AIR² Access to INFRASTRUCTURES for Radiation protection Research

Issue 20
September 2017

Editorial

The results of the 2nd CONCERT Call are beginning to emerge. The success of this call has been remarkable! Although the budget allocated was less than for the 1st call (€6.98 million *vs* €10.4 million), twice as many proposals were received (24 *vs* 12). We now know the 6 projects selected: 4 are from topic 1 (Understanding human health effects from ionising radiation and improving dosimetry) (20 projects submitted), and 2 are from topic 2 (Radioecology, Emergency and SSH) (4 projects submitted). The financial distribution between the two calls has now rebalanced, with 80% of the budget from the 2nd Call being allocated to topic 1.

Again, only the acronyms and project titles were whispered to us, and not the infrastructures needed.

Dr Laure Sabatier, CEA

The floor to...

In the last few months, many of you may have found different messages in your inbox underlining the importance of research data and open access. In June, Springer Nature launched a survey on how we manage research data. In May, the European Commission contacted beneficiaries to inform them of the open access obligations in Horizon 2020. And we, in CONCERT Subtask 6.2.2, also invited researchers in the radiation protection field to take part in our survey on data management. The main goals of the survey were to find out why researchers were not sharing their data and what kind of support would be effective to populate databases with past and ongoing studies, which is the main objective of this subtask.

Incrementing Databases

With past and on-going studies

The survey was sent to the members of the CONCERT-all mailing list, asking them to distribute it extensively. The results showed that 44% of respondents had not heard of the STORE database. This is quite surprising if we consider that the survey participants all have some links with the CONCERT project. The survey also revealed that the participants had limited awareness of their IPR rights in relation to raw data.

The lack of time available to make data understandable is another major barrier. Based on the survey, specific funding or internal assistance for data sharing can be an effective means of support for researchers. However, it was also found that requirements set by funding bodies to make public data sharing obligatory is another effective approach because most participants fully concur with the requirements of their funding bodies, institutions or journals.

While it is not clear whether the funding of data sharing is possible within the CONCERT project, we have to work hard to increase the visibility of data sharing infrastructures and to provide information about open data policies and the rights related to raw data. We are looking forward to seeing the first data generated in CONCERT-funded projects and uploaded to STORE. As one respondent wrote, "Sharing data should be the MUST for the future of research". We hope that these actions will help to establish a data sharing culture in radiation protection research that will bring this future closer.

Dr Balázs Madas

MTA-EK

CONCERT WP 6.2.2

Photo: Borbála Madas

CONCERT CORNER

Future events:

10-12 October 2017

Joint ICRP-ERPW 2017

Paris, France

and at the same place

October 9th 2017:

ExB/ESAB: 13h00 - 14h30

MB: 15h00 - 17h00

WP 6 News:

Next WP6 meeting:

October 10th, Paris, France

During the ICRP-ERPW

AIR²D²:

- Please complete the online form(s) to register your infrastructure(s) in the database.
- A new option to feature your infrastructure is now available: add document.

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October 2017

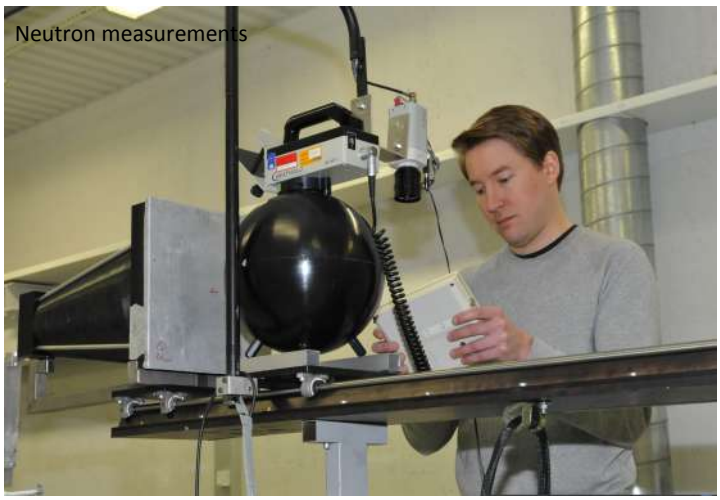
This project has received funding from the Euratom research and training programme 2014-2018 under grant agreement No 662287

