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COMET- CO-ORDINATION AND IMPLEMENTATION OF A PAN-EUROPEAN INSTRUMENT FOR RADIOECOLOGY

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INTRODUCTION

Under the EC-FP7 project COMET (**CO**ordination and **iM**plementation of a pan-**E**uropean instrumen**T** for radioecology) we aim to strengthen the pan-European research initiative on the impact of radiation on man and the environment by facilitating the integration of radioecological research, including both the human food chain and the protection of wildlife. The project will build upon, and compliment, the foundations laid by the European Radioecology Alliance (ALLIANCE¹) and the on-going FP7 STAR Network of Excellence in radioecology². The ALLIANCE initiated the first step toward integrating European Radioecology in 2009; following up on STAR, COMET will begin to realise the ambitions of the ALLIANCE on a larger pan-European scale and prepare for *Horizon 2020*, by collaborating with the European platforms³ on nuclear and radiological emergency response and recovery (NERIS⁴) and low dose radiation risk (MELODI⁵), and relevant training networks (e.g. EUTERP, ENEN⁶).

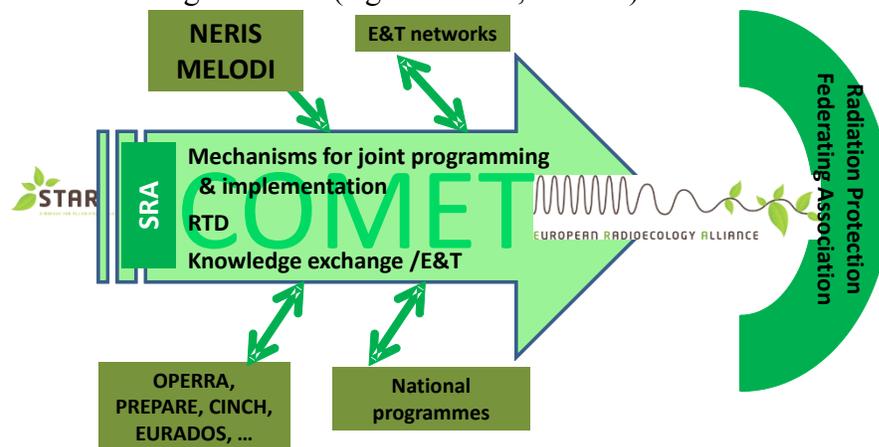


Figure 1. Scheme of progress of COMET from STAR and of the interactions of COMET with the allied European research platforms/networks and national programmes in radioecology to strengthen the position of the ALLIANCE as a key component of the future Radiation Protection Federating Association

¹ ALLIANCE: European Radioecology Alliance (ALLIANCE) <http://www.er-ALLIANCE.org/>, the association created by 8 organizations in Europe to integrate radioecological research in a sustainable way; at the time of writing, 8 new members have already join the ALLIANCE.

² STAR: Strategy for Allied Radioecology, <https://wiki.ceb.ac.uk/display/star/>

³ Platforms like ALLIANCE, NERIS, MELODI are legal associations of research institutes, universities and authorities that develop and coordinate scientific policies in the domains of Radioecology, Emergency Management and Low Dose respectively

⁴ NERIS: European Platform on Preparedness for Nuclear and Radiological Emergency Response and Recovery, <http://www.eu-neris.net>

⁵ MELODI: Multidisciplinary European Low Dose Initiative, <http://www.melodi-online.eu>

⁶ EUTERP; <http://www.euterp.eu>; ENEN: <http://www.enen-assoc.org>

In the context of the future *Horizon 2020* approach, the European Commission (EC) is looking for umbrella structures (legal entities/associations) to delegate some of the tasks related to the management of Community research programmes to third parties. Such an umbrella structure for Radiation Protection is being prepared by OPERRA⁷, with which COMET will collaborate. The COMET consortium currently has thirteen partners; eight from EU member states, two from Norway, two from Ukraine and one from Japan. The COMET consortium expands on organisations in STAR and fosters links with countries which have experienced major nuclear accidents (i.e. former Soviet Union states and Japan) and new member states which hold Observatory sites for research (e.g. Poland). A call was launched in December 2013 and this will incorporate more organisations to COMET from December 2014 onwards.

