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Sustainability and integration of radioecology – position paper

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Sustainability and integration of radioecology – position paper

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Abstract

This position paper gives an overview of how the COMET project (COordination and iMplementation of a pan-European instrument for radioecology, a combined Collaborative Project and Coordination and Support Action under the EC/Euratom 7th Framework Programme) contributed to the integration and sustainability of radioecology in Europe via its support to and interaction with the European Radioecology ALLIANCE. COMET built upon the foundations laid by the FP7 project STAR (Strategic Network for Integrating Radioecology) Network of Excellence in radioecology. In close association with the ALLIANCE, and based on the Strategic Research Agenda, COMET developed innovative mechanisms for joint programming and implementation of radioecological research. To facilitate and foster future integration under a common federating structure, research activities developed within COMET were targeted at radioecological research needs identified in the Strategic Research Agenda. Furthermore, COMET maintained and developed strong mechanisms for knowledge exchange, dissemination and training to enhance and maintain European capacity, competence and skills in radioecology. In the short term the work to promote radioecology will continue under the H2020 project EJP-CONCERT (European Joint Programme for the Integration of Radiation Protection Research). The EJP-CONCERT project (2015-2020) aims to develop a sustainable structure for promoting and administering joint programming and open research calls in the field of radiation

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protection research for Europe. In the longer term, radioecological research will be facilitated by the ALLIANCE. External funding is, however, required in order to be able to answer emerging research needs.

Keywords: Radiation protection, joint programming, Strategic Research Agenda, Europe

1. Introduction

A decade ago, the need for radioecological expertise was increasing world-wide with a renewed interest in commercial nuclear energy production and the scientific challenges related to the nuclear fuel cycle. Concurrently, education related to radioecology was declining, leading experts were approaching retirement, and funding for radioecological research had decreased in many European countries. The EC/Euratom 6th Framework Programme's coordination action FUTURAE (A Future for Radioecology in Europe, 2006 – 2008) was launched to produce an analysis of the state of radioecology in Europe and “*to examine the feasibility of a network of excellence to maintain and enhance competence in a resource efficient manner and to enhance sustainable collaboration in the field of assessment and management of the impact of radionuclides on man and the environment*”. It observed a considerable decrease in the amount of funding allocated to radioecology within the various Member States and in the EC Framework Programmes for Research and Development, as well as fragmentation of research teams, lack of coordination of the different business strategies and R&D programmes of the Member States, and a threat of some facilities being closed after the retirement of experts. To cope with the necessity of maintaining and enhancing competences and to address the various scientific challenges, it was suggested that a European structure that would be capable of ensuring a long-term governance of research in the field of radioecology should be created.

In 2009, the directors of eight European organisations signed a Memorandum of Understanding, stating their commitment to the long-term integration of radioecology within Europe. The final aim was to maintain and enhance radioecological competences and experimental infrastructures, and to address scientific and educational challenges in assessing the impact of radioactive substances on humans and the environment. The first step was to create the European Radioecology Alliance [1], which was officially formed as an association in September 2012. The ALLIANCE has expanded from the initial eight founding members to 27 members from 14 countries (Belgium, Croatia, Finland, France, Germany, Greece, Ireland, Kazakhstan, Norway, Poland, Portugal, Spain, Sweden and United Kingdom) in 2017. Whilst focussed on Europe, the ALLIANCE is open to organisations throughout the world with interests in supporting research in radioecology.

One of the first actions of the ALLIANCE, before it was officially founded, was to follow the recommendations of the FUTURAE project and make a proposal to the EC to create a Network of

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Excellence in radioecology. The proposal was approved and the STAR (Strategic Network for Integrating Radioecology) Network of Excellence [2] was established under the EC/Euratom 7th Framework Programme in February 2011. The goal was to efficiently integrate organisations, infrastructures, and research efforts into a sustainable network that would contribute to a European Research Area in radioecology. To achieve this, a Joint Programme of Activities was implemented covering: integration and sharing of infrastructures; training, education and mobility; knowledge management and dissemination; as well as three key research themes (integrating human and non-human radiological risk assessments; radiation protection in a multi-contaminant context; ecologically relevant low-dose effects).