RADIATION METROLOGY LABORATORY

Facilities with wide range of radiation sources at STUK

The Finnish national standard for ionising radiation is maintained by the Radiation metrology laboratory (DOS) at the Radiation and Nuclear Safety Authority (STUK) in Helsinki. In addition, DOS provides a wide range of irradiation and calibration facilities.

The facilities at STUK include equipment for calibration, testing and irradiation of active and passive targets such as electronic components, with the following radiation qualities:



Neutron measurements

Photo: Teuvo Parviainen/STUK

- Gamma-ray sources: 4 x ^{137}Cs and 5 x ^{60}Co
- ^{241}Am photon source
- Two X-ray devices with voltage span from 10 kV to 320 kV
- Beta-active point sources (^{90}Sr, ^{85}Kr, ^{147}Pm)
- Neutron sources (AmBe, ^{252}Cf)
- Planar sources (^{90}Sr, ^{36}Cl, ^{60}Co, ^{14}C, ^{241}Am, ^{239}Pu, ^{137}Cs).

The air Kerma rate available is from 700 nGy/h to 40 Gy/h. In addition, a medical X-ray imaging facility with digital radiography is at hand. The calibration and irradiation premises include three separate irradiation halls for radiotherapy, radiation protection and X-ray calibrations and a common control room to operate irradiation instruments. Typically, either measurement devices or passive targets are irradiated. There is no facility available for maintenance of living biological materials.

Quality assurance and quality control at the national laboratory are maintained in accordance with the international Mutual Recognition Arrangement CIPM MRA (Comité International des Poids et Mesures). The quality systems of the laboratories recognised by the CIPM MRA arrangement meet the requirements of the ISO 17025 standard. The approval decision to join CIPM MRA is by self-declaration. In order to earn recognition by other laboratories, it is necessary to deliver annual reports to the EURAMET association and participate in regular intercomparison measurements and external audits.

Photo: Tosikuva Oy/Jarkko Översti

Dr Reetta Nylund

STUK is a member of the IAEA/WHO SSDL laboratory network and the European Association of National Metrology Institutes (EURAMET) and has contributed to a vast number of EURAMET- operated research projects in the field of dosimetry and metrology. The research conducted in the laboratory has generally been related to the use of radiation, such as in dosimetry, occupational and clinical radiation exposure, X-ray imaging and measuring methodologies. Several equipment manufacturers use the services of the laboratory as an integral part of their R&D process. In addition, STUK has agreements with Finnish universities for research cooperation involving the use of STUK's irradiation facilities. Access to the STUK facilities is by prior agreement either in the context of collaborative research projects or for irradiation and calibration services.

GBX200 ^{60}Co irradiation unit with a water phantom

Photo: Teuvo Parviainen/STUK

ID Card:

Exposure type:
External

Source:
see text

Dose rate:
700 nGy/h to 40 Gy/h

Irradiation type:
gamma, X-ray, alpha, beta, neutron

Irradiated organism type:
not available

Address:
Radiation and Nuclear Safety Authority (STUK)
Laippatie 4, 00880 Helsinki, Finland

Access:
Prior agreement/research collaboration service

Supporting lab:
No

Internet link:
www.stuk.fi

Contact:
Reetta Nylund
+358401520941
Reetta.nylund@stuk.fi

Related to:
EURADOS, MELODI, EURAMED

Hourdakis C.J., et al, (2016) Comparison of pencil-type ionization chamber calibration results and methods between dosimetry laboratories, Physica Medica,32(1):42-51.

