



JRC Newsletter

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Editorial



As Europeans face challenging and uncertain economic times, we are reminded that in today's knowledge-based economies growth and jobs are more dependent than ever before on progress in science and technology. This is why solid investment in research and development remains a key policy objective for the EU.

As the Lisbon target dedicating 3% of our GDP to research and development - will most probably not be reached by 2010, it is even more important to better analyse EU trends and compare them with the rest of the world.

The target of 3% covers all R&D sectors in Europe, while R&D policies tend to be sector specific and closely linked to innovation systems. It is therefore important to analyse the contribution of individual business sectors in order to assess area-specific challenges and to effectively support evidence-based policy making. This is especially important for information and communication technologies (ICT), a key sector of the European economy.

This is why the European Commission's Information Society & Media Directorate General (DG INFSO) asked the JRC to map the European ICT sector's R&D investments. The study was carried out by scientists at the JRC Institute for Prospective Technological Studies (IPTS) in Seville and has just been published.

This study is based on the collection and analysis of internationally comparable data on R&D expenditure and its results constitute an important contribution to our understanding of ICT business dynamics and the role played by R&D within the sector. It is also an excellent example of the ongoing, decade-old collaboration between the JRC and DG INFSO.

This report shows the important role played by the JRC in providing a thorough analysis of the impact of ICT on the development of the knowledge-based economy and the information society. I hope that our fruitful cooperation in the provision of evidence-based European policy in the information society and media field will continue in years to come.

FABIO COLASANTI
Director General, Information Society and Media



JRC reference report: Mapping R&D Investment by the European ICT Business Sector

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Mapping R&D investment by the European ICT business sector

To coincide with *ICT 2008*, Europe's biggest research event for information and communication technologies, the JRC published a new Reference Report on 25 November. The report, *Mapping R&D Investment by the European ICT*

Business Sector, provides European business and policy decision-makers with the first comprehensive overview of available data on European ICT industry R&D spending.

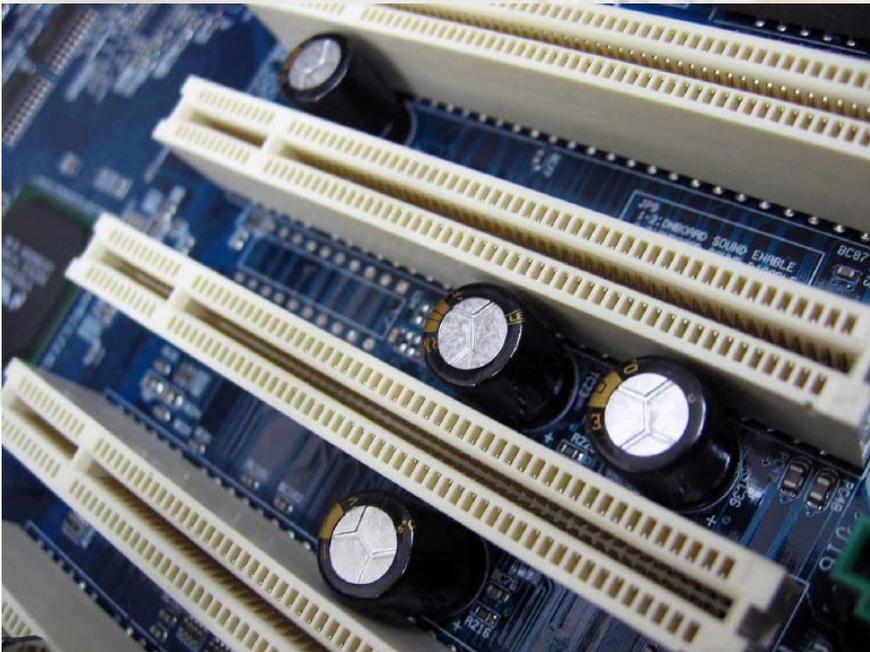
The research, carried out by the JRC Institute for Prospective Technological Studies (IPTS) at the request

of the European Commission's DG Information Society & Media, shows that the ICT industry based in Europe is the largest R&D-investing sector, contributing 26% of total business expenditures in R&D (BERD), ahead of the automotive and pharmaceutical industries.

Nevertheless, the EU's ICT industry spends some 50% less on R&D than its counterparts based in the US, not only in absolute amounts but also as a share of the respective Gross Domestic Product. This difference between EU and US levels of ICT business sector R&D accounts for half the overall transatlantic R&D gap.

