

JRC Newsletter

The Joint Research Centre (JRC) – The European Commission's in-house science service

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DECEMBER 2011 – JANUARY 2012



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the US Ambassador to the EU*

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E-MOBILITY Reducing electric vehicle charging times will be a crucial factor to address in order to encourage market up-take of electric vehicles.



The U.S. and the EU: making a real difference together

Now, more than ever, it is crucial that the European Union and the United States show strong leadership and intensify cooperation to address global challenges and to ensure that our partnership brings greater prosperity and security to our

800 million citizens. The transatlantic relationship has been prominent on the agenda in recent weeks, with the U.S.-EU Summit and the Transatlantic Economic Council (TEC) took place in late November in Washington, D.C. It is welcome news that our leaders are closely cooperating at this time when the global economy is in a difficult and challenging phase. The U.S. and the EU are the world's two largest economies, accounting for almost 50% of global GDP. Together we are central to the global economy and are each other's most important markets for our products, services and investments. Trade flows between the U.S. and the EU exceed \$3.5 billion per day. Foreign Direct Investment (FDI) has created millions of jobs on both sides of the Atlantic and represents over 50 percent of global flows. The amount of U.S. FDI in the EU – \$1.95 trillion as of 2010 – was more than twice U.S. FDI into any other region in the world. The EU's FDI of almost \$1.5 trillion into the U.S. is approximately quadruple the amount from any other region.

The importance of the transatlantic relationship requires us to face global challenges together. One of these challenges is protecting the environment while guaranteeing future generations a sustainable energy supply and clean transport systems. Science and innovation will play key roles in our success in meeting this challenge.

Electromobility and smart grids are excellent examples of how we have cooperated to promote a clean and sustainable future while stimulating economic and job growth by harnessing the potential

of our best innovators. Electromobility holds great promise for the transatlantic economy and our industry, and offers a real opportunity to show citizens on both sides of the Atlantic that we remain global leaders when it comes to cutting-edge technology. President Barack Obama has set the ambitious goal of putting one million electric vehicles on American roads by 2015.

“It is essential that we work together towards compatible approaches if we are to achieve economies of scale in this critical new technology.”

At the TEC meeting, both sides highlighted our cooperation on e-vehicles as a model for future collaborative work between the United States and the European Union. The Letter of Intent signed on 29 November by the JRC and the U.S. Department of Energy on the occasion of the TEC in Washington creates the basis for the establishment of Electric Vehicle and Smart Grid Interoperability Centres on both sides of the Atlantic, and is a concrete step in this direction. The two laboratories, based in Chicago, and at the JRC's site in Ispra, Italy, will develop interoperability for electric vehicles, smart grids and charging stations. It is essential that we work together towards compatible approaches if we are to achieve economies of scale in this critical new technology.

Now is the time to bring our best minds together. This was the purpose of the Transatlantic Scientific Bridge Roundtable which the JRC organized in November, and which I had the pleasure to co-host with Dominique Ristori. I am confident that by working together we can make a real difference in meeting the global challenges facing us.

WILLIAM E. KENNARD

Ambassador of the United States to the European Union



COVER STORY

E-mobility and smart grids: the JRC is prepared for the future

E-mobility – clean and environmentally friendly transport using electric vehicles – is an innovative technology with big growth potential. For this dynamic sector, standards and interoperability are becoming increasingly important as they provide a predictable framework that gives innovators confidence to bring their products to market. On 29 November, the JRC signed a Letter of Intent for closer cooperation with the US Department of Energy (DoE), and agreed to establish two electric vehicle and smart grid interoperability centres, one at Argonne National Laboratories, in the US, and one at the JRC facilities in Ispra, Italy.

The twin centres will facilitate permanent contact between US and European scientists, promoting a common approach to testing of equipment for electric vehicles and smart grids, and development and promotion of standards. They will in particular focus on interoperability issues between e-vehicles, smart grids and recharging systems. In addition, they will participate in each others' inter-laboratory comparisons. The two organisations will together prepare a work plan for the centres outlining common goals and final targets.

VELA

The JRC's Vehicle Emissions Laboratory (VELA) has state of the art equipment capable of measuring the emissions and environmental impacts of a range of vehicles from motor-cycles to trucks, according to standard test protocols as well as under realistic operating conditions. In addition it will analyse energy efficiency and costs and benefits of cleaner transport technology options including electrical, hybrid, hydrogen and fuel cell vehicles.



Fuel cell electric vehicle being tested at VELA.

In 2011, the JRC extended its VELA installations to encompass the testing and development of electric vehicles. It set up a new laboratory for testing of electric vehicles and studying smart grids, and the communication between them. The research will cover aspects related to safety and vehicle performance with respect to driving range, energy efficiency and durability of the vehicle. In parallel, complementary research will address vehicle batteries, with particular focus on their durability and charging time as well as their performance in different temperatures and under different driving conditions.

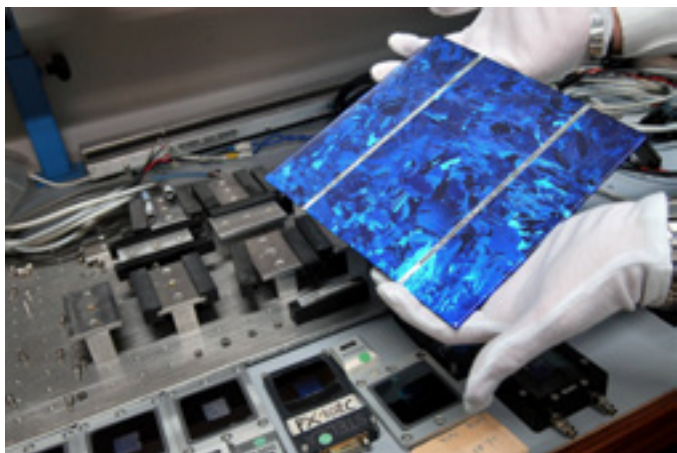


Scientist testing a heavy-duty truck in VELA.