Csete I., et al, (2010) Report on EUROMET.RI(I)-K1 and EUROMET.RI(I)-K4 (EUROMET project no. 813): Comparison of air kerma and absorbed dose to water measurements of ^{60}Co radiation beams for radiotherapy, Metrologia, Vol 47,Technical supplement 06012

Laboratory for Dosimetry Standards (NDS)

HQ metrological support for ionizing radiation measurements

The Laboratory for Dosimetry Standards was established at Jozef Stefan Institute in 1992. In 2008 it was appointed by Metrology Institute of the Republic of Slovenia (MIRS) as Designated institute (DI) and holder of Slovenian national standard for ionising radiation (air kerma, Ka , and dose equivalent, H). NDS is accredited according to the ISO/IEC 17025:2005 standard by Slovenian Accreditation. With calibration of dose / dose rate meters and surface contamination monitors we provide dissemination of metrology traceability on national and international level. We are actively engaged in the work of Technical Committee for Ionising Radiation (TC-IR) at the international organisation EURAMET. In 2015 best Calibration and Measurement Capabilities (CMC) of the NDS were approved and reported by BIPM.

Photo: JSI

Dr Benjamin Zorko

For calibrations in gamma radiation beams, the NDS uses collimated photon beams produced with ^{137}Cs and ^{60}Co sources and a set of lead attenuators with attenuation range of 16.000 (^{137}Cs), installed in a revolver type homemade irradiator. Additional variation of the dose rates at the irradiated object can be achieved with distance changes in the range from 1 to 100. This is also true for ^{241}Am source which does not have attenuators. The shape of the field is 30 x 30 cm for ^{137}Cs and ^{60}Co sources and 30 cm in diameter for ^{241}Am source, all at 1 m distance. The shape of X-ray fields are circular 18 cm (N, RQR, RQA qualities) and 10 cm (RQR-M, RQA-M qualities) in diameter at 1 m distance. Dose rate can be varied in orders of magnitude with anode current and distance. The irradiated object is put into the central beam of selected source with the aid of several lasers. Relative shifts are made with remotely controlled 3 dimensional coordinate system.

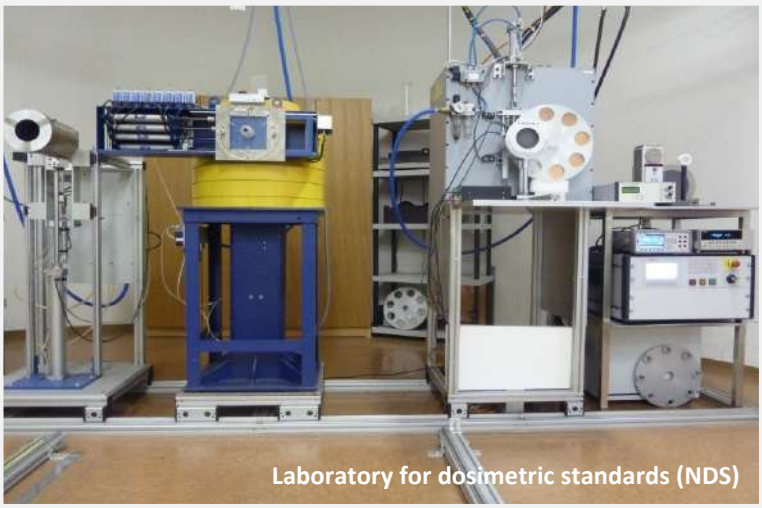
Photo: JSI

Dissemination of metrology traceability on national and international level; ionisation chambers from top to bottom: 1. LS-01 ensures the traceability for ^{137}Cs, ^{60}Co, ^{241}Am sources, and X-ray narrow spectra ;2. TW 34060 ensures traceability for RQR and RQA radiation qualities; 3. RC 06 M ensures traceability for RQR-M in RQA-M radiation qualities

Our lab can irradiate arbitrary samples within the above mentioned dimensions. The irradiation time is controlled by means of electronic timer. The ambient parameters are measured with traceable sensors of temperature, pressure and humidity.

Background irradiation is regularly measured and kept within narrow margins.

