

# Moving towards Lisbon

Driving the knowledge economy

> **EDITORIAL**

Portuguese Chair set to widen EUREKA's horizons and help boost Europe's future competitiveness

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EUREKA Clusters set direction for future of information and communications technologies in Europe

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Portuguese science minister José Mariano Gago offers unique view on research collaboration

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The quarterly magazine  
of the EUREKA Initiative



EUREKA is a European network for market-oriented R&D. Its aim is to strengthen European competitiveness by

promoting market-driven collaborative research and technological development. The EUREKA Initiative enables industry, universities and research institutes from 38 member countries and the EU to collaborate in a 'bottom-up' approach to developing and exploiting innovative technologies.

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## Focusing on Lisbon

*Two parallel themes are highlighted in this edition of Eureka News, both related to Lisbon. The focus of this issue is Portugal as the new EUREKA chair – and our Viewpoint article is from Professor José Mariano Gago, Portuguese Minister for Science, Technology and Higher Education and one of the authors of the EU Lisbon strategy during the Portuguese presidency in 2000. His background as a particle physicist and long tenure as science minister – from 1995 to 2002 and since 2006 – provides him with a unique view on the value and importance of European research and research co-operation.*

*At the same time, the European Commission has relaunched its annual information society event as ICT 2008, to be held in Lyon in November this year. This event is intended to set the agenda for ICT research and innovation in Europe during the coming decade. Information and Communications Technology (ICT) is a key element driving the EU Lisbon strategy to make Europe the most dynamic and competitive knowledge-based economy in the world. And the EUREKA ICT Clusters ITEA 2 software, EURIPIDES smart devices, CELTIC telecommunications and CATRENE – the new nanoelectronics Cluster that is taking over from MEDEA+ this year – are playing major roles in driving the future of ICT in Europe.*

*Portugal was one of the founding members of EUREKA and this is the second time that the country has held the EUREKA Chair. The Portuguese are strongly committed to increasing the visibility of EUREKA – emphasising our long track record and the excellent results of our bottom-up approach and our strong commitment to research and innovation. A particular priority will be increasing political visibility for EUREKA, with the organisation by Portugal of both an Inter-Parliamentary Conference (IPC), hosted by the Parliament in Lisbon, and a Ministerial Conference (MC) before the end of the Chair year in mid 2009.*

*At the same time, Portugal will be seeking stronger links with third countries around the globe that are already knocking on our door. Many Asian countries, for example, see important advantages in research co-operation and the opportunity to enter new markets in Europe. Similarly, small and medium-sized enterprises (SMEs) here would benefit from greater access to faster growing markets worldwide. Attention would also be paid to establishing new network-to-network co-operation with similar organisations elsewhere in the world, such as IBEROEKA, which supports collaborative research in Latin America.*

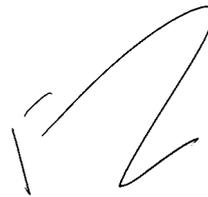
*All this will involve a review of EUREKA's own organisation – perhaps with the idea of streamlining membership categories to encourage more non-European associate members. We will have to explore new policies, instruments and channels to enable us to increase internationalisation of the EUREKA network outside our members' borders.*

*Methods could include technology missions, co-organisation of major international technology events both inside and outside Europe as well as participation in such third party events around the globe. This would involve a critical mass of current members and of companies both large and small, with political engagement within the EUREKA countries themselves and with the countries or regions targeted.*

*A driving force will certainly come from the EUREKA Clusters, which are already involved in longer term strategic initiatives that have a global effect, particularly in the ICT domain – but also in energy and in the medical and biotechnology sectors. The success of our Clusters inspired the creation of European Technology Platforms and the industry-led Joint Technology Initiatives – also co-financed by the Commission – that are emerging from them.*

*We have also been increasing communication between the Clusters and the main EUREKA programme to reinforce our efforts in supporting close to market industrial research.*

*This is all part of EUREKA's increasingly thriving co-operation with the European Commission and the EU research Framework Programmes. The success of the Eurostars Programme, established with the EU last year and administered by the EUREKA Secretariat, is also reported in this issue with the outstanding results of the first call. Such joint programmes are leading the way to an ever more active future for the EUREKA network.*



**Luuk Borg**

Head of the EUREKA Secretariat



**Luuk Borg**  
Head of the EUREKA Secretariat

*We will have to explore new policies, instruments and channels to enable us to increase internationalisation of the EUREKA network outside our members' borders.*

## New Cluster

### New Cluster focuses on whole energy mix

The EUREKA Ministerial Conference in Ljubljana on 6 June 2008 approved EUROGIA+, a five-year energy Cluster worth €1 billion. "Our ambition is to develop low-carbon energy technologies," says Gabriel Marquette, EUROGIA Chairman and Director of Collaborative Research at Schlumberger. "We are planning 'Master Projects' on specific topics of key importance such as carbon capture and storage, geothermal energy, hydrogen production and Arctic exploration."



EUROGIA+ will cover the whole

energy mix, from fossil fuels to renewable sources, promoting and supporting European competitiveness in the oil and gas engineering, manufacturing, supply and service industry, as well as the renewable energies industries. The first call opened in September 2008, so that the first EUROGIA+ approved projects can start early in 2009.

[www.eurogia.com](http://www.eurogia.com)

## EUREKA membership

### EUREKA membership boost to economic growth in FYROM

The EUREKA 2008 Ministerial Conference confirmed the full membership of the former Yugoslav Republic of Macedonia. The FYROM joined EUREKA as a co-operating National Information Point (NIP) country in October 2007, as part of the Slovenian Chair's desire to increase activities in the Western Balkans.

"EUREKA offers concrete possibilities for our research and industrial organisations to take part in international co-operative innovation," says Professor Jovan Lazarev, Deputy Minister of Education and Science. "Membership will enhance the joint activities of our small and medium-sized enterprises (SMEs), large companies,

research centres, universities and the public administration in developing market-oriented projects indispensable for supporting the economic growth of our state."

## Eurostars

### European Council endorses Eurostars funding

EU funding for Eurostars passed its final hurdle with endorsement by the European Council of Ministers in Brussels on 23 June 2008. The Council agreed to provide €100 million from the EU Seventh Framework Programme (FP7) to top up the €300 million already provided from national budgets by the 31 countries participating in the joint EUREKA-EU Programme for R&D-performing small and medium-sized enterprises (SMEs).



