Working together for the responsible use of nuclear energy

Nuclear safety is an absolute priority for the EU. This is why the European Commission is developing, in line with the Euratom Treaty, the most advanced legal framework for nuclear energy in Europe, based on the highest standards for nuclear safety, security and non-proliferation.

A fundamental step was the adoption of the 2009 Nuclear Safety Directive, with the support of the 27 Member States and the European Parliament. A similar initiative is now being developed for the safe management of spent fuel and radioactive waste. This makes the EU a real model for the world.

These EU initiatives are in line with the growing worldwide recognition of the need for the responsible use of nuclear energy, particularly in the current context of increasing interest in this source of energy. This was highlighted at the highest political level earlier this year during the Paris Conference on Access to Civil Use of Nuclear Energy, the Washington Nuclear Security Summit, and the Non-Proliferation Treaty Review Conference in New York.

Ever since its creation, the JRC has closely supported Euratom on these issues. The JRC was originally established in 1957 under the Euratom Treaty. Although the JRC expanded its range of activities to non-nuclear fields and transformed its role beyond pure research, it remains a key partner for achieving Euratom’s policy objectives.

Let me cite just a few examples of this fruitful cooperation in the areas of nuclear safety, security and non-proliferation.

The JRC provided key contributions for nuclear safety, in particular in the context of EU enlargement and also more recently by creating a European Clearinghouse for Operational Experience Feedback and a European (nuclear) Human Resources Observatory.

Another example is the area of nuclear safeguards which is increasingly recognised as a cornerstone of a robust international nuclear security and non proliferation regime. Euratom has established the world’s most advanced regional safeguards framework. In this context as well, the JRC has developed a recognised expertise and provided essential support, including in the areas of Euratom inspections and illicit trafficking of nuclear materials.

“Through its wide-ranging activities, the JRC contributes to maintain Euratom's competence and expertise in nuclear research”

Through its wide-ranging activities, the JRC contributes to maintain Euratom’s competence and expertise in nuclear research. One very promising area for the future is the development of generation IV nuclear reactors, for which it is contributing very actively, in particular in the context of the Strategic Energy Technology Plan. As Euratom’s implementing agent in the Generation IV International Forum, the JRC ensures a pivotal role for Europe in the field of future nuclear fission technologies.

Over the last years and in particular during the term of Director-General Roland Schenkel, it was possible to put in place a very fruitful cooperation between Euratom and the JRC. This has resulted in a clear connection between the JRC’s nuclear activities and the main priorities of European nuclear energy policy, thus contributing to increased nuclear safety, security, safeguards and technological excellence in Europe.

Dominique Ristori
Deputy Director-General for Energy, European Commission
The JRC Innovative Projects Competitions aim at stimulating JRC researchers to transform their ideas or research results into new innovative products or processes with market potential.

This year’s Innovative Projects Competition has attracted remarkable interest. Twenty-two applications were received among which twelve projects were selected for funding:

**Spectrally interrogated multiplexing biochips for the label-free analysis of biological samples**

This project aims to develop a spectrally interrogated multiplexing Surface Plasmon Resonance (SPR) system, which will serve as an alternative to imaging techniques for the label-free analysis of complex biological samples. This novel SPR system will account for drawbacks found in current methods such as reduced sensitivity. To achieve this system, many (> 50) micrometric SPR sensors, with well-designed different spectral responses, will be integrated and interrogated at the same time on the same biochip surface. [P. Colpo, F. Rossi, G. Marchesini]

**Development of portable system for the contactless detection of hidden persons**

The objective of this project is to develop a laboratory prototype of a portable system to detect hidden persons and a scanner for commercial containers based on multiple electrostatic sensors. The principle of operation has already been proved with a laboratory prototype. The main application of the system is in detection of people that are illegally trying to enter a country by hiding inside commercial containers. [C. Coutsomitos, L. Faggion, E. Stringa, G. Azzalin]

**Design and development of a pocket diffusive sampler for VOCs to POPs**

The goal of this project is to develop a diffusive sampler for volatile organic compounds (VOC) to persistent organic pollutants (POP) that can provide the maximum versatility for sampling different compounds and duration, and being able to easily modify the uptake rate. [P. Pérez Ballesta, E. Grandesso, R. Connolly]

**PESTO: Portable Energy Storage Box**

This project aims at designing and building a prototype of a portable energy storage unit for flexible, non carbon-based energy charge — mainly for solar/wind applications. This box will be able to store electrical and mechanical energy into compressed air energy. Compressed Air Energy Storage is more environmentally friendly than batteries, since it is a clean and sustainable energy production method, and is cheaper and easier to use. [G. Fulli, U. Von Estorff, L. Debarberis, H. Ossenbrink.]

