

## **NERIS**

# **European Platform on Preparedness for Nuclear and Radiological Emergency Response and Recovery**

**Maarit Muikku, STUK  
on behalf of NERIS**

**CORES Symposium  
6.9.2018, Tampere, Finland**

- Created in 2010
- Financial support from the European Commission to structure the Platform
- Adoption of legal statutes in May, 15, 2012 in Glasgow
- Legal registration under the French Law: August, 28, 2012
- Self-sustainable since 2014

**Members**

- 60 organizations from 24 different countries
- 26 supporting organizations (legal members of the NERIS association supporting it financially)

- Improving the effectiveness and coherency of current approaches to preparedness concerning nuclear or radiological emergency response and recovery.
- Identifying gaps and needs for further developments
- Addressing new and emerging challenges
- Improving know-how and technical expertise
- Establish a forum for dialogue and methodological development

- Activities of the NERIS Working Groups
  - WG on practical implementation of ICRP recommendations
  - WG on Contaminated Goods
  - WG on processes and tools for emergency and rehabilitation preparedness at community level
  - WG on Information, Participation & Communication
- Activities of the decision support system RODOS Users Group
- R&D Committee – Update of the SRA
- NERIS Training courses on emergency and recovery
- Dissemination Activities (Website, Newsletters...)

## Three challenge areas, 10 key topics

- Challenges in radiological impact assessment during all phases of nuclear and radiological events
- Challenges in countermeasures and countermeasure strategies in emergency & recovery, decision support and disaster informatics
- Challenges in setting-up a trans-disciplinary and inclusive framework for preparedness for emergency response and recovery

## **Challenges in radiological impact assessment during all phases of nuclear and radiological events**

### **Key topic 1: Improved Modelling**

- Atmospheric transport and dispersion modelling (ATM/ADM), hydrological modelling, dose models, environmental models

### **Key topic 2: Improved Monitoring**

- Monitoring techniques and strategies, data collection and sharing, optimisation

### **Key topic 3: Data assimilation**

- Improved source term estimation, improved impact assessment, big data, data fusion

## **Challenges in countermeasures and countermeasure strategies in emergency and recovery, decision support and disaster informatics**

### **Key topic 4: Countermeasures & countermeasure strategies**

- Countermeasures/management options, implementation of countermeasures, lifting of countermeasures, transition from emergency to existing exposure situation

### **Key topic 5: Formal decision support**

- Decision making methods and tools, decisions under high uncertainty

### **Key topic 6: Disaster informatics**

- Analytical platform, knowledge databases, new generation Decision Support Systems (DSS), virtual and augmented reality (training)

## **Challenges in setting-up a trans-disciplinary and inclusive framework for preparedness for emergency response and recovery**

### **Key topic 7. Emergency response and recovery framework, including reference levels**

- Implementation of BSS including reference levels and relation with operational levels, longer term management, contaminated goods

### **Key topic 8. Stakeholder engagement, involvement of the public & communication**

- Stakeholder engagement processes including the public, citizen Science, communication



## **Challenges in setting-up a trans-disciplinary and inclusive framework for preparedness for emergency response and recovery (continued)**

### **Key topic 9. Integrated emergency management – non-radiological aspects**

- Health surveillance, ethical aspects, socio-economic aspects, integrated surveillance and monitoring, radiological protection culture

### **Key topic 10. Uncertainty and incomplete information handling**

- Dealing with uncertainties

In the construction of the NERIS roadmap two scenarios with societal concern have been taken into account:

- Facing the consequences of a nuclear or radiological major accident or incident
- Facing the threat of a radiological terrorist act

The aim of the roadmap is to develop research endpoints for three time periods:

