



Nuclear 2013

Multidisciplinary European Low Dose Initiative

UPDATE ON THE ACTIVITIES OF THE MELODI ASSOCIATION

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Radiation protection standards

- Actual Radiation Protection Standards in Europe are based upon scientific knowledge (UNSCEAR) and recommendations of the International Commission on Radiological Protection (ICRP). But it is a permanent challenge to adjust for and to keep up with new scientific knowledge, in particular, on exposures at low doses (<100 mGy) and low dose rates.
- Radioprotection for high doses is well established, mostly on the basis of epidemiological studies. However, at low doses and low dose rates a number of uncertainties and open questions exist which constitute a wide range of new challenges:
 - *Low dose/low dose rate and chronic exposures, exposures and internal contaminations from nuclear accidents, cancer, individual radiosensitivity, non-cancer effects (lens opacities, vascular and neurological effects ...)*

High
Level
Expert
Group

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Development of a new strategy for low dose risk research and radioprotection in Europe (1)



- ***In 2009, the High Level Expert Group (HLEG) www.hleg.de identified current problems in improving overall radiation protection and proposed a new strategy and organisational framework.***
- **Key questions:**
 - **How robust is the current system of radiation protection and risk assessment?**
 - **How can it be improved?**
 - **What are the areas of greatest uncertainty in radiation research?**
 - **What are the research priorities?**
- **The proposed new strategy :**
 - **Multidisciplinary scientific approaches centered around questions on most pertinent radiation protection issues**
 - **An integrated and concerted effort at the European level**
 - **Inclusion of other relevant (scientific) research disciplines**
 - **International cooperation**

Development of a new strategy for low dose risk research and radioprotection in Europe (2)



The **new organisational framework** included the establishment of a **European network of excellence (NoE)** (FP7 EURATOM call in 2009): « **Low Dose Research towards Multidisciplinary Integration** » **DoReMi** (2010-2015), an operational tool (www.doreminoe.net) to address key policy questions (HLEG) and develop a sustainable long term European platform, i.e. **MELODI**.

MELODI « **Multidisciplinary European LOW Dose Initiative** » (2010-2030) was founded from major national bodies with research programmes and long-term commitment to low dose risk research, and designed to promote, coordinate and pilot efforts on low dose radiation risk research and radiation protection (www.melodi-online.eu).



Birth of harmonic low dose risk research and radioprotection in Europe within HORIZON 2020



*EU contribution
13 M€ / 5 M€
for calls (2010-2015)*

*EU contribution
0 M€
(2010-2030)*

**OPERRA « Open Project for European Radiation Research Area »
Structure for integration and piloting of European research programs
in all domains of radiation protection**

EU contribution 8 M€ / 4M€ for calls (2013-2014)

The European NoE DoReMi (2010- 2015)

(coordinator: S. Salomaa STUK, Finland, 7 Work packages)

The primary activities of **DoReMi** (www.doremi-noe.net) are:

- **Scientific research and feasibility studies** on low dose/low dose rate ionising radiation: (1) cancer induction, (2) individual sensitivity (3) non-cancers as well as on radiation quality effects, tissue sensitivity and effects of internal emitters (see HLEG).
- **Organisation of exploratory workshops** (definition of research priorities, epidemiological cohorts, radiation infrastructures, training and education, dissemination of knowledge).
- **Establishment of a transitional (short term) research agenda (TRA)** with regular updating.
- **Preparation of specific calls** attracting new partners and research approaches for DoReMi (and MELODI): 2 external (2011, 2012) and 2 internal calls (2011, 2013) allowed to integrate 20 new partners into DoReMi → DoReMi counts now 32 partners.
- **Help in structuring MELODI** and establishing the long term strategic agendas (SRA) for MELODI (WP2 of DoReMi)

Founding the MELODI European Association in 2010

- The **MELODI Association** (according to French law 1901) has the aim to coordinate and promote research on low dose ionizing radiation and radiation protection in Europe (*with **international partners like IAEA, WHO, DOE, Japan...***)
- **Membership**
 - Members are from National European bodies responsible for defining, funding and implementing low-dose risk research and radiation protection, and
 - from European universities, institutes,..., committed to contribute to R&D efforts
- **Governance**
 - **General assembly, Governing Board and a Bureau** that runs the Association's activities
 - The actual **Chairman of the Governing Board** is **Jacques REPUSSARD (IRSN, France)**
 - **Scientific Committee** of renowned scientists in key disciplines

