



**TECHNOLOGIES AND ENGINEERING** 

**ANNUAL REPORT 2011** 





# Euro-CASE A HUB OF COLLECTIVE INTELLIGENCE

The European Council of Academies of Applied Sciences, Technologies and Engineering is an independent non-profit organization of national academies of applied sciences, technologies and engineering representing 21 European countries.

Euro-CASE acts as a permanent forum for exchange and consultation between European Institutions, industry and research.

Through its affiliated Academies, Euro-CASE has access to top expertise (about 6000 of Europe's most eminent engineers) and provides impartial, independent and balanced advice on technological issues with a clear European dimension to European institutions, national Governments, companies and organizations.

### Vision 2020

"Euro-CASE will be the voice of European excellence in Engineering, Applied Sciences and Technology for the world."

The full text of Vision 2020 can be found on the Euro-CASE website (www.euro-case.org/AboutUs.html).



Lena Treschow Torell Chairman of Euro-CASE Painting © Olle Hamngren / BUS 2011

#### **MESSAGE FROM THE CHAIRMAN**

It is a great privilege for me as Chairman to open Euro-CASE's first annual report.

It has been a year of dramatic political activity, not least in the Middle East and North Africa. At the same time we are involved in a global economic restructuring, with the balance shifting towards Asia, while the US and Europe are fighting to keep their momentum despite enormous debt crises.

Not only are the political and economic power balances in the world changing, but the worlds of R&D and innovation have acquired new players with enormous potential.

In all of this Euro-CASE is well positioned. We are here to provide independent advice on technological issues with a clear European dimension.

# We are convinced that EU needs improved innovative capabilities to help solve the grand challenges of the world."

Specific activities undertaken this year include examining best practice in attracting students to mathematics, science and technology, providing advice on how to improve European innovation strategies, and demonstrating how EU infrastructure can be improved by more intelligent transport systems. We are convinced that the EU needs improved innovative capabilities to help solve the grand challenges of the world, including energy and water resources, and dealing with the effects of an ageing population and climate change.

Last year's Euro-CASE annual conference in Berlin was devoted to Innovation and this year, in Madrid, the topic was Water and Food Security. Resulting messages were forwarded to the European Commission. We have also contributed to the EC consultation on the future of the European Research Area.

Frontiers of Engineering, the successful annual conference for promising younger engineers jointly organised with the US National Academy of Engineering took place this year in California. All in all it has been a year full of activities.

Enjoy our report.

Lena Treschow Torell Chairman of Euro-CASE

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# **Euro-CASE ANNUAL CONFERENCES**

After a series of Annual Conferences:

2008 London: "How Can Europe Meet its 2020 Renewables Targets?" (RAEng);

2009 Stockholm: "Increasing the interest in Mathematics, Science and Technology" (IVA);

2010 Berlin: "Innovation - Best Practices" (acatech), the

**2011 Annual Conference** on "Water and Food Security in Europe" took place in **Madrid** on November 10 and was organized by the Real Academia de Ingenieria (RAI).

# 2011 ANNUAL CONFERENCE ON "WATER AND FOOD SECURITY IN EUROPE"

Forecasts of population growth and economic development indicate that there will be substantial increases in food demand in the forth-coming decades, which will increase the pressure on our natural resources, notably on water. The conference gathered together representatives from European Institutions, the Spanish host academy and Euro-CASE partner academies, along with experts on food security and water issues from many different disciplinary backgrounds, to discuss the nexus between food security and water.

In her opening speech, Lena Treschow Torell, Chairman of Euro-CASE, emphasized the paradox of the abundance of freshwater on Earth and the scarcity faced by many regions, even in Europe, and the need for innovative solutions to tackle the food and water crisis. She also highlighted the role of engineering academies in fostering international cooperation.

Other speakers focused on how to face the challenge of achieving sustainable increases in food production in the face of an uncertain climate. A number of presentations followed by discussions covered key aspects of the interdisciplinary research and development needs, illustrated by several case studies from different European regions.



© Courtesy RAI. Opening Ceremony of the 2011 Euro-CASE Annual Conference, from left to right: Lena Treschow Torell, Chairman of Euro-CASE, Josep Puxeu, Spanish Secretary of State for Rural and Water Affairs, Elías Fereres Castie, President, Spanish Royal Academy of Engineering, Javier Pérez de Vargas, General Manager, Spanish Royal Academy of Engineering