**Novel software package for design review of safety-related systems of critical installations**

This project aims at developing a software package for implementing a novel methodology to support safety engineers in reviewing the design of complex systems such as nuclear or chemical installations, transport means etc. The goal is to remove both components that may cause accidents or increase the cost. This novel methodology aims at producing a uniformly protected system assuring a predefined safety level in a cost effective way. [S. Contini, L. Fabbri, V. Matuzas]

**High temperature silicone resin plastic**

This project sets out to investigate and characterise the thermal, mechanical, chemical and material science aspects of high temperature silicone resin based plastics. The

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**Twelve projects were selected for funding in this year’s JRC Innovative Projects Competition**

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**Industrial prototype of all weather area surveillance device for moving target detection**

This project aims at realising an industrial prototype of an all-weather area surveillance device for moving target detection in border surveillance. All-weather area surveillance systems have a major market for land and sea border control in Europe and abroad. With its expertises in synthetic-aperture radar (SAR) technology, the JRC has already developed a low-cost laboratory prototype of a novel area surveillance device based on radar imaging. [D. Tarchi, R. Giuliani, F. Oliveri, P. F. Sammartino]
intention is to fully understand their merits, limitations and potential as well as to exploit them in real industrial and specialist environments. The material has not yet been tested in numerous fields such as, for example, nuclear, space, food, human implant applications. [D. Ward]

Support software for evaluating data from GMO screening results

This project will provide a computerised Decision Support System (iDSS), enabling the interpretation and documentation of GMO screening results. Not only will such analytical iDSS greatly streamline and facilitate enforcement efforts for compliance with European legislation, such a system moreover represents a considerable aid and money-saving tool at the laboratory level. [M. Van den Bulcke, E. Ben, L. Cengia]

Cassette system for automated synthesis of Bi-213 labelled radiopharmaceuticals

The aim of this project is to develop an industrial prototype of a single-use cassette system that allows the operation of the ITU standard Ac-225/Bi-213 radionuclide generator and the synthesis of radiopharmaceuticals labelled with the therapeutic alpha emitter Bi-213 in a fully automated manner. [A. Morgenstern, F. Bruchertseifer, C. Apostolidis]

Nano crystalline UO2 – industry application (nuclear)

This project involves the manufacture of nanocrystalline (nc)-UO2- powders and bulk pellets to be tested under irradiation. The aim is to develop a fuel constituted of nc-UO2 material which due to faster relief of the fission damage by defects recombination at the multiple grain boundaries (GB) of the nanostructure, in addition to the enhanced plasticity and gas retention, will have also the possibility to sustain longer periods of irradiation in a reactor. Very recently, computer simulations for nc-Cu emphasised the role of the nc-interfaces to heal radiation damage, suggesting nanocrystalline materials in general being the most promising materials for the construction of future nuclear reactors. [J. Spino, R. Jovani Abril, R. Malmbeck, J. McGinley, A. Cambriani, M. Holzhaeuser, J. Somers]

Automatic multilingual indexing of parliamentary documents

Purpose of this project is to develop a software tool that automatically or semi-automatically categorises parliamentary documents according to the thousands of classes of the multilingual Eurovoc thesaurus, in all official EU languages. The software would be used by the libraries of many national parliaments in the European Union and the Publications Office of the European Institutions. [R. Steinberger, M. Turchi, E. van der Goot]

Production of a ready-to use GMO screening test kit for enforcement purposes

This project aims at producing a ready-to-use test kit for GMO analysis. In this way, it is foreseen that a cost-efficient solution will be provided to the request of harmonised GMO screening methods by the enforcement laboratories, facilitating compliance with European legislation on the commercial use of GMOs. [M. Van den Bulcke, L. Kluga, N. Foti, J-M. Gineste, T. Weber]

Towards an open and competitive economy

INNOVATION

http://iri.jrc.ec.europa.eu/

2010 corporate R&D investment: limited effects of the crisis

The 2010 EU R&D Industrial Investment Scoreboard has been published on 26 October. R&D investment by top EU companies fell by 2.6% in 2009, even though sales and profits fell much more, by 10.1% and 21.0% respectively. The fall in R&D investment by leading players in the US, at 5.1%, was twice as sharp as in the EU, but the worldwide reduction was lower, at 1.9%. Japanese firms maintained their level of investment. Companies based elsewhere in Asia - China, India, Hong Kong, South Korea and Taiwan - continued the high R&D growth seen in previous years.

Japanese car maker Toyota is the world’s biggest R&D investor (€6.8bn) for the second consecutive year. Three EU companies feature in the top ten: Volkswagen, the biggest investor based in Europe with €5.8bn, Nokia and Sanofi-Aventis. The Scoreboard covers the top 1400 companies worldwide.