MELODI Governing structure

Administration and decision making

- A **Bureau** is elected for 3 years: **president** (J. Repussard, IRSN, France), **vice-president** (T. Jung, BfS, Germany), **a secretary** (F. Hardeman, SCK-CEN, Belgium), **treasurer** (M.A. Trabocchini, ISS, Italy). Its main task is to assure daily activities of the association and to prepare decisions to be submitted to the **MELODI governing board (GB)**(administrative council).
- The **MELODI GB** is composed out of members representing each member association which meet twice a year. It guides and decides all strategic orientations of the association (within the GB the CE is usually represented by an observer).
- The yearly **General Assembly** votes on decisions of the GB, the financial status and new memberships.
- The **Scientific Committee** comments on the strategic research agenda (SRA) and gives scientific advice and guidance. It also evaluates the **MELODI young scientist award**.

MELODI MEMBERS



- 22 organisations are now members of MELODI: 14 Member States (including two new European Member States) and one Associated Country

MELODI Board chairman: IRSN (J. Repussard, France)

BfS (T. Jung, Germany)

HMGU (M. Atkinson, Germany)

KVSF (Wolfgang-U Mueller, Germany)

SCK-CEN (F. Hardeman, Belgium)

NCRRP (R. Georgieva, Bulgaria)

CREAL (E. Cardis, Spain)

UAM (J. Santos, Spain)

URV (V. Linares, Spain)

STUK (S. Salomaa, Finland)

CEA (G. Bloch, France)

PHE (J. Harrison, United Kingdom)

DUTH (M. Koukourakis, Greece)

NRIRR (G. Safrany, Hungary)

ENEA (S. Pazzaglia, Italy)

ISS (M-A. Tabocchini, Italy)

RIVM (H. Bijwaard, The Netherlands)

ITN (P. Vaz, Portugal)

SSM (G. Lars, Sweden)

SU (M. Harms-Ringdahl, Sweden)

IRA (F. Bochud, Switzerland)

SUJCHBO (F. Zoelzer, Czech Republic)

MELODI Scientific Committee

- **Disciplines covered**: physics, chemistry, mathematics, molecular biology, biochemistry, genetics, toxicology, epidemiology, medical sciences
- **Members**: 10 members (9 countries, including 7 European Member States, USA and Japan), with 3 female scientists (*proposed by MELODI partners*):

Belli Mauro (Italy)

Blettner Maria (Germany)

Forsell-Aronsson Eva (Sweden)

Legrain Pierre (France)

Löbrich Markus (Spain)

Morgan William (USA)

Mutsonen Rita (Finland)

O'Neill Peter (United Kingdom)

Smeesters Patrick (Belgium)

Niwa Otsuhara (Japan)

MELODI: Principal goals

Principal goals of the **MELODI Association** (www.melodi-online.eu):

- To promote **low dose health risk research**
- To establish and regularly update a long term **Strategic Research Agenda (SRA)** and the **roadmap** for European research on low dose ionising radiation effects.
- To better **integrate national and European research activities** and to exploit synergies.
- To establish effective **collaboration** between European research programs on low doses (and those outside of the EU) and interactions between all interested partners.
- To establish a clear overview and concept on investments made in **key infrastructures, knowledge management and education & training**.