Eurostars aims to align and synchronise relevant national research and innovation

efforts in a joint programme marking an important contribution towards the realisation of the European Research Area (ERA). It will also contribute to European competitiveness, innovation, employment, economic change, sustainable development and environmental protection, helping to achieve the EU Lisbon and Barcelona objectives.

See page 14 for results of the first call.

## European affairs

### EUREKA discusses research involvement at European Parliament

The Republic of Slovenia concluded its EUREKA Chairmanship and EU Presidency with an informal working lunch at the European Parliament. The occasion was hosted by MEP and Eurostars rapporteur Paul Rübzig. The lunch was an opportunity for the Chairmanship to explore the areas in which EUREKA is heavily implicated: not just SME support, but also joint

programming, better communication of European research and improving the exploitation of industrial R&D clustering.



Paul Rübzig, MEP and Eurostars rapporteur

Mojca Kucler Dolinar, the Slovenian Research Minister, dismissed accusations of 'arrogance' at EUREKA's decision to proceed with the first call of Eurostars before the official co-decision procedure had taken place, claiming "this was simply a clear demonstration of the confidence of [EUREKA] member countries in the potential of the Programme".



Mojca Kucler Dolinar, Slovenian Research Minister



Lively discussions took place between the 40 people attending the event. Participants included leading European industrialists, key actors in European research and development and representatives from the European Commission and Council Secretariat. Tables were chaired by European parliamentarians Philippe Busquin, Jerzy Buzek, Den Dover and Vittorio Prodi.

### Past events

#### Science for a better life

EUREKA, COST and the European Science Foundation (ESF) combined forces at the EuroScience Open Forum (ESOF 2008) from 18 to 22 July in Barcelona. The theme was 'science for a better life' and topics included issues impacting directly on people's daily lives. The scientific programme featured 122 sessions with the participation of 450 scientists and researchers. Some 4000 scientists, researchers, policy makers and journalists attended the event.



"Joining forces with COST and ESF was a natural step for EUREKA," says Franco Cozzani, Head of Strategy and Evaluation at the EUREKA Secretariat in Brussels. "Where COST actions cover basic and pre-competitive research, EUREKA focuses on supporting market-oriented research driven by industry. Our organisations therefore complement each other ideally, as they cover the full research-development-innovation cycle and offered something for everyone at ESOF2008."

[www.esof2008.org](http://www.esof2008.org)

### New Cluster

#### Developing competitive sustainable manufacturing

A new Cluster – Manufacture Industry – received its EUREKA applicant label this year. The five-year strategic initiative aims to implement the strategic intelligence developed by the EU Manufacture platform on future manufacturing technologies. Its ambition is to lead and accelerate the transformation of European industry towards competitive sustainable manufacturing.

"This initiative was proposed by industry itself and concentrates on medium- to high-tech manufacturing products," says Professor Francesco Jovane, EUREKA High Level Representative for Italy and vice president of the EU Manufacture platform.

The new Cluster intends to set up networks of high-tech EU technology providers as well as new companies such as system integrators, and integrate them with advanced product producers to develop and validate Manufacture production systems solutions. The Cluster will co-operate with the EU Framework Programme, EUREKA Umbrellas and Clusters, the EU Manufacture platform and national platforms, regional initiatives for manufacturing systems innovation and international manufacturing innovation networks.

### Events

#### 'I's on remote heart surgery

EUREKA is demonstrating remote heart examinations at the ICT2008 'I's TO THE FUTURE event in Lyon, France from 25 to 27 November. The exhibit is based on the results of the CELTIC telecommunications Cluster Broadband Access Networks Integrated Telecommunication Systems (BANITS) project. BANITS started from existing network solutions, investigating new ways to extend use both in time and service availability.

ICT2008 is organised by the European Commission's Directorate-General for the Information Society and Media and will be the biggest research event for Information and Communication Technologies (ICT) in Europe in 2008. Visitors will include researchers, innovators, engineers, and policy and business decision-makers in the field of digital technologies.



See article on page 12

[http://ec.europa.eu/information\\_society/events/ict/2008/](http://ec.europa.eu/information_society/events/ict/2008/)

#### European Nanoelectronics Forum 2008



The CATRENE and preceding MEDEA+ EUREKA Clusters on micro-/nanoelectronics are organising a joint European Nanoelectronics Forum with AENEAS and the EU ENIAC Joint Undertaking on nanoelectronics in Paris on 2 and 3 December 2008. The theme of the invitation-only event is the 'Changing environment in the semiconductors industry' and this will be examined from the industrial, market and experts points of view. The forum is expected to attract more than 300 participants and will include demonstrations of MEDEA+ and relevant EU Framework Programme projects.

[www.catrene.org/web/forum2008/](http://www.catrene.org/web/forum2008/)

# Ministers demand wider and more visible role for EUREKA

**Ministers and representatives from 38 European countries and the European Commission met in Ljubljana on 6 June 2008 for the XXIII Session of the EUREKA Ministerial Conference at the invitation of Slovenia, which held the EUREKA 2007-8 Chair. Key conclusions included widening the role of the Network and increasing its visibility.**

The Ministerial Conference lays down political guidelines for the initiative. This year, it endorsed the proactive strategy drawn up under the Slovenian Chair that will see EUREKA developing into a European service provider, enabling better coordination of industrial research and development projects of national, regional and European initiatives and contributing to improved international co-operation.

In particular, ministers proposed the establishment of a high-level expert group by the incoming Chair, involving representatives of EUREKA countries and the European Commission, to oversee this expansion. EUREKA should also facilitate new activities such as implementation of the strategic research agendas of European Technology Platforms, EU Joint Technology Initiatives and other forms of international industrial R&D co-operation.

## Communications strategy

Visibility of the network should be significantly increased by a coordinated and active communication strategy at national and international level, with well-defined and attractive messages on EUREKA projects and activities. EUREKA was also encouraged to build further on the very promising start for the Eurostars programme to prove that such a service is transferable to other instruments/sectors.

The efficiency and potential development of EUREKA has been restricted by the significant differences in member country contributions and commitment to the network. To overcome these problems, member countries were asked to upgrade their contribution and honour the obligations of membership. Moreover, successful implementation of the new proactive strategy will call for additional financial and human resources from

all member countries. The financial commitment of member countries therefore needs to be intensified. The key role of national offices needs to be reiterated and EUREKA members called upon to ensure necessary resources for efficient and high-quality operation.