This report is the first from a series of studies that will be extended to provide further analysis of data from the EU27 and to incorporate public financing for ICT R&D. Future reports will aim to measure EU ICT R&D performance vis-à-vis other leading world economies.

The report can be downloaded from: <http://ipts.jrc.ec.europa.eu>



EU code of conduct for data centres

The EU code of conduct for data centres launched by the European Commission on 19 October provides guidelines, recommendations and examples of best practice which could lead to a reduction in energy consumption of up to 20 % by data centres in Europe.

Developed over the past two years by the JRC Institute for Energy (IE), in consultation with a range of stakeholders including industry experts, equipment vendors and representatives of both data centre owners and operators, the code should represent a key source of information for those seeking to run an energy-efficient data centre.

Data centres, housing computer servers for industry, businesses and administrations across Europe,

consumed 56TWh of electricity in 2007. This is roughly equivalent to the total yearly electricity consumption of the Czech Republic and, without specific action to improve



Data centres: room for energy efficiency

energy efficiency, the electricity consumption of data centres is expected to nearly double by 2020. Furthermore, CO₂ emissions from the IT-sector, estimated to be 2% of total global CO₂ emissions and roughly equivalent to that of the

airline industry, would increase significantly.

The key aim of the code of conduct is to inform data centre operators and encourage them to reduce energy consumption without hampering the performance of such facilities. This is achieved through a series of best practice recommendations which focus on design in areas such as software, IT architecture and infrastructure. The JRC has recently launched a number of codes of conduct such as this one in the energy efficiency field. The initiative is in line with the EU's 2020 energy saving targets and reflects the important contribution expected from the ICT sector.

http://ec.europa.eu/dgs/jrc/index.cfm?id=1410&obj_id=6260&dt_code=NWS

EU Strategic Energy Review: JRC assesses performance of technologies

On 13 October the European Commission proposed a wide-ranging energy package with the aim of boosting energy security in Europe and supporting the “20-20-20” climate change target proposals to be agreed upon by December. The new strategy seeks to build up energy solidarity among Member States and to stimulate investment in more efficient, low-carbon energy networks.

As part of this second “Strategic Energy Review”, the JRC Institute for Energy (IE) produced a comparative analysis of energy sources, production costs and the performance of various technologies for power generation, heating and transport.



Transmission Towers

The JRC’s study of energy sources, production costs and performance examined 21 technologies for the power sector, 8 central heating systems for households and 4 road transport fuels. Two different fuel price scenarios were considered in order to reflect variations in the future price of energy commodities and all reported values for electricity generation, heating and transport fuels were calculated using the same methodology. The assessment provides insight on the

current production costs of different technologies and their expected evolution in the short and medium term.

The new EU Energy Security and Solidarity Action Plan sets out five areas where more action is needed to secure sustainable energy supplies and looks at the challenges that Europe will face between 2020 and 2050. An additional package of energy efficiency proposals also aims to make energy savings in key areas, such as better energy efficiency in buildings, through reinforced legislation and enhancing the role of energy performance certificates and inspection reports for heating and air-conditioning systems.

<http://ec.europa.eu/dgs/jrc/index.cfm?id=2270&>

New website on alternatives to animal testing

On 11 October the JRC launched TSAR, a special website for tracking the status of regulatory approval for new test methods as alternatives to animal testing. The website is intended as a step towards addressing concerns over the limited availability of such alternatives and it should provide

more transparency throughout the regulatory approval process, from the proposition of a new method to its final approval.

The website, *Tracking System for Alternative test methods Review, Validation and Approval in the Context of EU Regulations on Chemicals* (TSAR), will provide information on the current status of all proposed alternative methods.

Details of an alternative test will be posted from the moment the proposed alternative method undergoes a preliminary regulatory analysis. The system is run and managed by the JRC Institute for Health and Consumer Protection (IHCP).

TSAR’s role is to assure transparency in each and every step of the review, validation and approval process, from initial submission of a new test method for pre-validation until final adoption by its inclusion in EU legislation and/or related guidance documents. When the final decision on a proposed test method is negative, TSAR will clearly indicate the reasons why this decision has been taken.

<http://tsar.jrc.ec.europa.eu/>



Alternative methods: preparing samples for in vitro tests

Joint EURATOM-IAEA nuclear inspector training course

For the first time in several years, a common training course for nuclear safeguards inspectors from the European Atomic Energy Community (EURATOM) and the International Atomic Energy Agency (IAEA)



Common IAEA-EU Inspector training Course on Pu Diversion Detection, PERLA, JRC, Ispra, 16-24 October 2008

took place in October. The event, a Plutonium Diversion Detection course, was held in the JRC's performance laboratory (PERLA) at its Institute for the Protection and Security of the Citizen (IPSC) in Ispra. Specialists from the IAEA, IPSC and EURATOM Safeguards organised the course, intended for and attended by experienced nuclear inspectors with a high level of technical experience.