Main MELODI Activities (1)

1) Establishment and Updating of the SRA

- Development and promotion of **sustainable R&D programs** at the European level and at the national level
- Development of **sustainable Programs for Education & Training and Infrastructures** at the European level
- **Interaction with international organisations**
- Helping to formulate and set up **calls**

2) Young Scientist MELODI Awards: *1st Young Scientist MELODI Award was attributed to **Kristian Unger** (HMGU, Germany) for his work related to bioinformatics and system biology (presented at the 4th MELODI international conference in Helsinki in September 2012)*

3) Dissemination of knowledge (Website, knowledge management)

Main MELODI Activities (2)

4) Organisation of open international Workshops

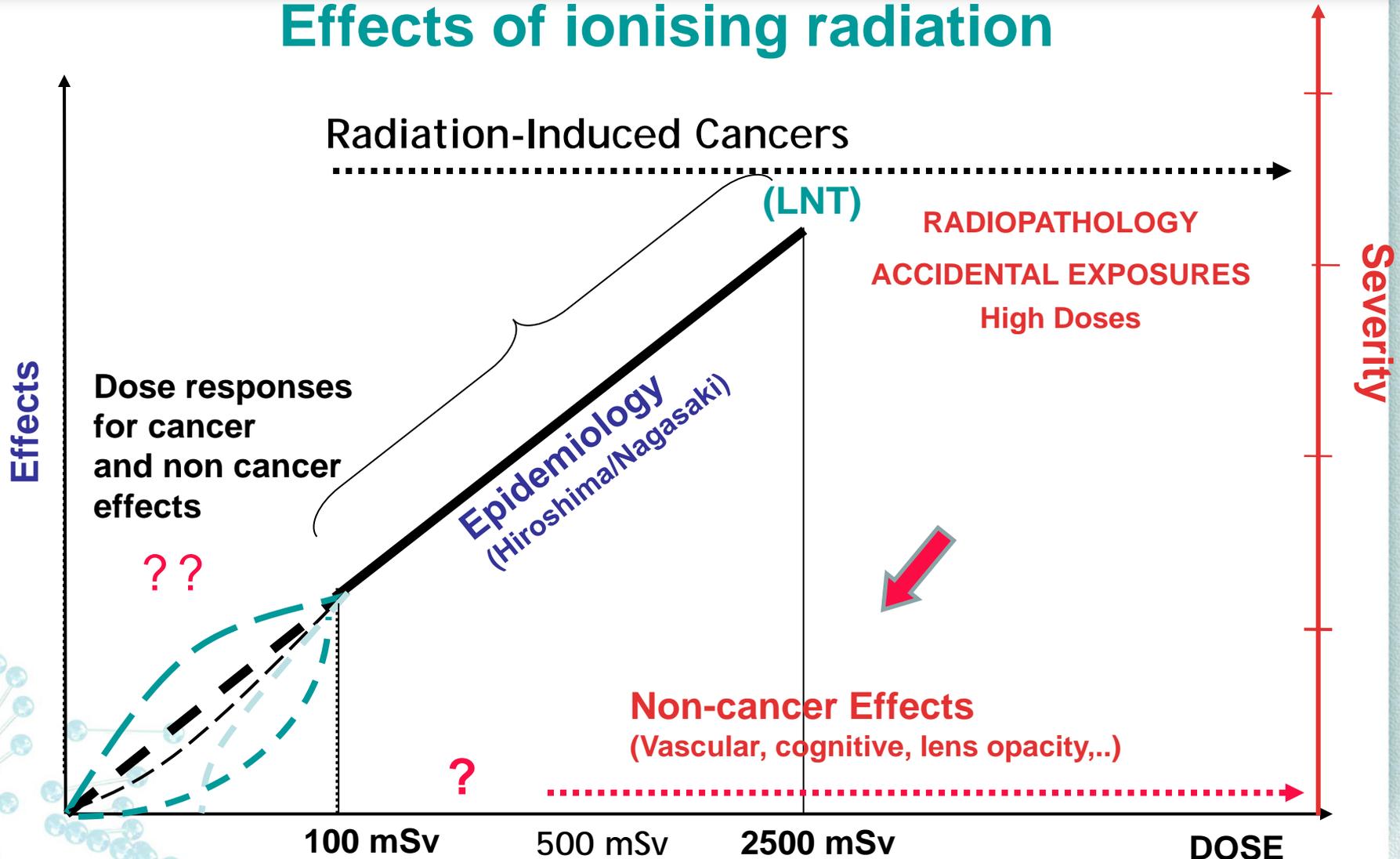
International MELODI Workshops are the basis for regular updating of the SRA and for attracting and integrating new partners:

