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Strategic Research Agenda a tool for structuring research efforts and sharing priorities

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European Radioecology ALLIANCE

Strategic Research Agenda *a tool for structuring research efforts and sharing priorities*

Rodolphe GILBIN

EPRI-NEA joint workshop on low-dose research co-ordination

Paris, 26 June 2024

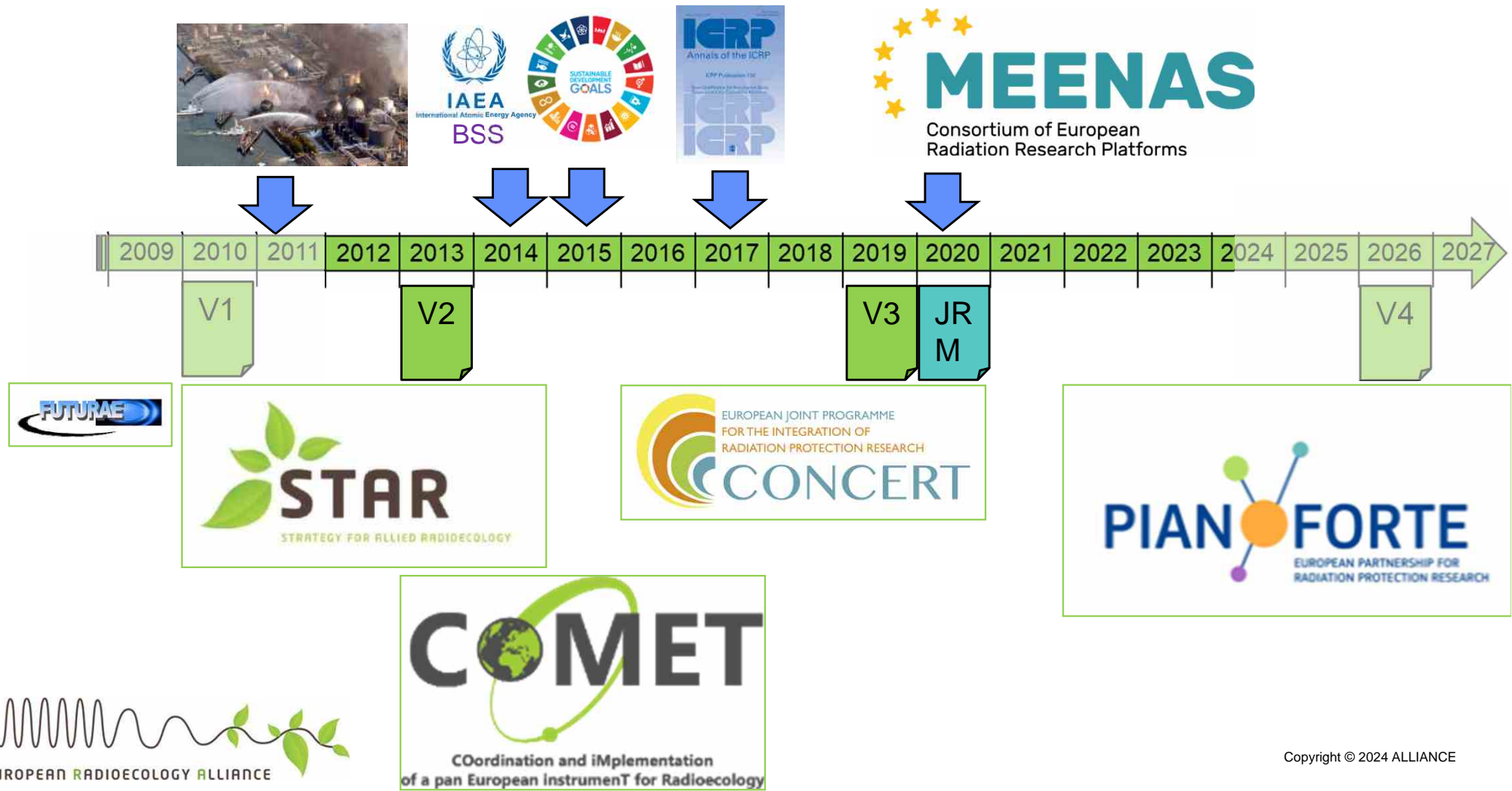


8 founding members (2009)
Official status (2012)
32 members, 18 countries

Strategic Research Agenda

A continuing story since 2009

An essential tool for defining priorities in scientific programming and maintaining the visibility of radioecology