London

Stockholm

rlin

Madrid

# **Euro-CASE 2011 CONFERENCE MAIN CONCLUSIONS WERE**

- ► To meet the challenge of increased food demand, the sustainable intensification of production in Europe is essential.
- Farmers must be permitted to increase agricultural productivity with the best available modern technology, while ensuring that intensification is sustainable.
- While modern food processing has enormously improved the quality and safety of our food, respect for food and its producers needs to be promoted as society becomes more urbanized in Europe
- ► Food production is a major consumer of diverted water in Europe and improved water management is essential to meet the challenge of dealing with a limited resource.
- Water scarcity is only one aspect of the water-food nexus but if intensification is to be sustainable, water quality and pollution control from agriculture must be faced firmly with appropriate technology and regulations.
- ► Energy is intimately linked to water-food issues, including the dilemma of using crops for food or energy, which in the latter case should be largely limited to the use of waste products, and the large energy needs of irrigated agriculture.
- The uncertainties brought about by climate variability and climate change, bring another dimension to the water-food problem that would be best tackled by appropriate adaptation and mitigation measures for European food systems.

- Adaptation measures to best address the risks of climate change should focus not only on economic and social issues, but should include measures to manage water and land in Europe aimed at maintaining healthy ecosystems as well.
- Industry, the European Commission, and national governments should all team together to develop and implement advanced water management practices and sound strategies for the rural sector in Europe to ensure sustainability in the long term.

These conclusions have been transmitted to the appropriate Directorates of the European Commission.

#### **2012 CONFERENCE**

The preparation of the 2012 Annual Conference has started. The event will be organized by the National Academy of Technologies of France (NATF). It will take place in Paris on November 13 and will be preceded by a solemn opening on the evening of November 12. The subject of the Conference will be "Energy Independence for Europe".

An International Steering Committee has been set up under the Chairmanship of Bernard Tardieu, President of the Energy & Climate Change Commission within NATF. Other members include leading figures from Germany, Slovenia, Sweden and France. A First Announcement has been sent out.



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# FRONTIERS OF ENGINEERING

# A JOINT NATIONAL ACADEMY OF ENGINEERING (US) Euro-CASE INITIATIVE

Since 1995, the US National Academy of Engineering has held an annual Frontiers of Engineering symposium that brings together outstanding engineers (ages 30-45) from US companies, universities, and government labs for an intensive 2 1/2 day symposium to discuss leading edge research at the boundaries of traditional engineering disciplines. In recent years, the NAE has adopted this model for bilateral annual symposia with key international partners, including China, India and Japan. In 2009, the NAE approached Euro-CASE to partner it in organising the first set of EU-US Frontiers of Engineering Symposia. It was decided that participation would be by invitation only, and that the invitation would be extended by Euro-CASE member academies.







The first EU-US FOE Symposium was organized by the UK Royal Academy of Engineering and took place on September 1-3, 2010 at Jesus College, Cambridge. 60 promising engineers from 10 EU countries and the US met to discuss opportunities for international and cross-disciplinary research collaboration, to examine the potential for transfer of new techniques and approaches across disparate engineering fields, and to help create a transatlantic network of world-class engineers. The four technology areas debated were: Materials Ecology, Augmented Reality, Signal Processing and Bio-Inspired Engineering.



2010 Symposium participants in Cambridge (www.raeng.org.uk)

The 2011 Symposium was held at the US National Academy of Science's Beckmann Centre in Orange County, California, from the 3rd to the 5th November. The four prospective themes discussed were: Networks in Biology and Personalized Medicine, Smart Grids, Sustainable Cities and Manufacturing... the Future.

All presentations were of an excellent scientific quality and of a high technical relevance. A poster session (all participants were required to bring a poster on their own research) allowed for developing wide and intense contacts. A good mixture of academic and industrial participants as well as a good gender balance was maintained.

Both 2010 and 2011 EU-US FOE events received excellent feedback from the participants.

After a year of break, the 2013 meeting will be organized by the National Academy of Technologies of France. It will be followed by the 2014 event in the US.



Science's Beckmann Center Site of 2011 Symposium ( www.nae.edu)

# **Euro-CASE PLATFORMS**

Euro-CASE Platforms are organized as working groups where various academies' representatives study a specific subject and produce a Final Report. This Report is often transmitted to the appropriate authorities in various European institutions and may become a basis for further interactions with them.

#### **INNOVATION**

This Platform was launched at the end of 2011 under the leadership of acatech (DE) and IVA (SE). Its purpose is to help put in place the necessary conditions for Europe to increase its innovative power. Preliminary goals have been set out as follows:

- ► Contribute to make Europe the most successful region in the world
- Establish best practice of national innovation strategies in Europe ("learning from each other")
- In a proactive way, provide advice to European institutions on innovation issues
- ▶ Inform member academies about innovation activities in the international arena (EU, OECD, others...)

The Platform is scheduled to last 2 years, from the beginning of January 2012 until the end of 2013. This initiative and topic have drawn the attention of the European Commission DG Research & Innovation which declared its interest and promised to participate in some of the Platforms' meetings.