- Since 2009, five MELODI Workshops were organised with about 200 participants each (without inscription fee) in Stuttgart (2009), Paris (2010), Rome (2011), Helsinki (2012)
- The **6th MELODI Workshop** will be held **in Brussels (Belgium): 8 - 10 October 2013** www.melodi2013.org
- **Submission of abstract avant 1st of June 2013** : <http://www.melodi2013.org/en/Abstracts>
- **Young scientist MELODI Award** (call for candidates is open)
- **General Assembly of MELODI** will be held during the MELODI Workshop
- Scientific sessions include other European platforms: Alliance, NERIS, EURADOS , etc. thus opening and sustaining the way to OPERRA
- Proceedings of the MELODI Workshop serve a.o. as a basis for updating the **MELODI SRA** (**4th version of the SRA is available**: <http://www.melodi-online.eu/sra.html>)

The Strategic Research Agenda (SRA): an essential part of the MELODI program

- **Epidemiological studies** alone are too limited to define health risks and cancers and non cancer effects) at low doses and dose rates
- **Uncertainties in the low dose range** also affect existing ICRP models which are difficult, if not impossible to overcome in the domain of low dose rate chronic exposure;
- Thus, complementary **mechanistic molecular studies** are needed to **reduce the existing uncertainties in the low dose range.**
- The **MELODI SRA** is addressing this scientific challenge.
- We need to get a **better understanding of « normal » life processes:**
“The more we know about normal life processes, the greater chance we have to identify radiation-induced anomalies and to find ways to improve radiation protection”.

Effects of ionising radiation



Focus of the MELODI SRA

In order to reduce uncertainties in low dose risk research and radioprotection the SRA focuses on:

- shapes of dose response relationships for different types of cancers and non-cancer effects;
- sensitivity variations as a function of age with possible differences between in utero irradiation, infants and older children and between young and old adults.
- individual radiation sensitivity and predisposition to cancers and certain non- cancer effects;
- biological effectiveness of different types of radiation; W_R
- radiosensitivity of different cell types and tissues; W_T
- mixed radiation exposures;
- dose rate effects, including chronic and fractionated exposures;
- interactions of radiation with chemical agents;
- effects of radionuclides and internal contamination;
- role of non-targeted effects of radiation.

The MELODI SRA proposes a combination of three complementary approaches

1. **Fundamental and molecular research:** dissection of altered metabolic pathways as a function of low dose → 'omics', biomarkers, systems biology
2. **Epidemiological research:** suitable (*retro- and prospective*) cohorts :→ precise definition of doses and pathologies with the help of suitable biomarkers
3. **Mathematical modelling** of altered metabolism and pathways in relation to persistent pathological changes. → Evaluation of radiation health risks.

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The harmonic pathway to OPERRA





Towards Horizon 2020

Multidisciplinary European Low Dose Initiative

Radioecology

Low-Dose Risk

Emergency Mgt



Three Strategic Research Agendas (SRAs)



A single umbrella structure for research call administration

OPERRA

Open Project for the European Radiation Research Area

The objectives of OPERRA (1)

(a response to the European call for projects 2013-Fission-3.3.1)

- **Cover in large the needs of R&D in the domain radioprotection, not just the domain of low doses but also integrate the wider ranging domains of the other European initiatives (NERIS, ERA, ARCH, EURADOS...)**
- **Attract researchers of Universities, academic partners (Universities) and scientific bodies and societies.**
- **Encourage a stronger and active involvement of European New Member States,**
- **Involve public authorities and stakeholder networks.**

The objectives of OPERRA (2)

