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Dissemination plan

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STAR

STRATEGY FOR ALLIED RADIOECOLOGY

EURATOM

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PU	Public	PU
RE	Restricted to a group specified by the partners of the [STAR] project	
CO	Confidential, only for partners of the [STAR] project	

List of Acronyms and Abbreviations

ALLIANCE:	European Radioecology Alliance. A European Research Platform, in accordance with relevant European Union policies which coordinates and promotes research on radioecology
BIOPROTA:	An international forum for exchange of information to support resolution of key issues in biosphere aspects of assessments of the long-term impact of contaminant releases associated with radioactive waste disposal
CROMERICA:	A tool to perform dose assessments for human and wildlife
CINCH-II:	Cooperation in education and training In Nuclear Chemistry – Coordination Action
COMET:	Coordination and iMplementation of a pan-European instrument for radioecology. An EC-funded project designed to further the work of STAR and to bring radioecology within the OPERRA radiation protection programme established by the EC's next funding framework: Horizon2020
CONCERT:	European Joint Programme for the Integration of Radiation Protection Research. A Co-fund action
CP:	Communication Plan
DEBtox:	A modelling approach that analyses how the Dynamic Energy Budget of organisms is altered when they are exposed to contaminants. DoReMi (Low Dose Research towards Multidisciplinary Integration): An EC-funded Network of Excellence in radiation biology under the MELODI framework
DoReMi:	An EC-funded Network of Excellence in low dose risk
DoW:	Description of Work
E&T:	Education and Training
EAB:	External Advisory Board
EC:	European Commission
EDF:	Electricité de France
EJP:	European Joint Programming
ENEN:	European Nuclear Education Network
EURADOS:	European Platform on dosimetry
EUrays:	European Radiation Research for Young Scientists
EUTRAP:	Framework Research Project "EU Trade Policy" - European Parliament
FORUM:	The "FORUM", a collective initiative prompted by IUR to promote worldwide harmonization of Radioecology networks
H2020:	Horizon2020

HERCA:	(Heads of the European Radiological protection Competent Authorities): A voluntary association in which the Heads of Radiation Protection Authorities work together to identify common issues and propose practical solutions for these issues
IAEA:	International Atomic Energy Agency
ICOBTE:	International Conference on the Biogeochemistry of Trace Elements
ICRER:	International Conference on Radioecology and Environmental Radioactivity
ICRP:	International Commission on Radiological Protection
IGD-TP:	Implementing Geological Disposal of Radioactive waste Technology Platform
IRPA:	International Radiation Protection Association
IUR:	International Union of Radioecology
IT:	Information Technology
Kd:	partition coefficient
MELODI:	Multidisciplinary European Low Dose Initiative. A European Platform dedicated to low dose radiation risk research
MODARIA:	Modelling and Data for Radiological Impact Assessments. IAEA Programme on radioecological assessment and modelling
MoU:	Memorandum of Understanding
NERIS:	European Platform on Preparedness for Nuclear and Radiological Emergency Response and Recovery
NSFS:	Norwegian Society for Radiation Protection
NGO:	Non-Governmental Organisations
NKS:	Nordic Nuclear Safety Research
NoE:	Network of Excellence
OECD-NEA:	Organisation for Economic Co-operation and Development – Nuclear Energy Agency
OPERRA:	Open Project for European Radiation Research Area
QA:	Quality Assurance
RadEx:	Radioecology Exchange
R&D:	Research and Development
RSS:	Rich Site Summary
SETAC:	Society of Environmental Toxicology and Chemistry
SSM:	Sweden Radiation Safety Authority

SRA:	Strategic Research Agenda
STAR:	Strategy for Allied Radioecology. An EC-funded Network of Excellence in radioecology under the Radioecology Alliance framework
TRS:	Technical Report Series
UK:	United Kingdom
UNSCEAR:	United Nations Scientific committee on the Effects of Atomic Radiation
WG:	Working Group
WP:	Work Package

BfS:	German Federal Office for Radiation Protection, Germany
CIEMAT:	Research Centre in Energy, Environment and Technology, Spain
IRSN:	French Institute of Radiation Protection and Nuclear Safety, France
NERC-CEH:	Natural Environment Research Councils Centre for Ecology & Hydrology, United Kingdom
NRPA:	Norwegian Radiation Protection Authority, Norway
NMBU:	Norwegian University of Life Sciences, Norway
SCK•CEN:	Belgian Nuclear Research Centre, Belgium
STUK:	Radiation and Nuclear Safety Authority, Finland
SU:	Stockholm University, Sweden
SUNY:	State University of New York, United States of America
TU:	Tokai University, Japan

Executive Summary

Dissemination activities in STAR have been carried out via a range of activities, the most important of which has been the development of the Radioecology Exchange. Prior to STAR, there was no single web site giving freely available, good quality information and recent news on environmental radioactivity. The creation of www.radioecology-exchange.org as the gateway to accessing on-line radioecological resources and news items, is a major step forward in providing a wide range of information on environmental radioactivity in a single web site. Analysis of a questionnaire distributed at the STAR dissemination event showed that feedback from participants was good and most people liked the site and intended to use the site in future. Recent agreements between STAR, COMET and the ALLIANCE has ensured that much of the information collated on the site will be held in a sustainable format and manner providing a valuable future resource to support radioecology.

The use of social media in STAR has been closely connected to the radioecology exchange. Prior to STAR there was no active social media sites for environmental radioactivity. There are now >100 followers of the twitter feed (@STARadiecology) and the facebook account has almost 250 followers, which includes both national and international organizations. The use of these sites we anticipate will grow with time under COMET and the ALLIANCE.

The collation and dissemination of data has been improved in STAR. Radioecological (and much other) information is often compiled in a manner which makes it difficult to identify the underpinning data, often uses unsustainable formats and lacks good quality metadata. Data held by STAR partners have been made more visible and accessible via a data catalogue. Improvements have also been encouraged in practices of data curation, availability and transparency. This process should make international data sets readily transferable and facilitate frequent updates of international collations of radioecological parameter values in the future.

Consultation with stakeholders via workshops (and other events such as the STAR final dissemination event) has been a very important component of STAR; especially in the development of the STAR Strategic Research Agenda and during the development of the Training and Education programme. Whilst organising these events for STAR we ensured that all interactions with stakeholders were carefully planned and managed. This was achieved by inviting participants with relevant expertise, planning presentations and discussion mechanisms, and ensuring their input and comments were handled transparently and that any outputs were reported openly. COMET WP5 (supported by the ALLIANCE) will continue to enhance and maintain this dynamic interaction to promote effective collaboration.

The aim of the STAR final dissemination event was to ensure that dissemination of STAR activities and outputs was accurate, well presented and understandable. Members of the STAR External Advisory Board have commented in their final report that STAR has ‘increased interest and awareness about radioecological issues in the European Community and beyond strengthening future scientific excellence and societal relevance on this important topic’. COMET WP5 will continue to build on and improve the dissemination activities initiated by STAR after which it will be supported by the ALLIANCE and continue under CONCERT.

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1 Introduction

This Dissemination Plan is intended to be a long-term plan for dissemination of radioecological activities and outputs within a sustainable framework of ALLIANCE co-operation building based on experience within STAR.

In this deliverable we therefore briefly describe the dissemination activities that have been carried out in STAR, the progression via COMET and how ongoing plans are proceedings to ensure that long term dissemination of the ALLIANCE activities can be sustained.

1.1 What is dissemination?

The term dissemination has been described as the "delivering and receiving of a message", "the engagement of an individual in a process" and "the transfer of a process or product" (Harmsworth & Turpin 2001). Dissemination thus involves the distribution of information and ideas in a variety of ways, with different, often sequential, aims. Dissemination is often thought to refer to communication of research outputs between academia or research organisations. However, communication beyond these groups is also essential for two way communication with other users and it is often nowadays termed knowledge transfer (Pardoe & Mays 2012).