At the same time EUREKA should improve its internal structure and further increase effectiveness of the Secretariat to meet the new challenges. Ministers asked the Executive Group to make recommendations to future Chairs for increased efficiency and cost-effectiveness of decision-making processes. Member countries were requested to secure full participation at the appropriate level in EUREKA bodies to enable their smooth functioning.

## Greater international presence

Ministers also saw the need to develop a strategy to strengthen EUREKA's role in a globalised economy and meet the growing interest of countries outside Europe to work with the Initiative. The ministers called on future Chairs, in particular Portugal, to explore the possibilities and strategies for further internationalisation.

In addition EUREKA Clusters and Umbrellas sought to strengthen relations with the network to explore common synergies. The regular exchange of information on activities and programmes of different Clusters and Umbrellas needs to be organised, with closer involvement and support of the Secretariat and the Chair.



## Setting new strategic direction

Aleš Mihelič – outgoing EUREKA High Level Group chairman – sees three major achievements of the Slovenian Chair:

1. Establishment of a new proactive strategy remobilising the EUREKA network to back the EU Lisbon strategy for a competitive and dynamic knowledge-based economy;
2. Reinforcement of co-operation between the EU and EUREKA, notably through the Eurostars programme providing public/private funding to support high-risk SME R&D; and
3. The much greater emphasis placed on the communication of the results of EUREKA projects, both within the network and externally, to the greater public.

## > Project showcase

# Cylinder pressure sensor cleans up diesel emissions

**Diesel cars are increasingly popular but ever stricter emissions standards require more efficient control. The EUREKA Σ!3379 CYPRESS project developed a revolutionary cylinder pressure sensor (CPS) making it possible to optimise combustion, reducing harmful soot particle and nitrogen oxide (NOx) emissions in diesel engines. The result is cleaner cars with less need for excessively expensive NOx filters to meet new EU and US standards.**

Over seven million diesel-engine cars are sold annually in the EU. Diesel cars now have a more than 40% market share in the EU-25 and over 50% in the EU-15. In the USA, around 12% of cars and light trucks are expected to be using diesel engines by 2015, with 25% of such vehicles using diesel engines worldwide by then.

Diesel engines work by self ignition. Fuel is injected into the cylinder and compressed, igniting the air-fuel mixture. However, this mix is not homogeneous, resulting in lots of soot particles when ignited. Moreover, excess oxygen increases ignition temperatures causing high levels of NOx that require costly after treatment.

So, unsurprisingly, the EU and the USA have had strict controls on diesel exhaust gas emissions since the 1970s, with ever tougher limits on carbon dioxide, hydrocarbons, NOx and particles. EURO 5 standards will limit NOx to 180 mg/km, while EURO 6 will cut levels to 80 mg/km. And in the USA, tightening of the Environmental Protection Agency regulations from BIN 8 to BIN 5 will cut NOx emissions from 200 mg/mile to 70 mg/mile.

### Combustion strategy

The Dutch division of multinational sensor manufacturer Sensata Technologies set out with German spark- and glow-plug manufacturer BERU to develop a glow-plug-integrated CPS that is a critical enabler for an alternative combustion strategy based on relaying the sensor output continuously to the engine's electronic control unit.

Direct measurement of combustion pressure is a challenge because of the high temperatures of gases in the engine

cylinder – in excess of 900°C. “Much work has been done on cylinder pressure sensors since the late 1980s but not very successfully,” says Dr Arjan Kölling of Sensata Technologies and coordinator of the CYPRESS project. Early sensors included both piezo-electric and optical approaches. But these stand-alone items required modifications to the cylinder head for application.

“Working with BERU made it possible to develop an integrated sensor,” explains Dr Kölling. “Combining the cylinder pressure sensor with the glow plug meant no significant change was necessary to the engine structure – and the glow function does not affect the measurement operation.”

The new sensor had to be robust to withstand the harsh temperatures and vibrations in the cylinder. And it had to be compact to be integrated into the glow plug. Piezo-resistive technology where electrical resistance varies proportionally to mechanical stress applied was seen as the solution, making it possible to measure both static and dynamic pressure. Piezo-resistive sensors also remain accurate over the lifetime of the engine.

