is both timely and urgent. Moreover according to its regulation, the EIT was set up to last for the long periods of time that innovation typically takes. Thus, the EIT wants to go for a second 'KIC investment round' in 2014 so that more potentially world class, and over time, self sustainable European innovation hotspots can emerge. Moreover, the EIT will add value to the European innovation landscape by providing a 'role model service' to others providing inspiration and good practice to the larger initiatives of post-2013 EU funding, namely the common strategic framework for research and innovation, the education and training programmes as well as the structural and cohesion funds. In the years to come, the EIT will aim and focus on becoming an entrepreneurial driven innovation impact investor in the KICs rather than a mere funding mechanism for KIC activities.

The EIT's mission to act as a catalyst within the European innovation landscape is clear but with many different initiatives addressing and targeting Europe's innovation capacity, the EIT welcomes the European commission's proposals to strengthen the links between these various initiatives. Indeed, Europe must act together in order to meet the goals put forward by the EU 2020 strategy and flagship initiatives such as the innovation union and youth on the move.

The EIT will present its own vision for the future, including its links with the European innovation initiatives, on 31 May 2011, in the form of its draft strategic innovation agenda. Following this, the commission will present to the European parliament and council a strategic innovation agenda by the end of the year. To this end, the commission is currently seeking stakeholders' specific views on the EIT's future strategy via its open public consultation.

The results of the commission's green paper "From challenges to opportunities: towards a common strategic framework for EU research and innovation funding" and consultation thereof will also very much contribute to the definition of the EIT's future role within the EU innovation landscape. However, the EIT was set up as an autonomous and flexible EU body, in order for the institute to fulfil its mission, it is crucial that the EIT retains its level of independence.

In summary, the EIT should be part of the common strategic framework for research and innovation (CSFRI) whilst maintaining a strong link with the European higher education area (EHEA). However, at the same time, any rules applying to the EIT will have to remain tailor-made and fully flexible to fit with the EIT's mission. ★

Ronald de Bruin is acting director of the European Institute of Innovation and Technology (EIT)

Higher education

Adam Tyson says higher quality education lays the foundations for long term economic security

People's talents are at the core of Europe 2020, Europe's vision of smart, sustainable and inclusive growth. And higher education has a pivotal role in shaping the landscape of talent and skills.

In the short run, well-targeted, high quality higher education can help people to overcome the impact of the economic crisis. In the long run, it lays the essential foundations - the scientific knowledge and the skills infrastructure - for our long term economic and social security. At its best, it fosters creativity, innovation and entrepreneurship and nurtures the attitudes that welcome new ideas and new ways of doing things in a changing world. Europe needs to strengthen its place in a world economy where knowledge is a factor of production, alongside capital, labour and resources. But to turn knowledge into innovation, to bridge the gap between the worlds of education and work, we need to spread the net wider to involve new groups of students and to work with business to deliver targeted results.

Adam Tyson is the head of unit for 'Higher education; Erasmus' in the European commission's directorate general for education and culture

The European Union has devoted much effort to strengthening relations between research and innovation and between education and enterprises. Broad political initiatives such as the creation of the European higher education area and the EU's modernisation agenda for higher education are complemented through specific actions. The university-business forum, for instance, has demonstrated that the appetite exists on both sides for partnerships that focus on education and entrepreneurship. But implementation on the ground so far has been uneven. While links between research and innovation have been strengthened, the relationship between education and innovation has often been overlooked, neglecting this key side of the knowledge triangle.

So the European parliament's support for a new, focused relationship between education and innovation is especially welcome.

Under the innovation union flagship initiative, the commission committed itself to support cooperation between education and business through the creation of "knowledge alliances" to develop new curricula addressing shortcomings in innovation skills. They will help universities develop modern approaches to inter-disciplinarity, entrepreneurship and stronger business partnerships.

Following the European parliament's proposal, the commission is launching a pilot project for "knowledge partnerships". The initiative will explore how EU higher education institutions, research institutes and training providers, at national, central, regional and local levels, can develop structured partnerships with business and industry, to deliver new curricula and courses and to develop new innovative ways of delivering shared educational goals.