Standardisation

The automotive industry, electricity suppliers and legislators are all pushing for standardisation in the field of e-mobility. For global automotive manufacturers and suppliers, this is particularly urgent as they must take investment decisions to support production of plug-in hybrid vehicles for the next model years. In parallel, electricity suppliers, who are investing heavily in the development of 'intelligent' electricity systems – smart grids – need to future-proof their infrastructure investments to meet the needs of a step-wise electrification of road transport and the specificities of different renewable energy production methods. The European Commission plays an important role in the standardisation process at European and global level in promoting global harmonised standards and enhancing product safety standards as well as interoperability.

Another important element for e-mobility will be smart grids. Smart grids will form the backbone of the future power system of the EU, enhancing security of supply. These upgraded electricity networks with intelligent metering and monitoring capacities as well as a two-way



The JRC's European Solar Test Installation (ESTI) develops performance verification methods for international standards.

digital communication between supplier and consumer should predict and intelligently respond to the behaviour and actions of all users connected to them, resulting in the



Three plug-in hybrid cars charging at a public recharging station in San Francisco.

efficient delivery of reliable, economic, and sustainable electricity services.

The success rate of e-mobility is intrinsically linked to smart grid development as the charging infrastructure is a precondition for large scale adoption of electric vehicles. Of course, the dependency goes both ways: large scale adoption of e-mobility is crucial for the large scale infrastructure investments to be profitable.

Smart grids

The JRC has expanded its capacity to support further research and development of smart grids. As part of this effort, the JRC has established a European Reference Centre for Security of Energy Supply. This provides a technical competence to support the technical development of standards and includes a real-time simulation for the assessment of smart grids operation. The JRC is also running an Energy Security Competence Centre, which together with a Smart Grid Simulation Centre will help to explore the stability of networked physical systems.

A recently compiled JRC report on smart grid projects in the EU Member States gives a comprehensive overview of progress in this area. Over the last decade, over €5,5 billion have been allocated to some 300 projects all over Europe. To put the investments into context, conservative estimates quantify smart grid investments by 2020 at €56 billion. The JRC continues to keep track of the status of smart grids and provides publicly available up-to-date information about them. This helps identify bottlenecks, potential synergies and gives all actors the information they need to better focus their efforts on smart grid development.

According to conservative estimates, smart grid investments in the EU will reach €56 billion by 2020, which highlights the importance of setting standards and improving interoperability. As the European Commission's in-house science service, the JRC works with organisations dealing with standardisation in order to facilitate this.

This also highlights the key role integrated research between smart grid and electric vehicles will play, ensuring the interoperability between one and the other as investment drives product and service innovation and technological advances.

Electric vehicles and urban areas: benefits and barriers

JRC scientists have researched the possible environmental benefits and techno-economic barriers for electric vehicles in urban areas. The study contributed to the book "Electric vehicles – the benefits and barriers" (In-Tech, 2011). Some main observations are :

- Widespread use of electric vehicles

could drastically reduce CO₂ emissions and other air pollution in cities. The global environmental impact will however depend on where and how the electricity was produced.

- An important barrier to widespread use is the cost. Today, electric vehicle can cost up to €15,000 more

than similar cars with a combustion engine, and an important part of the high cost is the battery. According to various scenarios, technical development is expected to considerably reduce production costs by 2030. To encourage a larger scale deployment of electric vehicles, policy options such as tax breaks and regulatory measures, should be considered.

LOW CARBON TECHNOLOGIES

<http://setis.ec.europa.eu>

New JRC report highlights risk of rare earth metal shortages

A new JRC report revealed that there is a high risk of shortage of five metals, essential for manufacturing low-carbon technologies, in Europe. Reasons for this lie in Europe's dependency on imports, increasing global demand, supply concentration and geopolitical issues.

Scientists at the JRC's Institute for Energy and Transport (IET) examined the use of raw materials, especially metals, in the six priority low-carbon energy technologies of the Commission's Strategic Energy Technology Plan: nuclear, solar, wind, bio-energy, carbon capture and storage and electricity grids.

The study showed among other things that a large-scale deployment of solar energy technologies will require half the current world supply of tellurium and 25% of the supply of indium. The envisaged deployment of wind energy technology in Europe will require large amounts of neodymium and dysprosium for permanent magnet generators.

The report considers possible strategies to avoid or mitigate shortage of these metals, for instance through recycling, increasing Europe's own production of such metals and by developing of alternative technologies that rely on more common materials.

In the near future the JRC will conduct similar studies on other energy technologies that also use critical metals, such as electric vehicles, electricity storage, lighting and fuel cells.

Metal	Market factors		Political factors	
	Likelihood of rapid demand growth	Limitations to expanding production capacity	Concentration of supply	Political risk
Dysprosium	High	High	High	High
Neodymium	High	Medium	High	High
Tellurium	High	High	Low	Medium
Indium	Medium	High	Medium	Medium

Summary of bottleneck analysis highlighting four rare earth metals.