The STAR Network of Excellence demonstrated its capability of reacting to emerging situations by opening a competitive call for marine radioecology research addressing topical issues following the severe accidental releases caused by the 2011 Great Earthquake and Tsunami in Japan [3]. As a result, the STAR work plan was amended with work related to fluxes and trophic transfers of radiocaesium in marine ecosystems, which included cooperation with the USA and Japan.

The STAR Network of Excellence initiated integration processes and established mechanisms to ensure long-term sustainability, with the support of the ALLIANCE. The process continued under COMET (COordination and iMplementation of a pan-European instrument for radioecology), a combined Collaborative Project and Coordination and Support Action under the EC/Euratom 7th Framework Programme launched in 2013 [4]. COMET, in its turn, has strengthened the pan-European research initiative on the impact of radiation on humans and the environment by facilitating the integration of radioecological research. COMET built upon the foundations laid by the STAR Network of Excellence. By collaborating with the European platforms on nuclear and radiological emergency response (NERIS) [5] low dose risk research (MELODI) [6] and the European dosimetry group (EURADOS) [7], COMET in close collaboration with the ALLIANCE significantly aided the preparation for the implementation of the Horizon 2020 umbrella structure for Radiation Protection developed under the FP7-OPERRA project [8] and EJP-CONCERT^{1,2} (Figure 1). In close association with the ALLIANCE, and based on the Strategic Research Agenda (SRA) for radioecology [9, 10] COMET developed innovative mechanisms for joint programming and implementation of radioecological research. To facilitate and foster future integration under a common federating structure, research activities developed within COMET were targeted at radioecological research

¹ The European Joint Programme (EJP) under Horizon 2020 is a co-fund action designed to support coordinated national research and innovation programmes. The EJP aims at attracting and pooling a critical mass of national resources on objectives and challenges of Horizon 2020 and at achieving significant economies of scales by adding related Horizon 2020 resources to a joint effort.

² The ‘CONCERT-European Joint Programme for the Integration of Radiation Protection Research’ under Horizon 2020 is operating as an umbrella structure for the research initiatives jointly launched by the radiation protection research platforms MELODI, ALLIANCE, NERIS, EURADOS and EURAMED. CONCERT is a co-fund action that aims at attracting and pooling national research efforts with European ones in order to make better use of public R&D resources and to tackle common European challenges in radiation protection more effectively by joint research efforts in key areas

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needs identified in the strategic research agenda. Furthermore, COMET maintained and developed strong mechanisms for knowledge exchange, dissemination and training to enhance and maintain European capacity, competence and skills in radioecology. The COMET project ended in May 2017.

