

NERIS Strategic Research Agenda

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Also on behalf of Frank Hardeman and the
NERIS R&D Committee

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STUDIECENTRUM VOOR KERNENERGIE
CENTRE D'ETUDE DE L'ENERGIE NUCLEAIRE



- Some history: process of development of the Strategic Research Agenda (SRA)
- Current status of the Strategic Research Agenda (SRA)
- Way forward: revision of SRA

Initial development of the NERIS Strategic Research Agenda



Break-out sessions (Brainstorm, First lessons from Fukushima)

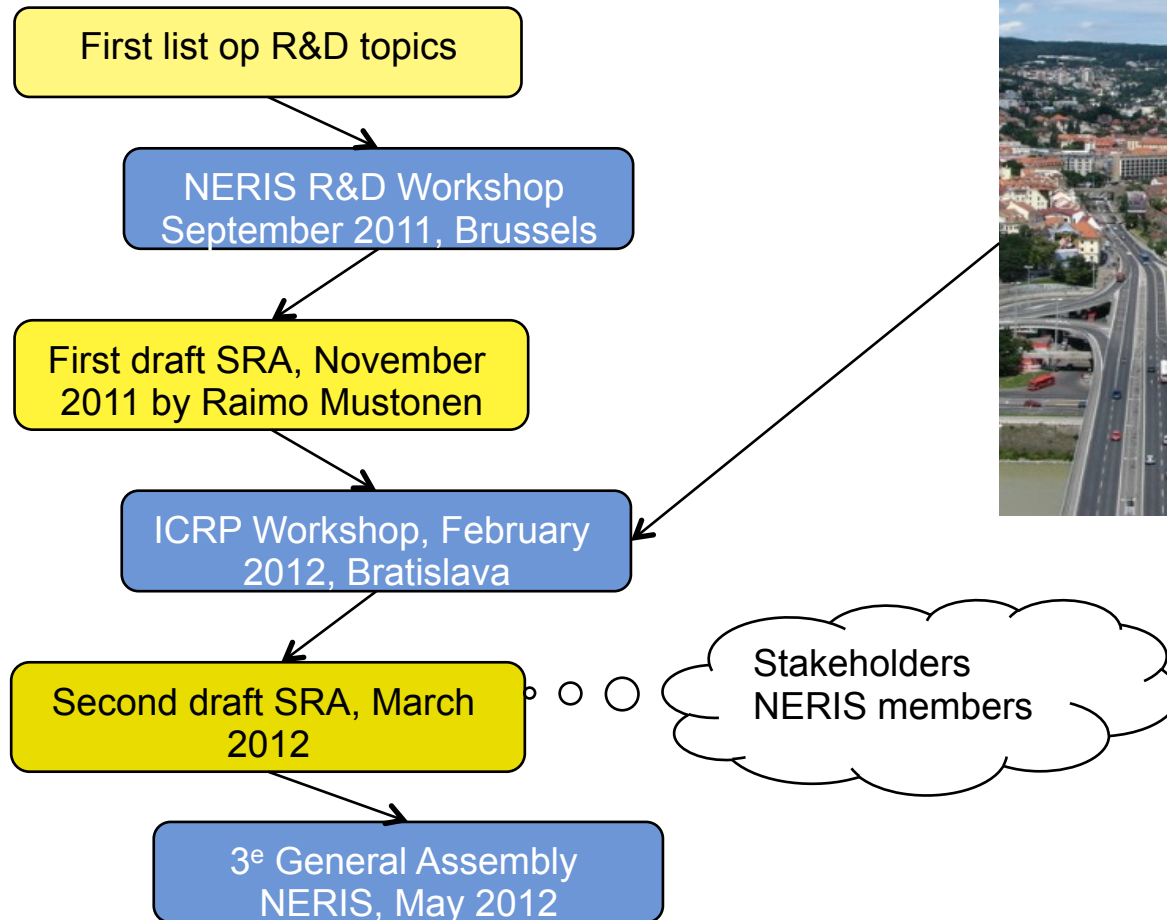
Topic 1. New challenges in atmospheric & aquatic modelling – Needs for improvement

Topic 2. New challenges for better dose assessments and decision support based on improved knowledge: source term, scenarios, etc.