The reference quantity for the beam calibrations is the air kerma, determined with secondary standard ionization chambers traceable to the primary standards of the Hungarian Trade Licensing Office (MKEH) and International Atomic Energy Agency (IAEA, Austria).



Laboratory for dosimetric standards (NDS)

Photo: JSI

Department of Low and Medium Energy Physics

ID Card:

Exposure type: external

Sources: ^{60}Co, ^{137}Cs, ^{241}Am, X-ray: 10-160 keV (ISO 4037 narrow spectra N, IEC 61267 diagnostic spectra: RQR, RQA), X-ray: 2-60 keV (IEC 61267 mammographic spectra: RQR-M, RQA-M)

Irradiation type: Gamma, X-ray

Dose rate range: 0- 0.1 Gy.min^{-1}

Dose range: 0- 1 Gy

Energy, Energy range: 2- 1250 keV

Possible duration of exposure: 100 h

Dose rate modulation options: manual: 10^4

Space available to install the objects to be irradiated: 7 m

Main use of the facility: calibration, irradiation

Dosimetric quantity used: Air kerma, ambient dose equivalent H*(10), personal dose equivalent Hp(10), personal dose equivalent Hp(0,07), surface emission rate: α,β

Address:
Jozef Stefan Institute
Jamova cesta 39
1000 Ljubljana, Slovenia

Access: by prior arrangement with head of the laboratory

Internet link: http://ol.ijs.si/?module=1&lan=1&id=13&mid=7_11_13

Contacts:
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+38614773651
Benjamin Zorko
benjamin.zorko@ijs.si, +38614773416

Related to: MELODI, EURADOS

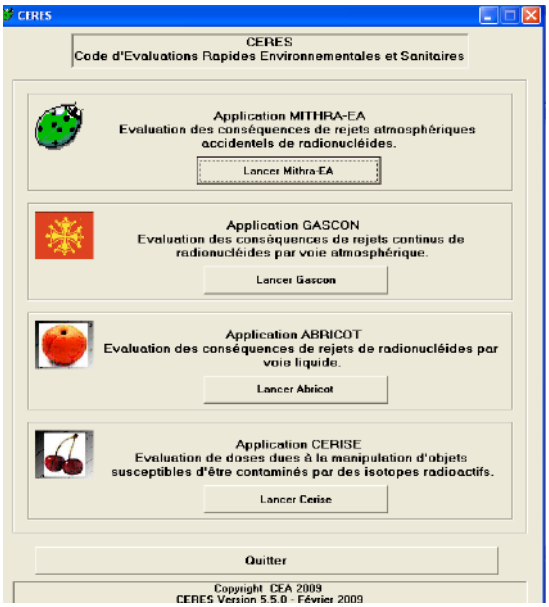
Calibration and measurement capabilities of NDS, confirmed with BIPM supplementary intercomparisons are published in BIPM KCDB database

Štuhec, M., Zorko, B., Vekić, B., Miljanić, S., Basić, B., Ban, R. (2007) Harmonization of individual dosimetry quality control within metrology system of a small country, Radiation Protection Dosimetry, Vol. 125, 1-4, p117-120

THE CERES® PLATFORM

A rapid environmental and sanitary assessment code

The Radioanalysis, Chemistry, Environment Division of the French Alternative Energies and Atomic Energy Commission (CEA) is in charge of the development of methods and tools to estimate the impact of accidental or routine pollutant releases (radionuclides or chemicals) on human health and the environment. It has developed the CERES® tool (Code d'Evaluations Rapides Environnementales et Sanitaires) of Environmental sanitation) to ensure that all impact evaluations of CEA installations releases are carried out in the same way. The CERES® platform houses a database containing the characteristics of approximatively 800 isotopes or pollutants (dose coefficients, transfer coefficients from soil to plants, from plants to animals…) and can be used either in emergency situations or for safety files.



Main interface of CERES® platform

Currently, CERES® focuses on the integration of chemical reactions during atmospheric transfer, the development of heavy gas models and the use of topography in accidental situations.