AGRICULTURE

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

Eyeing the future of plant nutrients for agriculture to feed a growing population

The supply of some plant nutrients vital for crops growth is a growing concern in modern land cultivation. These nutrients could fall under the category of strategic materials in agriculture to feed a projected global population of nine billion in 2050. Therefore, early initiatives are required to develop long-term policies to cope with scarcities. Research and innovation in the area of fertilisers' production, recycling and use by the soil-water-plant system will be essential to address the challenges of global food security.

These are some of the conclusions of the two day JRC hosted workshop "NPK: Will there be enough plant nutrients to feed a world of 9 billion in 2050". NPK refers to Nitrogen

(N), Phosphorus (P) and Potassium (K), essential nutrients for the soil fertility and cultivation of crops. They are common ingredients contained in most compound fertilisers used in modern agriculture. However, they are not renewable resources and the supply shortage of Phosphorus and the Potassium could threaten the capacity to feed the global population.

The workshop, held on 5 and 6 December in Brussels, brought together a group of researchers, experts and policymakers. It's a first of a series of JRC Anticipation events that will explore topics of medium to long-term relevance to future EU policies.



NUCLEAR MEDICINE

<http://itu.jrc.ec.europa.eu/index.php?id=451>

New treatment against invasive fungal diseases

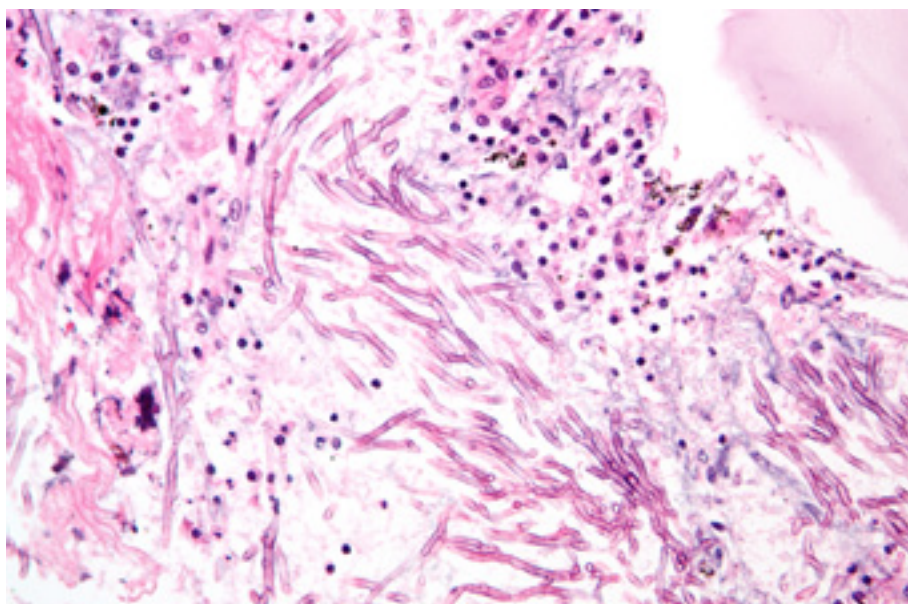
Invasive fungal infections (IFI) are a major threat to individuals with cancer, transplants, HIV, and other conditions that weaken their immune system. New research has shown that radio-immunotherapy (RIT) could be a promising new avenue for development of new types of treatment of fungal diseases, according to the article "Toward Developing a Universal Treatment for Fungal Disease Using Radioimmunotherapy Targeting Common Fungal Antigens", published by JRC scientists in collaboration with other researchers in the scientific journal *Mucopahtologia* (November 2011).

The results of the research project indicate that RIT could have distinct advantages over existing therapies as it can better remove fungal pathogens, is less likely to lead to development of resistant strains, and may shorten the duration of the treatment. In addition, RIT is less toxic than current antifungals.

Fungal diseases can be life threatening to patients with immune compromised

conditions. The number of cases has more than tripled since 1979. The need for new approaches to treat fungal diseases is highlighted by the fact that there are significantly fewer available medications for such diseases than for

bacterial diseases, and that the most recent generation of antifungal medication was developed ten years ago, which increases the risk of developing resistant strains.



Micrograph image of a pulmonary Aspergillus hyphae infection. Such infections develop mainly in individuals who are immunocompromised.

NANOMATERIALS

<http://pubs.acs.org/doi/pdf/10.1021/nl2029095>

Innovative method to study impact of nanoparticles on proteins

Scientists at the JRC's Institute for Health and Consumer Protection (IHCP) have contributed to the development of an innovative and highly sensitive method to measure changes to the structure and stability of proteins interacting with nanoparticles. The research, done in collaboration with the Diamond Synchrotron Radiation source in the UK, showed that human serum albumin – the most abundant protein in blood plasma – loses stability when it interacts with silver nanoparticles. On the contrary, this destabilisation does not happen when the protein interacts with gold nanoparticles.

This new technique will provide much needed data on the relative stability of key biological proteins and assist in understanding and predicting the potential toxicology of nanomaterials. This particular research is critical for the health and safety assessment of current and future nanomaterials. There is great potential for nanomaterials in numerous fields, however, their exact effects on biological systems is not yet clear, highlighting the importance of such research. This type of work may eventually contribute to

the design of the next generation of non toxic nanoparticle-based drug delivery systems.