Strategic Research Agenda

Strategy for its development

Objectives

1. Maintain and develop the **workforce (education and training)**
2. Maintain and develop associated **infrastructure**
3. Defining a long-term vision (for the next 20 years) of the **research needs in radioecology** in Europe (3 Research Challenges)

Inputs

- **State of research** in radioecology and, where relevant, related sciences
- **Stakeholder's vision** on research needs and data gaps

Expected Impact

Confidence in and Credibility of the radiation protection of the public (environmental exposures) and the environment (e.g. robustness of 'no-effect' benchmark dose rates)

1/ Education and training

to maintain and develop a skilled workforce



- Increasing student and teacher/researcher **mobility**
- **Funding early career researchers** in funded projects
- **Joint EU MSc** (Erasmus, European Universities) and links with other E&T programs in nuclear and environmental sciences
- Providing **courses and workshops** for students, professionals and academics
- Offering **refresher courses and seminars** at conferences
- Organising **summer schools, field training...**

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Small Calls

PIANOFORTE
Mobility
programme
(ECR/ECP)

Members initiatives
MSc in Radioecology (NMBU)
SCK•CEN Academy
Stockholm University courses


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Refresher courses
(ICRER, ERPW)



ALLIANCE
webinars

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Observatories

2/ Infrastructures and capabilities to maintain and develop the infrastructures

- Identify the requirements and create the **partnerships of excellence** that bring together the required infrastructures
- Maintain a web-based **catalogue** of infrastructures and capabilities 
- Promote the visibility and **joint use of existing infrastructures**, encourage wider collaboration
- Further **development of the Radioecological Observatory sites** (Chernobyl Exclusion Zone, Fukushima Exclusion Zone, NORM-impacted sites in Belgium, Poland and France)

CONCERT webHandbook D6.4



Exposure Platforms

- FIGARO (Norway)
- PULEX-COSMIC (Italy)
- SCRS-GIG (Poland)
- Microtrol Lab (Czech Rep.)
- MICADO-Lab (France)
- SNAKE (Germany)
- Radon expo (Germany)
- BIO (Hungary)
- CIRIL/GANIL (France)
- SCK.CEN (Belgium)

Observatory Sites

- Chernobyl Obs. Site (Ukraine)
- Fukushima Obs. Site (Japan)
- NORM Obs. Site (Belgium)

3/ Research Challenges in the SRA

main drivers

Joint Roadmap



- Identify research needs and develop tools that will further **optimize the existing radiation protection system and advance radiation protection**, considering the **societal needs and concerns**, and to plan such research

Need for improvement of mechanistic understanding across radioecological research

- Provision of **scientific evidence** and **fit-for-purpose** impact/risk assessments for human and wildlife (mechanistic modeling, improved parameterisation, improved databases)
- **Support the evolution in policy** making and guidance
- Addressing of **shortcomings linked to new technological developments and releases** of radioactivity in the environment (e.g., SMRs, decommissioning, waste disposal, legacy sites, medical uses...)