For accidental atmospheric releases, atmospheric transport modelling is performed using the Gaussian puff model, MITHRA. Different standard deviation equations are used such as Doury's formula (default option), function of travel time. The activity emitted from a facility into the environment is evaluated using the ERASTEM system which is a box model, that takes into account transfers between different compartments of the installation. For routine atmospheric emissions, dispersion calculations are performed using the GASCON model, which is based on the Gaussian puff model described above. In this case, the release over time rate is constant and the different meteorological data acquired near the sites over a period of one or more years is based on observations. For normal releases in rivers, the ABRICOT model which assumes immediate dilution, is used.

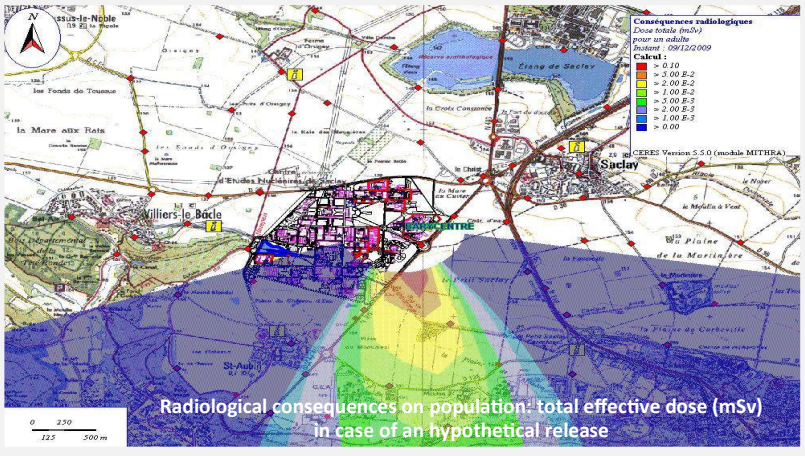
Dr Marguerite Monfort

Impact evaluations are performed in population groups whose characteristics are made available in a "site" dependent database containing stacks, measurement points, dietary habits, etc. The consequences in terms of effective dose or dose to the thyroid in accidental situation only, are estimated for the following pathways:

- immersion in the plume, which leads to internal exposure by inhalation and external exposure by irradiation following atmospheric release,
- presence on the deposits, which leads to external radiation exposure,
- inhalation of resuspended deposits in the case of liquid releases,
- ingestion of water or fish following liquid releases,
- consumption of plants, whose activity comes from the deposits of aerosols and rainfall or from ground transfers *via* root uptake,
- consumption of contaminated animal products.

In the case of tritium emissions, the modes of exposure differ in that immersion in the plume leads to internal exposure by inhalation and passage through the skin. Tritium is a low energy pure β emitter and does not cause external exposure via radiation deposits. Contamination can also occur through inhalation or ingestion *via* the food chain.

For accidental releases, the intervention levels for radiological emergencies defined by decree are highlighted if reached. The external exposure dose coefficients are derived from the Federal Guidance Report n°12, while the internal ones are either from the decree of September 1, 2003 or from ICRP publications: transfer coefficients in food chain are those proposed by international literature - TRS 472, AIEA, 2010.



Radiological consequences on population: total effective dose (mSv) in case of an hypothetical release

ID Card:

Purpose:
Dose assessment on population

Use:
need a specialist

Housed on:
CEA

Training proposed on the code:
Yes

Delay to start:
No

Access:
On demand (not free)

Internet link:
www.dase-cea.fr

Contact:
Marguerite Monfort
Marguerite.monfort@cea.fr
33 1 69 26 46 19

Address:
CEA DAM Ile de France
Bruyères le Châtel
91297 Arpajon
France

Related to:
MELODI, EURADOS, NERIS

Eckerman K. F., Ryman J. C., (1993) External exposure to radionuclides in air, water and soil. Federal Guidance Report 12-EPA 402-R-93-081