Graduates should emerge not only with an in-depth knowledge of their subject, but also with high levels of "transversal" skills, such as languages, communication and team working skills. This will boost their employability and arm them with an entrepreneurial, creative and innovative attitude. Knowledge alliances will help education systems better match the skills sought after by employers and develop the innovation capacity of the learners.

Higher education is not a business, but it must be able to deliver the skills which businesses need. Our goal is to help higher education institutions in their drive to be more flexible and more strategic; to play to their strengths; to open up more opportunities for students to follow the best study path for their needs and aspirations, and to equip them with the transversal skills required by the changing nature of work. These and other challenges will be part of the new reform agenda for higher education that the commission will present later this year. ★

'If you are bright and ambitious, and thrilled by the prospect of doing research on one of the world's most exciting big science projects in a stimulating, multidisciplinary, international environment, and moreover keen on contributing to a clean energy supply for all, for ever, then Fusion is probably just the thing for you.'

This appetizer, addressed to prospective students of nuclear fusion, expresses the spirit of the European Fusion Education Network FuseNet, which started about 2 years ago as a FP7 coordination action.

FUSENET coordinates joint educational activities, such as the annual summer school on Fusion Technology in Karlsruhe.

The information portal on fusion education: **www.fusenet.eu**

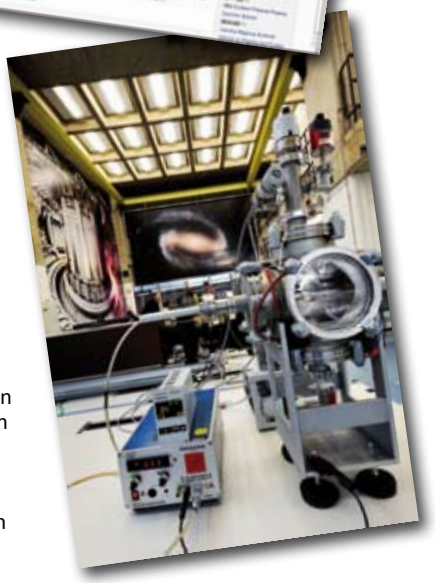
The motivation for the establishment of this network is the advent of ITER, the large international fusion reactor presently under construction in Cadarache (France). ITER is one of the exceptionally large Big Science projects, and the international collaboration on which it is founded – comprising China, India, Japan, S-Korea, the USA and Russia, with the EU as leading and host party – is the broadest ever. With ITER, there is a broad international political commitment to the development of fusion power for the coming decades. ITER calls for a new generation of fusion engineers and researchers – and conversely, ITER and the associated research offer an exciting career perspective.

But fusion is much more than a career perspective. The development of fusion power is characterized by extreme challenges: heating the fuel to temperatures ten times hotter than the sun; confining this hot plasma in a cage of superconducting magnets that are kept at a few degrees above the absolute zero temperature; inventing materials that can handle neutron fluxes a hundred times more intense than in present devices. And more. ITER is often touted to be the most complex device mankind has endeavored to construct. A challenge to the high-tech industries involved in the construction, that need to develop new technologies – which in turn will boost their competitiveness. A challenge, indeed, calling for a new generation of bright young minds, trained in an interdisciplinary mix of science and technology.

With that in mind, the FuseNet network was launched. With 36 members –universities, research labs – from across Europe, its mission is to improve the quality and appeal of fusion education all over Europe, by sharing educational material and best practices, making hands-on labs available as well as virtual educational tools, preparing a text book on fusion engineering, and supporting the organization of joint educational events such as summer schools. Fusenet also supports students who want to do an internship outside their home university. Importantly, Fusenet has established common criteria for the awarding of European Fusion Master and Doctoral certificates, the quality of which is guaranteed by an academic council.

The FuseNet website provides transparent information to students on where courses on fusion science and technology are taught, where they can do internships, how they can participate in the hands-on plasma lab courses and, of course, how they can apply for individual support for participating in joint educational activities.

Why don't you sample it at www.fusenet.eu?