During the course, mixed IAEA-EURATOM teams simulated inspection of a nuclear installation's inventory, first developing an inspection strategy, before executing the inspection and identifying problems and deliberate falsifications.

PERLA is a laboratory for the assessment and evaluation of performances for all non-destructive assay (NDA) techniques applied in the safeguards of nuclear materials. It is a unique facility within the EU, housing an extensive collection of nuclear reference materials and instrumentation.

<http://ipsc.jrc.ec.europa.eu/facility.php?id=perla>

Hurricanes: JRC contributes to post-crisis assessment in Haiti

In the aftermath of the three hurricanes (Gustav, Hanna and Ike), which struck Haiti during September leaving the country badly damaged, the European Commission, the World Bank (WB) and the United Nations (UN) together carried out a post-crisis assessment to estimate needs for reconstruction and recovery. This was the first joint assessment carried out by the three organisations following the signature on 25 September 2008 of a 'Joint Declaration on Post-Crisis Assessment and Recovery Planning'.

The JRC Institute for the Protection and Security of the Citizen (IPSC) represented the Commission in the joint assessment and contributed through the following measures:

- 1) rapidly carrying out initial satellite data-based damage assessments (prior to field-based assessment), focusing on housing and transport in areas potentially the worst affected;
- 2) collecting field data to calibrate and improve the initial damage assessments based on the analysis of satellite data and;
- 3) testing field tracking and reporting tools under development.

The JRC's assessment of damage to buildings and transport infrastructure in the city of Gonaives was also included in the joint post-crisis assessment report and presentation prepared by the World Bank.

<http://isferea.jrc.ec.europa.eu/>

First 'China Rice Bulletin'

The China Rice Bulletin is a new tool developed by scientists in the Agriculture unit at the JRC's Institute for the Protection and Security of the Citizen (IPSC) for targeted quantitative rice yield forecasts at provincial

level in China. It is planned to release such bulletins twice a year.

In order to forecast the yield of rice and other crops, crop growth simulation, agro-meteorological analysis and remote sensing analysis are carried out in-house by the JRC scientists, while area statistics are taken from publicly available sources.

The core of the system is the *CropML-WARM* model used to simulate rice crop growth. The crop yield forecasting approach and agro-meteorological analysis follows closely the approach applied for the EU Crop Yield Forecast, released in August. The China Rice Bulletin is the latest in a series of crop yield forecasting bulletins produced by the JRC's AGRI4CAST team.

<http://mars.jrc.ec.europa.eu/mars/About-us/AGRI4CAST/Crop-yield-forecast>

JRC atomic detectives in joint nuclear forensic analysis with Slovakia

Scientists from the JRC's Institute for Transuranium Elements (ITU) have carried out a joint nuclear forensic analysis together with Slovakian authorities. In the framework of their direct cooperation with Member States, ITU's 'atomic detectives' were provided with two sets of uranium pellets that had been seized on different occasions in Slovakia (before accession to the EU) in the late 1990s. The JRC scientists were tasked with determining the origin and purpose of the seized radioactive material. Two Slovakian experts participated in an analysis of the samples at JRC-ITU labs in Karlsruhe where, over one week, a series of measurements were carried out on the Uranium. A database query proved the intended use of the material, the identity of its manufacturer and its legal owner.

<http://ec.europa.eu/dgs/jrc/index.cfm?id=3990>

Study on multi-level climate policies

JRC scientists Suvi Monni and Frank Raes from the Climate Change Unit at the JRC Institute for Environment and Sustainability (IES) have published a paper on multilevel climate policies, looking in particular at the European Union, Finland and its capital Helsinki. This follows an ex-post approach to analyse the implementation of EU directives at national and city levels, identifying relevant voluntary action taken in Helsinki. The paper presents a methodology to examine the coherence of policies at different levels of governance and uses the Finnish case to demonstrate the complementary and/or contradictory nature of city level policies in relation to those at national and EU levels.

The study, *Multilevel climate policy: the case of the European Union, Finland and Helsinki*, was published in *Environmental Science and Policy* 11, (2008) pp. 743-755.