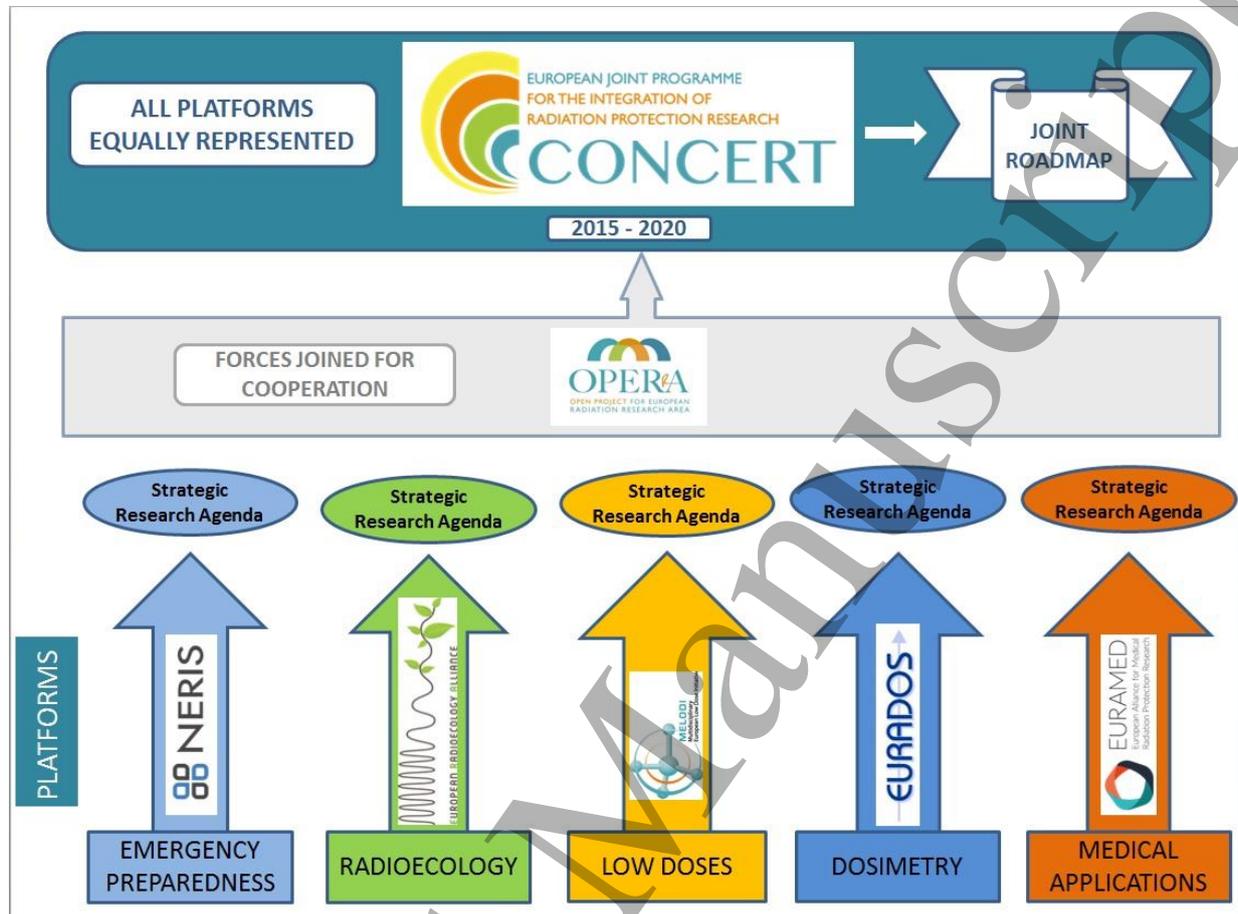


Figure 1. Overview of projects, platforms and strategic research agendas in radiation protection research in Europe. CONCERT – European Joint Programme for the Integration of Radiation Protection Research. OPERRA – Open Project for the European Radiation Research Area. Platforms: NERIS – European Platform on Preparedness for Nuclear and Radiological Emergency Response and Recovery, ALLIANCE – European Radioecology Alliance, MELODI – Multidisciplinary European Low Dose Initiative, EURADOS – European Dosimetry Group, EURAMED – The EUROpean Alliance for MEDical radiation protection research.

2. Establishing and maintaining the Strategic Research Agenda and roadmap

The first strategic research agenda provided a long-term vision (20 years) of radioecological research needs and was created under the STAR Network of Excellence in May 2012. The strategic research agenda has been updated several times, taking into account comments from stakeholders and experts (September 2013)

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and by adding a strategic part focusing on education and training challenges as well as infrastructure-related issues (January 2017) [9, 10].