Dissemination has previously often been thought to involve the need to acquire communication skills to be able to present the outputs of research projects, particularly to the media. Pardoe and Mays (2012) challenged this view. They state that a greater emphasis should be placed on the use of research via a process of communicating with potential users and stakeholders which can usefully challenge research findings, demand additional evidence or ways of presenting evidence, create new opportunities to develop understanding and identify new areas of significance.

Awareness involves making people aware of something. This may be useful for stakeholders that do not require a detailed knowledge of a topic but it is helpful for them to be aware of activities and outcomes. Creating such an awareness will help the "word of mouth" type of dissemination and help to build an identity and profile for radioecology. This would also help to boost interest in radioecology as a study and career path. For example, many radioecologists will be aware of radioecology, but this was much less true of a significant number of people involved in other aspects of radiation protection within the other EC platforms prior to the commencement of the STAR network.

Understanding: There will be a number of different stakeholders that need to be targeted directly with dissemination activities because they will most directly benefit from what is offered. It will be important, therefore, that these people understand the topic area well. Examples would be other scientists including consultants, international organisations such as the IAEA and ICRP, and regulators.

Action: This is aimed at promoting a change of practice resulting from the adoption of information or ideas. The target stakeholders may be those people that are in a position to influence and bring about change within their organisations such as staff in government ministries, regulators and industry. These stakeholders need to be equipped with the right skills, knowledge and understanding of radioecology to achieve real change, for example, by adopting improved models. They also need to understand what benefits radioecology can

offer. The contributions of stakeholders, their knowledge and perspective can also promote a change in scientific practise and help in identifying needs for future research and applicability of current research.

The obvious tendency, as has happened frequently in the past for radioecology, is to use the most familiar and obvious methods of dissemination, such as newsletters, project-focused websites, emailing lists, workshops and conferences, and publications. These methods represent concrete outputs and are easily evidenced as methods of dissemination. However, these methods of communication may not be sufficient to target and impact on key groups, for example, representatives from regulatory bodies and industry, who may not be particularly responsive or aware of radioecological outputs. Varying dissemination routes are therefore important and a variety of ways of disseminating information, such as briefings, handouts accompanying talks, media, one to one discussions, debates, panel discussions, roadshows and e-learning, might be suitable to match the needs of different target audiences. A key requirement for all these dissemination routes is the need for good planning and quality of outputs which are suitably adapted for the different routes.

The importance of recognising effective dissemination as a major high impact outcome of research projects and networks, in addition to the more traditional list of refereed publications etc., is also emphasized by Pardoe and Mays (2012). They also highlighted the importance of feedback and trying to understand the reasons for people not using information on research outcomes.

1.2 Intended dissemination activities in STAR

The dissemination of knowledge, exploitation of results and spreading of excellence were considered vital to the success of the STAR Network of Excellence (NoE). Therefore, STAR had a work package (WP7) dedicated to dissemination activities.

A strategic goal of STAR WP7 was to build on the foundation of the considerable resources and expertise of the NoE partners to develop the capability to provide open access to as much relevant, high quality compiled data, knowledge and training resources as possible. Furthermore, the main objective of work package two (WP2) was to ensure the long-term sustainability of a European Research Area in radioecology (i.e. the transition of STAR into COMET and the ALLIANCE). Work package six (WP6) was dedicated to ensuring the dissemination of knowledge and spreading of excellence via mobility and the consolidation of education and training activities to ensure a competent workforce now and in the future.

There are a wide variety of potential users of radioecological knowledge, including the scientific community, decision makers, radiation protection community, educationalists and other stakeholders. The routes via which information can be provided to the different users vary and STAR intended to use a range of different strategies to ensure that there was effective knowledge dissemination established for the different users. It was acknowledged that the success of WP7 would depend on the full integration of knowledge and data resources from all STAR partners and the construction of an efficient vehicle for dissemination and exploitation. To achieve these aims STAR listed the following activities with the Description of Work for the project:

1.2.1 Webportal and social media

A key output of WP7 was intended to be the Radioecology Exchange webportal. The consortium agreed to use Web 2.0 software (i.e. web applications facilitating interactive information sharing such as a wiki). WP7 planned to subcontract for the procurement of expert IT (Information Technology) services to assist in establishing web-based communications to ensure an effective dissemination to the wider community and optimal use of Web 2.0 technologies for 'social networking' and the sharing of knowledge. The site was to be set up with the aim of informing stakeholders via newsletters and press releases of the activities of STAR and to provide open access to all of the outputs of STAR (including deliverables and data). Key areas of the webportal would be open access databases allowing the wider community to (i) interrogate/summarise key data including geospatial display; and (ii) add data to the database under a quality assurance (QA) procedure developed by WP2 and (iii) a Virtual Laboratory of best practice for experimental, analytical and field methods also to be developed by WP-2. Other content would include: training and some e-learning materials, in collaboration with WP6, information on the STAR Observatories, and a grey literature archive. Mechanisms of engaging the public were to be continually investigated and pursued throughout the project. STAR also planned to exploit Wikipedia where it was intended to publish a 'Radioecology page' to host general interest materials on radioecology as the site offers an excellent and established method of making STAR science available to a global audience (and an opportunity to provide links to the Radioecology Exchange and other webportals).

Throughout the project the use of social networking sites such as Facebook, YouTube, Twitter and Blogs was to be encouraged.

1.2.2 Data Dissemination Strategy

One of the roles of WP7 was to develop the capability to provide open access to as much of the relevant, high quality, compiled data as possible using state of the art data cataloguing and searchable databases. This included ensuring that all of the data generated by work packages 3-5 (and including that for the Observatory sites) are made freely available. These databases would allow STAR, for instance, to develop an online database for empirical and mechanistic transfer parameter values that are used in radioecological models for both humans and wildlife which can be updated by online input from the radioecological community and provide continually improving summary tables of data for general usage by radioecologists and other disciplines. Moreover, in collaboration with WP3 and WP7 STAR planned to investigate how databases for human and wildlife assessments can be combined (e.g. currently freshwater databases are developed separately for human foodstuffs and wildlife transfer). Subtask 7.2.2 was also set up to explore the possibility of an open-access journal.

Publications are an important dissemination activity and STAR planned to develop a publication strategy to ensure a high quality output and to raise the profile of radioecology via peer-reviewed scientific journals. Publication in the referred scientific literature was actively encouraged by the coordinator and when publishing in international refereed journals, partners agreed to endeavour, where available, to secure rights for open access to the publication.

The scientific dissemination strategy included identifying key scientific conferences (radiological and other related disciplines such as ecotoxicology) at which the aims and work

of STAR would be presented, with STAR representative participation covered by WP7. Two STAR partners already had an established co-operation to arrange a major radioecology conference (ICRER) every three years in collaboration with the IUR and the IAEA. The STAR network planned to take an active role in development and management of the conference series, which would then be sustained under the ALLIANCE. Furthermore, the activities of STAR were to be disseminated via the many national and international fora in which the partners are high profile contributors (e.g. IUR, IAEA MODARIA working groups and NKS).

1.2.3 Engagement with stakeholders

To achieve the overall aim of establishing a sustainable European Research Area in radioecology (WP2), and the more specific objectives of work packages 3-7, STAR recognised the need for effective engagement with a wide range of relevant stakeholders. A proactive communication plan was produced that targeted the stakeholders (deliverables D1.2 and D1.6). Funds were also allocated to promote integration through workshops, mobility stimulus, teaching, and the exchange of scientists.

The following consultation workshops were planned:

- WP3: arrange and host an international workshop on state-of-the-art dosimetry methods for non-human species.
- WP4: four workshops to interact with invited experts from fields of (chemical) multi contaminants (to maximise resources two of the workshops were to be held in collaboration with WP5 as similar external experts will be appropriate to both work packages).
- WP5: two workshops devoted to discussion of Dynamic Energy Budget Model development and systems ecotoxicology (to be held in collaboration with WP4).
- WP6: in additional to training and education courses that were to be open to the wider community, two consultation workshops would discuss training and education needs; and training and education supply.
- WP7: two workshops to inform the wider community on the dissemination activities of STAR and explore how they may disseminate their outputs via the webportal (e.g. database entries).