Part of the Industrial Research Investment Monitoring activity carried out jointly by the JRC and the Research Directorate-General (DG RTD) of the European Commission, the scoreboard is the fruit of research conducted by the JRC Institute for Prospective Technological Studies, with overall monitoring and guidance provided by Directorate C (Research & Innovation) of DG RTD.
New regional competitiveness index highlights strong regional dimension

To improve the understanding of competitiveness at the regional level, the JRC’s Institute for the Protection and Security of the Citizen, together with the Commission’s Directorate-General for Regional Policy, has developed a new index to demonstrate the strengths and weaknesses of each of the 271 EU regions. This index incorporates a wide range of issues related to competitiveness including innovation, quality of institutions, infrastructure (including digital networks) and measures of health and human capital, and will be a crucial tool in assisting EU regions to set the right priorities to further increase their competitiveness.

The index measures the competitiveness of a region, including factors related to innovation and technological capabilities, to transport and communication infrastructure, health, education policies and quality of institutions.

In most countries, the capital region has the highest competitiveness score as the top ten table below indicates. This is also the case in countries with intermediate levels of competitiveness. For example, in Greece, Romania, Bulgaria, Hungary and Slovakia, the capital region is (by far) the most competitive.

The index reveals substantial differences in competitiveness within some countries. For example Belgium, Spain, Portugal, Italy and Greece all have significant regional differences in competitiveness. These results underline that competitiveness has a strong regional dimension, which national level analysis does not capture.

Assessing the robustness of international indexes

Three important indexes recently published by worldwide recognized organisations have been assessed for their robustness by scientists of the JRC’s Institute for the Protection and Security of the Citizen.

Global Competitiveness Index (GCI)

The 2010-2011 Global Competitiveness Report, released in September by the World Economic Forum (WEF), examines the factors enabling 139 national economies to achieve sustained economic growth and long-term prosperity. The WEF has made a substantial effort in collecting and grouping together 111 indicators into 12 pillars, each representing a crucial aspect of competitiveness: from infrastructure to higher education and training, from macroeconomic environment to health & primary education.

The JRC’s assessment addressed the robustness of the index with respect to assumptions on the weighting scheme, the role of the pillars in shaping the index final scores and the statistical consistency of the framework. Overall, the JRC found that GCI is robust to changes in weights and is a solid index where all the pillars almost equally contribute to the final score. In addition, the JRC
the Rule of Law Index™

The Rule of Law Index™ 2010, produced by the World Justice Project (WJP), is a thematic composite indicator that aims to gauge nations’ efforts in delivering the rule of law to their citizens in 35 countries worldwide. The conceptual framework for the WJP Rule of Law Index™ is based on survey data from 35,000 people and over 900 experts in 35 countries, including seven EU countries (Austria, France, Netherlands, Spain, Sweden, Bulgaria and Poland). Ten indices are considered, including for example “Absence of Corruption”, “Clear, Publicized and Stable Law”, “Fundamental Rights”, “Access to Civil Justice”.

The JRC’s analysis, which was as well based on the recommendations of the OECD (2008) Handbook on Composite Indicators, suggests that the WJP Rule of Law Index™ is statistically and conceptually coherent and that almost all dimensions are well balanced in their underlying components. This analysis spanned different iterations, since this cooperation started in 2009. In the present version of the indices, country classifications are fairly robust to methodological changes on the estimation of missing data, weighting or aggregation rule.

European Lifelong Learning Indicators (ELLI) Index

The ELLI index is a new aggregate measure for the country-level assessment of lifelong learning in the EU Member States. The ELLI index, an initiative led by the Bertelsmann Foundation, represents a first step towards making lifelong learning more tangible and measurable. The conceptual framework for the ELLI-Index identifies four major dimensions of learning: Learning to Know, Learning to Do, Learning to Live Together, Learning to Be.

The JRC analysis, which was based on the recommendations of the OECD (2008) Handbook on Composite Indicators, suggests that the 2010 ELLI-Index classification provides a reliable picture of the situation at the national level in the EU and can be used to generate a discussion about what policies contribute to lifelong learning, to study the association between lifelong learning and other concepts, such as competitiveness and innovation, and to provide insight into the nature of relevant policy challenges at the EU scale.

Development of a low carbon society

ENERGY EFFICIENCY

http://re.jrc.ec.europa.eu/energyefficiency/

Major ICT companies sign JRC-developed codes of conduct

On 28 September in the frame of the "ICT 2010-Digitally Driven" event, 16 more ICT firms have agreed to reduce the electricity consumption of their broadband equipment and data centres. The JRC’s Institute for Energy develops and manages voluntary codes of conduct for ICT companies that can reduce their energy consumption, in many cases by as much as 50%.

Information & communication technology (ICT) equipment and services consume over 8% of electrical power in the EU and produce about 4% of its CO2 emissions. These figures could double by 2020. Although a voluntary measure, 36 of Europe’s biggest ICT companies already apply the codes of conduct.

Broadband equipment accounts for around 15% of the ICT sector’s overall...
A new version of the SETIS website has been published, better structured for ease of access to information on particular low carbon technologies. SETIS, the Strategic Energy Technology Information System, is run by the JRC’s Institute for Energy in support of the Commission’s Strategic Energy Technology Plan (SET Plan).