#### TRANSPORT AND MOBILITY

The Final Report of this Platform, where experts from Austria, France, Germany, Romania, Sweden, Switzerland and United Kingdom have been involved, is currently in the process of being approved by the Board of Euro-CASE. Given a very wide scope of possible subjects related to the Freight, Logistics and Transport activities, the Platform decided to focus only on four topics with a strong impact on European Union competitiveness, but which also contribute to meeting other objectives such as cleaner environment, security of energy supply, transport safety and security: The four chapters of the Report, each of them providing Conclusions and Recommendations, are related to: Freight Transport Logistics and Taxation in Europe, Intelligence Systems for Freight Transport (IST), Priority of Passengers vs. Freight

Transport, Green Corridors. The Platform members met several times with European Commission representatives to inform them about their work and to exchange views.

#### EUROPEAN RESEARCH NETWORK ON SOILS AND LAND MANAGEMENT

Soil and land management stands as the main basis of biomass production for food, raw materials and energy in the focus of society, politics and economy. Climate change and rising world population increase pressure on soils and challenge a future-oriented, sustainable land use management.

To solve the upcoming global challenges and to position European Soil and Land use research, acatech suggested establishing a permanent European Research Network. The opening Workshop took place in September, in Berlin, with the participation of representatives of several Euro-CASE Academies. The Workshop has considered and defined numerous tasks for future meetings.

The group has discovered, among other findings, that there are no currently available mechanisms for task oriented scientific exchange at member state level (learning from existing knowledge/experience) and that there is little or no general information available about research capacities in the EU at member state level. Moreover, structures in member countries are diverse.

#### **ENGINEERING EDUCATION**

The Platform on Engineering Education came to an end in 2011. Its final report summarized the results of 23 questionnaires filled in by the member academies. The subject has drawn the attention of the International Council of Academies of Engineering and Technical Sciences (CAETS). Pending availability of resources, the Engineering Academy of the Czech Republic intends to pursue this topic, in particular by organizing, in 2012, an Engineering Education Conference in Prague.

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# RELATIONS WITH EUROPEAN INSTITUTIONS AND OTHER MAJOR ACTIVITIES



- ➤ Over the past two years, Euro-CASE has delivered three Position Papers, following consultation calls from the European Commission.
- A Response to the Commission's Consultation on the Future EU Strategy
- A Position Paper on the Common Strategic Framework for Research and Innovation
- A Position Paper on the European Research Area



- ▶ Relations with the Cabinet of the Commissioner for Research & Innovation, on matters related to the Innovation Policy, have been established and two meetings, in July and in December, took place. Other contacts have taken place with DG Transportation, DG Environment, DG Energy and with the Joint Research Centre.
- ➤ Contacts with the European Parliament Office of Science and Technology Options Assessment (STOA) have been initiated. Two meetings in 2011 took place in Brussels. Euro-CASE has been invited to the STOA Panel meeting in Strasbourg, during the European Parliament session in March 2012. The objective is to examine how Euro-CASE could contribute to the works of the Parliament on issues related to technology and society.



Following a CEN-CENELEC request, a meeting was organized with its management in July to discuss possible ways of collaboration on the education of young engineers in Europe, with a particular focus on standards and norms. It was decided to invite the Euro-CASE Platform leaders on Innovation to the CEN-CENELEC Conference on Innovation in 2012, and to invite CEN-CENELEC representatives to the EA CR (CZ) Conference on Engineering Education which is planned to take place in Prague in 2012.



► Following the Board's recommendations, initial talks have started with the Polish Academy of Sciences inviting this institution, through its Division of Technical and Applied Sciences, to join Euro-CASE and represent Poland. It is expected that the Polish Academy of Sciences will become a full Euro-CASE member in 2013.



► The Intel Lecture Series on "Engineering Research & Innovation"

The lecture series is a programme of the Irish Academy of Engineering in partnership with Euro-CASE and with the generous sponsorship and support of Intel Corporation plc. Lectures are held at University College Dublin and Queens University Belfast. It is planned to publish these lectures upon the completion of the series.



▶ In 2011, Euro-CASE began an edition of member-Academies' public reports, limited to titles and their abstracts. The first list available on the Euro-CASE website covers the last three years, 2009-2011, but will be updated annually. This database of publications has been classified according to standard themes such as: Energy and Climate Change, Mobility and Transportation, Biotechnologies, Technologies and Health, ICT... Large majority of member-Academies have enriched this database which includes presently 141 reports.