[Click here to access the study](#)

JRC scientist awarded for aerosol research

JRC researcher Stefania Gilardoni from the Institute for Environment and Sustainability (IES) presented her work on the application of several statistical methods to model evaluation studies at the 7th AeroCom (aerosol comparisons between observations and models) meeting in Reykjavik, Iceland, 8-11 October 2008.

Ms Gilardoni proposed new tools for the evaluation of model performance, most notably a large scale experiment aiming to evaluate the ability of AeroCom's models to simulate black carbon concentration.

Ms Gilardoni also received the NASA Group Achievement Award for the Intercontinental Chemical Transport

Experiment (INTEX-B) dedicated to the study of Asian pollution outflow over the Pacific Ocean.

<http://www.espo.nasa.gov/intex-b/>

JRC scientists challenge assumptions on spread of the flu

It may come as a surprise to many, but the precise manner in which the flu is transmitted from person to person remains unknown. The prevailing view, until now, has been that large droplets expelled during coughing or sneezing are chiefly responsible for transmitting the disease.



How is the flu transmitted from person to person?

In a paper published on 9 October in the "Journal of Infection", Thomas P. Weber and Nikolaos Stilianakis from the JRC Institute for the Protection and Security of the Citizen (IPSC) have challenged the dominant view on influenza transmission by critically reviewing all published information on the ability of the influenza virus to survive outside of its host. The scientists, part of the JRC's Crisis Monitoring and Response Technologies (CriTech) research team, conclude that indoors, the influenza virus can remain infectious in fine droplets for up to a few hours.

Inhalation of these fine droplets is likely to be a significant factor in transmission because an infectious dose can be very small if the virus is thus directly delivered into the lung. Large droplets, on the other hand, quickly settle on surfaces in

the environment unless they are immediately inhaled by persons less than one meter away. Weber and Stilianakis used their collected data to argue that this is probably very rare.

The argument that fine aerosol droplets may play a prominent role in transmission could have important implications for preparatory measures against pandemics. During an influenza pandemic against which no vaccine is available, the implementation of other control measures becomes necessary. Surgical masks only stop large droplets, whereas so-called respirators are needed to block fine droplets.

The paper, "Inactivation of influenza A viruses in the environment and modes of transmission: A critical review" is online [here](#).

<http://ipsc.jrc.ec.europa.eu/showaction.php?id=15>

Nuclear Medicine: JRC shares Marie-Curie Award for bladder cancer treatment

A joint study involving JRC scientists Frank Bruchertseifer and Alfred Morgenstern from the Institute for Transuranium Elements (ITU) and collaborators from Klinikum Rechts der Isar (KRDI) in Munich has won the 2008 Marie Curie Award of the European Association of Nuclear Medicine (EANM). As explained last month (see previous edition) the scientists developed a new alpha-immunotherapeutic treatment using the alpha emitter Bismuth-213.

The president of the EANM presented the prestigious Marie Curie prize to Birgit Pfost, who accepted the award on behalf of the KRDI-ITU team, at the highlights session of EANM's annual meeting in Munich on 15 October, 2008. The prize carries a value of €3,000.

<http://itu.jrc.ec.europa.eu/index.php?id=202>

Studying the migration of uranium in hard rock

JRC scientists at the Institute for Energy (IE) in Petten, the Netherlands, have completed a study in collaboration with researchers from Finland and the UK on the migration of uranium in granite-type rocks. Uranium is a major radioactive constituent of spent nuclear fuel and high-level radioactive waste. While considerable effort has been spent on the subject world-wide, its migration or escape from containment in certain geological environments still requires further study to fully understand the phenomenon.

Migration from a repository for nuclear waste was simulated in a controlled laboratory experiment undertaken at the University of Reading (UK) using rock samples from Finland provided by University of Helsinki. A numerical simulation was then performed at the JRC, with initial models employing generic information in 'blind predictions' successively refined by experimental data-supported interpretation. This approach was intended to mimic the various stages of a given site's assessment for suitability as a geological repository for radioactive waste.

The findings of the study – which shows that uranium migration in hard rock is “solubility controlled” rather than by sorption – should lead to a better understanding of the migratory mechanisms of uranium and therefore to further improve the safety of underground radioactive waste disposal in crystalline host rocks such as granites.

W.E Falck, Read, D., Black, S., Thornley, D., Markovaara-Koivisto, M. and Siitari-Kauppi, M. (2008): *Understanding Uranium Migration in Hard Rock*. In: Merkel, B.J., Hasche-Berger, A. [Eds.] *Uranium Mining and Hydrology*: pp. 19-26, Berlin/Heidelberg (Springer-Verlag).