New features include a toolkit where SETIS’ interactive tools, such as the Energy Cost Calculator and the ‘bubble chart’ on potential energy scenarios can be readily accessed. The site now also better integrates all available items on a particular technology and displays them on a single page. BIOMAP, another newly integrated feature, provides unique information on EU-funded and industrial projects as well as several aspects of biofuels technologies and feedstocks, including legislation, quality specifications and the key stakeholders.

The site will continue to evolve and include news on all low carbon technologies. In the near future, for example, information sheets on each technology, a comprehensive library of documentation and a regular e-newsletter highlighting the latest updates and news on SET-Plan activities will be included.
**Fish population in the North Sea: fishing pause during WWII provides unique insight**

A study published by a team of European scientists shows how the cessation of commercial fishing in the North Sea caused by World War II led to a profound change in the age structure or ‘complete demographic transition’ in the populations of resident fish.

Understanding the mechanisms via which commercial fishing pressures, management regimes and environmental changes interact with the ecology of wild fish populations is a key question for fisheries management science. Such questions are, however, difficult to address using recent time-series datasets as fishing pressure has been sustained and ubiquitous over recent decades. An unintended ‘experiment’ in fisheries science did however occur in
the North Sea during World War II when commercial fishing almost ceased because fishing vessel movements were restricted due to wartime dangers, and the fact that many fishermen were called up, and their vessels requisitioned for war service.

This study, published in *Naturwissenschaften*¹ and started at the JRC’s Institute for the Protection and Security of the Citizen as an Exploratory Research Project, examines the unintended effects of the six-year closure of the North Sea during World War II on migratory fish species, such as cod, haddock and whiting.

Creating protected areas where fishing is not allowed has proven useful to help the recovery of sedentary fish populations, but the utility of Marine Protected Areas (MPAs) for protecting migratory fish stocks in the temperate areas of the North is still debated. This study demonstrates that migratory fish populations benefit from the protection of marine areas against commercial fishing as well as sedentary species.

¹ An unintended experiment in fisheries science: a marine area protected by war results in Mexican waves in fish numbers-at-age
Doug Beare, Franz Hölker, Georg H. Engelhard, Eddie McKenzie and David G. Reid
*Naturwissenschaften* - 2010, Volume 97, Number 9, Pages 797-808

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**Increasing importance of alternative methods that avoid animal testing**

In September, the European Parliament has voted to revise legislation on animals used for scientific purposes. The revised legislation, first proposed by the European Commission in 2008, will strengthen the protection of animals still needed for research and safety testing. The new directive will also play a significant role in minimising the number of animals used in experiments, and require alternatives to be used where possible, whilst ensuring a level playing field for EU industry and enhancing the quality of research conducted in the EU. The JRC-run European Centre for the Validation of Alternative Methods (ECVAM) coordinates and promotes the development and validation of alternative test methods at the European Union level.

The "Three Rs" principle of replacing, reducing, and refining animal testing is firmly anchored in the new legislation. The Commission strongly supports efforts to find alternative methods to testing on animals. Where this is not possible, the number of animals used must be reduced or the testing methods refined so as to cause the least harm to the animals. The new Directive refers to a Union Reference Laboratory within the JRC which shall be responsible for coordinating and promoting the development and use of alternative procedures in the areas of basic and applied research and regulatory testing, as well as coordinating and participating in the validation of these approaches at EU level. The Reference Laboratory will thus continue the work carried out so far by ECVAM. Member States are required to contribute in this crucial activity by identifying and nominating suitable specialised and qualified laboratories, as well as ensuring the promotion of alternative methods at national level.

ECVAM, part of the JRC’s Institute for Health and Consumer Protection, carries out the scientific validation of alternative methods to animal testing developed and submitted by research laboratories. The assessment of the robustness, reliability and predictive capacity of the methods includes independent peer review of validation study reports. Its own scientific advisory committee, composed of 15 external scientists, supports the work of ECVAM. The Institute also engages with regulators and testing laboratories early in the process in order to ensure the relevance and suitability of the submitted alternative methods. Finally, ECVAM supports the post-validation regulatory acceptance process at both the European Union and at international level, particularly through the Organisation for Economic Co-operation and Development (OECD)’s Test Guideline Programme.

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**Safety of food and consumer products**

*Commercial artificial human skin test*
**FOOD SAFETY**

http://irmm.jrc.ec.europa.eu/EURLs/eurl_mycotoxins/

Mycotoxins remain a major concern in food imports

In 2009 the number of notifications in the EU’s Rapid Alert System for Food and Feed (RASFF) reached a total of nearly 8000, a 12% increase compared to 2008 and an all-time-high number. There were 557 alert notifications reporting on serious risks found in products on the market, of which two-thirds related to products originating in the EU, and most of these problems were detected by controls carried out on the market. Among the risks most reported through these alerts were the presence of pathogenic micro-organisms, allergens, heavy metals and mycotoxins. While the national authorities are responsible for the appropriate implementation of food safety legislation and controls, the JRC’s EU Reference laboratories (EU-RL) in this field play a leading role in maintaining a high level of confidence in the measurements and ensuring a harmonised approach between EU Member States, industry and stakeholders.