### Moving into production

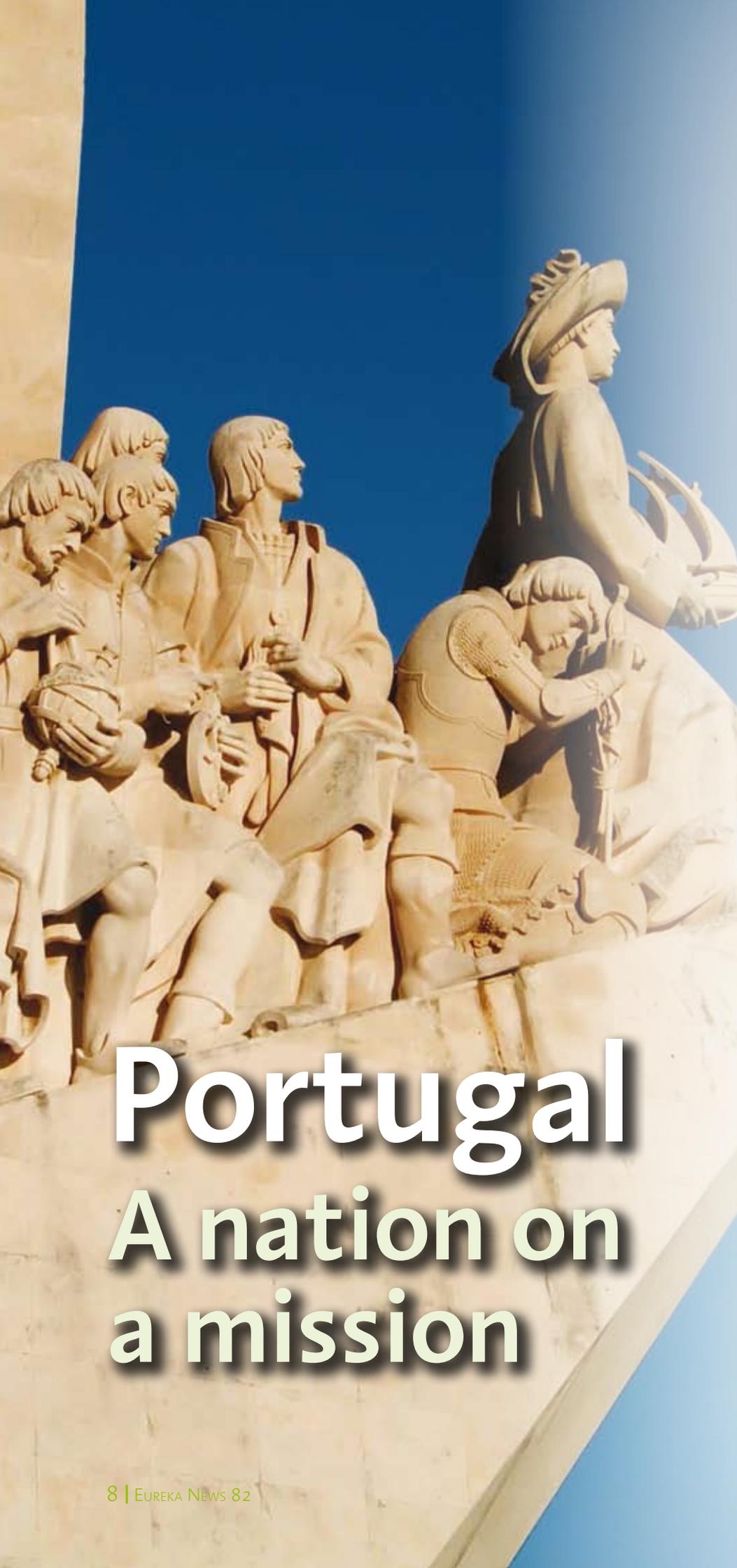
CYPRESS has attracted major interest from European car manufacturers and reinforced Europe's global leadership in automotive innovation. The CPS is the first of its kind to be sufficiently reliable and low cost for mass production. And integration into the glow plug of the diesel engine simplifies engine redesign; the standard glow plug can simply be replaced by the CPS unit that incorporates the glow function.

BERU has already started to market CPS glow plugs incorporating Sensata sensors. Depending on the quality of the engine control system, up to 90% of NOx and particulate emissions can be removed. This success led to CYPRESS winning the 2008 EUREKA Lillehammer award for projects that improve Europe's environment.



Winning the EUREKA Lillehammer award is an honour, especially for Sensata Technologies as it reinforces our image and success since our separation from Texas Instruments two years ago. It is also recognition for the effort we are putting into high risk research and development in Europe.

*Dr Arjan Kölling, Sensata Technologies*



**As Portugal takes on the EUREKA Chair for the second time, Professor Manuel Nunes da Ponte, High Level Group Chairman, talks about the country's commitment to building on its predecessor's achievements and its plans to strengthen the EUREKA brand, become the network of choice and better meet the needs of Europe's innovating companies and research organisations.**

Portugal's economy has undergone a great deal of change in the 11 years since it first held the EUREKA Chairmanship. True, the global economic slump is now making itself felt, as with the rest of Europe. However, the Government's recent public sector reforms and introduction of an ambitious national technology plan are testament to the country's mission to increase growth and competitiveness by making it easier to do business and investing in knowledge, innovation and skills.

In doing so, Portugal is resurrecting an entrepreneurial spirit that made it a nation of legendary seafarers and traders for more than half a millennium, overseeing an empire encompassing Brazil and sizeable areas of Africa and Asia. This is the spirit that Portugal intends to work to EUREKA's advantage during its Chair year.

#### **Fulfilling technological potential**

While Portugal's public sector has embraced new technologies and its small and medium-sized enterprises (SMEs),

# Portugal

## A nation on a mission

## The Portuguese government aims to triple private sector investment in R&D – currently 0.26% of GDP – by 2009 and double public spending to 1% of GDP.

which are the cornerstone of its economy, carry out a respectable amount of research and development (R&D), the country's overall level of technological innovation lags behind that of the rest of the EU. Principal reasons for this slow progress include the specialisation of its economy in low-technology sectors and the corresponding problems in implementing a national innovation policy, difficulty in obtaining funding for projects and a general aversion to risk.

The Government's technology plan, launched in 2005, seeks to address these issues, and achieve a sustained increase in productivity over the medium to long term, by overcoming the science and technology gap, boosting innovation and equipping the population with the education and skills necessary for establishing a knowledge society.

Specifically, the government aims to triple private sector investment in R&D – currently 0.26% of GDP – by 2009 and double public spending to 1% of GDP. There will be new tax incentives for R&D and €30 million will be allocated to help finance the creation of 200 new high-technology companies. The plan's ambitious goals also include tripling the number of patents registered each year, increasing the number of scientists working in R&D by 50%, hiring 1,000 more researchers in the public sector, providing funds for 1,500 science doctorates a year and placing 1,500 science and management graduates in SMEs.

Refocusing the economy to embrace more innovative medium- and high-technology products and services is vital if Portugal is to capitalise on the positive changes of recent years, especially in these economically challenging times. "For too long the Portuguese economy was based on traditional industries characterised by low salaries, such as tourism, textiles, clothing, footwear and cork," says Professor Nunes da Ponte.

"Today the picture is very different. We have had significant public-sector investment and, as far as our science and technological activity is concerned, we are probably the country in Europe that has improved the most. There's also more venture capital available, and the number of start-ups and university spin-offs has increased steadily over the past five years. But we need to stimulate more investment in R&D from the private sector."

### Putting innovation at the heart of Portuguese business

A founding member of EUREKA, Portugal has taken part in 253 completed EUREKA projects comprising a total budget of €155 million. Participation peaked, not surprisingly, around the first Chair year in 1997-98, but was not sustained.

"Portugal is not perceived as a powerhouse in R&D, and holding the EUREKA Chair will help us to change this perception both internally and externally," says Professor Nunes da Ponte. "We need to develop a brand image for our science and technology, and this time we wish to create a more sustainable level of participation. The Eurostars SME programme is proving a successful platform for us – we already have participants in 11 projects."

New materials, biotechnology, information and communications technology, and energy are areas in which the Portuguese Chair is particularly keen to encourage project participation. Additionally, the government has facilitated programmes with Microsoft, the Massachusetts Institute of Technology (MIT) and other American universities, and the Portuguese Chair is consulting with programme coordinators to transfer suitable projects to EUREKA.