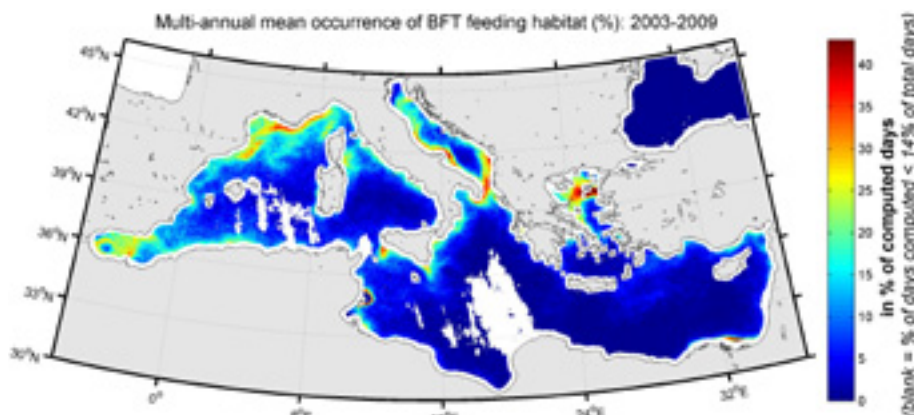
Scientist loading a sample on an atomic force microscope.

MARINE PROTECTION<http://ipsc.jrc.ec.europa.eu/index.php/Fishreg/288/o/>**Satellite data can help protect bluefin tuna**

A new model developed by JRC scientists makes it possible to track the potential presence of bluefin tuna through daily updated maps, helping to protect endangered stocks and fight illegal fishing.

The model, based on satellite remote sensing data, provides for the first time an overall view of the preferred bluefin tuna habitats in the Mediterranean Sea, as well as their changes over time. Satellite-based habitat mapping can help identify more precisely areas to be inspected or to be closed for fisheries and it can also help refine estimates of fish stocks, thus contributing to a more effective fisheries management.

The results achieved through the model clearly highlighted that bluefin tuna feeding and spawning is concentrated in some recurrent locations, especially the northern side of the Mediterranean. Reproduction starts in May in the eastern



part of the Mediterranean and ends in July in the western part.

However, the results also showed that habitat size and locations vary strongly according to the season, as well as high year-to-year variations for the potential spawning habitat depending on regional weather conditions. Understanding these variations is key to defining Marine Protected Areas (or sensitive areas) for this species.



Bluefin tuna caught out of the cage in Castellammare del Golfo, Italy.

GMOs<http://www.springer.com/food+science/book/978-1-4614-1389-9>**New GMOs guide: from legislation to detection and new challenges**

A new scientific publication "How to reliably test for GMOs", co-authored by JRC's Institute for Health and Consumer Protection (IHCP) and the Slovenia's National Institute of Biology (NIB), provides an overview of the current legislation and latest methods for testing genetically modified organisms (GMOs). The 100 page guide is addressed to professionals and practitioners within national authorities and testing laboratories worldwide. It was published by Springer.

The guide offers an overview of GMOs legislation and gives practical information for testing GMOs, such as the organisation of the laboratory, latest detection methods and their verification, as well as DNA extraction. Special focus is given to qualitative and quantitative real-time Polymerase Chain Reaction (PCR)

analysis relevant to all areas where detection and identification rely on nucleic acid-based methods. The PCR technique is nowadays the most commonly applied methodology in GMO analysis. It is an in vitro technique used to amplify a specific DNA region that lies between two other regions of known DNA sequence.

The JRC has more than a decade of experience in developing methods for detecting the presence of GMOs in food and feed, including the development of certified reference materials. Since becoming operational in 2004, JRC's Reference Laboratory has validated some 70 methods for GMO detection, while ten additional methods are in the process of assessment.



JRC contributes to the validation of important GMO detection methods.

STANDARDS

<http://irmm.jrc.ec.europa.eu/>**JRC shortlists denaturants to combat alcohol tax fraud**

JRC scientists have set up a shortlist of denaturants to harmonise denaturing practices and reduce cases of fraud and tax evasion of alcoholic beverages. The shortlisted substances should replace the over 100 different substances used in Member States to denature alcohol for non-human consumption.

Under a request from the European Commission's Directorate-General for Taxation and Customs Union, JRC scientists identified reliable denaturants that could be used throughout the EU. The shortlist includes isopropyl alcohol (IPA), methyl ethyl ketone (MEK), denatonium benzoate, tert-butyl alcohol (TBA) gasoline, ethyl tert-butyl ether (ETBE) and ethyl acetate (EA).

Denaturants are strong-smelling and/or bitter tasting agents which are used to make alcohol unfit for human consumption. Denatured alcohol is used for example in screen-washer fluid, perfumes and solvents, and is not subject to alcohol taxes. The European Commission will now examine how to adopt the proposed denaturants throughout the EU. The aim is to have a voluntary transition over time to the new denaturants in order to harmonise European practices for denaturing alcohol.

Untaxed alcohol, such as window cleaner fluid, has denaturants added to render it unfit for human consumption.

LANGUAGE TOOLS

<http://langtech.jrc.ec.europa.eu/>**JRC system excels in multilingual automatic summaries**

NewsGist, a language software developed by the JRC's Institute for the Protection and Security of the Citizen (IPSC), had the best results among 10 participating software packages in one of the three competing categories at the international Text Analysis Conference (TAC) held on 14 and 15 November in Gaithersburg, Maryland, the US.

The conference is organised annually by the US National Institute of Standards and Technology (NIST), with the support of the US Department for Defense. It offers a series of workshops and evaluations aimed at encouraging research in language technologies. JRC system developers took part in the category "Summarization" which considered systems that produce coherent summaries of text.