38% of border rejections concerned products refused entry because of too high levels of mycotoxins - toxic metabolites produced by fungi growing in food and animal feed. The EU-RL for mycotoxins, run by the JRC Institute for Reference Materials and Measurements (IRMM), co-ordinates activities related to the development and improvement of methods of analysis for the official control of the maximum levels. Working together with appointed national reference laboratories of the EU Member States, it develops analytical approaches and validates them in-house. In case a method is suitable and robust enough, the EU-RL organises an international collaborative study to validate the method and to assess the method performance. Furthermore, inter-laboratory comparisons organised by the EU-RL enable national labs to assess their performance and allow improving the overall correctness of analytical results for mycotoxins.

On behalf of the European Commission’s Directorate General for Health and Consumers, the JRC is currently managing six EU-RLs. These are located in the IRMM in Geel, Belgium and the Institute for Health and Consumer Protection (IHCP) in Ispra, Italy.

**GENETICALLY MODIFIED ORGANISMS**

http://ecob.jrc.ec.europa.eu/

Report: best practice for cultivation and coexistence of GM maize

Specific measures relating to storing and the application of isolation distances can help limit or avoid the co-mingling of genetically modified (GM) maize with conventional and organic maize, a report prepared by the European Coexistence Bureau (ECoB) concludes. The “Best Practice Document”, published by the JRC Institute for Prospective Technological Studies (IPTS), notes that storing seeds adequately and applying spatial isolation (separation distances, buffer zones and/or discard zones) are the best ways to limit or avoid co-mingling. Alternative practices based on temporal isolation (shifting flowering times of GM and non-GM fields) are possible in several EU countries with specific climatic conditions.

The “best practice” document, which essentially contains a set of non-binding practices that aim to assist Member States to develop and refine their national or regional approaches to co-existence, covers the cultivation of GM maize up to the first point of sale. It deals with three types of productions: grain, whole plant and sweet maize.

The ECoB analysed the potential sources of admixture and reached a set of consensually agreed, best agricultural management practices that will ensure coexistence while maintaining the economic and agronomic efficiency of the farm.

In 2006, the Council invited the Commission to further work on coexistence in order to identify best practices for technical segregation measures and to develop crop-specific guidelines for coexistence. The Commission created the ECoB in 2008. The Bureau consists of experts nominated by interested Member States (20 Member States currently participate) and a scientific secretariat provided by JRC-IPTS.

Work on the “best practice” document was carried out in close cooperation with stakeholders and the final outcome allows EU Member States the necessary flexibility to adapt the measures to their specific regional and local conditions.
JRC and EPA’s National Centre for Computational Toxicology to collaborate

The JRC Institute for Health and Consumer Protection (IHCP) and the National Centre for Computational Toxicology (NCCT) of the United States Environmental Protection Agency have signed an agreement to facilitate exchange of research materials and results useful for the development of integrated methods for predicting chemical toxicity.

The NCCT, through its ToxCast programme, is generating toxicological profiles of hundreds of reference chemicals using a comprehensive array of automated high throughput screening assays. The intention is to use this unique dataset to build computational models to identify chemicals that may have adverse effects on human health and the environment, and to establish priorities for more in-depth testing. This endeavour fits well with the work programme of the IHCP in the area of chemical safety, where efforts are focused on the design and evaluation of integrated testing strategies for predicting chemical toxicity, by combining chemical-grouping approaches, computational modelling and in vitro testing.

A common theme underlying this collaboration is the shift towards mode-of-action or toxicological pathway based hazard assessment which is expected to provide a scientifically grounded regulatory framework where alternative methods are a key component, thus reducing the reliance on animal testing.

The IHCP’s High Throughput Screening (HTS) facility is equipped with sophisticated robotic platforms for reliable and rapid testing of chemicals on cell cultures.

Rapid and accurate method for uranium age dating

A new method for rapid and accurate age dating of uranium materials has recently been developed by scientists at the JRC’s Institute for Transuranium Elements (ITU). The method, which is described in detail in a paper accepted for publication in International Journal of Mass Spectrometry, is an important step forward in establishing accurate geological time scales.

The method is based on a direct measurement of the amount of parent nuclide (U-234) and daughter nuclide (Th-230) by sector field Inductively Coupled Plasma Mass Spectroscopy (ICP-MS), a type of spectroscopy that is based on coupling together an inductively coupled plasma as a method of producing ions with a mass spectrometer for separating and detecting the ions. The challenges arising from the spectral interferences experienced whilst using this method were overcome by data post processing using a peak deconvolution algorithm.