Topic 3. New challenges in stakeholder involvement and local preparedness and communication strategies

NERIS, R&D Workshop, September 2011, Brussels
37 participants from 14 countries + European Commission

Further development of the NERIS Strategic Research Agenda



➔ March, 2012 draft = current version published on NERIS web-site

<http://www.eu-neris.net/index.php/library/general/document/strategic-research-agenda-1.html>

SRA Challenges

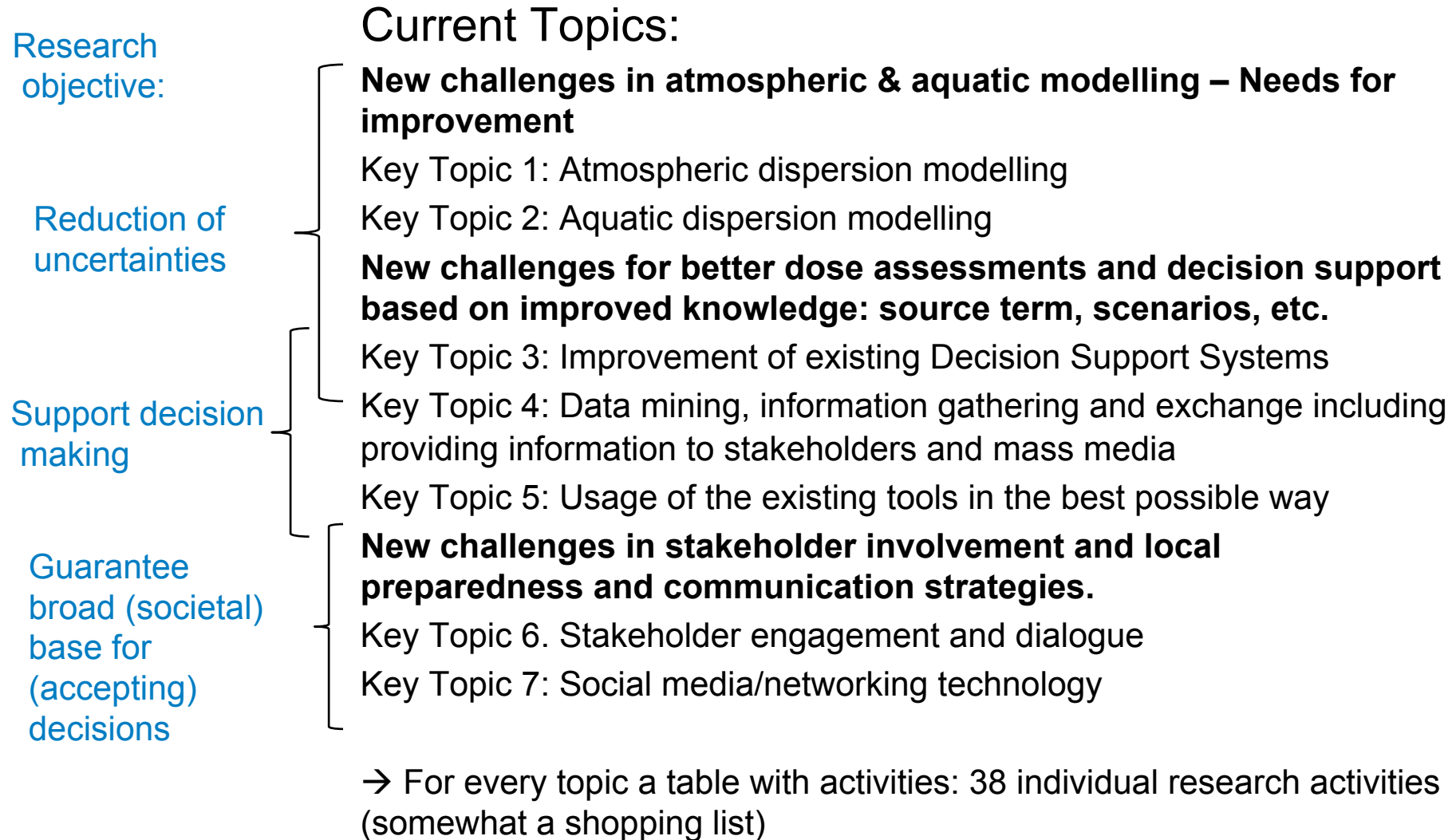
- General goal as quoted in the SRA is "to enhance European countries capability to response to and recover from nuclear and radiological emergencies in a coherent way"
 - Improvement: can be obtained by R&D but also by better implementation of current tools and knowledge
 - Harmonization: R&D can support, but mainly realized by implementation of common tools and guidelines
- How to balance between new research & development and implementation