- 0 – 5 years
- 6 – 10 years
- > 10 years

<https://eu-neris.net/library/sra.html>

**Key topic 2: Improved Monitoring (for more detailed description of topics and subtopics please refer to the SRA)**

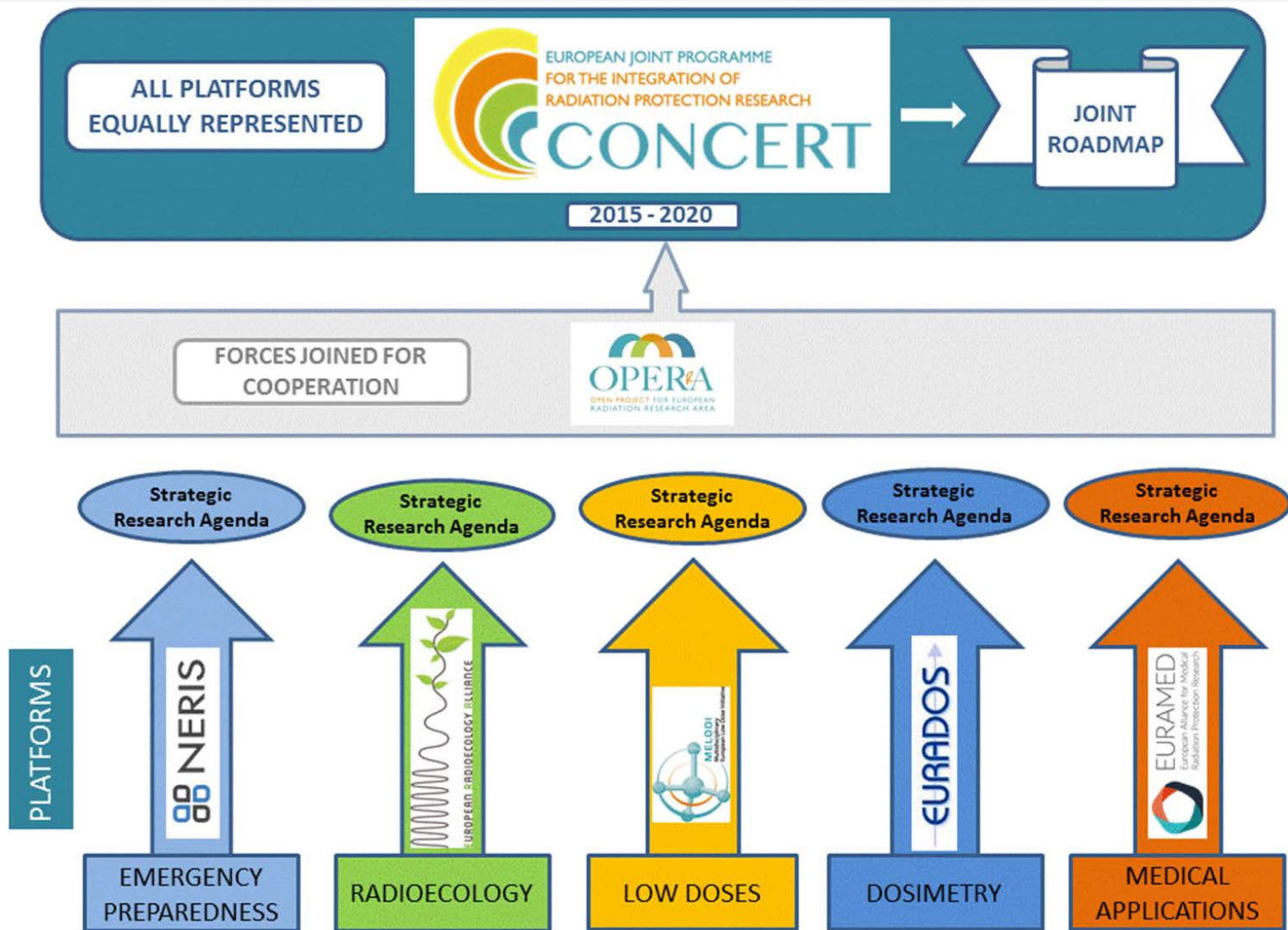
Challenges and achievement in	1-5 years	6-10 years	>10 years
<p><b>Monitoring techniques and strategies</b></p> <p><b>VISION:</b> New devices, techniques and guidelines for monitoring in Europe being harmonised for cross-border application and monitoring information supplied by professionals, NGOs and lay people; Harmonised monitoring strategies for Europe for all phases and for all types of radiological and nuclear events</p>	<ul style="list-style-type: none"> <li>• Development of low cost monitors for nuclide specific information for wider use</li> <li>• Improve reliability of low cost monitors for lay people</li> <li>• Investigate the capabilities of drones as part of a strategy</li> <li>• Improve existing monitoring techniques such as whole body, thyroid, lung counting – together with EURADOS</li> <li>• Improved concept combining modelling and monitoring approaches</li> <li>• Investigation of techniques for measurement/characterisation of radionuclides that can not be measured by dose rate or gamma emission</li> <li>• Methods for local determination of environmental parameters governing radionuclide migration</li> </ul>	<ul style="list-style-type: none"> <li>• Improve monitoring capabilities based on the investigation on drones and cheap nuclide specific monitors</li> <li>• Integrate monitoring from lay people into strategies and decision tools</li> <li>• Investigate the capabilities of autonomous moving monitors, such as drones as part of a strategy</li> </ul>	<ul style="list-style-type: none"> <li>• Optimise monitoring techniques and develop European wide guidelines for monitoring and the integration of monitoring data of all kind into decision support systems (e.g. dose impact assessment, source term reconstruction, OILs)</li> <li>• Develop methods and guidance for harmonisation in Europe</li> </ul>