In the framework of the cooperation between the JRC and the U.S. Department of Energy, a task sheet on uranium radiochronometry standards was agreed to and signed last year. In the first semester of this year, ITU performed accurate age dating measurements on uranium reference materials, provided by the New Brunswick Laboratory (NBL), using this new methodology. The experimental results agree very well with their nominal age according to the NBL’s record.
Euratom and Canada strengthen cooperation in nuclear safety and safeguards

Canada and Euratom, represented respectively by Atomic Energy of Canada Limited (AECL) and the JRC as well as the Commission’s Research and Energy Directorates-General, strengthened their ongoing collaboration during their annual coordination meeting held on the 15-16 September at the premises of the JRC Institute for Reference Materials and Measurements (IRMM) in Geel, Belgium.

Both partners have shown interest in developing scientific co-operation in the fields of nuclear safety, nuclear technology and safeguards. Areas for ongoing and potential additional collaboration include:

- nuclear safety for existing power reactors (participation in the network on reactor aging assessment, the network on maintenance and periodic review, the clearinghouse on operational experience feedback);
- complementary post irradiation examination of high-burnup CANDU fuels;
- safeguards (design and technology for equipment for safeguards activities at Romanian CANDU reactors);
- high quality neutron measurements for Deuterium at the JRC-IRMM laboratories;
- participation of Canadian students to JRC fellowship schemes.

The next coordination meeting will be held in October 2011 in Canada.

Radio frequencies for new and faster wireless services

A five year policy programme for the use of the EU’s radio spectrum was proposed on 20 September by the European Commission. The proposal includes steps to promote efficient spectrum management and, in particular, to ensure that sufficient spectrum is made available for wireless broadband. It also calls for improvement in the standardisation process. The JRC together with various standardisation bodies, such as the CEPT — European Conference of Postal and Telecommunications Administrations — work closely to assure that services and wireless devices can be used seamlessly across borders.

Access to radio spectrum is essential for a huge range of activities from telephony and broadcasting through to transport and space applications. As not all the demand for spectrum can be satisfied, priorities need to be defined which ensure that spectrum is allocated and used in an efficient and effective way while ensuring the avoidance of harmful interference.

Through experimental activities carried out in the European Microwave Signature Laboratory (EMSL), the JRC’s Institute for the Protection and Security of the Citizen is supporting the Commission’s Directorate-General for the Information Society and Media in the implementation of the EU radio spectrum policy. For example, in 2009 JRC’s scientists carried out in EMSL reference measurements to assess the possible coexistence of Ultra Wide Band (UWB) technology with broadband wireless access and radar systems. These measurements allowed scientists to experimentally validate the technical limits set in the Commission Decision (2009/343/EC) which were exclusively based on numerical models and simulations specified by the Conference of European Postal and Telecommunications Administrations (CEPT). The results of the JRC’s pilot study have proven the co-existence of UWB systems with broadband wireless access and radar systems without the risk of harmful interference to the latter.
**Supporting the EU Marine Knowledge 2020 initiative**

The Marine Knowledge 2020 initiative, launched by the Commission on 13 September 2010, calls for easier access to marine data, less fragmented standards and formats of the data, quality of the data, as well as for an integrated approach at EU level. The initiative acknowledges the role of the JRC as a thematic assembly centre for fisheries data. Scientists at the JRC’s Institute for the Protection and Security of the Citizen (IPSC) collect and maintain fisheries management data transmitted by EU Member States. These data sets are then used by experts of the Scientific and Technical and Economic Committee for Fisheries (STECF) to provide scientific advice to EU policy makers, for example to decide on fishing effort reductions or management measures.

**Roadmap towards more efficient maritime surveillance**

The JRC-IPSC will also be deeply involved in the implementation of the ‘Roadmap towards establishing the Common Information Sharing Environment (‘CISE’) for the surveillance of the EU maritime domain’, which was presented by the European Commission on 21 October. The roadmap spells out how to bring together relevant Member States’ bodies across all maritime sectors to allow for the exchange of maritime surveillance data. Electronic maritime information exchange across sectors and borders shall be supported by a digital system of data exchange based on modern and secured means of telecommunication.

**Reference materials and measurements**

**STANDARDS**

The European Committee for Standardization, CEN, has adopted two analytical methods developed by the JRC’s Institute for Reference Materials and Measurements to measure the levels of mycotoxins in infant food.

Mycotoxins are toxic contaminants produced by fungi. These toxins can enter in the food chain as a result of crops infected by fungi, either by being directly consumed by humans, or by being used as livestock feed for animals. Strikingly, mycotoxins are extremely resistant to processing, and even to temperature treatments. Analytical methods were developed to measure aflatoxin B1 and zearalenone mycotoxins in cereal products for infants and young children. These methods, established under the leadership of Dr. J. Stroka of the EU Reference Laboratory for Mycotoxins at JRC-IRMM, were adopted by CEN as European standards with an entry into force as national standards at the latest by October 2010.