FUSENET stimulates the development of joint educational tools, such as the Hands-on PlasmaLab at the Eindhoven University of Technology. (*Photo by: Bart van Overbeeke*)

Mobilising creativity

Europe's regions and cities are spaces where universities and talents, entrepreneurial spirit and innovative funding schemes can come together, writes Danuta Hübner

Regions and cities play a crucial role in designing and exploiting innovation systems. Innovation-led growth is increasingly place-based with regions and cities taking the lead. It is recognised that regions and cities are spaces where universities and talents, entrepreneurial spirit, attractive lifestyles and innovative funding schemes can come together. Regions and cities offer demand-driven and supply stimulated innovative solutions to many development challenges.

They increasingly reach out to innovative solutions to the problems they face, but also to the opportunities they can exploit. For many of us, innovation goes beyond technological research to innovation processes. Over recent years, we created hopes and expectations in the context of innovation. There is reason to worry that if we do not start to deliver soon, we might lose or weaken the commitment to innovation. Networks of cooperation, multilevel governance and the integrated approach to policy making are all conducive to innovation.

Innovation in Europe cannot be limited to a few most advanced technology centres, however. Europe must mobilise creativity as well as knowledge generation and its use across its territory. This means that all regions and cities must upgrade their human capital and capitalise on their resources via knowledge and innovation. All regions must enhance the ability and willingness of their enterprises to innovate and be internationally competitive.

"Regions and cities offer demand-driven and supply stimulated innovative solutions to many development challenges"

→

Danuta Hübner is chair of the European parliament's regional development committee

"Innovation cannot be limited to a few most advanced technology centres...Europe must mobilise creativity as well as knowledge generation"

We all know that Europe has to deliver solutions to such challenges as demography, climate change, resource efficiency, competition from emerging economies and new patterns of globalisation. Innovation is an essential part of any effective response to these challenges. Innovation can help Europe put productivity gains on track.

Of course investing in innovation is not a one-off boost. It is a process as regions and cities will be confronted with a permanent need to restructure, to modernise, to foster knowledge based innovation, to meet the challenges mentioned previously and to exploit the opportunities that those challenges bring ahead. European regional policy should continue its involvement in enhancing innovation, building all necessary links and fully exploiting synergies with other policies. A lot has already been done for innovation in the history of regional policy. In particular in the current programming period (2007-2013), significant investment in regional innovation systems has taken place. Regional policy contributes to innovation through support for integrated regional innovation strategies and experimentation.

A good example would be the regional programmes of innovative actions from 1994 to 2006, which allowed for the creation of experimental laboratories of ideas for regions to develop innovation policies. Another example would be the launch of the regions for economic change initiative in 2005, which supports innovative projects and promotes the exchange of experiences across regions. The RegioStars award was established within this initiative, aiming at identifying good practices in regional development and at highlighting innovative projects attractive and inspiring to other regions. These initiatives have promoted small scale experimentation, mutual learning and the set up of clusters. They have also contributed over the years to the changed role of modern cohesion policy that manages a third of the community budget, or 0.4 per cent of EU GDP. Today, a large share of these funds is devoted to the spread of innovation and to investments in the knowledge-based economy.

The long term planning that comes with these funds also provides a stable financial basis for companies to invest in innovation on a prolonged basis. Thanks to all the experience we have accumulated so far, we know that innovation is man-made; it can be grown where we create adequate conditions. In a period of economic crisis we need to be both practical and ambitious. Regional policy already makes an important contribution to research and innovation activity in the regions of the EU and it represents a big opportunity for the knowledge-based economy.

Regional policy disposes of a consolidated methodology in terms of an integrated approach and offers a well worked out governance system, able to mobilise local investments and to engender structural reforms in the long run. Future success in the implementation of the knowledge-based economy will strongly depend on how deeply these tools are going to be used. It is important to further build on what we have built so far. ★

EURO DOTS

EURO-DOTS (acronym for European Doctoral Training Support in micro/nano-electronics) is an FP7 project that started on 1 May 2010, with a duration of 2 years and that is coordinated by imec, Belgium (BE). The partners are the Katholieke Universiteit Leuven (BE), KTH - Royal Institute of Technology (SE), École Polytechnique Fédérale de Lausanne (CH), MEAD (CH), and the Slowak Technical University (SK). The main objective of EURO-DOTS is to create a delocalized (virtual) platform to serve the Doctoral Schools in Europe by improving the offering and the quality of training of European PhD students in the fields of micro- and nano-electronics. This platform will help PhD students in acquiring ECTS (European Credit Transfer System) credits, imposed by major European universities for obtaining the Doctoral (PhD) degree in Engineering.