An initial short-term (5-y) scientific roadmap for radioecology was developed by COMET [11]. It was a transitional implementation plan to structure and enhance interactions between the ALLIANCE and two of the other European radiation protection research platforms, namely NERIS and MELODI. The strategy underlying the development of the roadmap is driven by the need for improvements in mechanistic understanding across radioecology such that we can provide fit-for-purpose human and environmental impact/risk assessments through interactions with society (connecting science, communication, economy) and for the three exposure situations defined by the International Commission on Radiological Protection (ICRP) (i.e., planned, existing and emergency). Many of the research areas for radioecology are also relevant to post-emergency management and low-dose effect research, and provide a powerful catalyst to further develop collaboration between the four platforms of radiation protection, ALLIANCE, NERIS, MELODI and EURADOS. The strategic research plan and the first transitional roadmap have constituted two of the essential elements for preparing the European Joint Programming project EJP-CONCERT scientific programme for radioecology in harmonisation with MELODI, EURADOS and NERIS and more recently EURAMED (The European alliance for medical radiation protection research).

Under the EJP-CONCERT, a Joint Roadmap based on research lines resulting from the Strategic Research Agendas of each of the five platforms (i.e. ALLIANCE, MELODI, NERIS, EURADOS, EURAMED) and also the developing SHINE (Social Sciences and Humanities in Ionizing Radiation Research) platform will be produced. The ALLIANCE contribution to this Joint Roadmap reinforces the cross-cutting characteristics of radioecology and environmental issues. The Radioecology strategic research plan has clearly supported the joint research by showing the best direction to take and how to optimise the use of our resources.

The strategic research plan and roadmap are discussed in detail in Garnier-Laplace *et. al.* 2017 [12].

3. Mechanisms of sustainable cooperation

Several mechanisms for sustainable collaboration have been established by COMET. The activities of the ALLIANCE are organized within working groups, in which any interested member can participate. These working groups provide input to promote ALLIANCE functioning, strengthen integration and sustainability of the developments done during STAR and COMET projects.

3.1 The topical roadmap working groups

The strategic research plan and the transitional roadmap are being complemented by topical roadmaps each dealing with specific scientific areas and/or complex environmental issues defined by the COMET project in

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3 collaboration with the ALLIANCE. Several topical roadmap working groups have been established under
4 COMET, with participation from ALLIANCE members (not involved in COMET), to make progress in
5 addressing the challenges and priorities put forward in the Radioecology strategic research plan in a
6 structured way:
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- 11 • Marine radioecology
- 12 • Human food chain
- 13 • Naturally-Occurring Radioactive Materials (NORM) (coordinated by ALLIANCE members)
- 14 • Transgenerational effects and species radiosensitivity.
- 15
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19 Under the ALLIANCE an additional topical roadmap was launched on "Environmental transfer processes of
20 atmospheric radionuclides".
21

22
23 Research addressing the strategic research plan has, in part, been realised through funding by the
24 participating organisations. This is possible when the participating institutes adapt their research priorities to
25 the priorities of the European radioecology research community as identified in the Strategic Research Plan
26 and endorsed by stakeholders. However, without the COMET funding and COMET acting as a promoter,
27 realisation of the Strategic Research Agenda priorities would have been much slower.
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31 After the COMET project these roadmaps will be maintained by the ALLIANCE. On a yearly basis, topical
32 roadmaps will be presented and discussed/evaluated by the ALLIANCE Board of Directors, the working
33 group members and selected stakeholders. Roadmap working groups may be discontinued on request of the
34 roadmap working group or after discussion at the ALLIANCE General Assembly. New topical roadmaps
35 may be introduced on an annual basis.
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38 39 40 41 42 *3.2 The Observatory Working Groups*

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44 Radioecological Observatories are contaminated field sites that provide a focus on long-term joint field
45 investigations. The development of a pooled, consolidated effort maximises the sharing of data and
46 resources. The Observatories also provide excellent training and educational sites. Four contaminated sites
47 have been selected under the STAR Network of Excellence and COMET project as the most promising
48 options for Radioecological Observatories:
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- 54 • the Chernobyl Exclusion Zone
- 55 • the aquatic environment of a previous coal mining and processing site in Poland
- 56 • a forest in the Fukushima prefecture in Japan
- 57 • the waste landfill "Kepkensberg" from the Belgian phosphate industry.
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More information on the Observatory Sites can be found on the Radioecology Exchange website [13, 14]. The Observatory Working groups were formed under the COMET project to coordinate the R&D activities performed in the four Observatories selected.