### Expanding EUREKA's influence

Slovenia has accomplished a great deal in several important areas during its Chair year, and its successor intends to continue this work, confirms Professor Nunes da Ponte. "The Clusters are a case in point – they have progressively moved away from EUREKA →

## Portugal set to promote a renewed, stronger EUREKA

- Pursuing a policy of greater international co-operation by looking proactively for partnerships beyond Europe.
- Seeking greater coordination and synergy with other intra-European mechanisms of R&D support, such as COST, the JTI's and the ERA NETS.
- Adding value to the EUREKA label by increasing global recognition of the network as a symbol of innovation, offering a competitive advantage for innovating firms and for new, innovative products.
- Strengthening project-generation mechanisms, improving relations between the network and its Clusters and promoting voluntary synchronisation of projects and funding through initiatives such as Eurostars.

# > Portugal – a nation on a mission



over the years, having developed their own programmes and evaluation procedures. The Slovenian Chair has been very successful in bringing them back into the network, so to speak, and giving them the sense of participating in EUREKA.

“This is something we want to continue – for EUREKA to help the Clusters actively. Eventually they may become Joint Technology Initiatives (JTIs) and benefit from EU funding. That would be a very good conclusion to a EUREKA Cluster!”

The Portugal Chair, like its predecessor, believes EUREKA should be more proactive about encouraging the European countries that still remain outside the network to join, and extending EUREKA’s influence beyond Europe. “EUREKA has in the past regarded itself as a European-only network, but it now needs to take a more global direction,” says Professor Nunes da Ponte. “European companies, especially SMEs, need a platform for co-operation with countries beyond Europe, and we can help them to find new partners, collaborators and markets.

“The Slovenian Chair has been proactive in pushing the globalisation agenda and encouraging High Level Representatives to discuss the issues. We may, for example, have to change the rules of participation for Associate Members. At the moment they can participate in projects but can’t be politically active in the network. We need to give Associate Membership more status if we want to make EUREKA more attractive to them.”

The network currently offers Associate Member status to non-European countries, with Morocco being the first to join. South Korea has participated in a number of projects and, together with Canada, may like to become an Associate Member.

“We are dedicating our diplomatic efforts to encouraging them to join and to extending membership beyond Europe. We won’t be able to achieve everything in our Chair year, but by being proactive now we hope to get things in place for more

countries to join, perhaps in the German Chair year (2009-10).”

## Consolidating the EUREKA brand

A key priority for the Portuguese Chair is raising the network’s profile commercially, politically and globally. EUREKA endorsement can be invaluable, companies find, when it comes to obtaining finance for a project and commercialising its outcome. That said, recognition of EUREKA as an organisation and of its achievements could be higher, argues Professor Nunes da Ponte.

“The EUREKA brand needs to be stronger, so that you can convince companies of the advantages of joining the network and, at a political level, persuade Ministers to invest

in projects. The Eurostars SME programme will bring recognition to EUREKA on both counts.

“In particular, EUREKA has to capitalise on its unique advantages as a platform for outsourced R&D programmes. The EU R&D Framework Programmes, for example, are becoming too cumbersome for many companies. It would make sense for the Commission to outsource on a joint-programming basis to a more flexible and close-to-market network such as EUREKA. We are keen to become the network of choice, and joint programmes with the Commission, such as Eurostars, as well as collaborations with COST and the JTIs, will greatly help to improve our visibility and our reputation as a trusted partner.”

## Portugal – a profile

**Population:** 10.6 million

**Key industry sectors:** tourism, textiles, clothing and footwear, wood products and paper, cork, car-building, electrical and technological equipment, manufacturing and mechanical engineering. Exports grew by 9% in 2006 and 7% in 2007, with the focus increasingly on business services and high and medium-high technology goods.

- Portugal became a republic in 1910. Following a military coup in 1926, it was ruled under a dictatorship until 1974 when another bloodless coup, known as the Revolution of the Carnations, ushered in a new democracy. Elections in 1975 and 1976 gave way to democratic governments, and the country was welcomed into the EU’s precursor, the European Economic Community, in 1986.
- Portugal’s position on the European stage was enhanced as the venue for the signing of the 2000 Lisbon Strategy, which aimed to make the EU the most competitive and fully employed economy in the world, and its successor, the 2007 Lisbon Treaty. Its profile was further raised by the appointment of former Prime Minister Jose Manuel Durao Barroso as president of the European Commission in 2004, and on assuming the EU presidency in July 2007.
- A major beneficiary of EU funding, Portugal has invested heavily in modernising its communications and infrastructure, and now has an impressive network of roads, motorways and rail links throughout the country. The country’s educated and skilled work force – Portugal invests more than the EU average in education – and low labour costs in both industry and services are attracting global brands such as Volkswagen and Siemens, the latter having recently moved its R&D operations from the USA and Germany to Portugal.

## > Project showcase

# Lightweight explosives sniffer combats terrorism

A fresh approach to systems technology and operational simplicity in the  $\Sigma!3109$  EULASNET EXPLOSIVES ANALYSER project resulted in a new generation of powerful and fast-acting portable explosives detectors that can boost public security around the globe. The compact, lightweight units can help prevent terrorist attacks by detecting explosive devices and bomb equipment through molecular traces on luggage, clothes, laptop computers, mobile phones, bank notes and identity documents. The systems can find bombs hidden in buildings, crates, road vehicles, aircraft, trains, shops or transport terminals and can be used as add-on detectors to X-ray scanners in public places.



Terrorism is an increasing problem worldwide, threatening transport, power stations, financial centres and concentrations of people – from sports stadiums to shopping centres. Governments have to put increasing priority on protecting the civilian population. This means supplying the police, army and security organisations with the equipment necessary to detect explosives quickly and reliably.

There has been a particular problem with portable analytical detectors. While they can often offer good detection, they tend to be so sensitive to interfering chemicals that they are difficult to use under real field conditions, leading to high false-positive reading rates. EULASNET EXPLOSIVES ANALYSER developed an approach for application at airports, border crossings, public buildings or nuclear power stations, with equipment operated by security forces rather than highly trained analysts.

### Solving four main problems

“We set out to solve four main problems,” explains project co-ordinator George Blaha of Czech SME RS DYNAMICS, which co-operated with Spanish engineering

company Sener Ingenieria Y Sistemas, responsible for systems testing, and the Czech Academy of Sciences.