Participants were asked to produce a short, coherent summary of less than 250 words out of a set of 10 related news articles each in seven languages (Arabic, Czech, English, French, Hebrew, Hindi and Greek). According to the jury, the JRC's system was ranked best in all languages except Arabic and Hindi, where each time it reached the fourth place. In a similar task for monolingual English systems, JRC was placed twelfth out of 50 evaluated systems, and second when measuring the avoidance of redundancy.

NewsGist is the summarisation system behind the JRC's Europe Media Monitor (EMM <http://emm.newsbrief.eu/>

[overview.html](#)), which gathers around 100,000 news articles every day from over 3,000 news sources in 50 languages and groups them in topic-homogeneous news clusters for each language. The core of the summarizer, used for the multilingual task, uses latent semantic analysis to extract the most important sentences about a given topic. Being highly language-independent, the JRC's summarisation system guarantees similar performance across languages.



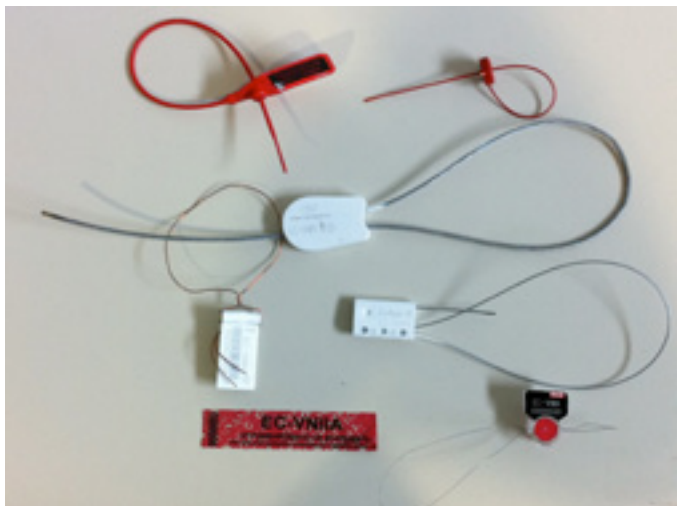
The JRC's NewsGist gathers around 100,000 news articles every day from over 3,000 news sources in 50 languages and then categorises them relative to topic.

NUCLEAR SAFETY

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

JRC tests Russian mechanical seals

Nuclear safety experts of the JRC Institute for Transuranium Elements (ITU) assessed Russian produced mechanical seals to be deployed at nuclear power plants and made recommendations on their use to an official Russian delegation.



Mechanical seals developed in Russia.

It is a common practice that such vulnerability assessment is performed outside the country of production in order to provide better input for possible corrections and improve safety. EU developed mechanical seals were recently tested in the US.

The assessment included seven different mechanical seals intended for in-situ safeguards applications in nuclear facilities controlled by Rosatom, the national atomic energy corporation. After having used different ways of tampering with the seals during several weeks, in a final phase the JRC researchers worked with a Russian vulnerability expert, experienced with the installation and protection of the seals against possible tampering attacks.

Following the evaluation, the experts agreed that some of the seals should not be deployed due to their vulnerability to tampering, while others needed modifications by the manufacturer before possible use. The results were subsequently presented to an official Russian delegation. The project was part of the European Commission technical assistance programme TACIS to post-Soviet countries.

NUCLEAR SECURITY

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

Training: JRC expertise supports nuclear safety and security in the post-Soviet region

JRC specialists offered their expertise in the fields of nuclear security and combating illicit trafficking in three different workshops for government experts from four post-Soviet countries. A two-week training course on high-resolution gamma-ray spectrometry was held for participants from Moldova and Georgia to contribute to establishing nuclear forensics core capabilities of the two countries. Organised within the European Commission's Technical Assistance programme TACIS which is addressed to former Soviet Union countries, this pilot course featured principles of radiation detection by various types of detectors, standard characteristics of high-purity Germanium detectors, electronics for gamma spectrometry, use of specialised gamma-spectrometric software, efficiency calibrations, activity calculations and determination of the isotopic composition of Uranium and Plutonium.

Another training course, focusing on nuclear security and funded by the International Atomic Energy Agency (IAEA), was held in October on the premises of JRC's Institute for Transuranium Elements (ITU). JRC researchers shared expertise on detection and response to illicit trafficking of nuclear and radioactive material with national trainers from Kazakhstan and Uzbekistan.

A separate workshop, organised jointly by the JRC and the Georgian Ministry of Internal Affairs (MOIA), addressed the managing and operational aspect of radiation detection equipment deployed at the borders and ports of the Caucasian country in response to threats to international security. This co-operation aims to enhance the global capacity to deter and detect illicit trafficking of nuclear and other radioactive materials at international border crossings, seaports, and airports.



Introduction to a radiological instrument.

CO-OPERATION AGREEMENTS

Swiss Confederation extends collaboration with JRC on air pollution control

In an agreement signed on 16 December, the Swiss Confederation and the JRC extended their joint research and development work on exhaust emission standards until 2014. Through the close co-operation between the Swiss Federal Office for the Environment (FOEN) and the JRC, Switzerland has reinforced the information exchange with the EU in air pollution control and numerous joint projects have been undertaken since 2007.

The extended agreement will allow FOEN and the JRC to continue with the joint development of exhaust emission test procedures for combustion engines, methods for the analysis of fuels as well as test procedures for newly developed vehicles and engines. Furthermore the two parties will examine the impact of emissions on health, climate and environment.