For the observatories to be successful in the future there needs to be a willingness amongst ALLIANCE partners to:

- Inform each other of research plans and be willing to be flexible on timetabling, such that local collaborators are not put under undue pressure and resources are best utilised;
- Incorporate the Observatory Sites within the R&D plan of the applicable roadmaps;
- Consider the Observatory Sites as key R&D infrastructure in pertinent projects;
- Openly invite participation from ALLIANCE members in planned activities;
- Consider jointly supervised PhD studentships as a mechanism of collaborating for comparatively little external funding;
- Make data openly available.

The Observatories need to be advertised to researchers and funders; what research opportunities do they present, what infrastructure is on site etc. The Observatories should not become a reason to conduct studies (i.e. ‘we have got this Observatory, we need to do something there’) but rather they should be used in hypothesis driven research. The hypotheses should come from the Strategic Research Agenda. Furthermore, the Observatories offer the opportunity to test and validate radioecological models.

The intensity of future studies that will be possible at the Observatories is dependent upon funding. The ALLIANCE can act as a coordinator and help develop Observatory Sites (e.g. by making data available), but it cannot finance research at the sites.

3.3 *The ALLIANCE Working groups*

The ALLIANCE has formed (2014 – 2015) four working groups on the Strategic Research Agenda & Roadmaps, Infrastructures & Sustainability, Education & Training, and Stakeholder Involvement. These will develop and promote the issues related to their topics in the future. Integration will also be addressed and further deepened in the future through the EU project CONCERT.

3.3.1 Strategic Research Agenda and roadmap working group

Under COMET, roadmap working groups developed topical roadmaps as explained above. One of the objectives under COMET was also an update of the Strategic Research Agenda, but after consultation with ALLIANCE members and the COMET Steering Committee, no actual need for adaption was identified. The

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3 ALLIANCE Strategic Research Agenda and Roadmap working group is now working with EJP-CONCERT
4 project. Additionally, a new mechanism was adopted to assist the definition of research priorities for the two
5 calls for proposals managed by EJP-CONCERT. This mechanism consists of requesting annually that each
6 platform ranks and justifies a limited number of priorities extracted from their respective Strategic Research
7 Agenda taking into account recent advances. From the beginning of EJP-CONCERT, the ALLIANCE has
8 produced two annual Strategic Research Agenda statements (2015 and 2016) [10]. The selection of priorities
9 was based on the conclusions of the OPERRA e-Survey [15], the progress in recent and on-going EC-funded
10 research projects and consolidation by the ALLIANCE Strategic Research Agenda/roadmap working group
11 and all ALLIANCE members considering selection criteria (impact, relevance, good science and feasibility).
12 The priorities were grouped into two categories reflecting expected impact on radiation protection increase.
13 Two of the priorities are dealing with impact expected mainly in terms of reduced uncertainty in exposure
14 and dose assessment and increased human and wildlife radiation protection:

- 15 • Environmental availability and impact of radionuclides in terrestrial and freshwater ecosystems
16 (including human food chain) and their interactions with atmosphere, incorporating physical,
17 chemical and/or biological processes. Validated process-based model parameterisation,
18 characterisation of variability and uncertainty, and guidance for fit-for-purpose models (ranked as
19 priority 1)
- 20 • Development of models/tools, and datasets for their calibration and validation and guidance to select
21 and evaluate the effectiveness of different remediation strategies in long-lasting exposure situations
22 (e.g. after nuclear accidents and/or sites containing elevated levels of NORM (Naturally Occurring
23 Radioactive Materials) or TENORM (Technologically Enhanced Naturally Occurring Radioactive
24 Materials) [16] (ranked as priority 3)

25
26 The two other priorities are dealing with impact expected mainly in terms of reduced uncertainty in effect
27 assessment and increased wildlife radiation protection:

- 28 • Biomarkers of exposure and effects to living organisms as operational outcomes of a mechanistic
29 understanding of intra- and inter-species variation of radiosensitivity to chronic low dose exposure
30 situations (ranked as priority 2)
- 31 • Multiple stressors and modulation of radiation effects in living organisms (ranked as priority 4).