Low-dose research related priorities

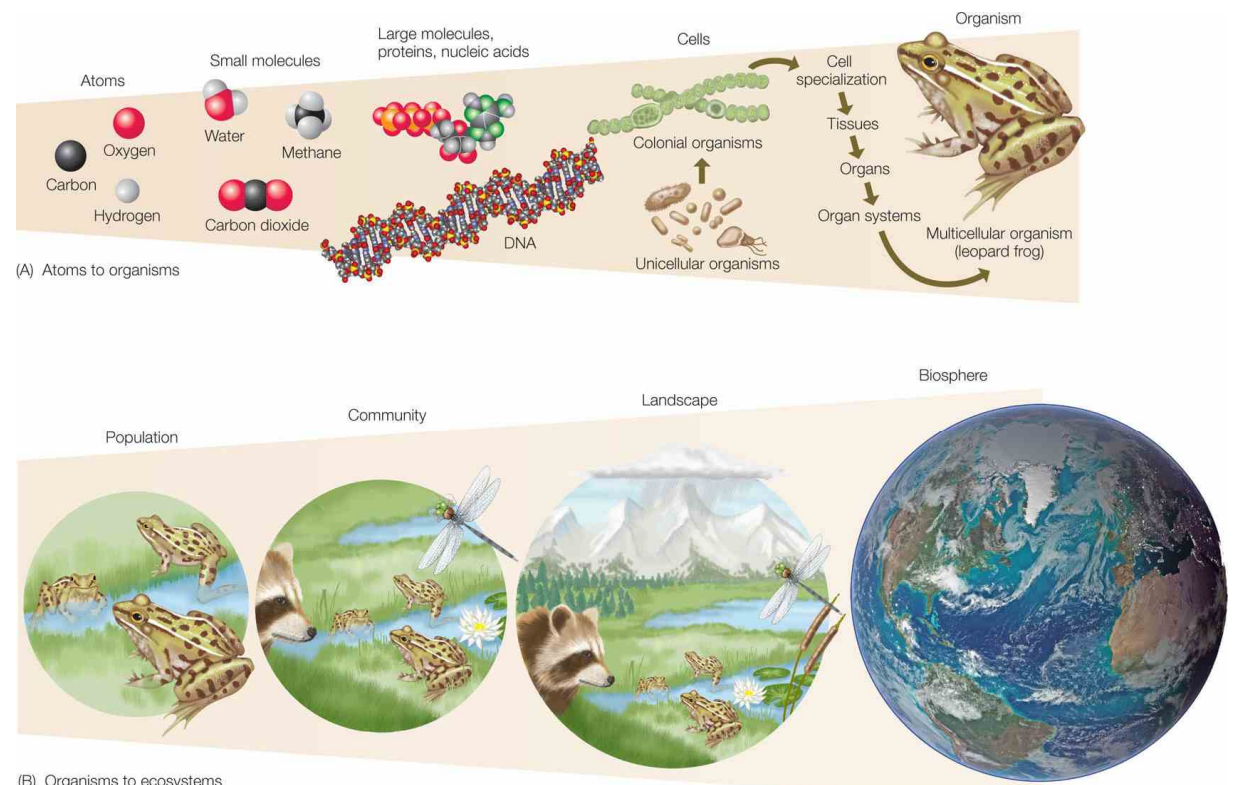
SRA (Challenge 2), Topical Roadmap, JRM (Challenge C)

- Radiation induced effects at multiple levels, **from molecules to individuals**
- Intra- and inter-species **differences in radiosensitivity**
- **Multi-generational responses** (e.g., hereditary effects, adaptive responses) and **long-term biological effects** of low radiation doses

- Interactions with other **co-stressors**

- **Effects at higher levels of organization**

(population dynamics, trophic interactions, indirect effects at the community level, ecosystem functioning)



Conclusion

Success

- SRAs and joint roadmap **evidence of increased integration**
- **Projects** follow from collaboration
- **PhDs** mobility
- Strong pillar of **MEENAS**
- **Growing membership**



Societal responsibility

- **Response to stakeholders concerns** regarding presence of RNs in environment
- **Responsible RD&I for improved radiation protection** of human health and wildlife populations

Coordination of research, infrastructures availability and E&T

- Build **common goals and share resources** among radioecology and with European radiation protection community (Joint Roadmap, PIANOFORTE)
- Promote **hypothesis-driven research** for the acquisition of new scientific knowledge, and model and tools optimization

Way forward

ICRP RP System adaptation for the Next Generation (in progress)

- IR effects on the **Structure and Function of ecosystems**
- **Resilience and adaptation** capacities of non-human biota and shifts between levels of organization (organisms and life stages, populations)
- IR effects with **Other stressors** (chemicals, **climatic change**...)

New contexts & societal perspectives

- **War situations** (Ukraine) or natural disasters
- **Novel nuclear technologies** (SMRs, AMRs, fusion) and specific sitings (marine, urban, arctic, tropical...)
- **Specific radionuclides** of interest (e.g. medical applications)
- **Waste** and Spent Fuel Management and **Decommissioning**

Incorporation of Advanced Technologies

- **Artificial Intelligence, Data science, Computational modelling** (e.g. Inverse environmental modelling)
- **AOP** approach to provide further insight in the effects of low doses(rates)
- High-throughput screening methods in Ecology (**environmental DNA**), **remote sensing** metrology...

Next steps

- Continued integration of environmental protection (**environmental health, exposome**)
- Links with larger considerations: UN Sustainable Development Goals (**SDGs**), preservation of **biodiversity** and **ecosystem services**
- **Balanced approach** against radiological impacts (social, environmental, economic)

→ **Update of the Joint Roadmap** (|  WP2.2)

- **Engagement with stakeholders and the public**
- Taking into account **scientific progress** and evolution of **societal needs**

Thank you for your attention !

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More information:



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