EURO-DOTS addresses problems that exist today at Universities in Europe regarding the organization of high-level doctoral programs that cover several engineering fields at the state-of-the art level, i.e. in direct connection with research. Especially in view of the increasing multidisciplinary nature and content of the emerging research fields and the fast evolution of the nano-electronics and micro-systems domains in which disruptive developments are expected in the near future, a rapid and coherent response of the doctoral and/or continuous education courses has become indispensable. Though major European universities are at the top level in some specific research fields, they can hardly cover the whole domain of nano-electronics and micro-systems, both for scientific and financial reasons. The doctoral program they can offer is therefore restricted to some fields, and cannot cover all the special topics that could be requested by innovative PhD work. But moreover, PhD students are mainly restricted to these local courses for various reasons. Foreign courses are hardly accessible because most courses are spread on a full semester at a rate of 1 or 2 hours per week, the cost for attending the few existing modular, intensive courses is prohibitive for students and last but not least, ECTS credits are most of the time not offered today for these courses (no exam organized, no official recognition and 'accreditation' of the courses).

A coherent set of advanced courses in micro/nano-electronics, explicitly accredited by major European universities in the framework of their Doctoral Program, will therefore be made easily accessible to European PhD students by the EURO-DOTS initiative and platform, offering them the opportunity to collect these ECTS credits throughout Europe. The courses respect specific organization criteria (short, intensive one-week course modules with optional exam) that make them very flexible, accessible and attractive towards PhD students as well as engineers from industry. And most importantly, scholarships are made available to PhD students fulfilling specific selection criteria.

In order to offer a broad spectrum of relevant state-of-the-art courses, the consortium carries out a detailed study of the gap between existing training courses at universities and the future needs in industry. It also reviews existing initiatives, studies the requirements and accreditation policies in European academia and defines the criteria that courses need to fulfill in order to become eligible (and obtain the EURO-DOTS label). EURO-DOTS will launch a call and invitation to European universities that are willing to contribute to the platform by working out suited training modules in response to the recommendations of the gap analysis and in line with the mentioned criteria.

This EURO-DOTS platform is being established and its working principles and the rules for attribution of scholarships to PhD students are defined and made public (**www.eurodots.org**).

KTH

SEVENTH FRAMEWORK PROGRAMME

imec

KATHOLIEKE UNIVERSITEIT LEUVEN

EPFL ÉCOLE POLYTECHNIQUE FÉDÉRALE DE LAUSANNE

STU FEI

MEAD Education

Training Europe's Future Leaders in Microelectronics

4 complementary training and support projects – initiated and coordinated by imec (Leuven, BE) – leading R&D centre in micro/nanoelectronics

EUROPRACTICE

IC design & fabrication support

Future engineers and scientists in micro/nanoelectronics need high-level, advanced technical support and expensive infrastructure to acquire the skills needed to become top in their profession. EUROPRACTICE is an FP7-supported program that makes this support and infrastructure available. Currently, EUROPRACTICE is used by over 650 academic and research institutes from 44 countries.

The EUROPRACTICE infrastructure offers cost-effective access to advanced design tools, with a scope that can only be found in the largest multinational IC companies. It also offers a road to IC fabrication (down to 40nm) at leading foundries.

In addition, EUROPRACTICE makes IC fabrication affordable for universities by offering a multi-project service, sharing setup and manufacturing costs across multiple designs. Also companies have access to prototyping and small-volume production.

http://www.europractice-ic.com/

EUROPRACTICE

STIMESI

Training on MEMS design tools and technologies

STIMESI wants to stimulate the wider adoption of MEMS technology in university curricula and research programs. The goal is to deliver skilled young engineers and designers to the European industry and to ensure European industrial competitiveness in the More-than-Moore era.