1.2.4 Transition to a Permanent Entity

During months 37-54 of the project STAR planned to gradually merge the functions of STAR with that of the ALLIANCE by providing a clear transnational structure with accountabilities. A transition plan was to be developed that mapped the road to sustainability of radioecology research in Europe. The ALLIANCE had agreed to provide a permanent management structure and implementation for long term international radioecological research that would go beyond the short term funding period of STAR. The step-wise phased integration programme was to permit the ALLIANCE to maximize integration of its radioecological infrastructures, research, training and education programmes. A dissemination plan (this deliverable) was to be developed which would ensure the sustainable application of network outputs within the ALLIANCE. The impacts of the STAR NoE were intended to include:

- facilitating the integration process of partner organisations and their research agendas
- reversing the trend of fragmentation of radioecology in Europe;
- enabling consultation and dissemination activities that broaden membership to the ALLIANCE, and aid in the development of a Strategic Research Agenda (SRA) in radioecology.

2 Dissemination activities carried out in STAR

STAR has conducted many dissemination activities during the project which are summarised below.

2.1 STAR webportals

- Set up NoE management Wiki: https://wiki.ceh.ac.uk/x/CYB7Bw (log in required; access restricted to STAR partners)
- Established www.star-radiecology.org as a gateway to access the outputs of STAR (D 7.1)
- Established the Radioecology Exchange (www.radioecology-exchange.org) as a gateway to access wider radioecological resources.
- Created and maintained a Radioecology news and careers blog – see side panel of the home pages of the STAR and Radioecology Exchange websites (and the COMET website). 'Old' news can be found here: https://wiki.ceh.ac.uk/x/U4FsD together with RSS feeds from the IAEA and the EC.
- Social media: set up a Twitter account - @STARadioecology and a facebook account - https://www.facebook.com/radioecology

2.1.1 The internal STAR project wiki

Internal communication and planning of various dissemination activities are carried out in STAR using an internal management wiki site with login requirements. This method has been very successful in avoiding thousands of emails and has facilitated efficient version control.

2.1.2 The STAR project website

The STAR website at www.star-radioecology.org is a 'project' wiki site containing: project descriptions, deliverable reports and a news blog. A similar site is set up for COMET.

2.1.3 The Radioecology Exchange

The Radioecology Exchange web portal (http://www.radioecology-exchange.org– (RadEx)) acts as a gateway to access a wide range of radioecological resources. The site is not project specific and will be maintained in the future via COMET and the ALLIANCE. Particular attention has been focused on the structure, layout and attractiveness of the site to making the content readily accessible. Because the radioecology exchange is built on a wiki platform it allows contribution from anyone registered to edit the site and as such it is potentially much more self-sustaining than web sites built on conventional platforms.

The portal has tabs on Training and Education, Information Exchange, the SRA, Fukushima, News and Careers, the Virtual Laboratory, Workshops and Observatories, and a News blog.

For a website to have an impact it has to include useful information, to be frequently updated, and to be well presented with a simple structure so users do not have to click too many links etc. It has taken about three years for us to accumulate and present enough good quality material to be able to advertise and inform the wider community about the site. Since then, the use of the site and its visibility has greatly increased such that it now has commonly 100 unique visits per day. We firmly believe this will increase further given the enhanced effort to improve the site prior to the dissemination event and the end of the project.

A questionnaire was distributed at the dissemination event to ask for feedback on the website (see section 2.2.5 for the results). Overall, the feedback received from participants was good and most stated they liked the site and would use it in the future.

2.2 News blog and Social media

The news blog on the Radioecology Exchange home page (which is also available on the STAR and COMET project wiki sites) is frequently updated by members of the STAR consortium and so reflects recent news related to environmental radioactivity. The blog has posts announcing project outputs, training courses, jobs, studentships etc. We have received requests to advertise (e.g.) jobs and conferences from many organisations via the blog including requests from organisations outwith STAR which shows that these organisations value the opportunity to use the site.

The Radioecology Exchange home page (and the STAR and COMET project wiki sites) also has links to Social media accounts set up at the beginning of STAR; a Twitter account https://twitter.com/STARadioecology (@STARadioecology) and a Facebook account - https://www.facebook.com/radioecology.

The Facebook account has more than 250 followers and this is increasing every week. Tweets from @STARadioecology are automatically posted to the account and vice versa. Currently, there are >100 followers of the Twitter feed which we anticipate will grow with time.

Social media activity by STAR (and COMET) partners is becoming much more frequent. Many people are now getting used to tweeting and retweeting information and many students (including non-STAR students) have signed up to the feeds. Other organisations are also following the Twitter account (e.g. STUK, IRSN, NERC-CEH, some UK universities and EUrays (European Radiation Research Association for Young Scientists)). Information on courses and relevant news are posted onto social media continually.

2.3 Access to radioecological information

Easier access to radiological information has been facilitated by the Radioecology Exchange; information currently available on the site are:

- The Virtual Laboratory: https://wiki.ceh.ac.uk/x/BYG8D (design & population was a WP2 output (D2.4)) which provides easy access to methods, procedures and protocols (some having been used in STAR experiments); facts, figures and data useful to

radioecology and provides a brief overview of two radioecology models, CROM and the ERICA-Tool.

- Twenty Radioecology Factsheets and associated datasheets, see: https://wiki.ceh.ac.uk/x/44BsD
- A web page (see https://wiki.ceh.ac.uk/x/bQHoDQ) for information related to Fukushima research. The page currently contains an information sheet (MS 7.6; NRPA) on the consequences of marine releases after the Fukushima accident and links to information available on STAR (and COMET) partner websites and from major international organisations. The page will be expanded during COMET.
- Easy access to historical EURATOM outputs see: https://wiki.ceh.ac.uk/x/RYFsD
- The Information Exchange to provide easy access to STAR (and COMET) partner publications, publication catalogues, newsletters, FAQ's and links to other websites of interest to radioecology.
- Access to information on the observatories on the Radioecology Exchange website (https://wiki.ceh.ac.uk/x/NoFsD; related to D2.3). These pages will be expanded further during the COMET project.
- Training and Education: The Training and Education Platform provides a focal point for students and professionals interested in radioecology/environmental radioactivity. These pages present an overview of course modules; course curriculums and learning outcomes; access to some training videos, lectures, presentations and summary notes from STAR and COMET training courses.

Project deliverables have been uploaded onto the Researchgate website which has greatly enhanced their availability and visibility. They are currently being downloaded frequently by followers.

2.4 Data dissemination

Some STAR Partners agreed to use the NERC-CEH Information Gateway to provide access to radioecological data which is compliant with the European INSPIRE Directive. Metadata and, in some instances, data can be accessed using the search term STAR NoE. Metadata describing the data were indexed to aid 'searchability' and was made publically available via the Radioecology Exchange.

To provide mechanisms to improve data transparency work package 7:

- Has designed and set up a STAR members data holdings wiki; see: https://wiki.ceh.ac.uk/x/EwGsC (log in required). The information collated using this wiki was then used to populate the data catalogue (see below).
- Has defined, developed and populated the data catalogue to provide access to radioecology data held by partners (D7.3).
- Will provided access (via the data catalogue) to data produced during STAR on the Radioecology Exchange after it is published in the scientific literature (related to D7.3; due July 2015).