JRC signs agreement with the science academies of the Danube region

The JRC has signed an agreement for closer cooperation with the Academies of Sciences of the Danube region Member States. The signatories are the Bulgarian Academy of Sciences (BAS), the Hungarian Academy of Sciences (HAS), the Romanian Academy (RA) and the Slovak Academy of Sciences (SAS). The agreement, which comes in the context of the EU Strategy for the Danube Region, was signed at the fifth edition of the World Science Forum, organised by the Hungarian Academy of Sciences in partnership with UNESCO, ICSU, and AAAS.

The letter announces the launch of a Scientific Cooperation Initiative "Science for the Danube Strategy". Cooperation activities are envisaged in broad areas of mutual interest such as environmental information systems, modelling (for

example in agriculture and climate change), sustainable management of natural resources (for example in water, soil, forests, air, land, biodiversity) and environmental risks (for example in forest fires, droughts, floods, desertification).

This initiative will be open to other countries' National Academies from the Danube region to join, contribute to and benefit from the common activities of the partnership.

The EU Strategy for the Danube Region aims at boosting the development of the region through an innovative and integrated approach in addressing its challenges. Member States endorsed the EU Strategy for the Danube Region at the General Affairs Council on 13 April 2011.



JRC signs an agreement with the Academies of Science of the Danube region Member States.

EXTERNAL RECOGNITION

JRC scientist on Board of Trustees of the Bulgarian Academy of Sciences

Dr. Arnulf Jäger-Waldau has been appointed a Member of the Advisory Committee "Energy and Energy efficiency" of the Board of Trustees of

the Bulgarian Academy of Sciences. Dr. Jäger-Waldau is a Scientific Officer and Senior Scientist at the Renewable Energy Unit of the JRC's Institute

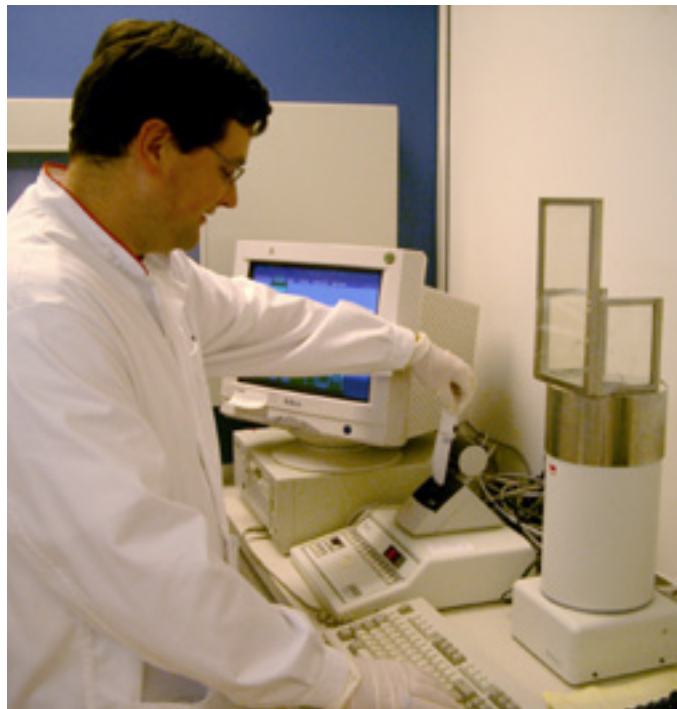
for Energy and Transport. Following his appointment, he will regularly take part in the Advisory committee meetings.

Alpha therapy study wins a second award

A study on targeted alpha therapy of neuroendocrine tumors, carried out jointly by the JRC and the University of Heidelberg, received the Trainee Research Prize at the 97th annual meeting of the Radiological Society of North America (RSNA), held in Chicago from 27 November to 2 December. It is the second prize for the study "Regional ^{213}Bi -DOTATOC Peptide Receptor Alpha-therapy in Patients with Neuroendocrine Liver Metastases Refractory to Beta Radiation", which already received the Young Investigator Award of the Society of Nuclear Medicine last June.

The paper presents the results of a clinical study of the treatment of patients suffering from neuroendocrine tumors using targeted alpha therapy with ^{213}Bi -DOTATOC. Due to the high energy of alpha radiation, combined with its very short range in human tissue, targeted alpha therapy allows highly effective destruction of tumor cells while minimising toxicity to healthy tissue.

The RSNA meeting is the world's largest annual radiology meeting with nearly 60,000 participants. The RSNA membership counts over 48,000 medical imaging professionals, including radiologists, radiation oncologists, medical physicists and allied scientists.



JRC scientist working in hospital on alpha therapy.

UPCOMING EVENTS

BT YOUNG SCIENTIST & TECHNOLOGY EXHIBITION

IE

DUBLIN, 10-14 JANUARY



The 48th edition of the BT Young Scientist & Technology Exhibition will be held 10-14 January 2012 in Dublin, Ireland. This annual competition

aims to encourage young people's interest in science and research awards over 100 prizes to second level students.

Besides 520 competing student projects on display, this edition will rely on four exhibition halls filled with science and technology based exhibits

and entertainment, making it a thrilling event for those who enter and for general visitors too.

JRC will participate with a stand showcasing its activities. The exhibition attracts over 40,000 people making it one of the largest events of its kind in Europe.