“First, we had to find a new principle of fast pre-separation to dramatically reduce the false-positive rate and improve overall operational robustness so testing time is kept to a minimum. Secondly, we needed good and quick detection of compounds with very fast cleaning after exposure. Thirdly, we needed high selectivity to avoid system oversaturation and cross contamination that lead to misinterpretation of results. And fourthly we wanted a system giving continuous readings with a response time of around one second.”

Development of several new technologies makes it possible to carry out security checks quickly and reliably even in difficult conditions, from rain-swept airport runways to diesel-exhaust environments at border crossings.

Moreover, highly-qualified analytical operators are not required – equipment can be operated by police, military personnel or security guards with a minimum of training.

Instruments can also be linked directly to the Internet over wired or wireless connections, making it possible to configure, run and maintain them remotely. And the systems can be installed easily in any automated environment such as a bomb squad robot or as an add-on to an X-ray scanner.

### Generating interest worldwide

RS DYNAMICS has already developed the results into a manufacturable product and has attracted interest from government authorities around the world. It is currently replying to tenders in the Middle East and India, and working with a major UK distributor with highly-qualified local partners in key global locations.

Success in the EULASNET EXPLOSIVES ANALYSER project is opening up a global market for our Explonix portable explosive analysers and detectors. Winning the EUREKA Lynx award will improve our reputation further and provide us with even wider recognition. This is important for the future of our activities and for our highly motivated young team of successful scientists.

*George Blaha, President, RS Dynamics*

# Leading the way



**EUREKA and its Information and Communications Technology (ICT) Clusters are making major contributions to the future of ICT in Europe. CATRENE, CELTIC, EURIPIDES and ITEA 2 have clear views on reinforcing roles and means for global European leadership in a domain that is crucial to the competitiveness of almost all industrial sectors as well as to the wellbeing of European citizens.**

Europe needs micro-/nanoelectronics as a driving force and enabling technology, but intensified efforts are needed to exploit existing potential fully. To remain competitive globally, Europe must generate leading-edge technology at research centres of sufficient size and relevance to attain critical mass. This also requires the support of small flexible units – particularly small and medium-sized enterprises (SMEs) – in creating new ideas and applying them commercially.

The new CATRENE nanoelectronics Cluster is more than ready to take up these challenges, building on the success of the MEDEA+ microelectronics Cluster that ends in 2008. CATRENE intends to increase the interaction between applications and technology with a strong focus on markets with high-growth potential for innovation-rich goods and services.

CATRENE aims to ensure technological leadership for a competitive ICT industry by creating lead markets that include

communications, security, transport and healthcare, as well as energy and environmental protection. “It is the ambition of Europe and European companies to deliver nanoelectronics solutions that respond to the needs of society at large, improving the economic prosperity of Europe and reinforcing the ability of its industry to be at the forefront of global competition. Close co-operation is foreseen with other EUREKA Clusters and with the ENIAC Joint Undertaking,” says Enrico Villa, chairman of CATRENE.

## **Service innovation**

Software is crucial in nearly all aspects of the economy and society. It will play an ever-increasing role as we move from a product-oriented to a service-oriented economy, according to Rudolph Haggenmüller, chairman of the ITEA 2 software and software-intensive systems Cluster: “For example, car manufacturers will no longer provide just vehicles but their main offering will gradually expand to full mobility services, with their income coming from these services.” Service innovation is one of the great challenges in the global economy, which should be actively taken up by the European ICT research community.

“Research must support the competitiveness of the European economy and solve societal needs,” insists Haggenmüller. “At the societal level, sustainability is a major challenge to which ICT research has to react. One trend is the move from enterprise to ‘societal’ computing – in addition to enterprise resource management systems, we will need resource management at the societal level, for example supporting more effective distribution of power and water.”

To keep Europe ahead in the global market, the establishment of ecosystems involving large companies, SMEs and academia is essential. Public investment in research is an important instrument to support this. “It is interesting to see how the co-existence of old and new infrastructures expands these

# to a competitive future

ecosystems – such as EUREKA Clusters with Competitiveness Centres and EU JUs,” says Haggenmüller. “For example, ITEA works with all EUREKA Clusters and with ARTEMIS at EU level, as well as with the national ‘Pôles de Compétitivité’ in Belgium, France, Germany, the Netherlands and Spain.”

Overall, Haggenmüller believes that EUREKA Clusters play an indispensable role in European ICT research as they are very flexible, being both industrial and intergovernmental. “EUREKA’s intergovernmental bottom-up approach allows a good project idea to attract funding from participating countries, even if it is not a priority for all of them,” he says. “It is the only instrument in the software sector to enable this.”

## Smart devices and smart manufacture

“ICT in the form of systems, software and services is responsible for innovations in most fields,” says Jean Luc Maté, chairman of the EURIPIDES smart devices Cluster. “Hardware and software integration is required in smart devices to deliver a complete system. However, while everyone thinks Europe is the leader in systems design and architecture, they all envisage manufacture in the Far East or other low cost region.”

Priorities for research should be to break this paradigm by funding two or three projects that make people think differently about high-tech, low-cost production in Europe. “This could be achieved using heterogeneous technology to improve integration and cut costs dramatically,” adds Maté. “However, it requires innovative, imaginative ways of manufacturing – also needing funding.”

It is not only necessary to make breakthroughs to maintain employment in Europe but also to synchronise research investment for both low-volume, high-tech strategic devices such as for aerospace and defence, and mass volume, high-tech low-cost products for communications,

multimedia, automotive, etc. This is the challenge EURIPIDES faces for the next generation of smart systems.

Research is transforming money into ideas; innovation is transforming those ideas into money thanks to markets, points out Maté. “EURIPIDES – following the bottom-up EUREKA process – is a booster to innovation. It takes the elements on the research shelf and makes them faster to generate market opportunities as a market-focused and industry-driven Cluster. Moreover, we can mobilise very small enterprises in all European countries to help accelerate this process.”

## Catching up with the USA and Asia

Europe still lags behind the USA and Asia in telecommunications, according to Heinz Brüggemann, office director of the CELTIC telecommunications Cluster: “If the industry is not supported here as in the USA, Korea and Japan, it will be difficult to catch up. We must close the gap – something CELTIC has already started to achieve.”