# **MAJOR EVENTS IN 2011**

#### Austria

www.oeaw.ac.at

#### Belgium

www.academieroyale.be www.kvab.be

#### Croatia

Central celebration of the 300th Anniversary of the birth of Rudjer BoškoviÐ, philosopher, theologian and engineer

www.hatz.hr

#### **Czech Republic**

- Annual Prize Award for "the largest highway bridge" in the Czech Republic
- Assessments and contribution to the realization of new major traffic corridors in Prague

# www.eacr.cz **Denmark**

- Conference on "Analysing cultural barriers for innovation"
- ► High-profile opinion-makers Conference "Universities and their role in society"
- www.atv.dk/

#### Finland

- ► Millennium Youth Camp in Helsinki
- Millennium Distinction Awards in Vaasa www.technologyacademy.fi

#### France

- Celebration of the 10th Anniversary of the Academy
   Numerical Engineering debate: Technology ruptures
- and social and economic progress www.academie-technologies.fr

#### Germany

- acatech Gala event: Why policy advice and dialogue with society belong together
- Second Innovation Dialogue: Chancellor Angela Merkel discussed the financing of innovation with leading experts

www.acatech.de/

#### Greece

 $http://portal.tee.gr/portal/page/portal/INTER\_RELATIONS/english/role$ 

#### Hungary

www.mernokakademia.hu/

#### Ireland

- Engineering Research in Irish Economic Development
- ► Energy Policy and Economic Recovery 2011 2015 www.iae.ie

#### Italy

- The Italian Hydrogen Way Conference
  Convention "The chemical meets the cultural heritage: a trip to Lombardy"
- www.fast.mi.it

#### **Netherlands**

- ► Celebration of the 25th Anniversary of AcTI
- Innovation Conference: "Grand Challenges Smart Solutions"

www.acti-nl.org/

#### Norway

- Seminar on "Technologies for Development of the High Arctic"
- Workshop on "Nanotechnology for (renewable) energy materials"

www.ntva.no

#### Portugal

www.ordemengenheiros.pt

#### Romania

- ► ASTR Days "PRO Prosperitas": Industry, Energy, Environment
- www.astr.ro

#### Slovenia

- ► Technology Highway Conferences: Researchers, Universities, Institutes and Companies
- Contribution to economic development of Slovenia. www.ias.si

#### Spain

- "Academiae Dilecta" and "Young Researchers" Awards
- www.real-academia-de-ingenieria.org

#### Sweden

- ► The Innovation for Growth project
- ► IVA's Annual Meeting on October 28 www.iva.se

#### **Switzerland**

- Study "Renewable Energies Challenges on the Way to Full Supply"
- Launching of the Platform educa.MINT -
- "Encouraging young talent Awakening interest in technology and the natural sciences" www.satw.ch

#### **United Kingdom**

- ► The Queen Elizabeth Prize for Engineering
- ► International Series of Symposia on Synthetic Biology www.qeprize.org www.raenq.org.uk

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# **EXECUTIVE COMMITTEE AND BOARD**



Lena Treschow Torell (IVA), Chairman



Reinhard Hüttl (acatech), Vice Chairman



Jacques Lukasik (NATF), Secretary General



William Wakeham (RAEng), Treasurer



Borut Mavko (IAS), Member



Manuel Marquez Balin (RAI), Member



Petr Zuna (EA CR), Member

The members of the Executive Committee are *ex officio* members of the Board. During 2011, the Executive Committee held 4 meetings and the Board met twice, in May, in Paris, and in November, in Madrid.

Austria	OAW	Kurt Richter
Belgium	ARSB / KVAB	Hervé Hasquin, Géry van Outryve d'Ydewalle
Croatia	HATZ	Stanko Tonkovic, Miljenko Lapaine
Czech Republic	EA CR	Petr Zuna, <i>Milos Hayer</i>
Denmark	ATV	Lasse Skovby Rasmusson
Finland	TAF	Ainomaija Haarla
France	NATF	François Guinot, <i>Jacques Lukasik</i>
Germany	acatech	Reinhard Hüttl, Otthein Herzog
Greece	TCG	Yannis Alavanos, Christos Tsatsanifos
lungary	HAE	Janos Ginsztler, János Takács
reland	IAE	Michael Higgins, John Kelly
taly	CISAI	Alberto Pieri
letherlands	AcTI	Emmo Meijer, Henk Dits
Norway	NTVA	Roy Gabrielsen, Hein Johnson
Portugal	PAE	Fernando Santana, João Pereira Bento
Romania	ASTR	Mihai Mihaita, Florin Tanasescu
Slovenia	IAS	Jadran Lenarcic, Igor Emri, Borut Mavko
Spain	RAI	Manuel Marquez Balin, Pere Brunet
Sweden	IVA	Björn O. Nilsson, Magnus Breidne, Lena Treschow Torell
witzerland	SATW	Arthur Ruf, Rolf Hügli
Jnited Kingdom	RAEng	William Wakeham, Shane McHugh

### **MEMBER ACADEMIES**

#### **AUSTRIA**

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RELATIONS/english/role

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