2.5 *Consultations and Workshops*

Consultations with stakeholders were vital to the development of the STAR Strategic Research Agenda (SRA) for Radioecology. A web-consultation was conducted in 2012 (via the Radioecology Exchange) to collect comments on the initial SRA and stakeholders attended a workshop to discuss the document which was held in Paris, November 2012. Expert consultation also provided inputs into 'Critical review of existing approaches, methods and tools for mixed contaminant exposure, effect and risk assessment in ecotoxicology and evaluation of their usefulness for radioecology (D4.1; WP4) 'Education and Training in Radioecology' (D6.1; WP6). They also contributed to the lively debate sessions at the STAR dissemination event held in Aix-en-Provence in June 2015. A series of workshops were also arranged, one workshop under WP3, two under WP4, one under WP5, one common to WP4 and WP5 and three connected with radioecological data under WP7/2. STAR allocated resources for the workshops to attract specified individuals that hold important data sets, as well as relevant expertise. The workshops attracted many relevant members of the research community. Information on the workshops is available at: https://wiki.ceh.ac.uk/x/u4XXD.

- Two stakeholder workshops "Education and training in Radioecology: Supply and Demand (see section 2.10 (WP6; D6.1)).
- International workshop on wildlife dosimetry (WP3); https://wiki.ceh.ac.uk/x/14HHD and D3.2).
- Workshop on the state of the art of multiple stressor research, including a session on the Dynamic Energy Budget (DEB) theory held in May 2011 (common WP4-WP5; related to MS4.1 and MS5.3 respectively).
- Expert consultation workshop to establish the final research and experimental programme of WP4 held in January 2012 (MS4.3).
- Workshop on Mixture Toxicity held at SCK•CEN in Mol, Belgium in January 2014 WP4).
- A workshop on mixed contaminants and development of a roadmap for future R&D was planned (related to MS4.10) but instead a WP4 panel debate was held at the STAR dissemination event (see section below).
- International workshop on transgenerational and epigenetic mechanisms of radiation toxicity at chronic doses (related to MS5.11) as a joint activity between STAR WP5 and COMET; outputs are available from: https://wiki.ceh.ac.uk/x/u4XXD
- Three international workshops on radioecological data – two on Kd (in collaboration with IAEA MODARIA WG4) and one on data availability (related to MS 7.7 and MS 7.10). Outputs are accessible from: https://wiki.ceh.ac.uk/x/u4XXD.

The international workshops are described in more detail below:

2.5.1 Wildlife dosimetry workshop

An international workshop was arranged on wildlife dosimetry in June 2014 at CIEMAT (Madrid, Spain). The aim was to analyse the current developments in the area of wildlife dosimetry to characterise the improvements that could be done in the future in this relevant field. The workshop was an integration activity and a forum for exchange of knowledge between the European radioecological community and researchers outside of Europe.

The workshop addressed a wide spectrum of questions related to the ionising radiation dose estimation in animals and plants, counting with world leading experts in each of the issues discussed. There were 21 participants from 14 countries (Belgium, Canada, France, Japan, Norway, Portugal, Russia, Spain, Sweden, United Kingdom and the USA).

During the Workshop there were four discussion sessions: (1) Internal dosimetry and biokinetics in wildlife; (2) Wildlife dosimetry fit for purpose; (3) Uncertainties in wildlife dosimetry; (4) What improvements are needed in wildlife dosimetry and why?. The information of the International Wildlife Dosimetry Workshop (agenda, presentations, minutes of the discussion sessions) can be freely downloaded from the STAR web site here: https://wiki.ceh.ac.uk/x/14HHD

A paper is being prepared by the participants, which will contain the main topics developed during the workshop, as well as the results of the discussion sessions and the main conclusions.

2.5.2 Epigenetics workshop

The international workshop on Transgenerational and Epigenetic Mechanisms of Radiation Toxicity at Chronic Doses was held on 10-12 December 2014 at St Catherine's College (Oxford, UK). It was organised by both COMET and STAR and was intended as an integrating activity between related research fields. The aim of the workshop was to bring together scientists involved in molecular biology studies, environmental and/or laboratory studies of chemical and radiation transgenerational and epigenetics effects. By allying human, ecological fields and radiation protection specialists, the different objectives were to:

- gain a greater understanding of the epigenetic changes in organisms exposed to ionizing radiation and of their relevance for key biological functions and transgenerational effects,
- discuss current methods for epigenetic studies,
- discuss current methods for data integration,
- agree future research priority questions and summarise these as a list.

The meeting focused on theoretical discussions on epigenetics and on the role of epigenetics in (eco)toxicology and radioecology, including biological processes such as development, aging and neurological diseases, adaptation and the use of epigenetic endpoints as generalized or even stressor-specific biomarkers. The agenda, and a COMET deliverable can be downloaded from the Radioecology Exchange here: https://wiki.ceh.ac.uk/x/u4XXD. As a number of novel studies were presented the attendees requested that their presentations were not made public.

The workshop addressed a wide spectrum of questions related to long-term and transgenerational exposure, in laboratory studies of radiation and chemical effects, molecular biology relating to epigenetic mechanisms, human and ecological risk assessment and radiological protection. World leading experts in each of the subjects attended the workshop. In total, there were 48 participants from 12 countries (Belgium, Canada, USA, Spain, France, Germany, Japan, Norway, Portugal, United Kingdom, Russia and Sweden). Discussion groups at the end of the plenary sessions addressed similar points on the role of epigenetics in radiobiology and ecotoxicology, but from a different perspective: one from an ecological and

evolutionary biology viewpoint and the other with a focusing on mechanistic issues and systems biology. The transgenerational effects of stressor that were presented and discussed emphasize that the epigenetic and evolutionary effects of chemicals and radioisotopes are not just of academic interest. Instead they can have real influences on the impacts that these stressors may have on the environment. Transgenerational mechanisms can result in effects that occur at concentrations ten times lower than those that have the same effect on the previously unexposed parent generation. The studies of the epigenome indicate important roles of major epigenetic factors in the longevity of these effects over generations. The revolution in understanding of epigenetic mechanisms that has occurred in medical research over the last decade has provided environmental toxicologists with access to a wealth of new methods and tools to understand these epigenetic effects. To date the major focus has been on DNA methylation, however, the widespread availability of methods for analysis of miRNAs and histones suggests that these should also be a focus of study – indeed it is entirely possible that these will prove to be more important mechanisms. High quality epigenetic and evolutionary biology studies will emerge when experts in radiobiology and in genetics and systems biology work together to address particular hypothesis-driven questions. This will mean that all aspects of work, exposure and dosimetry, and epigenetics and mechanistic toxicology use appropriate tools within an integrated study. Both discussion groups agreed that forming such partnerships is important to help move the field forward.

Following these discussions further work in the following key areas was suggested:

- Fundamental studies of genome-wide methylation patterns across species from different taxa to assess the different roles of DNA methylation in gene regulation, including expression levels and alternative splicing.
- Further work on the role of DNA methylation as a first case study of the role of epigenetic mechanisms in species responses to radionuclide (and chemical) exposure.
- Studies to assess the specific role of DNA methylation as a potential biomarker of exposure, including the potential for cytosine modifications to act as a “memory” of exposure for individual subject to pulsed exposures.
- Studies using non-coding RNAs in radiological and ecotoxicological species including assessment of the link between the changing non-coding RNA complement and gene expression.
- Assessing comparative radio-sensitivities for different organisms of different phylogeny to allow assessment of the role of physiological traits including the epigenome in sensitivity.
- For risk management, to know what protection goals are of most importance (human vs ecosystem) and in which contexts (chronic vs accidental releases), and to understand how information that may be gained from epigenetic studies can support decision making within these different types of assessments.

2.5.3 Kd (partition coefficient) workshops

The first Kd workshop was held in May 2014 in Oslo and the second in Monaco in April 2015. The main objectives of the Kd work were to:

- Conduct a critical review of literature of soil and freshwater Kd values to describe Kd variability.

- Develop a common data base structure that can be used by modellers to estimate Kd values and Kd variability in soil, fresh water, and marine systems.
- To assess the use of analogues to estimate Kd values for which there is little information.
- Develop/identified approaches to describe and reduce uncertainty of Kd values.
- Identify additional data needs.