Brüggemann regards the future Internet as a big challenge that offers major opportunities for Europe. “Telecommunications networks are key and will long remain so in the Internet

business,” he believes. Nearly all elements related to the future Internet are already part of CELTIC’s work plans, including large-scale projects such as 100GET, which develops new Ethernet-based networking concepts and technologies. CELTIC also takes into account the strategic research agendas of related European technology platforms.

“It will be crucial for the success of future Internet and for assuring broad user acceptance that the existing networks and technologies are combined in a way that the complexity of the systems will remain manageable, safe and user-oriented,” Brüggemann points out. “With so many actors involved, we need to take a pragmatic approach, improving existing networks gradually. EU framework programmes and national research programmes tend to take a top-down view. We are closer to the market and our work plans are broader. Our roadmap is more pragmatic, with lots of open doors.”

Moreover, CELTIC has the most important telecommunications vendors and operators on board, and they play an active role in the research programme. The Cluster not only focuses on telecommunications elements, but also on the full system from end-to-end.

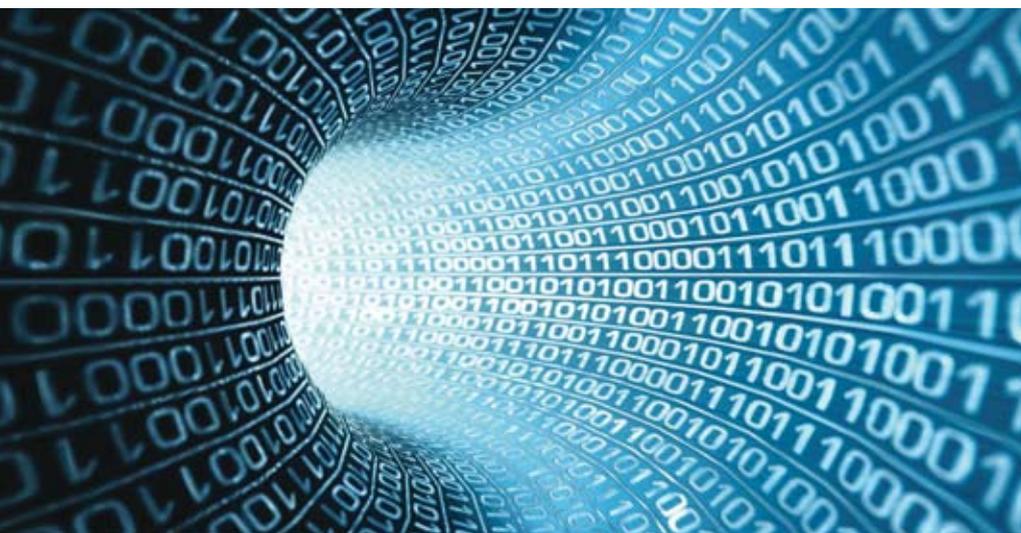
## Aiming high for the future Internet

The CELTIC Broadband Access Networks Integrated Telecommunication Systems (BANITS) project, winner of the CELTIC excellence prize in 2007, obtained major increases in bandwidth across existing copper-based telecommunications networks. BANITS-2, which finishes this year, focused on xDSL to boost bandwidth even further, with speeds of 500 MB/s over a single copper pair, and up to 100 GB/s over multiple copper pairs. The objective is to ensure a solid foundation for high bandwidth Internet services – particularly in rural areas, where speeds are lagging far behind cities. High speed applications are an important element. The Medirob is a medical robot allowing heart examinations at rural sites and transmitting the high bandwidth data to hospitals in distant cities. Its use will be demonstrated at the EUREKA stand at the ICT 2008 event in Lyon in November. Other applications include high-definition TV (HDTV) distribution.

[www.celtic-initiative.org/Projects/BANITS-2/](http://www.celtic-initiative.org/Projects/BANITS-2/)

# Coming up trumps for R&D-performing SMEs

The first cut-off for applications to the Eurostars programme was in February 2008 and resulted in 215 applications, of which 189 were eligible for assessment. After evaluation, 133 exceeded the quality threshold, each with an average cost of €1.54 million. A typical application involved three participants from two or three countries with a proposed duration of about 30 months. More than 80 projects will probably be funded. This success is already encouraging participating member countries to increase funding.



“This is the first successful synchronised public funding programme in Europe that commits countries to pay!” says Luuk Borg, head of the EUREKA Secretariat in Brussels. “We received a particularly good range of high-quality project proposals that obtained positive evaluations. All our target groups are present. We were expecting around 40 project proposals in the first call but had well over 200 by the cut-off date.”

Eurostars is a flexible and efficient funding programme dedicated to research-performing small and medium-sized enterprises (SMEs) that take the driving seat in short-time-to-market R&D projects resulting in a tangible product, process or service. A Eurostars project involves partners from at least two of the 31 participating countries<sup>1</sup>, but not just SMEs, as the programme also welcomes large company, research institute and university involvement.

The programme – a joint initiative between the EU and Member States, coordinated by EUREKA – is open to applications in all areas of technology. While assessment and evaluation is conducted centrally in Brussels by an independent panel of technical and business experts, Eurostars project applicants benefit from local business advice and expertise through the network of EUREKA national project co-ordinators (NPCs) based in each member country.

## Same but different

“The main areas of project applications in the first call were biotechnology, and information and communications technology (ICT) – as we were expecting,” says Michel Vanavermaete, responsible for the Eurostars programme in the EUREKA Secretariat. “However, the ICT technologies are mainly for medical and health-market applications, and less for the pure ICT markets found in the main EUREKA programme.”

Evaluation and ranking of the projects by the panel of independent experts were carried out well within the four- to five-month period scheduled. Interest has been so high and the quality of proposals so good that 133 proposals were considered suitable and more than 80 will be funded. Over 75% of the participants were SMEs, with many more R&D-performing SMEs than expected.

“We need to wait a couple of years to see the real results of the projects but this first call seems more than successful,” says Vanavermaete. “The second call closes on 21 November and already seems to be attracting the same, if not more, interest – however the competition will be tougher.”

## Leverage for future

“The success of this first call for Eurostars shows the clear need that R&D-intensive SMEs have for such a scheme tailored to their needs,” adds Borg. “It also demonstrates the value EUREKA can add to such a process using a strengthened expert evaluation and a single funding decision from earmarked budgets. We are now seeing if EUREKA can apply a similar approach to research funding synchronisation schemes for other services needing centralised support.”