The NERIS platform is one of the European platforms in the domain of radiation protection

Active cooperation with:

- European radioecology ALLIANCE (radioecology)  
[www.er-alliance.org](http://www.er-alliance.org)
- MELODI (Low dose research)  
[www.melodi-online.eu](http://www.melodi-online.eu)
- EURADOS (European dosimetry group)  
[www.eurados.org](http://www.eurados.org)
- EURAMED (The EUROpean Alliance for MEDical radiation protection research)





- The Joint Roadmap for Radiation Protection Research is under construction within the European Joint Programming project EJP-CONCERT.
- It will be based on the roadmaps produced by the five radiation protection research platforms, namely NERIS, ALLIANCE, MELODI, EURADOS and EURAMED.
- It is intended as a guide to plan radiation protection research over the next decades. The overall aim is to improve the radiation protection system, to answer priority radiation protection questions and to support decision making.

Gap 1. Modelling of the biokinetic behaviour and risk for internal emitters (EURADOS, MELODI, NERIS, ALLIANCE)

Gap 2. Improving environmental and health monitoring, particularly by lay people (NERIS, EURADOS)

Gap 3. Dose optimization in medical exposures (EURADOS, EURAMED, MELODI)

Gap 4. Radiation protection approaches based on individual radiosensitivity (MELODI, EURADOS, EURAMED)

GAP 5. Individualized dosimetry-based activity determination in radionuclide therapy (MELODI, EURADOS, EURAMED)

Gap 6. Biomarkers of exposure, disease and susceptibility (MELODI, ALLIANCE, EURAMED)

Gap 7. Radiation impact on the immune system (MELODI, EURAMED)

Gap 8. Epigenetic mechanisms of radiation disease/effect (MELODI, ALLIANCE, EURADOS)

Gap 9. Biological and ecological effects of low dose/ low dose rate exposure on humans and biota (ALLIANCE, MELODI)

GAP 10. Integration of environmental exposure assessment for ionising radiation and other stressors (ALLIANCE, NERIS, MELODI, EURAMED)

Gap 11. Optimising emergency and recovery preparedness and response (NERIS, ALLIANCE)

- Social Sciences and Humanities (SSH) as a cross cutting issue



The monitoring strategy working group:

- set by Ministry of the Interior
- consists of members from

*Ministry of the Interior*, Ministry of the Social Affairs and Health, rescue services, defence force, STUK, Finnish meteorological Institute, Evira (food safety authority), central hospitals etc.

Main tasks:

- Identification of bodies making radiation measurements (including cooperation and information exchange between bodies), measuring capacity in Finland and possibilities to get international help in measurements and how to adjust it with national monitoring activities
- Planning arrangements for monitoring and handling waste
- Estimation of costs for maintaining measuring capacity and know-how and further development



The 5th NERIS Workshop will be hosted by DTU – Nutech, Center for Nuclear Technologies, in Roskilde (Denmark) from 3rd to 5th April 2019.



**Thank you for your attention**

[www.eu-neris.net](http://www.eu-neris.net)