<http://ie.jrc.ec.europa.eu/>

Nuclear safeguards: a batch of large-sized dried spikes produced using a new tool

The JRC's Institute for Reference Materials and Measurements (IRMM) has produced a new batch of large-sized dried (LSD) spikes.

Dried spikes are isotopic reference materials, of certified uranium and plutonium composition, intended to meet requirements for reliable and traceable fissile material control in dissolved nuclear fuel. These spikes are applied to measure the uranium and plutonium content of dissolved fuel solutions using isotope dilution mass spectrometry.

Prepared under carefully controlled conditions, the new LSD series of spikes, called “IRMM-1027k” is the first to be dispensed by a new automated robot system at IRMM

allowing production in large batches. A light cellulose layer is dried on the spike material in a penicillin-type ampoule to retain the spike at the bottom of the vial during transport to where it is to be used.

Spikes are a fundamental part of the fissile material control of irradiated nuclear fuel, allowing the implementation of effective safeguards in nuclear facilities around the world. They play a vital role in verifying the non-diversion of nuclear materials from their intended and declared peaceful use. They are provided to plant operators worldwide and to safeguards authorities including the European Commission's Directorate-General for Energy and Transport, to be used for verification measurements at on-site laboratories in Sellafield, La Hague and elsewhere.

<http://irmm.jrc.ec.europa.eu>



Automated system for dispensing and ampouling of large-sized dried spikes at JRC-IRMM

JRC and European Food Safety Authority sign co-operation agreement

A new Co-operation Agreement signed in Brussels on 10 November will advance scientific co-operation and the development of international standards in the fields of food and feed safety.

The detailed *Memorandum of Understanding*, signed by JRC Director General Roland Schenkel and EFSA Executive-Director Catherine Geslain-Lanéelle, sets out how the JRC and EFSA will aim to ensure that additional robust data is provided for risk assessment, that harmonised standards are applied to data generation and that analytical best practices are shared. The Agreement will also

contribute to the better understanding of the relationship between food and health in areas such as food allergens, acrylamide and polycyclic aromatic hydrocarbons.



Catherine Geslain-Lanéelle and Roland Schenkel

The thematic areas given the greatest prominence under the new

agreement are food and feed safety, nutrition, animal health and welfare and impact of climate change on plant health.

Roland Schenkel stated: “In a short period of time, EFSA and its partners have put in place a comprehensive programme to improve EU food safety and ensure a high level of consumer protection. This is essential to maintain confidence in the EU food supply. The JRC is committed to working with EFSA to provide essential scientific data to contribute to informed and responsible policy decisions in industry as well as in government”.

http://ec.europa.eu/dgs/jrc/index.cfm?id=1410&obj_id=6170&dt_code=NWS

JRC and Chinese Academy of Sciences to cooperate in disaster management

On 18 November 2008 the JRC Institute for the Protection and Security of the Citizen (IPSC) and the Chinese Academy of Sciences’ *Centre for Earth Observation and Digital Earth* (CEODE) signed a Memorandum of Understanding to establish co-operation in the field of advanced image analysis in support to disaster management.

The agreement, signed by IPSC Stephan Lechner and the CEODE’s Director General Guo Huadong, covers the following areas:

- image analysis algorithms for automatic information extraction from remotely sensed data;
- benchmarking of satellite sensors, including new and planned European and Chinese satellite platforms and sensors to support disaster management (risk assessment, loss estimation, reconstruction and planning);
- sharing of tools and data;

exchange of scientists for short duration; organisation of joint annual scientific workshops.

Past co-operation between the two bodies has included assistance provided by the JRC such as damage assessment for reconstruction planning following the Wen Chuan earthquake earlier this year.

<http://ec.europa.eu/dgs/jrc/index.cfm?id=2360&>

New project opens access to JRC particle accelerators

The JRC is providing researchers with access to its particle accelerator facilities at the Institute for Reference Materials and Measurements (IRMM) as part of a newly launched European research project.

EUFRAT, or European facility for innovative reactor and transmutation data, is a Support Action funded under the Seventh Framework Programme of the European Atomic Energy Community. As part of a wider initiative to enable trans-

national access to large scientific infrastructures, the 4-year project allows external researchers to perform experiments at the two accelerator facilities at IRMM in Geel, Belgium. The EUFRAT website



Van de Graaff accelerator at JRC-IRMM

describes the specialised accelerator facilities at IRMM in more detail.

Accurate neutron data is required for the assessment of safety aspects of nuclear power installations and for studying innovative concepts such