**More information about Eurostars can be found at: [www.eurostars-eureka.eu](http://www.eurostars-eureka.eu) or from the EUREKA NPCs.**

<sup>1</sup> EU Member States Belgium, Bulgaria, the Czech Republic, Denmark, Germany, Estonia, Ireland, Greece, Spain, France, Italy, Cyprus, Latvia, Lithuania, Luxembourg, Hungary, the Netherlands, Austria, Poland, Portugal, Romania, Slovenia, Slovakia, Finland, Sweden and the United Kingdom, plus Iceland, Israel, Norway, Switzerland and Turkey

# Collaboration is the name of the game in a global marketplace

A scientist by profession, José Mariano Gago, Portugal's long-standing Minister for Science, Technology and Higher Education, reveals to EUREKA News the unique perspective he brings to policy-making at a national and a European level, and his genuine understanding of the challenges facing our innovators in an aggressively competitive global environment.

## ***How does your experience as a scientist feed into your ministerial work?***

I cannot imagine one without the other. Being trained as an engineer and as a research physicist, and then working for many years in experimental physics, all greatly influenced me. I was trained in an international environment, working at CERN, a very large organisation with large project budgets and people from many countries. I am trained not to have a naïve view of research. It is about finding answers to questions, coming up with new ideas and achieving results, but there are also economic and social aspects to research. This has given me a practical understanding of the issues and challenges involved in both pure and market-led research. You cannot achieve results without it.

All my professional life I worked in experimental particle physics, and what could be further away from practical applications than that? But many of the instruments and techniques you need to develop for pursuing this type of research have applications in fields other than particle physics, so we also became used to developing relations with industrial firms and with industrial R&D.

## ***How would you characterise Portugal's science and technology base?***

We are unique in Europe in that we have experienced very fast growth over the last decades. Democratisation since the 1970s, the accession of Portugal to the EU, the transformation of its economy and its social transformation in terms of the accession of women to education and the labour market – all went hand-in-hand



with the development of research and the growth of our higher education system. It is the only way you can explain that Portugal has almost equal numbers of men and women working in research, and that we have the largest proportion of young researchers. Our research base is fast-growing and very internationalised, one of the most so in Europe. It is rare to find a researcher that has not worked abroad for some time, and you will find foreign researchers working alongside their Portuguese counterparts in any university in the country.

## ***What challenges does Portugal face in terms of R&D?***

The same that many other European countries face. You cannot just pay lip service to the idea of universities and other research institutions collaborating with industry. You need a strong science base to build networks, something American universities achieved decades ago. That is one problem we have been tackling in Portugal.

Internationalisation is another crucial ingredient for the development of a





nation's science and technology objectives, and for the creation of consortia and networks within a country. Without that external catalyst, such movement is painfully slow and very difficult to achieve. One of Portugal's most successful developments over the last couple of years has been in very strong partnerships between Portuguese companies and universities and American universities such as the Massachusetts Institute of Technology (MIT), Carnegie Mellon University (CMU) or the University of Austin, Texas in transportation, energy, bio-engineering, information technologies and other areas.

**You helped shape European research policy. What does Europe need to do now to meet the Lisbon Strategy?**

There is no single recipe; the situation is different from country to country, but the response to the Lisbon Strategy has been very positive. Before 2000, science was not on the EU's political agenda. It is almost incomprehensible that it has been possible to integrate Europe economically without science and technology being considered a crucial element of its future security in economic, social or any other terms.

The main response to Lisbon has been at national level, as it should be, given the vast majority of public funds available for investment in R&D comes from national budgets. The crucial point is that Europe's future, in terms of science, is determined by the policy of each member country. All companies and research institutions rely on the priority given to science and technology by their own governments and parliaments, and finally by their own citizens. There is need for a long-term complicity between societal and research objectives; the success of the latter depends on society accepting the idea of investing in the future, and not just for short-term benefits.

**What role can EUREKA play in this?**

EUREKA has been a very important tool, and will continue to be in the future. International collaboration in industrial

research was almost nil 20 years ago and even considered a danger, something that would probably help your competitors. EUREKA helped change that attitude and create a constituency within the European industrial sector in favour of openness and internationalisation of research. Its non-bureaucratic, bottom-up approach is the crucial element.

In my view, EUREKA should continue with the same approach, with the help of the public policies of each member state. Its new instrument, Eurostars, which it has developed in collaboration with the European Commission, is a very important development. The next step is to promote EUREKA outside Europe, to promote globalisation and collaboration in industrial research between European and non-European firms and research institutions. This will be to Europe's benefit, and something EUREKA is very well placed to facilitate because it operates beyond the EU's traditional political

frontiers and has no strict boundaries.

**As Minister responsible for higher education, are you on a mission to encourage more young people to work in science and technology?**

It must be part of any national science policy to encourage young people to study science and technology, but also to encourage society in general to understand what science is about, to develop a view of the social and economic importance of science and technology. Of course, higher education is important too, but we need to go further and develop a culture of greater proximity between scientists and non-scientists – this is a key element of any successful science policy.

**As a scientist, if you could change one thing about the way R&D is carried out in Europe what would it be?**

Cut red tape and bureaucracy – they are the worst enemies of research and innovation.

## Who is José Mariano Gago?

A scientist by profession, José Mariano Gago was Portugal's Minister of Science, Technology and Higher Education from 1995 to 2002, and again since March 2005. He is also Professor of Physics at Lisbon's Instituto Superior Técnico (IST). After graduating from IST as an electrical engineer and gaining a PhD in physics from the École Polytechnique in Paris, he worked for several decades as an experimental high energy physicist at CERN, the European Organisation for Nuclear Physics, where he is still a Council member. He also chaired Portugal's Laboratory for Particle Physics. In 1998, he launched the EUREKA-Asia Initiative in Macao, and also the Ciencia Viva movement to promote science and technology culture. During the Portuguese EU presidency in 2000, he helped to prepare the Lisbon Strategy for the European Research Area (ERA) and for the Information Society. During the 2007 Portuguese EU presidency, he promoted the adoption of a strategy for the future of science and technology, and for the modernisation of universities in Europe. Professor Gago was President of the International Risk Governance Council (IRGC) in Geneva and is a member of the IRGC Board. He is also a member of the Academia Europaea.