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33 An on-going concern is whether it is possible to fully reflect and integrate radioecological requirements with
34 other demands on funding through EJP-CONCERT.
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3.3.2 Sustainability & Infrastructure Working Group

There are a number of activities that contribute to the overall sustainability of the ALLIANCE (e.g. education and training, and the ‘mobility funding’ initiative launched in 2017). However, the focus of the Infrastructure and Sustainability Working Group to date has been on the future of the Radioecology Exchange website [14] and its content. The creation of the Radioecology Exchange website as the gateway to accessing on-line radioecological resources and news items, was a major step forward in providing a wide range of information on environmental radioactivity in a single web site. The portal has pages on Training and Education, Information Exchange, the Strategic Research Agenda, the Virtual Laboratory, Workshops and Observatories, and a News blog. The Virtual Laboratory provides access to methods, procedures and protocols, facts, figures and data useful to radioecology. The Information Exchange provides access to STAR and COMET partner publications, publication catalogues, newsletters, FAQ’s and links to other websites of interest to radioecology.

In preparation for the end of the COMET project, the bespoke STAR [2] and COMET [4] websites have been incorporated into the Radioecology Exchange. The STAR and COMET web addresses now redirect to the Radioecology Exchange. Natural Environment Research Council in Centre for Ecology and Hydrology (UK) has purchased all three website addresses until at least 2022. After the end of the COMET project, some of the pages on the Radioecology Exchange will be ‘frozen’ and no longer updated (e.g. those associated with the STAR and COMET projects). Regarding the ALLIANCE webpage [1] it was agreed that the actual webpage (hosted by Norwegian Radiation Protection Agency) will contain only general information about the ALLIANCE (how to join, statutes, information about members, etc.). The main site on radioecology will be “The Radioecology Exchange”. The Radioecology Exchange will remain a mechanism for ALLIANCE members communicating their activities. The ability to post news items, studentships or vacancies will be retained on the site.

The @RadioXchange *Twitter* account will also continue to be used to communicate with a wider audience; the *Twitter* feed automatically links to the *facebook* page to best use these social media resources, ALLIANCE members in the future need to ensure that they use them to promote for instance, new papers, new projects, conferences etc.

To ensure effective collaboration and integration, *an inventory of infrastructure* covering equipment, methods, bioinformatic resources, sample archives, models, expertise and facilities for radioecological research was created under STAR. The Observatory Sites are a special type of ‘infrastructure’. The resultant list of the facilities available for others, either as commercial services or through research collaboration, is on the Radioecology Exchange under “Virtual laboratory, Equipment and facilities”. The listing is largely restricted to STAR partners. The infrastructure-related work is at the moment being further developed under the EJP-CONCERT Work Package 6 (WP6). The four main objectives of WP6 aim to increase the visibility

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3 of infrastructures: (i) prepare the criteria and to compile a list of infrastructures; (ii) prepare regular
4 information about infrastructures; (iii) develop harmonised practices and protocols to strengthen and expand
5 databases from past radiobiological experiments and from stored biological material; (iv) to develop
6 strategies for facilitating access to infrastructures.
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9 10 11 3.3.3. *Education and training working group*

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13 The overarching objective of the ‘Knowledge Exchange’ work package in COMET was to “enhance and
14 maintain European capacity and skills in radioecology by establishing a dynamic interaction promoting
15 effective collaboration between researchers, tool developers, regulators and industry”. COMET has further
16 developed the education and training web platform initiated by STAR and arranged a number of courses and
17 workshops for students and professionals. Courses and workshops were as short and time-efficient as
18 possible to allow the participation of professionals with high demands on their time. COMET has also given
19 refresher courses in conjunction with conferences, and full PhD and MSc courses for an international
20 audience. In addition, COMET has been engaged in discussions for more long-term solutions to maintain the
21 sustainability of radioecology education and training after the end of COMET.
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30 In the future, education and training in radioecology will be led and promoted by the ALLIANCE with the
31 education and training platform of the Radioecology Exchange being maintained by the education and
32 training working group. An ALLIANCE education and training working group is already in place and
33 currently comprises nine organisations. This working group also connects to education and training WP of
34 CONCERT and to other platforms (e.g. MELODI), consortia and projects (e.g., PETRUS III - Programme
35 for Education, Training and Research on Underground Storage [17]).
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40 The education and training activities under COMET have been presented in Skipperud *et. al.* 2017 [18].