ICRP Publication 72 (1995) Age-dependant doses to members of the public from intake of radionuclides-Part 5 Compilation of Ingestion and Inhalation Dose Coefficients

AIR²

Access to INFRASTRUCTURES for Radiation protection Research

Issue	Exposure platforms	Databases, Sample banks, Cohorts	Analytical platforms, Models & Tools
Published to date:			
Oct 2015, #1	FIGARO	FREDERICA	RENEB
Nov 2015, #2	B3, Animal Contamination Facility	The Wismut Cohort and Biobank	The Hungarian Genomics Research Network
Dec 2015, #3	Pulex Cosmic Silence	STORE	METABOHUB
Feb 2016, #4	SNAKE	French Haemangioma Cohort and Biobank	Dose Estimate, CABAS, NETA
Mar 2016, #5	Radon exposure chamber	3-Generations exposure study	PROFI
Apr 2016, #6	Biological Irradiation Facility	Wildlife TransferDatabase	Radiobiology and immunology platform (CTU-FBME)
May2016, #7	CIRIL	Portuguese Tinea Capitis Cohort	LDRadStatsNet
Jun 2016, #8	Mixed alpha and X-ray exposure facility	Elfe Cohort	ERICA Tool
Jul 2016, #9	SCRS-GIG	RES^{3}T	CROM-8
Sep 2016, #10	Facility radionuclides availability, transfer and migration	INWORKS cohort	France Génomique
Oct 2016 #11	LIBIS gamma low dose rate facility ISS	JANUS	Transcriptomics platform SCKCEN
Nov 2016, #12	Microtron laboratory	EPI-CT Scan cohort	CATI
Dec 2016, #13	Nanoparticle Inhalation Facility	UEF Biobanking	The Analytical Platform of the PRE-PARE project
Feb 2017, #14	Infrastructure for retrospective radon & thoron dosimetry	Chernobyl Tissue Bank	HZDR Radioanalytical Laboratories
Mar 2017, #15	Alpha Particles Irradiator Calibration Laboratory at KIT		SYMBIOSE
Apr 2017, #16	Changing Dose rate (SU) Low dose rate (SU)		Advanced Technologies Network Center
May 2017, #17	Chernobyl Exclusion Zone	Chernobyl clean-up workers from Latvia	BfS whole and partial body Counting
Jun 2017, #18	MELAF	Belgian Soil Collection	INFRAFONTIER
Jul 2017, #19	MICADO'LAB	Estchern Cohort	ECORITME
Sep 2017, #20	DOS NDS		CERES
Coming soon:			
Oct 2017, #21	To Be Announced	To Be Announced	To Be Announced

Future events:

CONCERT Short Courses

30 October-10 November 2017

Molecular Mechanisms of Radiation Carcinogenis
IHelmholtz Center - Munich Institute for Radiation Biology, Germany

Contact:
Michael Rosemann
Rosemann@Helmholtz-muenchen.de

5-9 February 2018

Emergency and recovery preparedness and response
National Center of Radiobiology and Radiation Protection, Bulgaria

Contact:
Nina Chobanova
n.chobanova@ncrrp.org

19-23 February 2018

Radiation Protection:
Basics and Applications

Forschungszentrum Jülich, Germany

Contact:
Ralf Kriehuber
r.kriehuber@fz-juelich.de

Other Events

3-8 September 2017

ICRER 2017, 4th International conference on Radioecology and Environmental Radioactivity,

Berlin, Germany

17-21 September 2017

ERR 2017, 43rd Annual Meeting of the European Radiation Research Society

Essen, Germany

24-25 October 2017

International Workshop on the INEX 5 exercises

OECD Nuclear Energy Agency Boulogne-Billancourt, France

5-11 November 2017

MICROS 2017, 17th International Symposium on Microdosimetry, Venice, Italy

See also on CONCERT website

Editorial Committee: Jean-Michel Dolo, Maria Panagiotopoulou, Elisabeth May, Laure Sabatier

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