The three STIMESI courses (4-day sessions) are taught all over Europe. They focus on MEMS EDA tools and MEMS technologies offered through EUROPRACTICE. This gives the 650 European academic institutions the chance to start new curricula in MEMS/SoC/SiP design, to start research in MEMS technologies and to have new MEMS designs prototyped.

http://www.stimesi.org/

STiMESi
Stimulation action on MEMS

IDESA

Essential training in advanced IC design

If Europe is to remain competitive in micro/nanoelectronics, it's essential that its young engineers and scientists are taught the most advanced technologies and methods used by the leading IC companies. However, the field is rapidly expanding, and the design methods and tools are becoming so complex that even top universities can no longer develop all the necessary courses. IDESA has been set up to address this issue.

IDESA develops advanced courses and seminars in IC design and implementation. These courses are set up to bring engineers and scientists up-to-speed with the latest technologies and solutions as they are used by the leading manufacturers.

IDESA's 4 flagship courses are taught all over Europe, 14 sessions for each course. They are organized as 4- or 5-day courses and target professors, post-docs and PhD-students. All courses include both lectures and hands-on sessions. The course material is copyright-free, available for all course attendants and ready to be incorporated in their own lectures. The subjects of the courses are *Advanced Analog Implementation, Advanced RF Implementation, Advanced Digital Physical Implementation, and Design for Manufacturability*.

Next to these courses, IDESA has invited leading experts to develop seminars on advanced topics in IC design and manufacturing. 40 of these 3-hour sessions are available as streaming video from the IDESA website (**www.idesa-training.org**)

IDESA is an FP7 project and is coordinated by imec (contact: Bart.Demey@imec.be). Project partners are: STFC Rutherford Appleton Laboratory, EPFL, Delft University of Technology, Katholieke Universiteit Leuven, Warsaw University of Technology, Slowak Technical University and CEA.

> ***"I really appreciated the IDESA RF implementation course I attended. Overall the course was of high quality both with respect to the lecturers and the content. The didactic material provided seems very useful for reuse at our department and we are planning to develop an intensive course for our students based on this material."***
>
> *Dag Wisland – University of Oslo*

EURO-DOTS

Supporting PhD education in Europe

EURO-DOTS' aim is to set up a coherent set of advanced courses in micro/nanoelectronics to complement and support the European PhD curricula. Such a broad and in-depth training is indispensable for PhD students, especially in view of the multidisciplinary nature of emerging research domains.

The EURO-DOTS courses will be organized as intensive, one-week modules with optional exams. They will be maximally flexible and accessible for both PhD students and engineers from the IC industry.

The courses will be accredited by major European Universities in the frame of their PhD programs. They will offer PhD students the opportunity to collect ECTS credits (European Credit Transfer System). Scholarships are available for PhD students to facilitate their participation in the EURO-DOTS courses.

EURO-DOTS is an FP7 project coordinated by imec (contact Herman.Maes@imec.be). Project partners are Katholieke Universiteit Leuven (BE), KTH - Royal Institute of Technology (SE), École Polytechnique Fédérale de Lausanne (CH), MEAD (CH), and Slowak Technical University (SK).

http://www.eurodots.org/

Skill set

For Georgios Papanikolaou, the message is clear; Fewer skills mean fewer job opportunities

More than 14 per cent of students not only do not have access to universities but they also decide to leave school earlier than normal. At the same time many enterprises and firms complain that newcomers in the labour market that have recently obtained their university degree are not competent and skilled enough.

How can the EU influence member states in order to encourage students to enter universities to facilitate their access and pursue them to follow higher educational programmes? Not an easy answer. Since EU competences are quite limited in this field and subsidiarity prevails, the most important priority should be given to developing and implementing more effectively what we already have, and the EU 2020 strategy plays a key role in this process. However, practical and often undemanding economic or political decisions can by far improve conditions under which students can attempt to follow a higher educational programme.