- Delineation and focus of SRA:
 - preparedness/ response/ recovery/ ...
 - how to deal with holistic approach of a crisis situation



The very first question to be answered in research strategy development is: “*what’s our shared understanding of the root cause of the problem we are trying to solve?*”

Main research topics in current SRA



NERIS R&D Committee
meeting October 2012,
Brussels

Current members:

Frank Hardeman - *Chairman*
(SCK•CEN, Belgium)

Kasper Andersen (DTU, Denmark)

Antony Bexon (PHE, UK)

Jarmila Bohunova (VUJE,
Slovak Republic)

Johan Camps (SCK•CEN, Belgium)

Sylvie Charron (IRSN, France)

Pascal Croüail (CEPN, France)

Claudia Landman/ Wolfgang Raskob
(KIT, Germany)

Milagros Montero (CIEMAT, Spain)

Eldri Naadland Holo/ Mark Dowlall
(NRPA, Norway)

Per Roos (DTU, Denmark)

Kaj Vesterbacka/ Michael Ammann/
Raimo Mustonen (STUK, Finland)

Formal set-up of R&D Committee

- Formal organization of first R&D Committee meeting
 - R&D Committee members proposed by MB NERIS
 - R&D Committee members + NERIS president and interested MB members
 - Meeting at least once/year
 - No direct link with NERIS Working groups
- Discussion of SRA: initiative started to review the current SRA
- Interaction with radioecology community (invited during this meeting)
- Deployment plan

NERIS R&D Committee
meeting September
2013, Brussels

Review current SRA & priorities

- Main topics:
- NERIS members have been invited to comment on the existing SRA;
- The feedback was grouped and discussed
- List of priorities was made



Issues discussed

- An overall **assessment of the completeness** of the SRA, taking into account lessons learnt from Fukushima
 - How to take into account technological and societal evolutions
 - How to make a more clear distinction between research, development and practical implementation issues (are the last ones of interest for EC funded research?);
- Nuclear & Radiological emergency versus **security research** (CBRN)
- Relation to **other organizations and platforms**
- A **systematic analysis** of the comment received per key topic (including lessons learned Fukushima);
- A systematic analysis per research topic of its **current status**: already dealt within DETECT, NERIS-TP, PREPARE or other organizations (e.g. ALLIANCE-radioecology) or not yet started
- An **onset of priority setting** for the different research questions
- So far monitoring not a high priority → how to **bring in monitoring?**
- **Validation** of tools and **uncertainty** not very visible

Example of technical/societal evolutions and importance to include monitoring



“There are better detectors than a cellphone camera will likely every be, but there are many more cellphones around than high-quality radiation detectors, which means there are times when the cellphone can be the best detector available and the density of cellphone detectors will always largely exceed any early warning network”



One key topic renamed: Usage of the existing tools in the best possible way → improving the decision making processes

Priorities:

- Extend the capabilities of the atmospheric dispersion models by considering the “wet” deposition by snow; to be started by a review of the current approaches;
- Development of models for the urban areas focusing on waste water from decontamination actions and contamination of water in urban areas in general;
- Develop local radio-ecological models and integrate them into a general Decision Support Systems (DSS) to interlink with monitoring information and the more global food chain and dose models. Applicable at farm level, simple to use, but integrated in the overall picture;