50TH ANNIVERSARY

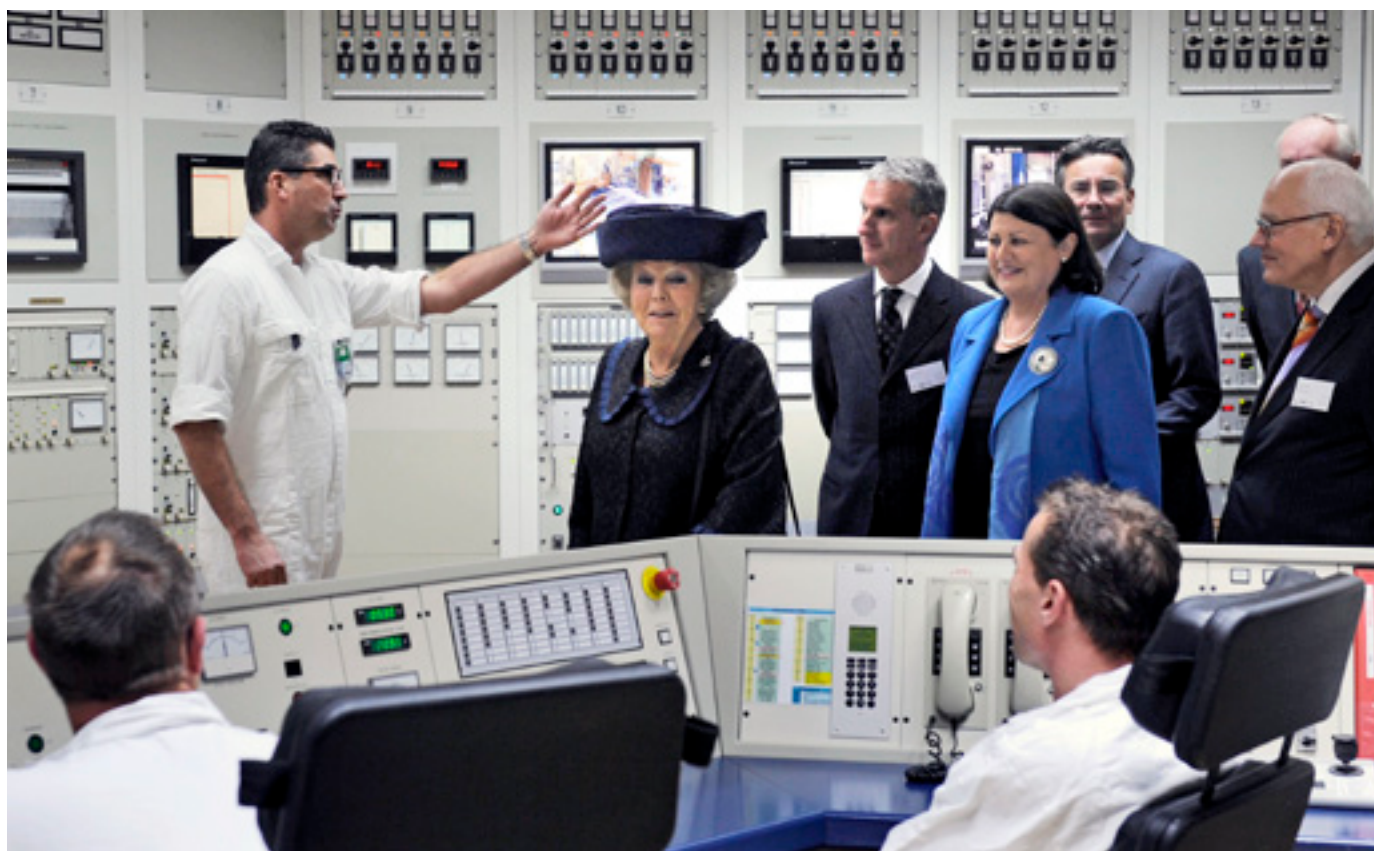
JRC and Netherlands: 50 years of research collaboration

On 22 November the JRC Institute for Energy and Transport (IET) and the Dutch Nuclear Research and Consultancy Group (NRG) celebrated the 50th Anniversary of the High Flux Reactor (HFR) in Petten, and 50 years of research co-operation between the European Commission and the Netherlands. Queen Beatrix of the Netherlands, Máire Geoghegan-Quinn,

European Commissioner for Research, Innovation and Science, as well as Maxime Verhagen, the Vice Prime Minister of the Netherlands joined the event along with policy makers and researchers.

The High Flux Reactor in Petten is owned by the Commission and operated by the NRG. Originally

designed for research purposes, it is a major supplier of medical isotopes, which are used worldwide in cancer treatment and diagnosis. A symposium “Forward Thinking” took place on the occasion of the event. At the end of the programme the guests visited IET laboratories and the High Flux Reactor.



HM Queen Beatrix of the Netherlands and Commissioner Geoghegan-Quinn visiting the High Flux Reactor in Petten.

EU-US COLLABORATION

Building a transatlantic scientific bridge for enhanced policymaking

European and American policymakers, researchers and industry representatives on 21 November discussed closer scientific co-operation in support of clean energy and sustainable mobility. The high level Brussels-held seminar was jointly organised by the JRC and the US Mission to the European Union. Titled ‘Building a Transatlantic Scientific Bridge’, it was timely scheduled

ahead of two key events: the US-EU summit and the Transatlantic Economic Council in Washington, held on 28 and 29 November respectively, featuring science and electro-mobility high on the co-operation agenda.