It is worth reminding ourselves that in the education sector at EU level, member states are cooperating under the open method of coordination, meaning that they follow non compulsory policies commonly agreed that gradually lead to a converging educational sector in Europe. Thus, progress can be achieved through urging governments to cooperate by exchanging best practices. A typical example is early school leavers. Spain confronts serious problems in reducing this indicator and declares itself unable to reduce the number below 15 per cent by 2020 while Poland achieves below 4.5 per cent. Finishing secondary education is the most important factor in stimulating someone to enter higher levels of education.

One cannot discuss this topic without taking into account the general economic constraints that national budgets are now facing. However, this is a deep trap. Facilitating student access to universities implicitly passes through the support of national education systems. This means money and member states argue for more young people with a higher level of education while rigorously cutting public spending in this sector. Countries declare their willingness to support poor social groups on having access to universities, but simultaneously do not support a vast policy of alumni for those categories. It seems quite ironic. The European commission and council should make it clear cut. Education must be exempt from austerity measures.

"Education systems in many cases remain cut off from real job needs and thus are not attractive to students. What is needed are skills and competences fully useful to the needs of society"

Finally in order to answer why some students decide not to follow higher education courses, we first should try to alter the initial question. Do higher education systems correspond to students' aspirations? Do they correspond to the jobs that youngsters want to follow in their lives? The answer is neither encouraging nor positive. Education systems in many cases remain cut off from real job needs and thus are not attractive to students. What is needed are skills and competences fully useful to the needs of society. The EU can stimulate a pan-European dialogue with educational institutions for that issue and the flagship initiative, "An agenda for new skills and jobs" is a basis from where we can start. The message is clear. Fewer skills means fewer opportunities for jobs. ★

Georgios Papanikolaou MEP is the European parliament's rapporteur on the EU strategy for youth

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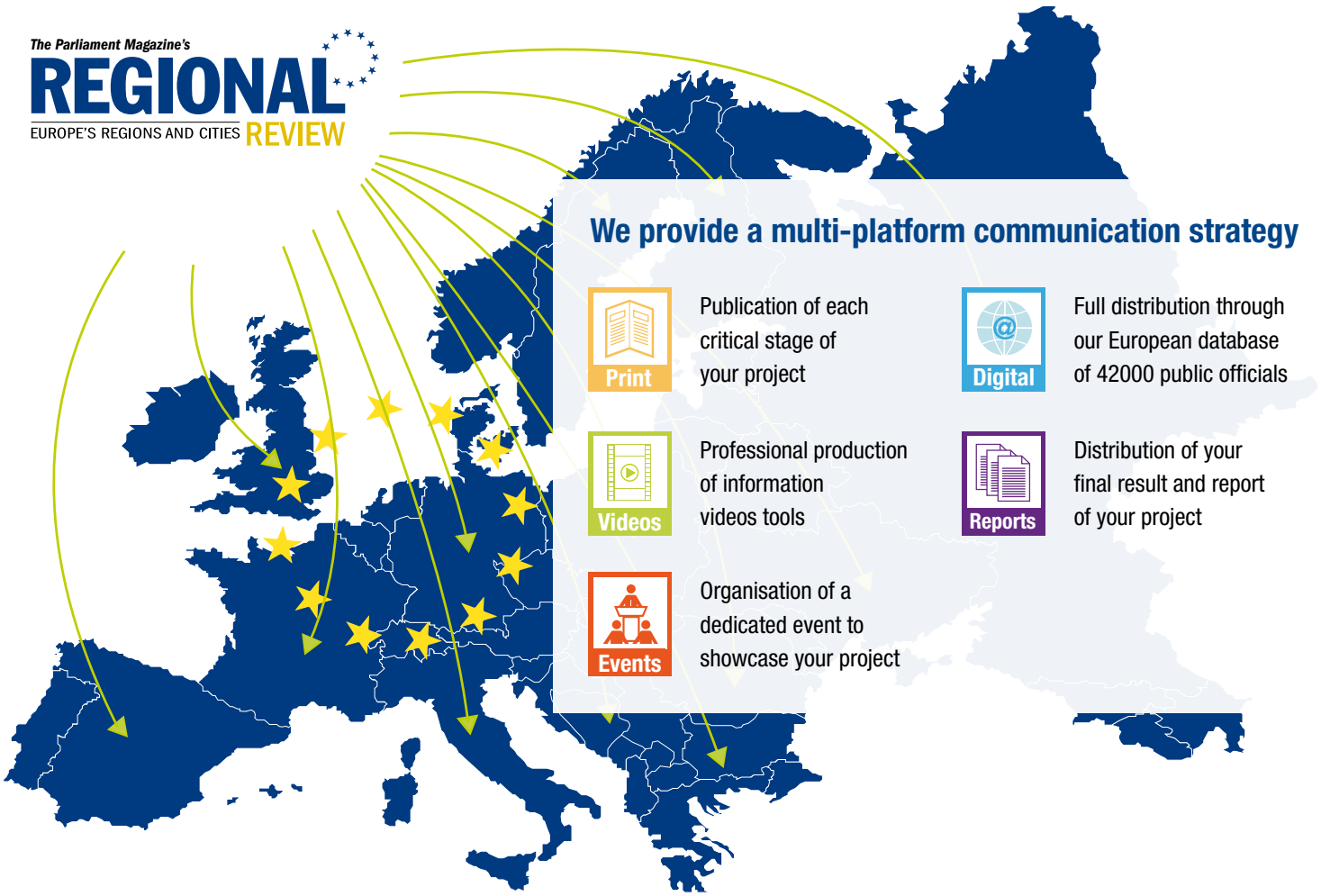