Dietary aflatoxins are of worldwide concern due to their toxicity. Aflatoxins are common contaminants of cereals and nuts, and aflatoxin B1 is the most frequent type present in contaminated samples (60-80% of the total aflatoxin content). Aflatoxin B1 has a carcinogenic effect on the liver, according to very extensive toxicology assessments carried out by bodies such as the World Health Organisation (WHO) and the International Agency for Research on Cancer (IARC).

Because of their relatively high intake of certain foodstuffs compared to their body weight, infants and young children are more vulnerable than adults to many toxins. For this reason, European legislation stipulates lower maximum limits for certain foods intended for infants and young children.
New high power target system installed at the IHCP cyclotron facility

A new cyclotron target system, specifically designed for high-power ion-beam irradiation of encapsulated samples was installed on beam line six of the cyclotron at the JRC’s Institute for Health and Consumer Protection (IHCP).

The cyclotron is a highly versatile particle accelerator which was originally commissioned in 1982, and is capable of accelerating protons and alpha particles (up to energies of 40MeV) and deuterons (up to 20MeV). The newly installed high power target system will be used mainly for the irradiation of nanoparticle samples and of materials supplied by the JRC’s Institute for Transuranium Elements (ITU) linked to collaborative work on alpha-immunotherapy.

The system includes a sample transfer line by which irradiated capsules can be pneumatically transferred after irradiation directly into a glove box for safe handling and analysis. This development comes at a time where the use of the cyclotron facility is at an all-time high, mainly due to the strong demand for radiolabelled nanoparticles by project partners.

JRC collaboration with leading US environmental agency

A delegation from the US National Oceanic and Atmospheric Administration (NOAA) met with JRC representatives on 22 September to discuss current collaborations and the potential for future collaborations between the two organisations. NOAA is a federal scientific agency within the U.S. Department for Commerce and a world leading authority on environmental issues. The delegation was lead by Dr Jane Lubchenco who is the current Under Secretary of Commerce for Oceans and Atmosphere within this department, and NOAA’s Administrator.

The JRC’s Institute for the Protection and Security of the Citizen and Institute for Environment and Sustainability currently collaborate with NOAA on a variety of topics including tsunami modelling and tropical cyclone forecasts for early alert/warning systems, as well as activities in the field of Earth observation, such as flood forecasting and work on the Global Climate Observing System. Discussions at the meeting proved fruitful and, in addition to the one current formal agreement between the two organisations, NOAA’s participation in the International Ocean Colour Coordinating Group (IOCCG) managed by the JRC, the two organisations now hope to establish more formal collaborations in the future.

Dr Jane Lubchenco, Under Secretary of Commerce for Ocean Policy – NOAA Administrator (3rd from left), visits the JRC on 22 September 2010
Heinz Ossenbrink from the JRC Institute for Energy has been confirmed for another five-year term as Chairman of the International Standards Committee “Solar photovoltaic energy systems” of the International Electrotechnical Commission (IEC). In derogation from the IEC’s statutes, this is the only technical committee with a Chair from a supranational organisation.

The IEC is a non-profit, non-governmental international standards organisation that prepares and publishes International Standards for all electrical, electronic and related technologies.

Frank Dentener from the JRC Institute for Environment and Sustainability has been elected secretary of the International Commission on Atmospheric Chemistry and Global Pollution (ICACGP) for the next four years.

The ICACGP is an International Commission of the IAMAS (International Association of Meteorology and Atmospheric Sciences) which is one of the associations within the IUGG (International Union of Geodesy and Geophysics) under the ICSU (International Council for Science) family. The ICACGP aims to stimulate international cooperation and collaborations, spread scientific knowledge and initiate, facilitate, promote and coordinate research on global pollution and climate change issues related to the surface-atmosphere-climate interactions and feedbacks and to global pollution and climate change.

The JRC was invited to give a presentation in the frame of the 2010 South Africa – European Union Summit. Under the motto ”Science at the Summit”, the seminar ”Exploring new opportunities for South African – European biodiversity research cooperation” was set up with reference to the International Year of Biodiversity 2010. Stephen Peedell, of the JRC Institute for Environment and Sustainability spoke about ”JRC cooperation with Africa: GIS and Protected Area Management”.

The specific areas of interest in joint collaboration between the JRC and South Africa were subsequently followed up on at the EU-South Africa Joint Science and Technology Coordination Committee in Pretoria on 4-5 October.

The JRC Institute for Transuranium Elements hosted the first Nuclear Material Congress. 400 scientists, engineers and industry representatives from all over the world participated in the conference. In particular, research and studies aimed at the basic understanding of the properties of nuclear materials and the impact of radiation were presented.

