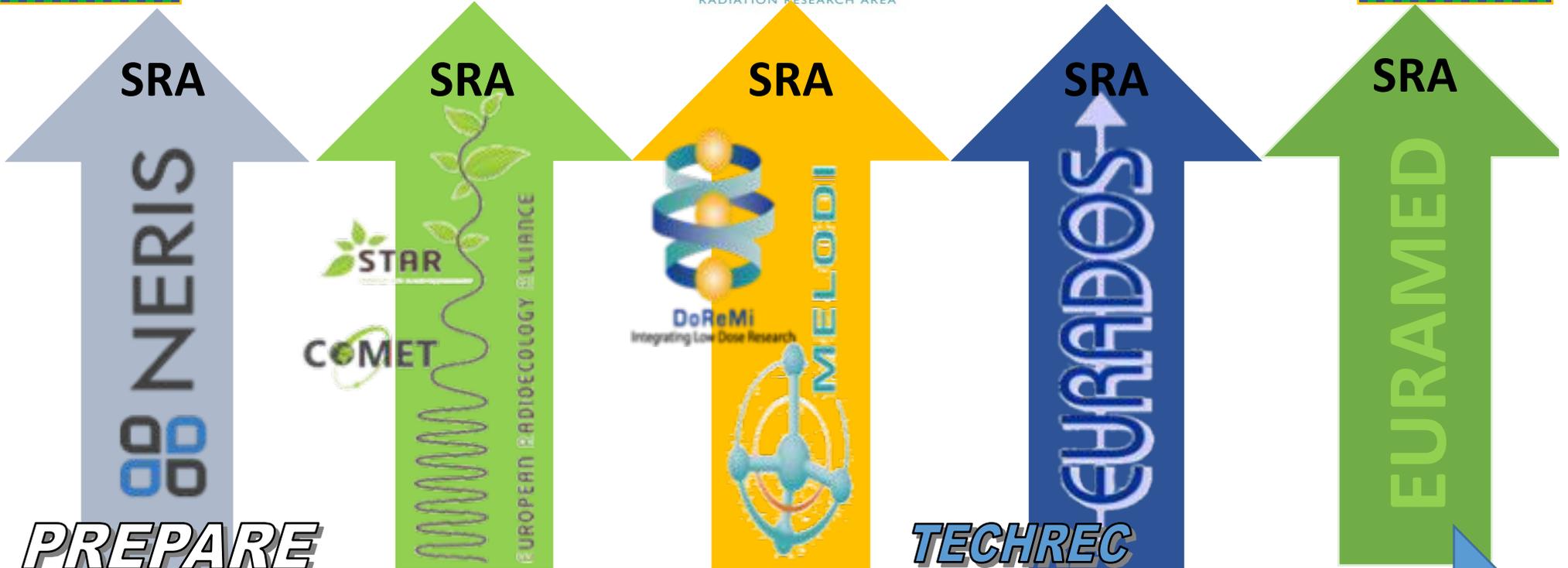


Development of a joint roadmap for radiation protection research:

A focus on the inclusion
of  **NERIS** related challenges

Nathalie Impens

- Radiation protection research + contexts
- 1st steps towards radiation protection research roadmaps
- Scenarios / challenges relevant to NERIS
- Next steps:
 - stakeholder involvement – NUGENIA as current example
 - roadmap alignment



Social sciences and humanities

Radiation Protection related to all exposure contexts

- Natural radiation contexts
 - Natural background
 - Cosmic radiation
- Anthropogenic radiation sources contexts
 - Nuclear energy production and fuel cycle:
 - Medical exposure of patients and personnel + related products manufacturing and waste
 - Use of natural resources containing naturally occurring radionuclides, that are processed neither for their fissile nor their fertile properties (NORM / TENORM)
 - Application of ionising radiation in industry and science
 - Military

Why do we need a joint roadmap for RPR?

- To identify the common research needs
- To enable planning of research over a longer time
- To discuss with national representatives, EC and relevant stakeholders the research and resource needs
- Final goal: to engage to an agreed joint roadmap accompanied by appropriate funding with a long-term call planning system

First steps towards the development of a roadmap for radiation protection research

- Preparatory document towards Joint Roadmap: [CONCERT Deliverable 3.4](#)
- Based on potential exposure scenarios to ionizing radiation, drafting a first set of Joint Research Challenges
- Complementary to the joint roadmap, MELODI, EURADOS, NERIS, ALLIANCE and EURAMED are developing individual roadmaps; link: [CONCERT Deliverable 2.5](#)

Current roadmap content based on input from:

- the platforms MELODI, EURADOS, NERIS, ALLIANCE, EURAMED, and the SSH community
- Programme Owners and Programme Managers (POMs)
- CONCERT WP5: to include stakeholders points of view in the future
- Including some introductory paragraphs on infrastructure and E&T

Scenario groups currently in joint roadmap

relevant to **NERIS**

1. Patients exposure regarding medical applications of X-rays, electron or particle radiation including the use of radiopharmaceuticals
2. Exposure of the general public and the environment as a consequence of industrial applications of ionising radiation and the use of NORM in normal operation conditions
3. Exposure of workers in normal operation conditions
4. Exposure of the general public and the environment with regard to legacy
5. Exposure of the general public and the environment to the natural radiation environment
6. Exposure of the general public, workers and the environment following a **major nuclear or radiological accident or incident including long term consequences**
7. Radiation protection of the general public, workers and environment as a consequence of a **malevolent nuclear or radiological act** including long term consequences