Co-operation between STAR and IAEA MODARIA WG4 has facilitated the enhancement and improvement of Kd values, which are relevant for both human and environmental assessments. STAR has provided support for these workshops to discuss a wide range of issues connected with what needs to be improved, how can it be done and the needs of the user community. MODARIA WG4 brought together an international community which has provided substantial amounts of new data from various member states to revise the Kd datasets. The focus of the MODARIA WG4 has been on soil and freshwater. IRSN, a STAR partner, has been responsible for the freshwater dataset kindly provided by EDF (originators of Kd data in TRS 472) and the University of Barcelona (MODARIA WG4 participant) for soil (also holders of the TRS 472 dataset).

The meeting hosted by the IAEA in Monaco enabled the STAR and MODARIA WG4 participants to benefit from the expertise of IAEA staff in developing and maintaining databases and discuss whether there was a need for revision of the current marine Kd values in TRS 422. Presentations of the meeting will be uploaded onto the MODARIA WG4 website. Discussion during the meeting of the methods of derivation of the marine Kd values in TRS 422 identified a number of assumptions which would lead to overestimation of the Kd values reported in TRS 422. Data presented also showed that a generic assumption used in TRS 422 for all radionuclides was not appropriate when tested using Japanese sediments.

The improved datasets constitute a significant improvement of a key international Kd database which will ultimately be published by the IAEA, as well as in a summarised format (yet to be agreed) on the Radioecology Exchange website.

2.5.4 Making data available workshop

The third data workshop on making data available was held in Vienna in April 2015. The aims of this workshop organised by STAR in collaboration with working groups 4 and 8 of the IAEA MODARIA programme were to:

- Discuss best practice for making data available
- Consider why we should make data available
- Review Japanese sources of Fukushima related data
- Communicate the evolution of international data sets
- Present analyses of international data sets
- Discuss data sets which may be published
- Present on-going IAEA modelling activities

The meeting was attended by 32 scientists from 11 countries and the IAEA; the majority of attendees were not involved in the STAR NoE. Abstracts and presentations are available from

on the Radioecology Exchange (see https://wiki.ceh.ac.uk/x/jgLoDQ. The workshop report (Beresford et al. 2015) documents discussions following each presentation.

2.6 Scientific papers; deliverables, conference proceedings

The STAR project was highlighted in the EC parliament magazine (issue 332; 18 July 2011).

Information on publications from the STAR project are available on the STAR project website here: https://wiki.ceh.ac.uk/x/a4FiC (with hyperlinks to the documents where possible).

2.7 Briefing documents

STAR has created a web page collating information related to Fukushima research such as information available on STAR (and COMET) partner websites and on those of major international organisations; the page will be expanded during COMET. An important component of this part of the site is a briefing document on the status of marine areas after the Fukushima accident.

Two briefing notes on estimation of doses were also prepared and made available on the Virtual Laboratory on (i) the relative importance of internal vs. external dose and exposure routes when exposed radionuclides in the environment (by IRSN), and (ii) radiation doses to frogs during different life stages (by SU).

2.8 Researchgate

We have recently made deliverables available through Researchgate which has greatly enhanced their availability and visibility. They are currently being downloaded frequently by followers.

2.9 The STAR Final Dissemination event

A questionnaire was uploaded into the Radioecology Exchange which asked attendees due to attend the event to prioritise possible topics for discussion during the debate sessions. This allowed the subsequent debate discussions to take account of people's concerns and interests in a focused way. A summary powerpoint presentation containing the outcomes of these five debate sessions has been made available on the Radioecology Exchange.

A lot of detailed planning went into the final dissemination event in June in Aix en Provence, such as the format and content of talks and posters and the debate sessions. The event had >100 participants with roughly half being outwith the STAR consortium. One of the aims of this final dissemination event was to ensure that dissemination of STAR activities and outputs was accurate, well presented and understandable and focused on the main message, as well as answering the "So what" questions arising. All the posters and presentations used a STAR template and were reviewed to ensure quality, project 'branding' and were of the appropriate length.

At the dissemination event a questionnaire about the Radioecology Exchange website was distributed. The aim of this was to gain feedback from attendees on the current content and look of the site. The results obtained could then be used by COMET and the ALLIANCE to target future improvements. Of the >100 people who attended the meeting, 34 responded to

the questionnaire. Analysis of the responses shows that 23 people who had previously used the site were associated with either STAR, COMET or the ALLIANCE whereas nine were not associated with any of these. The responses to particular questions are given below:

'for what purpose did you use the site'

> 21 people responded stating they used the site to find information, some stating specifically the news updates, the training and education pages and the publications and other documentation available.

'if, in the future, they would they use the site',

> There were 33 'yes' responses, who were mainly interested in information, training and education; STAR & COMET updates and items posted on the news blog.

'what was missing from the site';

> 27 people responded. Suggestions were: a link to ResearchGate pages for members of STAR and/or COMET; an index; a 'about us' feature on the home page, an 'executive summary'; a discussion forum to make the Radioecology Exchange site the first port of call when looking for information on Radioecology; specialist advice to the public; an experience exchange for scientists; links to other websites for industry and regulation and to expand the scope and to also include non-European radioecological websites.

When asked 'what needs improving' on the site;

> 24 people responded. There was no overall consensus of opinion. However, more 'interactivity' was mentioned. Other suggestions were the inclusion of an 'about us' feature; an invitation for collaborators and more pictures and a little less text. Others stated some pages on the site do not have much detail and the site should be kept 'current' with timely updates.

When asked 'what was considered the best feature' of the site;

> 28 people responded. Many stated that they liked the site and its simplicity and straightforward design; others mentioned that a site where all information on radioecology is situated (i.e. a hub/gateway) was the best feature. Others stated the news blog and access to social media. Overall, the feedback from participants was good and most people stated they liked the site and would use it in the future.

2.10 Training and Education

Tasks conducted related to Training and Education dissemination were:

- Created the Training and Education platform on the Radioecology Exchange to disseminate information on STAR (and COMET) training courses and to provide links to other EU E&T networks e.g. DoReMi and CINCH.
- Held two workshops "Education and training in Radioecology: Supply and Demand Stakeholder Workshops (D6.1) where a total of 47 stakeholders participated. The engagement with the stakeholders has continued by informing them of syllabus

revisions, including ways in which the revisions have been made according to their recommendations.

- A one week PhD course on Environmental Radiobiology, held in June 2013 by NMBU. There were 28 attendees; 9 took the final exam to obtain the 5 ECTS. This course has been held again in June 2015.
- A two week MSc course on Radioecology and experimental radioecology, held in October 2013 by NMBU. There were 16 attendees; 13 took the final exam to obtain the 10 ECTS. This course was repeated in 2014 and will be held again in 2016.
- A three day training course on Mixture Toxicity was held in January 2014 by SCK.CEN; there were 9 attendees.
- NERC-CEH held a three day training course in Environmental Protection in April 2014.
- NERC-CEH and SCK.CEN held two refresher courses on updates to the ERICA Tool and Noble Gas modelling in collaboration with COMET at the International Radioecology Conference in Barcelona, 2014.
- Interacted with other EU E&T networks (DoReMi, CINCH, EUTRAP, NERIS etc.).
- Mounted e-learning materials (videos; made during a meeting in Stockholm) onto the Radioecology Exchange. See the 'what is radioecology' on the home page and three videos describing DEBtox, Mixed contaminants and Biotic Ligand Modelling on the Virtual Laboratory here: https://wiki.ceh.ac.uk/x/5oBsD.