This inaugural conference, formed in association with Journal of Nuclear Materials and the IAEA, aimed at merging several smaller workshops and conferences into a larger multidisciplinary event to strengthen exchanges on nuclear materials science. NuMat2010 has become an international key scientific forum in the field, combining six international workshops in three parallel sessions, covering the topics of nuclear fuels, structural materials, and molten salts.
The JRC 2010 annual lecture was given by Yvo de Boer, Special Global Advisor, Climate Change and Sustainability, KPMG and former Executive Secretary of the United Nations Framework Convention on Climate Change (UNFCCC). Speaking on the topic of "Climate services: fit for purpose?", Mr. de Boer explained the ingredients for their success. Such services have to be put in the context of citizens’ local relevance - even if this means extrapolating data at local level - and their frequency has to be appropriate. Only then, they will be able to provide their crucial role of supporting the policy-making process, bringing business on board and contributing to the creation of a public understanding.

Addressing a select audience of about 350, including top European Institution officials, science and technology leaders, business executives, NGO leaders and students, de Boer stated that: "...the urge to build climate-resilient nations naturally brings with it a desire for more detailed knowledge of the changes that lie ahead. In response to this demand, the idea of ‘climate services’ has emerged, whereby detailed climate information will be tailored to the needs of specific end users and delivered on demand”.

The information most urgently needed by decision-makers and resource managers is how the climate will change in the decades ahead and on regional scales. Much of the new science that will be presented in the next International Panel on Climate Change Report, due out in 2013-2014, will be focused on this sort of decision-relevant science. But the scientific community recognises that here, climate science is still very much in its infancy.

The Belgian Nuclear Society, in association with SCK•CEN, the Institute for Radioelements (IRE), and the JRC, is organising a conference on nuclear sciences in physics and medical applications.

The main purpose of the conference is to promote nuclear science and innovation and to demonstrate its impact on new technologies and health in Belgium and at international level. The conference deals with research in nuclear sciences, and with its applications in nuclear physics (neutron data measurements at IRMM) and for the production of radio-isotopes for medical application (production reactor at SCK•CEN and targets processing at IRE).

The conference is intended for experts from universities, research organisations, public bodies and the European Commission. It will take place at the JRC Institute for Reference Materials and Measurements.
JOBS AT THE JRC

RECENTLY PUBLISHED

Ispra, Italy

Trainee
• Safeguards verifications in dry storage of CANDU spent fuel – 26 Nov

Grantholder (PhD Student)
• Analysis of feed-backs between land function dynamics and the hydrological cycle – 10 Nov
• Microbial biodiversity monitoring as climate change indicator – 10 Nov
• Options for climate change mitigation in agricultural soils and impact on crop and grassland production in candidate countries of the EU – 10 Nov

Grantholder (Post-doc researcher)
• Advanced workflow modeling for the support of interoperability of geospatial data, services and models – 10 Nov
• Climate of the Carpathian Region and EDO – 10 Nov
• Drought monitoring and forecasting in Africa – 10 Nov
• Environmental spatial data interoperability and harmonization – 10 Nov
• Evolution of the INSPIRE geoportal and the INSPIRE architecture – 10 Nov
• Flood Early Warning Systems – 10 Nov
• Generation of multiscale soil water maps on the basis of newly developed pedotransfer functions – 10 Nov
• Innovative approaches for the interoperability of data, services and models to support the development of next generation data infrastructures – 10 Nov
• Mapping green infrastructure elements for biodiversity assessment – 10 Nov
• Rational design of recombinant receptors for label-free biosensors for detection of endocrine disruptor chemicals – 10 Nov
• Resilience, tipping points and thresholds in ecosystems – 10 Nov
• Spatial data infrastructure and shared environmental information system in Lombardi – 10 Nov
• Water quantity modelling in Africa and Europe using state of the art satellite rainfall and soil moisture products – 10 Nov
• Wavelength-dispersive X-ray fluorescence spectrometry for the characterization of European soils – 10 Nov
• Maritime surveillance expert – 18 Nov
• Maritime surveillance researcher on piracy – 22 Nov
• Visual analytics for interactive satellite image information mining – 22 Nov

Seconded National Expert
• Greenhouse gas and air pollutant emissions expert – 15 Nov
• Food safety expert – 30 Nov

Petten, The Netherlands

Trainee
• Development of test protocols and testing of the fuel cell power chain – 14 Jan 2011
• Numerical simulation of inspection reliability – 14 Jan 2011
• Professionalisation of the CAPTURE website on nuclear safety knowledge preservation and dissemination – 14 Jan 2011

Seville, Spain

Grantholder (Senior researcher)
• Industrial research and innovation – 14 Nov
• Quantitative analysis of agricultural policies – 14 Nov

Seconded National Expert
• Best Available Techniques BREF author (IPPC Directive) – 30 Nov

Geel, Belgium

Grantholder (Post-doc researcher)
• Europe and metrology in Turkey – 20 Nov
• Light charged particle cross sections at GELINA – 1 Nov
• Neutron metrology and detector simulations – 1 Nov

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