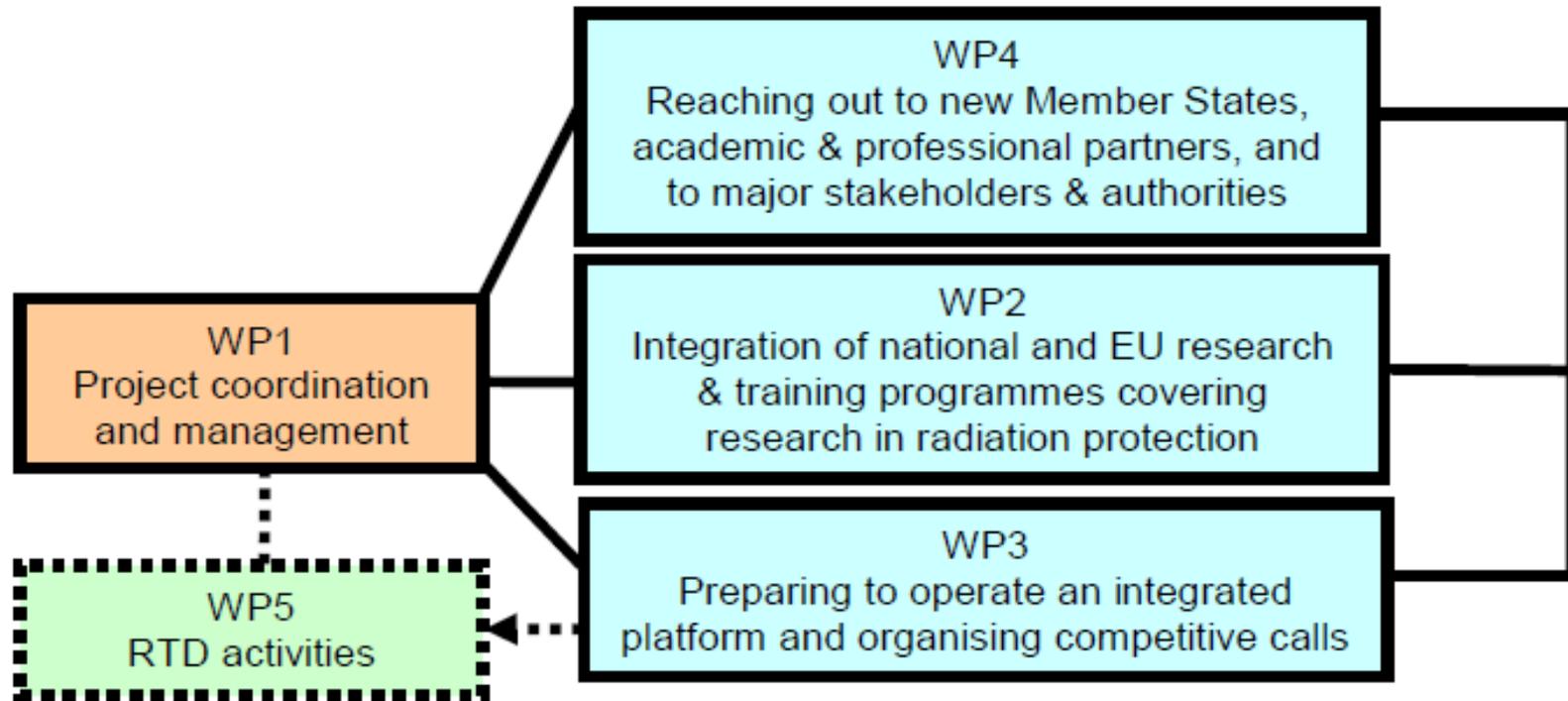
(a response to the European call for projects 2013-Fission-3.3.1)

- Prepare the integration of future national and European programs in line and coherence with **HORIZON 2020**.
- Make sure a smooth transition of the **DoReMi** network (ending 31st December 2015) within **MELODI** without loss of achievements of the NoE.
- Prepare MELODI to act as the **future platform for integrating research** including all legal, administrative and financial aspects.

OPERRA CONSORTIUM MEMBERS: (coordinator: JR Jourdain, IRSN, France)

Participant no.	Participant organisation name	Country
1. IRSN	Institut de Radioprotection et de Sûreté Nucléaire	France
2. SCK-CEN	Studiecentrum voor Kernenergie-Centre d'étude de l'Energie Nucléaire	Belgium
3. BfS	Bundesamt für Strahlenschutz	Germany
4. STUK	Säteilyturvakeskus	Finland
5. MELODI	Association MELODI	France
6. JU	Jihočeská Univerzita v Českých Budějovicích	Czech Republic
7. OSSKI	Országos Frederic Joliot-Curie Sugárbiológiai és Sugáregészségügyi Kutató Intézet	Hungary
8. HPA	Health Protection Agency	United Kingdom
9. CEA	Commissariat à l'Energie Atomique et aux énergies alternatives	France
10. CREAL	Fundació Centre de Recerca en Epidemiologia Ambiental	Spain
11. ISS	Istituto Superiore di Sanità	Italy
12. HMGU	Helmholtz Zentrum München Deutsches Forschungszentrum für Gesundheit und Umwelt GmbH	Germany
13. UNIPV	Università degli Studi di Pavia	Italy
14. SU	Stockholms Universitet	Sweden