2.11 Conference dissemination

STAR was promoted at the following conferences:

- The NSFS Conference, Reykjavík, 22-25 August 2011.
- The 2nd International Radioecology Conference (ICRER), Hamilton 2011, where STAR was given a 1.5 hour time slot in a special session on "the integration of international radioecological efforts" (23 June 2011).
- The Environmental Radioactivity: Implications for Environmental and Human Health conference, Plymouth 2012 where a special session for PhD students introduced the STAR PhD Research School to a wide audience.
- The 12th International Conference of the Biogeochemistry of Trace Elements (ICOBTE) conference, Athens, Georgia, USA; 2013 where STAR co-chaired the special symposium on "Environmental Radioactivity: Legacy Sites, Chernobyl and Fukushima" (with associated special issue of J. Environmental Radioactivity, vol. 131).
- The Society of environmental Toxicology and Chemistry (SETAC) conferences (SETAC North America 35th Annual Meeting, Vancouver 2014, SETAC Europe 34th Annual Meeting, Basel 2014 and SETAC Europe 35th Annual Meeting, Barcelona 2015) where research done under WP4 and WP5 were promoted through posters and oral presentations.
- The 4th Dynamic Energy Budget Symposium, Marseille 2015, where STAR research was promoted through oral presentations.
- The IUR International Workshop on worldwide harmonization of radioecology networks: launching the "FORUM", 19-20 June 2014 - La Baume, Aix en Provence, France.

- The 3rd International Radioecology Conference (ICRER) in Barcelona, 2014, where STAR gave refresher training courses and promoted its research through posters and oral presentations.
- The STAR final dissemination event, Aix June 2015: Programme and Presentations

'Flyers' promoting STAR have also been distributed at conferences and other appropriate events.

2.12 Strategic Research Agenda (SRA)

Various stakeholders contributed to the SRA, mainly through three events: the public consultation launched through internet in July 2012 and the associated STAR SRA workshop in November 2012 (Paris) and the OPERRA e-survey. These events helped to identify priorities in radioecology when examining the common needs between the SRAs released by the four European platforms dedicated to radiological protection.

The public web-consultation was open for 3 months (from July to October 2012) to collect stakeholders' views on the SRA. The questionnaire allowed stakeholders to participate in further developing the SRA by making suggestions and recommendations. Advertisement for this public consultation was achieved through e-mail and via the STAR website. 110 questionnaires were received, from 36 countries (19 from Europe). They came from researchers, regulators, NGO, industry and consultants; covering a large spectrum of stakeholders.

The November 2012 SRA workshop in Paris had ~80 participants and enabled consultation on the document through (i) plenum presentations and discussions and (ii) breakout sessions on: 1) how to prioritise research lines within the SRA; 2) how to improve stakeholder involvement in the implementation of the SRA; 3) how to inform stakeholders of radioecology's importance; 4) listing other key scientific disciplines that radioecology should bridge with to achieve the goals of the SRA; and 5) a list of approaches to help radioecology bridge with these other disciplines. This workshop promoted exchange with international organisations (e.g. IUR, UNSCEAR, ICRP, IAEA, OECD-NEA, IRPA) about research priorities in radioecology and how they could be incorporated into the SRA. The key outcomes were to:

- highlight and refinement of the SRA relative to the activities and priorities of other existing research platforms (such as NERIS, MELODI, BIOPROTA and HERCA);
- identify recommendations for modification or improvement from a variety of stakeholders (from radioecology and other relevant disciplines), including regulators, funding agencies, nuclear industry representatives, the scientific community, scientific societies and NGOs.

The OPERRA e-survey was openly available for all interested responders at http://www.melodi-online.eu/operra_eSurvey.html, and actively announced to members of the four platforms (MELODI, ALLIANCE, EURADOS and NERIS), various European and international organisations, various stakeholders involved in other relevant EC projects and informed members of society. The final version of the survey report (Perko et al. 2015), including more detailed analysis of the answers related to open questions can be accessed through the OPERRA website.

The SRA has been already proved to be valuable as it was utilized when a joint stakeholder survey on priorities for radiation protection research was launched by the ALLIANCE, NERIS, MELODI and EURADOS in mid June 2014.

The Strategic Research Agenda will continue to be valuable for radioecology research groups, other European platforms and stakeholders to formalise priorities for radiation protection research. It will also prevent fragmentation and help to optimise use of resources. Importantly, the SRA will be instrumental for inclusion of prioritising radioecological research within CONCERT.

3 Activities with other organisations

There has been considerable interaction between the STAR NoE, including those with the:

3.1 IAEA

STAR partners are key contributors to the ongoing IAEA activity of updating the 'SRS 19' report (IAEA 2001). Contributions include updating the existing human assessment methodology and creating the methodology to be used for non-human biota. The IAEA have agreed that the approaches developed can be incorporated into the CROMERICA model (see Mora et al. 2015) though the new methods used for non-human biota first need to be prepared as a refereed paper (NRPA and NERC-CEH leading).

MODARIA activities on modelling of radiation effects in wildlife species greatly benefited from STAR methodological developments on modelling of population responses to ionizing radiation (see D5.2 « Life history traits, radiosensitivity and population modelling: methods to extrapolate from individual endpoints to population dynamics ») and calculation of ecological risk to populations (see D5.5 « Protection criteria: Integrating radiation effects from molecules to populations and evaluation of group-specific criteria »). Several STAR partners participated to the development of the database on life history, ecology parameters and radiation effects for wildlife animal and plant species produced by IAEA MODARIA Working Group 9. This work will lead to the publication of an IAEA report and several articles as part of MODARIA WG9 reporting e.g. Alonzo et al., under revision for Journal of Environmental Radioactivity (IRSN leading) and a data paper to be prepared (NERC-CEH leading).

STAR partners were also key contributors to the development of the database on wildlife biological half-life values produced by IAEA MODARIA Working Group 8 (Beresford et al. in-press a;b). During its development the database was used to blind test models developed by STAR WP3 Beresford & Vives i Batlle 2013; Beresford & Wood 2014; Beresford et al. 2015 (open access publication)).

STAR has conducted three workshops in collaboration with the IAEA MODARIA WG4 on 'making data available' and efforts to establish an improved partition coefficient (Kd) database (see section 2.2).

3.2 ICRP

From the beginning of the project, STAR has communicated its results to ICRP effectively since three individuals from STAR partners (IRSN, CIEMAT, SCK•CEN) are also members of ICRP Committee 5 dedicated to protection of the environment. During the two last annual Committee 5 meeting (Abu Dhabi, 2013 and Barcelona, 2014), European project outcomes were presented and discussed under the item "International and national outcomes". The next annual C5 meeting will take place in Seoul (October 2015), jointly to the ICRP international symposium, and a time slot will be requested to the C5 chair to share the key messages from the STAR final dissemination event held in Aix en Provence (2015). Outputs from STAR may surely influence the priority list of PhD topics suggested by ICRP. Additionally, outcomes from STAR WP3 and WP5 will help the development of the work planned by Task Group 99 dedicated to "RAPs monographs", mainly by using inference methods developed under STAR either for quantifying radionuclide transfer to species or for treating the individual to population extrapolation issue. An ICRP Task Group will utilise outputs of the STAR WP3 extrapolation task. Finally, the ALLIANCE has just sent an expression of interest to the ICRP scientific secretary, to become a liaison organisation to ICRP.

3.3 IUR

The IUR contributed to the second version of the SRA and also gave a presentation at the Workshop held in Paris in November 2012 to launch the SRA.

As STAR is now preparing its "Final plan for integration and the long term Strategic Research Agenda (SRA)" the president was asked to provide comments to the following issues on behalf of the IUR:

- Role of the ALLIANCE in the future of radioecology in Europe.
- How could the ALLIANCE be connected to the work done by your organization, or assist this work?
- What could be expected in the future of the ALLIANCE? Or in broader context, what could be expected of the recent integration trend in radiation protection (through the EJP-CONCERT of Horizon 2020)?
- Which do you think is the next step regarding radioecology and its integration in the radiation protection arena? How to proceed worldwide?
- Any other view/comment regarding the long-term sustainability and integration of radioecology.

The response is now available on their website.

Tom Hinton also attended the "IUR International Workshop on worldwide harmonization of radioecology networks: launching the "FORUM", held in June 2014 in Aix en Provence, France on behalf of STAR.

3.4 Industry and regulators

Representatives from industry and regulatory bodies participated in the consultation on the Strategic Research Agenda launched by STAR and at the associated workshop held in Paris in November 2012. In addition, representatives attended the workshops organised by WP6

(D6.1. "Education and training in Radioecology: Supply and Demand Stakeholder Workshops") and the STAR final dissemination event.