41 42 43 3.3.4 *Stakeholder involvement working group*

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45 The stakeholder involvement of the ALLIANCE has been mainly limited to key stakeholders of the wider
46 research community concerned with radiation protection of humans and wildlife and regulatory authorities.
47 In 2014, ALLIANCE, MELODI, NERIS and EURADOS platforms were involved in promoting the
48 OPERRA e-survey with appropriate stakeholders, giving users the chance to prioritise further research in
49 radiation protection. The ALLIANCE received high scores in the e-survey for all of their 15 research goals
50 presented in the Radioecology Strategic Research Agenda supporting these goals as being relevant for
51 improving radiation protection.
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58 For a broader stakeholder involvement, however, the ALLIANCE is realising that it would be essential to
59 seek input from social sciences and humanities. Such bridging activities could facilitate the communication
60 with non-expert stakeholders and the wider public, for instance by:

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- making scientific results easier to understand without concealing residual uncertainties,
- improving risk communication,
- decreasing prejudices,
- increasing trust and credibility,
- inciting stakeholders to get involved and give feed-back on their information needs.

As an active partner of the CONCERT stakeholder working group, the ALLIANCE is presently profiting through a lively interexchange with social science and humanities. The ALLIANCE has been contributing to the CONCERT deliverable on stakeholder involvement and communication in radiation research [19] and made sure that the radiation protection goals will not only target at protecting humans but also at conserving the biodiversity of wildlife and that environmentalists will be part of the future CONCERT stakeholder group. The ALLIANCE is also participating in developing a new questionnaire for getting responses from the wider public on radiation protection issues. Results of the public consultation will be available on the CONCERT website [20].

4. Interactions with outside bodies

Integration of the European radioecology community has been enhanced by COMET. The four European radiation protection platforms (ALLIANCE, MELODI, NERIS and EURADOS) have also strengthened their connections and interactions. They all signed a joint Memorandum of understanding in December 2013. COMET partners, as representatives of the ALLIANCE, have participated in several meetings arranged by the other platforms. The four platforms worked together for the H2020 European Joint Programming call in September 2014 to prepare the proposal for a European Joint Programme (EJP-CONCERT).

Through COMET, OPERRA and EJP-CONCERT projects the Radiation Protection platforms in Europe and recently the medical platform EURAMED and the social sciences platform SHINE, have consolidated their interactions. The EJP-CONCERT intends to establish an umbrella structure for radiation protection research in Europe, it also reinforces the position of radiation protection within Euratom. The interaction of ALLIANCE with the other European radiation protection platforms is important and needs to be continued. Today and in the short-term, this will be mostly mediated through EJP CONCERT where the platforms, such as ALLIANCE, interact for updating Strategic Research Agendas and roadmaps, infrastructure, education and training, stakeholder involvement and in the organisation of an annual 'Radiation Protection Week' (a conference series bringing together professionals, experts and stakeholders from all the radiation protection fields).

In addition, the ALLIANCE will continue interaction with international radiation protection organisations with links with radioecology (ICRP, International Atomic Energy Agency, International Union of Radioecology, IRPA, etc.), developing mechanisms for, and defining the scope of effective collaboration.