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Smart investment

Europe needs to invest in smart people if it wants smart growth, argues John Smith

Europe's universities have a major role to play in the innovation union. Europe's future as a dynamic competitive global region will depend largely on its ability to increase substantially the number of highly trained people within EU member states and to attract others from abroad. The task of universities is to create new ideas and to educate people to be creative in their personal development, in their economic activity in the workplace, and as citizens of a civil society. Innovation is, at its roots all about people and their ability to reach their full potential in skills development and resourcefulness, and fostering the right conditions to achieve and maintain this Hence, in its published response to the EU flagship initiative "innovation union" the European university association (EUA) has placed emphasis on the fact that Europe needs to invest in "smart people for smart growth". Europe's universities play an essential role in the "innovation chain" through their research and teaching activities which strengthens our knowledge base and skills development to provide new jobs for the future. Innovation requires a wider interpretation and understanding rather than simply being seen as the last step to commercial application.

John Smith is deputy secretary general of the European University Association (EUA)

The breadth of university-based research has its impact at many levels in the economy and society. Innovation comes from contributions across the full spectrum of sciences, engineering and technical sciences, medical and life sciences, social sciences, arts and humanities. Wider interdisciplinary perspectives will also be needed to tackle effectively the growing challenges society faces.

We believe that three concerns should be overriding for EU research and innovation funding instruments in the innovation union. An excellence criteria should determine the allocation of funding across the range of research and innovation activities, based upon indicators of best practice in the domains of both basic research and collaborative research with external partners. Simplification and reduction of heavy administrative and accounting procedures should be the driving forces for the improved implementation of EU funding instruments. Competitive funding instruments should be open to all research institutions, with no programmes targeted specifically for certain types of research institutions, as exclusive partners.

One of our essential messages is that, particularly during these times of financial crisis, government expenditure on university-based research and training (and higher education as a whole) should not be regarded as "consumption" of public resources that can be easily cut, but as an "investment" in training, skills development and research, and innovation activities, needed to lead Europe out of the economic downturn and towards a truly innovation union.

In order to achieve the ambitious programme, an increased EU budget for 2014-2020 will be required. "European added value" will need to be clearly demonstrated in order not to run the real risk that in periods of economic downturn research and innovation funding could be used to substitute for reductions in national and regional funding. The full commitment of member states with corollary increased resource allocation, will be crucial in achieving the innovation union goals, given the strong emphasis on partnership and overcoming of fragmentation in national research and innovation systems.

The European parliament has rightly set an ambitious target for the EU budget for research and innovation, that meets investments being made by our global regional competitors. We must hope that Europe too is smart enough to invest in its universities and the next generation of innovators. ★

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