4 Challenges (and solutions) for dissemination

There are many challenges related to dissemination activities, examples include:

- Awareness: Target groups need to know who you are, what you do and where they can find you. To ensure they have this information ensure there is an appropriate web presence (where the webpages are regularly updated) and consider the use of social and traditional media.
- Consumer: Different audiences require different dissemination approaches. Target groups must be clearly defined and the style of communication and language must be appropriate for the audience.
- Searchability: On-line information should be easily found. It should be published not only on official webpages but also on research gate, https://www.academia.edu/ etc.
- Accessibility: Project data should be made available in a manner that it is clear to the user how the data was collected and analysed. An example of this would be the use of a data catalogue or database (preferably conforming to the INSPIRE directive) with appropriate metadata describing the study.
- Formats and systems: 'Future proofing'; software evolves over time and can expire. To ensure information and data can be read and analysed in the future ensure readable formats are used (e.g. CSV files) tools for analysis are (and remain) available and consider the other methods suggested in the INSPIRE directive.
- Acceptance: Even if knowledge and data are disseminated, it does not mean that the solutions and approaches suggested will be accepted. However, acceptance is more likely if stakeholders are involved in discussions.

4.1 Challenges encountered for dissemination in STAR

Dissemination takes commitment, time and resources. The relative importance given to dissemination activities inevitably varies between partners and even between individuals. Furthermore, different types of organisation have different views on the relative priority of such activities, depending on their status and roles in their country. They also may prioritise dissemination via their own organisation rather than via an EU project.

Given these perspectives, it has been difficult to get some partners to contribute to some of the intended dissemination activities in STAR, particularly with regard to data. In part, this is due to the constraints of being a regulator, or differing priorities of organisations. However, this is not a problem confined to STAR. Similar problems have been noted for other EU projects/platforms. The consequence of this situation is that if only a few partners contribute 'their' information, this input appears to dominate and other useful information is missed.

Inevitably, a key interest for scientists is their scientific output rather than dissemination outputs. It is relatively rare for extra time above that funded to be given for dissemination activities (except perhaps conferences). This emphasizes the importance of allocating an adequate amount of time to dissemination activities in EU projects.

5 Continuing dissemination in COMET

Many dissemination activities carried out in STAR will be continued and enhanced in COMET. A Communication Plan has been developed within the COMET project, which defines the goals, strategy and the necessary means to produce good dissemination of the results targeted to the desired audience and using the appropriate resources.

The global objective of the Communication Plan of COMET is to show the usefulness of radioecology, by making this discipline not only more visible but also more understandable, valuable, interesting and attractive for a wide range of stakeholders. Relevant stakeholders include: students and professors (high school and university); funding agencies; regulators (local to international); industry; local, national and international administrations; policy makers; researchers of other disciplines (such as emergency preparedness, low doses, ecotoxicology, ecology): non-governmental organisations (NGOs) and (to a limited extent) the general public.

To reach this global objective, the specific goals are:

- Increase knowledge about research in radioecology, targeted appropriately, but including some efforts focused more widely at the general public.
- Effectively, accurately and transparently communicate the objectives of radioecology.
- Optimize resources in R&D in Europe and minimise the duplication of efforts by effectively transmitting the outputs of COMET via the ALLIANCE.
- Provide appropriate channels for small research groups within Europe to join the common European efforts in radioecology
- Provide to industry, stakeholders and end-users an overview of key outputs concerning environmental radioactivity to avoid misunderstandings or undue concern.
- Facilitate the application of COMET outcomes for regulators, the industry and other end-users.

The communication of COMET's outputs is essential for enhancing the visibility of the science of radioecology within Europe and worldwide, and to make it more relevant for the user community. Effective communication means that information in the correct format, at the correct time, to the correct audience, and with the desired impact is provided.

Two web sites, essential for the communication strategy, have been developed in COMET: one public website (www.comet-radioecology.org) and one website (i-share) only for COMET partners, including the COMET Steering Committee. COMET will also contribute to further develop the public Radioecology Exchange website (www.radioecology-exchange.org) created during the STAR project.

Other communication channels include: the ALLIANCE webpage; social media and networks; scientific workshops, seminars and congresses; publications in scientific and technical journals; participation in/leading international activities at IAEA, ICRP, IUR etc.; news items in popular science journals and the organisation of training and education activities in radioecology.

Many of COMET's planned activities have a strong communication focus, reflecting the wide objectives of the project. Activities include: a workshop on uncertainties in estimation of effects on wildlife in radioactively contaminated sites; workshops on Fukushima (with an

additional meeting following the ICOBTE conference special session) and field studies courses in Poland and the Ukraine.

The COMET Communication Plan includes evaluation mechanisms, to know how much each communication activity contributes to the goals defined in the Communication Plan. Some of these evaluation mechanisms are: electronic based systems to collect data on number of visits, depth of the visits, etc.; number of publications in peer reviewed scientific journals and chapters in books; number of publications in media (newspapers, media); completed questionnaires to NGOs and policy makers; number of questions sent, by organisations not involved in the ALLIANCE, to the institutions within COMET; changes in regulation (local to international) where COMET publications are mentioned; number of students in organized courses and involved in multi-partner activities; number of workshops, courses and conferences in radioecology; number of conferences, workshops and events where COMET related research/ activities/work are presented.

6 The European Radioecology Alliance

Integration of the European radioecology community is underway with the help of STAR partners. The ALLIANCE, officially formed as an association in September 2012, has expanded from the initial eight founding members (BfS, CIEMAT, IRSN, NERC, NRPA, SCK•CEN, SSM, STUK) to 21 members from 14 countries (http://www.er-alliance.eu). The first ALLIANCE annual workshop was held in Madrid in the end of April 2014 in connection with the General Assembly. Proving that STAR has made considerable progress in enhancing the long term stability and sustainability of radioecology in Europe the COMET project, which began on 1st June 2013 and will build upon the foundations laid by the STAR and the ALLIANCE, will continue to strengthen the pan-European research initiative on the impact of radiation on man and the environment by facilitating the integration of radioecological research.

6.1 Sustainability and dissemination of STAR (and subsequently COMET) outputs

The importance of sustaining the outputs of STAR via COMET and subsequently thereafter via the ALLIANCE is recognised. Significant efforts have been made to ensure that outputs will remain visible and be supplemented and improved in the future. Key aspects of this strategy for various outputs are discussed below.

The key route for dissemination in the future for the ALLIANCE will be the Radioecology Exchange. Because the site is built on a wiki platform it allows contribution from anyone registered to edit the site and as such it is potentially much more self-sustaining than other web sites built on conventional web platforms. Frequent use and improvement of the site is undertaken. COMET will continue to improve it (at a lower level than STAR) and the ALLIANCE has recently agreed that http://www.radioecology-exchange.org/ (RadEx) will be the main radioecology web site rather than developing a separate website. The recent agreements between STAR, COMET and the ALLIANCE (see below) means that much of the information collated on the Radioecology Exchange site will be held in a sustainable format and manner providing a valuable resource to support radioecology in the future.

The outputs of STAR which require consideration for 'maintaining' are largely located on the RadEx website though many have a 'life of their own' and should not simply be considered as web-pages. Co-ordination of work at Observatory sites and the SRA would, for instance, fit into this latter category.

By 'maintained' here we mean further developed; there may be materials on the RadEx which do not need to be developed whichwill be left on the site if appropriate. The STAR project has a separate project website (www.star-radioecology.org) which only contains STAR deliverables, publications lists and information on the project. At the end of STAR this site will be 'locked' once all deliverables etc. are uploaded; the home (and potentially other) page(s) will then be edited to reflect the change in status of the project (and website). At the end of the COMET project the same approach will be taken for the bespoke COMET project website (www.comet-radioecology.org).