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3 The ALLIANCE will also follow-up the evolution of European platforms with links to radioecology (i.e.
4 IGD-TP (Implementing Geological Disposal of Radioactive Waste Technology Platform), NUGENIA
5 (Nuclear Generation II & III Association), EURAMET (The European Association of National Metrology
6 Institutes)) and be open to interactions with those platforms.
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10 5. Conclusions

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14 *The integration within radioecology* has been enhanced by getting a wide variety of organisations to
15 collaborate in radioecological studies. The actions jointly taken by various European organisations under
16 COMET have been able to slow down the gradual deterioration of expertise and knowledge in the field of
17 radioecology. The funding available under COMET has also helped the ALLIANCE develop its structural
18 basis. The ALLIANCE platform has a solid basis, having expanded from the initial eight founding members
19 to 27 members from 14 countries (Belgium, Croatia, Finland, France, Germany, Greece, Ireland,
20 Kazakhstan, Norway, Poland, Portugal, Spain, Sweden and United Kingdom) in 2017. The European
21 projects STAR and COMET have also been successful in enhancing collaboration globally. In particular,
22 scientific collaboration has been strengthened with participation of scientists from the USA, Ukraine,
23 Australia and Japan. Additionally, the interaction with international radiation protection organisations has
24 been enforced.
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33 Innovative mechanisms for joint programming and implementation of radioecological research have been
34 developed. To facilitate and foster future integration under a common federating structure, research activities
35 developed within COMET were targeted at radioecological research needs identified in the Strategic
36 Research Agenda. The Strategic Research Agenda was complemented by a transitional roadmap and topical
37 5-year roadmaps each dealing with specific scientific areas and/or complex environmental issues. Thus,
38 COMET has fostered *integration of radioecological research*.
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45 *Integration with other programmes and platforms* involving research and development in health and safety
46 issues relating to ionising radiation in Europe has been enhanced by COMET. The four platforms
47 (ALLIANCE, MELODI, NERIS and EURADOS) have strengthened their connections. COMET partners,
48 together with representatives of other platforms, worked together on the preparation of a successful proposal
49 and establishment of the new project EJP-CONCERT – European Joint Programme for the Integration of the
50 Radiation Protection Research, under H2020. In the short-term the work to promote radioecology will
51 continue under the EJP-CONCERT (2015 – 2020) which aims to develop a sustainable structure for
52 promoting and administering joint programming and open research calls in the field of radiation protection
53 research for Europe. In the longer term, radioecological research will be facilitated by the ALLIANCE.
54 However, external funding is required in order to be able to answer emerging research needs.
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3 The integration of programmes involving research and development concerning health and safety issues
4 relating to ionising radiations will be partly achieved by bringing ALLIANCE, MELODI, NERIS,
5 EURADOS, EURAMED and SHINE into a single framework under CONCERT. However, a single
6 framework does not necessarily imply an integrated programme and there remains a need to identify where
7 the various component programmes are complementary and can enhance each other's research through
8 collaboration. It is worth considering cross-cutting themes that are relevant across the different radiation
9 protection programmes. Identification of common requirements in these areas could help in building bridges
10 between the programmes. However, this should not exclude research that is not cross-cutting or
11 multidisciplinary from future funding as the platforms each have their own research needs as defined by their
12 Strategic Research Agendas. Integration with ecological and other environmental sciences also needs to be
13 fostered. It is important to build on an ecocentric vision: Bring more ecology into radioecology and move
14 from the biological impacts of radiation to the ecological impacts. There is an obvious need to find a balance
15 between applied and curiosity driven radioecological research.
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18 Sustainability and further integration need continuing efforts and exploration of new modes of cooperation.
19 The radioecological research community should continue to network and broaden the scope beyond countries
20 with commercial nuclear programmes and beyond Europe. Cooperation with regional/topical scientific
21 networks and sister organisations or networks dealing with non-radioactive stressors is encouraged. In
22 addition, more intensive interaction with end users could be beneficial. A communication/dialogue strategy
23 is needed to appropriately address stakeholder concerns.
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26 There needs to be a strong emphasis on the education and training of the next generation of scientists and
27 experts. External funding is required in order to be able to achieve this and to answer emerging research
28 needs (to support the safe use of radioactivity within Europe).
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