Future climate change, transport and energy policy objectives will require a major transformation of the

US-EU electricity infrastructure and related services and technologies. Upgrading existing networks is of paramount importance to integrating an increasing amount of renewable energy generation, enhancing grid security, fostering e-mobility, developing the internal energy market and realising energy saving and efficiency.

SPACE WEATHER

Space-weather awareness event recommends concrete actions

The Space Weather Awareness Dialogue, co-organised by the JRC and Directorate-General Enterprise and Industry on 25 and 26 October in Brussels, focused on the potential impact of extreme space weather events on modern technological infrastructures in space and on the ground.

The participants sought to identify related scientific, operational and policy challenges for disaster prevention, preparedness and response, risk mitigation but also to make recommendations for concrete actions to protect susceptible infrastructures. Besides EU and Member States policy-makers and experts, the Dialogue attracted – as panellists – senior officials from the NASA Ames Research Center, the

World Meteorological Organisation and the US National Oceanic and Atmospheric Administration (NOAA).



Participants at the Space-Weather Awareness Dialogue.

INNOVATION CONVENTION

JRC success stories showcased at the Innovation Convention

This first edition of the Innovation Convention, held in Brussels on 5 and 6 December 2011, gathered world leading experts in research and innovation to share their views on building a global innovation economy. The conference – taking place one year after the adoption of the Innovation Union flagship initiative – was opened by the President of the European Commission, José Manuel Barroso.

The JRC was present with a selection of its success stories. These included: Plasmore, a JRC spin-off using

nanotechnology to develop portable biosensors; Sesamonet, a system to improve the mobility and safety of visually impaired persons; and 3D-reconstructor, an innovative 3D software to monitor nuclear installations.

JRC innovation experts presented the European TTO Circle, officially launched earlier in 2011 with the objective to strengthen the technology transfer offices of public research organisations.

OPEN POSITIONS

JOBS AT THE JRC

<http://www.jrc.ec.europa.eu/jobs>

RECENTLY PUBLISHED

(Applicants must submit their application no later than the indicated deadline)

Ispira, Italy

Ph.D. students (Cat.20)

- Climate Change and Air Quality Unit - Trend Analysis of global greenhouse gases and air pollutants emissions – **17 January**
- Land Management and Natural Hazards Unit - Future flood risk in Europe in view of climate change and land use dynamics – **17 January**
- Land Management and Natural Hazards Unit - Global forecasting of hydrological extremes and

water availability – **17 January**

Post-doc researchers (Cat.30)

- Engineer or scientist in multi sensor data fusion for maritime vessel tracking – **6 January**
- Climate Change and Air Quality Unit - Climate modelling and renewable energy resource assessment – **17 January**
- Climate Change and Air Quality Unit - Modelling impact of air quality on the carbon balance of terrestrial ecosystems – **17 January**

- Global Environment Monitoring Unit - Development of Low Resolution imagery advanced processing system – **17 January**
- Global Environment Monitoring Unit - Environmental Monitoring of Protected Areas through Remote Sensing – **17 January**
- Global Environment Monitoring Unit - Optical Remote Sensing of the Extreme in European & African Seas – **17 January**
- Land Management and Natural Hazards Unit - Analysis of climatology

and ensemble forecasts of European and global fire weather – 17 January

- Land Management and Natural Hazards Unit - Assessing current and future forest resources in Europe under diverse policy/climate scenarios – 17 January
- Land Management and Natural Hazards Unit - European Land Use Modelling Platform: economic land functions – 17 January
- Land Management and Natural Hazards Unit - European Land Use Modelling Platform: models integration – 17 January
- Land Management and Natural Hazards Unit - Hydrological modelling and statistical postprocessing of hydrological model output – 17 January
- Monitoring Agricultural Resources Unit - Automatic processing of LPIS inspection records in support of screening activities – 17 January
- Monitoring Agricultural Resources Unit - Best practices in space data policy and space data access – 17 January
- Monitoring Agricultural Resources

Unit - Crop Model Development and Application in Climate Change Impact Studies – 17 January

- Monitoring Agricultural Resources Unit - Crop monitoring and food security assessment – 17 January
- Monitoring Agricultural Resources Unit - Geo data modelling for agricultural policy management – 17 January
- Monitoring Agricultural Resources Unit - Satellite image portal developments – 17 January
- Rural, Water and Ecosystem Resources Unit - Assessment of biophysical criteria in Areas with Natural Handicaps – 17 January
- Rural, Water and Ecosystem Resources Unit - Modelling of water-borne diseases and chemicals – 17 January
- Rural, Water and Ecosystem Resources Unit - Water Economics and Valuation of Watershed Services – 17 January
- Rural, Water and Ecosystem Resources Unit - Water resources optimisation modelling – 17 January
- Sustainability Assessment - European Platform on Life Cycle Assessment and Environmental Footprint – 17 January

• Sustainability Assessment - Sustainability and Europe beyond 2020 – 17 January

Senior researchers (Cat.40)

- Monitoring Agricultural Resources Unit - Crop modelling for food security monitoring – 17 January
- Risk mapping of chemical infrastructures – 20 December 2011

Seconded National Experts

- Expert in the collection, handling and analysis of aviation accident and incident reports – 6 January

Petten, The Netherlands

Post-doc researchers (Cat.30)

- Compressed hydrogen technologies: safety and performance assessment of hydrogen storage components” Hydrogen Safety in Storage and Transport – 21 December
- Nuclear Engineer for Nuclear Knowledge Management Activities – 20 January

Senior researchers (Cat.40)

- Scientific and technological support to batteries testing activities – 30 January

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