Current Joint Research Challenges for RPR roadmap

- A. Understanding radiation related human health effects
- B. Improving the concept of effective dose and other quantities
- C. Studying the biological and ecological effects on biota
- D. Optimized radiation protection in medical applications of ionising radiation
- E. Improving radiation protection for workers
- F. Integration and optimization of environmental exposure assessment for ionising radiation and other stressors
- G. Optimizing emergency and recovery preparedness and response
- H. Enhanced integration of radiation protection science with society

Stakeholder (SH) engagement in further roadmap development

- National Programme Owners and Managers + EC
- + Other stakeholders, legislators, decision makers, practitioners, NGOs etc.
- Can indicate their interest in exposure scenarios / research challenges + define concrete exposure scenarios / more detailed research challenges + **funding**

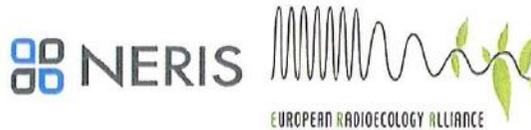
→ We need

- SH consultation methodology (RICOMET 2018),
- SH mapping + identify questions (SH Board meeting @RPW2018)

Next steps (1): Stakeholder consultation: NUGENIA as example

- Invitation to NUGENIA FORUM 2018
- NUGENIA major stakeholder for NERIS
- → investigation of links with NUGENIA roadmap in following slides

Paris,
10 October 2017



**Memorandum of Understanding
to initiate stakeholder dialogue and interactions between
the
European Radiation Protection Research Platforms
MELODI, EURADOS, NERIS, ALLIANCE
and
NUGENIA**



NUGENIA roadmap - Technical Area 1

Plant Safety and Risk Assessment

- related to ALLIANCE/MELODI/NERIS:
 - Challenge: Data, methods and tools for Risk Assessment: Advanced Safety Assessment methodologies
 - R&D topic: establishing methodologies **for level 3 PSA** (up to health effects) including integration with level 2 PSA

NUGENIA roadmap: Technical Area 2 – Severe accidents challenges

Related to NERIS:

- Impact of severe accidents on the environment
- Severe accidents scenarios
- Emergency preparedness and response

More detailed information in the NUGENIA Global Vision Document

R&D topics related to the **radiation protection challenge**

- **Related to NERIS:**
 - **Develop platforms, methods, guidelines and tools for realisation of credible and useful PSA Level 3 as an essential pillar of emergency preparedness and response**
- **Related to EURADOS:**
 - Improvement of radiological protection and reduction of occupational exposures by application of new tools (real-time monitoring of received doses, augmented reality tools, better dosimetric measurements (especially for actinides) and interpretation, etc.,)
- **Related to ALLIANCE**
 - Improvement of public and environmental RP (improving technical issues minimising release under normal operational conditions, improving models and risk assessment methods for quantifying impact to population and environment, including input data)
- **Related to MELODI – ALLIANCE:**
 - Concepts, strategies, methods and tools allowing assessment of co-exposure risks

Interaction with NUGENIA in future R&D activities

- Plan for a workshop in 2019 well acknowledged.
- NERIS roadmap + NUGENIA Roadmap + Global Vision document could be a good basis to identify synergies

Interaction with NUGENIA in future R&D activities proposed by ALLIANCE

- Topics potentially relevant to NERIS as well:
 - TOPIC 1: Updated radionuclide transport modelling through thorough soil characterization and improved knowledge of radionuclide transport processes around NPP sites and temporary nuclear fuel cycle waste storage sites.
 - TOPIC 2: Understanding at the process level the behaviour of radionuclides in the marine environment, uptake by organisms and the resulting doses.
 - TOPIC 3: Aquatic dispersion and food chain modelling based on the input from big data.
 - TOPIC 4: Coupling of aquatic models for short- and large scale simulation.
 - TOPIC 5: Coupling of experience about environmental radium behaviour gathered in NORM affected industries with spent fuel long term management
 - TOPIC 6: Development and application of specific radioactivity determination procedures and instruments according to the requirements scenario

Interaction with NUGENIA in future R&D activities → EURADOS

- Challenges in the EURADOS SRA where joint actions with NUGENIA could be envisaged (examples):
 - **Radiological Emergencies**
 - To identify and characterize new markers of exposure
 - To develop strategies and methods to increase measurement capacity
 - To quantify doses after accidental internal contamination
 - **Radiation Protection of Workers and the Public**
 - To implement new biokinetic models for intake of radionuclides
 - To develop calibration procedures for partial body counters
 - To develop accurate and on-line personal dosimetry for workers
 - To improve neutron dosimetry techniques
 - To include nuclide-specific information in dose rate measurements in the environment

Next steps (2): towards roadmap alignment

- MELODI roadmap:
 - 6 key areas;
 - assessment of feasibility + impact;
 - 3 dose ranges;
 - 3 time scales;
- ALLIANCE roadmaps:
 - 5 topical roadmaps
 - Assessment of good science, relevance + public perception, achievability, impact
 - Graphical presentation with needed science, targets, drivers + timeline
- NERIS roadmap:
 - 2 challenge areas, 3 key topics, each having subchallenges
 - Table with sub-challenges and time scales
- EURADOS roadmaps:
 - 5 visions and many more challenges
 - Graph. Presentations with drivers, target and experimental + computational realisation + timeline

MISSING: resources and links + coherence between roadmaps

Potential approach to more coherence: to be discussed and decided in 2018.

Thank you for your attention!

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