Priorities (cont'd)

- Investigate model uncertainties and how this can be communicated in the model results and in the DSS to help decisions maker in understanding the usefulness of a map result;
- Improving the decision making processes and their interactions in an emergency event and the recovery
 - Decision making for all involved stakeholders taking into account the complexity and the large uncertainty of the situation;
 - Robust decision making;
 - Develop the best possible way how to use the results of a DSS;
 - Usage of formal decision aiding tools for the various concerned stakeholders (e.g. Multi Criteria Decision Analysis);
 - This may have many subtopics which require further prioritisation;
- Monitoring strategies – how to learn from past events
 - How to integrate results from professionals and lay people into one common operational picture at the various stages of an emergency and recovery situation.

**New tables created with indication of priorities, current status
(example next slide)**

Example: Improving the decision making process

Research sub-topics for Improving the decision-making process	Description	Project addressing the topic or Priority (for new topics)
5.1 Assessment and communication of uncertainties	Investigation of data uncertainties (model or monitoring results) and how they can be communicated, e.g. in model results and in DSS to help decision-makers to understand the radiological situation. Inter-comparisons (models or measurements).	High priority* *Subtopics will be defined for further prioritisation
5.2. Coupling of DSS with Command and Control (C2) systems	Coupling of the existing strategic DSS such as ARGOS and RODOS to Command and Control (C2) systems	
5.3 Robust decision making	Structuring the decision process with the help of formal decision aid tools, such as multi-criteria analysis. Feedback from stakeholder processes	High priority
5.4 Guidance on the use of DSS		
5.5 Serious gaming	Development of serious gaming tools to train the emergency actors	
5.6 Revision of European handbooks	Revision of European handbook sections (creation of addendum) for consideration of malicious dispersion scenario	

Research sub-topics for Improving the decision-making process	Description	Project addressing the topic or Priority (for new topics)
5.7 Development of tools for the usage at the local level		Partly NERIS TP
5.8 Countermeasure strategy preparedness	Analysis of countermeasure strategies for relevant accident scenarios, ensuring that parameters governing the radiological consequences can be identified in time to enable optimized remediation	Partly NERIS TP
5.9 Use of dose reconstruction information	<p>Procedure for health surveillance, including sampling of population.</p> <p>Should be performed in collaboration with MELODI</p>	
5.10 Monitoring strategies	<p>Optimised use of monitoring resources, including mobile units. Use of new monitoring technologies.</p> <p>Integration of monitoring results from experts and lay people into a common operational picture.</p> <p>Information fusion (e.g. radiological, land-use, etc</p>	<p>High priority (Partly addressed in DETECT for fixed stations)</p> <p>Subtopics will be defined for further prioritisation</p>

Way forward

- Results of 2013 R&D meeting summarized with priorities and status: a further iteration among the R&D committee members will be foreseen
 - major outcome of this process will be an update of the SRA completed with a clear list of priorities (important in discussion in broader field of radiation protection: cf. Operra)
- On longer terms, a deployment plan will be developed
- Organization of a yearly NERIS R&D Committee meeting
- Need for a larger research community? E.g.
 - Including more researcher from social sciences?
 - A dedicated European Conference on nuclear and radiological emergency response and recovery (cf. US National Radiological Emergency Response Conference)?

Conclusions

- Current SRA developed based on research needs identified from a large brainstorm, insight from completed and running EU projects, early lessons identified from Fukushima
- SRA on emergency management and recovery is needed to secure a joint European approach and to harmonize with other radiation protection platforms/SRA's (MELODI-low dose research, ALLIANCE-radioecology, EURADOS-dosimetry)
- Process of update is running: from somewhat a shopping list to a clearer setting of priorities including the lessons learned from Fukushima
- But more is needed: SRA living document → R&D Committee has to keep SRA updated

Thank you – Questions?

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