The major outputs from STAR will, in the short term (next 24 months), be maintained during the COMET project, including: the SRA, Roadmaps, the training pages of the RadEx, Observatories information, social media etc. The SRA and Roadmap are a key focus of COMET activities. If ALLIANCE members who are not COMET partners make demands which are in excess of the COMET budget then mechanisms to facilitate these demands will need to be discussed (currently such demands would appear unlikely). It is likely that the focus of efforts within COMET with respect to the RadEx will be: Observatories; Fukushima pages; Information Exchange; Blogs. The Training and Education pages will continue to be managed by Stockholm University in collaboration with NMBU.

All COMET partners can add 'News' items and, if they wish, they can take responsibility for certain areas of the RadEx in which case their website access rights can be changed (e.g. Stockholm University currently maintains the Education and Training pages). Consideration could be given to issuing access rights to ALLIANCE members who are not COMET partner's to allow them to add news items, and edit pages if this is considered appropriate.

Towards the end of the COMET project there needs to be consideration by COMET/ALLIANCE members of what aspects of the STAR/COMET outputs will need to be further maintained. Some of these will be obvious, e.g. the SRA and Roadmaps, information on the Observatory sites, etc. For others, we will need to judge the willingness of partners to contribute to their maintenance, e.g. updating of data catalogues, keeping sample archives available, updating analytical methods, etc. We recommend that this is reviewed 6 to 12 months prior to the conclusion of COMET (May 2017). Obviously pages not requiring active maintenance/updating would be left available on the website.

After the COMET finishes, if there is a willingness to maintain (i.e. keep current) the majority of outputs on the Radioecology Exchange, then ALLIANCE members will need to take responsibility for maintaining areas of the site; the use of a wiki platform makes this easy to accomplish.

The Radioecology Exchange, STAR and COMET sites are hosted by NERC-CEH on their wiki system. Currently, NERC-CEH will continue to host the sites for the foreseeable future. The domain names for the sites have been purchased by NERC-CEH and currently expire on:

- star-radioecology.org - 03/03/2023
- radioecology-exchange.org - 14/10/2018
- comet-radioecology.org - 09/07/2018

Estimates for 10 year licences to keep the names after these dates are relatively cheap at <£180 each. STAR and COMET outputs could be moved to the RadEx with a redirection from the old domain names being set-up. However, direct linkage to any documents would then be lost, as a first choice we would not recommend this.

The ALLIANCE has a separate website (funded by NRPA) and at a recent OPERRA led meeting on platform/project websites the need for it in its current format was questioned (by the other platforms). Currently, the ALLIANCE site has a number of pages including news items – these are not regularly maintained. At the ALLIANCE General assembly in France in 2015, it was agreed to reduce the ALLIANCE website content to information on the ALLIANCE and its members how to become a member. The ALLIANCE site should then link to the RadEx for outputs and news etc. This removes the need to keep two sites current and it should be possible to do this in a manner which makes the two site integrated. There has been suggestion that the ALLIANCE should only have one site. Whilst this may appear to have some logic, strong arguments against include: (i) that the RadEx is becoming known and has an increasing number of viewing figures (over 100 unique views per day being relatively common); (ii) moving the contents of the RadEx to the ALLIANCE site after the COMET project would require substantial (and unfunded) resources and it would remove some of the flexibility presented by the wiki platform to share future workloads.

6.2 Sustainability and dissemination of Radioecological Databases

6.2.1 Observatories

Within STAR the first steps to establish radioactively (and chemically) contaminated field sites that will provide a focus for joint, long-term, radioecological research have been taken. Sustainability of these Radioecological Observatories involves the long-term perspective of these sites for radioecological field work and the sustainability of data and information.

Basic information on the selected Radioecological Observatory sites is accessible on the Radioecology Exchange website (see: https://wiki.ceh.ac.uk/display/radex/Observatories). Links provide overviews of the Observatory sites in the Chernobyl Exclusion Zone) and the Upper Silesian Coal Basin). All information on the Polish Observatory sites that was available from scientific literature or other publications, including Polish grey literature, is compiled in a comprehensive document. This document will be made available shortly on the Radioecology Exchange website. This website is intended to be the repository that provides easy access to data and information.

Attempts to ensure a long-term perspective of the Polish Observatory sites was more difficult and time-consuming than expected. There is a significant delay in signing Memorandums of Understanding (MoU) with the Polish site owners. Their attitudes towards research in general, their individual interests and their economic situation played an important role. One of the site owners is still very reluctant because of the public opinion, especially reservations against radioactivity. The Central Mining Institute (Główny Instytut Górnictwa, GIG) acts as the local contact point and facilitates the communication with the Polish site owners. GIG is expected to provide support in the long term, since this institute is a member of the COMET consortium and the European Radioecology Alliance (ALLIANCE). The MoUs will be signed by the corresponding site owner and GIG as the representative of the ALLIANCE.

Within the EC-funded project COMET, the concept of Radioecological Observatories will be further developed, including mechanisms to access these sites for hypothesis-based field investigations. In the long term, the ALLIANCE will ensure that establishing Radioecological Observatories will be a successful initiative and broaden the range of Observatory sites. Based on a detailed list of selection criteria developed by STAR, the ALLIANCE Secretary encouraged all ALLIANCE members to suggest terrestrial NORM sites that are contaminated with high levels of naturally occurring radionuclides.

6.2.2 Parameter values

WP7 designed and set up a STAR member's data holdings wiki; see: https://wiki.ceh.ac.uk/x/EwGsC (log in needed). The information collated using this wiki was used to create the data catalogue which was defined, developed and populated to provide access to radioecology data currently held by partners on the Radioecology Exchange (STAR deliverable 7.3).

STAR has pioneered mechanisms to improve data availability and transparency. This was facilitated by organising three workshops on radioecological data – two workshops on the partition coefficient (Kd) and one on data availability were held in the reporting period (MS 7.7 and MS 7.10). The outputs from these workshops are accessible from: https://wiki.ceh.ac.uk/x/u4XXD and the Kd information will be available on the IAEA MODARIA WG4 site.

We provide access (via the data catalogue) to data produced prior to STAR on the Radioecology Exchange. STAR WP data is being managed by the respective WP 3-5 leaders, who have agreed the policy and implementation with WP partners. Uploading of STAR data will occur past the end of the project in conjunction with reporting of results in scientific journals (the details of which will be added to the STAR publications page: https://wiki.ceh.ac.uk/x/DYFsD).

6.3 Long-term integration and dissemination with other EU platforms

The four radiation protection platforms (ALLIANCE, MELODI, NERIS and EURADOS) have strengthened their connections. They have all signed a joint Memorandum of understanding in December 2013. STAR/COMET partners as representatives of the ALLIANCE have participated in several meetings arranged by the other platforms. The four platforms were working together for the H2020 European Joint Programming call in Sep 2014 (joint CONCERT proposal) and for the second OPERRA call (Dec 2014).

The work to promote radioecology will continue under CONCERT (European Concerted Programme on Radiation Protection Research). There are 52 partners in the consortium including the four research platforms ALLIANCE, MELODI, NERIS and EURADOS. CONCERT aims to develop a sustainable structure for promoting and administration of joint programming and open research calls in the field of radiation protection research for Europe. Activities of the CONCERT consortium will focus on (i) the aspects of support to develop an integrated landscape for radiation protection research in Europe and (ii) to directly fund coordinated research projects in an open, fair and transparent manner dedicated to state of the art science and tailored to the radiation protection needs of the society, authorities and stakeholders. Integration of education and training in the research agenda as well as optimal use of research infrastructures in Europe and even beyond are essential for the consortium.

Also, within CONCERT, the development of infrastructure databases, data collection databases (e.g. linked with Observatory sites) and databases on models etc. will be supported.

As stated above, STAR has made considerable progress in enhancing the long term stability and sustainability of radioecology in Europe. The collaborative work and joint research strengthens radioecology and enables us to achieve the goals set together. We have managed to integrate even further than we imagined in the beginning of the project.

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