COMET'S WORK PACKAGES

COMET is structured around 5 work packages (WP) presented in Figure 2 and intends to strongly integrate with the European radioecology and radiation protection framework and the international radioecological community. The key points of the different WPs are given below.

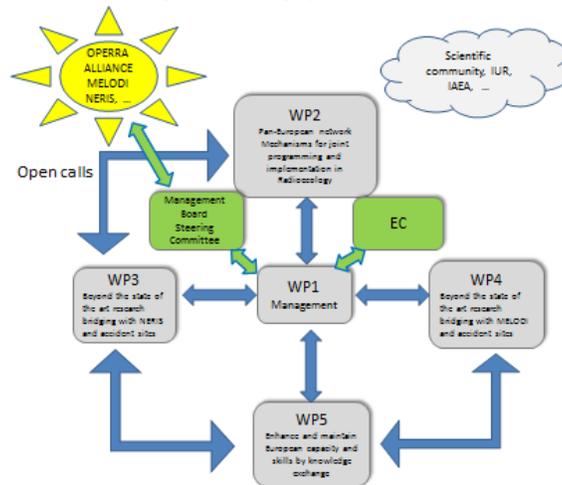


Figure 2. Graphical presentation of COMET work package interdependencies

WP2 - Joint Programming and Implementation – Expanding the ALLIANCE

WP2 aims to strengthen the pan-European research initiative on the impact of radiation on environment and man. To achieve this objective we are further developing the strategic research agenda (SRA)⁸ created under STAR/ALLIANCE in light of advances in knowledge, identification of new priority needs and to better align it with the SRAs of other radiation protection platforms. COMET will form the nucleus to bring together European radioecology and begin to work towards achieving the goals of the SRA in collaboration with those of allied European platforms (in low dose effects and post-accident management) which rely upon radioecology for their underpinning science. COMET will encourage organisations from the European radioecological research community to join the ALLIANCE to help realise the identified priorities for radioecological research; these can only be accomplished by an enlarged and committed network.

COMET is further developing innovative mechanisms for joint programming and implementation of radioecological research in close collaboration with the ALLIANCE. These mechanisms

⁷ OPERRA: Open Project for the European Radiation Research Area, <http://www.melodi-online.eu/operra.html>

⁸ https://wiki.ceh.ac.uk/display/radex/Strategic+Research+Agenda?atl_token=fe07d049905080ed0c00efdb2a3f00cf38cf9377

should be consistent with the mechanisms developed for the Radiation Protection Federating Association developed by OPERRA. In collaboration with the ALLIANCE, COMET is developing a roadmap and implementation plan for radioecology. A limited number of key research priorities are being identified around which working groups will be established and where partners of COMET, members of the ALLIANCE but also any interested organisation or individual is invited to join.

To work towards increased sustainability, COMET will identify and integrate national radioecology programmes to create a framework for future research. We aim to get an overview of national programmes, funding schemes and requirements for radioecological research in Europe and begin the integration of national radioecology programmes to create a common framework for future research. This will give a first indication on the extent to which nationally funded projects could assist in reaching the overall goals of the SRA at the European level. The national funding bodies will be encouraged to take into account the research lines indicated in the SRA.

WP3 - Improving and validating radioecological models for risk assessment and for emergency and post-accident situations

Under WP3 we want to strengthen links between the radioecology and the emergency and post-accident communities and to undertake joint research activities to improve and validate radioecological models of interest to both communities for a better protection of humans and the environment in existing, planned and emergency exposure situations.

Initial Research Activities (IRA) are beginning to address priority needs highlighted by the SRA. The IRA focus on improved parameterisation of key processes controlling the transfer of radionuclides, with an emphasis on process based, dynamic modelling approaches. The IRA topics are presented in D3.1⁹ and their objectives can be summarised as follows:

1. Marine modelling – improving predictions of concentrations in, and exposures of, marine biota and humans through sophisticated modelling, e.g. trophic transfer modelling and by combining transfer modelling with sediment modelling.
2. Forest modelling - reducing the uncertainties in assessments of short and long term impacts of radioactive contamination in forested areas through model development and parameterization of key processes controlling the transfer of radionuclides.
3. Human food chain modelling - improving human food chain modelling through regional customization of parameter values, using Bayesian methods and studying the long-term dynamics of soil-to-plant transfers for specific soil types and for long-lived radionuclides.
4. NORM modelling - acquiring data necessary for the parameterization of key processes, and improving existing models or developing parametric models linking observed accumulation, mobility, and transfer with environmental parameters and processes.
5. Particle behaviour - improving our ability to describe the processes of hot particle transformation in the environment and radionuclide leaching in various media.
6. ICRP reference sites - providing the data to derive a taxonomically based model of radionuclide transfer for wildlife independent of site-specific factors.

Projects linked with the COMET call (call subjects dealt with items 1,3,5 above) will be also integrated under WP3. Validation of models will, when appropriate, be performed at the Observatory sites in Poland, Chernobyl and, possibly, Fukushima.

⁹ https://wiki.ceh.ac.uk/download/attachments/197986961/D3%201__Final%20PU.pdf?api=v2

WP4 - Shared challenges in chronic low dose effects and risk assessment, and beyond

WP4 endeavours to strengthen pan-European links and implement research-sharing mechanisms between the radioecology and radiobiology communities studying biological effects of ionising radiation. The research developed under WP4 is related to Challenge 2 of the Radioecology SRA - Chronic low dose effects and risk assessment. The IRA is focused on a specific topic of common interest to radioecology and radiobiology: the possible contribution to long-term or transgenerational effects of mechanisms governing the activation or the repression of the epigenome of organisms exposed chronically to ionising radiations. To streamline the research, deliverable D4.1¹⁰ was established which describes the state-of-art on epigenetic pathways, their relevance for radioecology and the up-to-date methods to characterize them. Based on this state-of-the art, DNA methylation was chosen as the focus of the studies. A description of the initial research activity for the chosen biological models (zebrafish, frogs, earthworms, Arabidopsis) is also included. Both gamma external radiation in the laboratory and field experiments (in Chernobyl exclusion zone and the Fukushima affected area) are envisaged.

WP5 – Knowledge exchange

The objective of WP5 is to enhance and maintain European capacity and skills in radioecology by establishing a dynamic interaction promoting effective collaboration between researchers, tool developers, regulators and industry. This will ensure (i) more effective 'take-up' of scientific advances by the user community and (ii) that radioecological research is better focused to address the needs of users. Key to this will be effective links including other networks, projects and platforms (e.g. STAR, OPERRA, PREPARE, ALLIANCE, MELODI, NERIS). An interactive website for COMET¹¹ has been established including supporting materials for the user community providing informed and regular updates of developments. COMET will facilitate discussion of topical radioecological issues between researchers and users to support radiation protection in Europe and beyond. Two workshops are already planned – one on 'Effects uncertainty' which will take place in UK in late 2014 and the other on 'Potential environmental impact of the accident in the NPP of Fukushima-Daiichi' organised in Japan in connection with the ICOBTE conference (July 2015). As a third mechanism, COMET will develop training packages to maintain and enhance professional competence including field based training courses will be organised in the Chernobyl Exclusion Zone and in the Polish Observatory Site.

IF YOU WANT TO TAKE PART

If you want to take part, through collaboration in working groups, join the ALLIANCE (by contacting its president) and you'll line up with COMET too.

¹⁰ <https://wiki.ceh.ac.uk/download/attachments/197986961/COMET%20Deliverable%20D4%201%20final%2013%2009%2013.pdf?api=v2>

¹¹ <https://wiki.ceh.ac.uk/display/COM/COMET+Home>