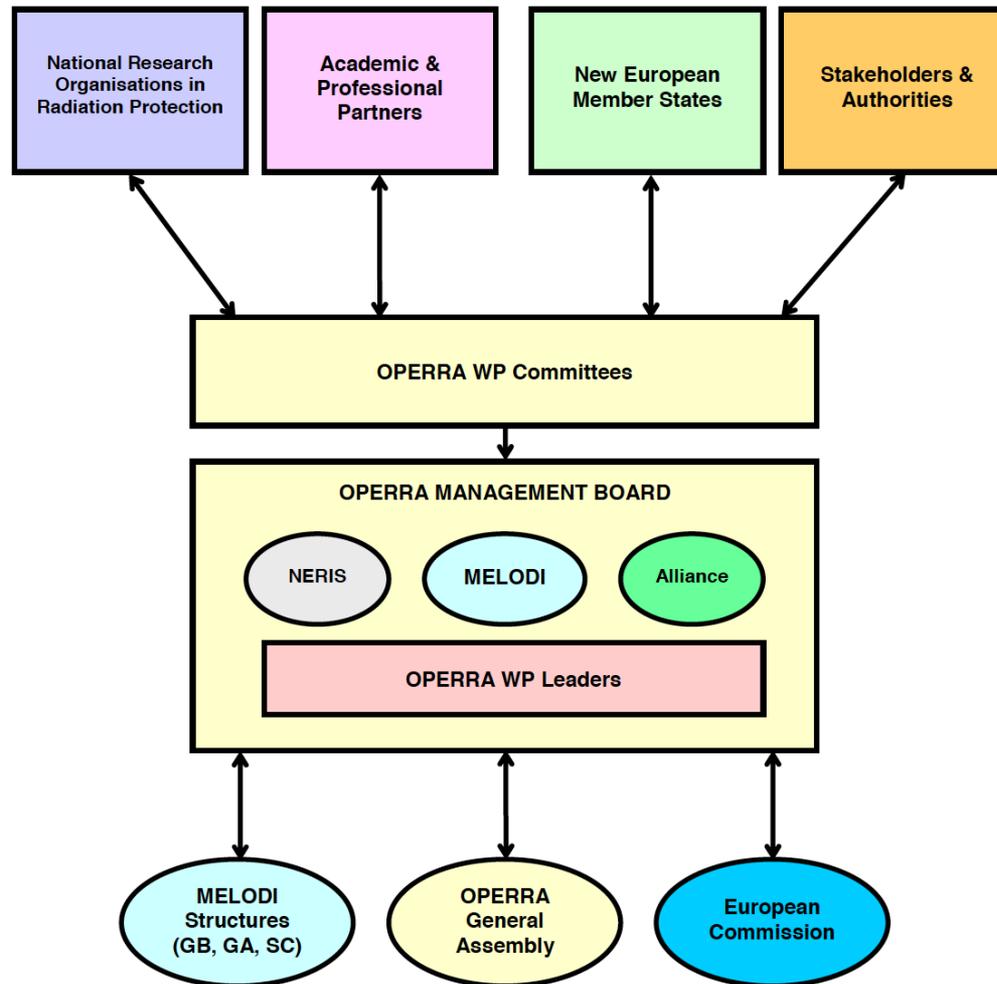
Structure of OPERRA (4 WPs, 14 partners)



Coordination: IRSN (WP1)

WP Leaders: BfS (WP2); **MELODI** (WP3); STUK (WP4)

OPERRA PILOTING



Preparation of calls **MELODI** → **OPERRA**

- **MELODI (SRA, roadmap** indicates priorities en relation avec External Advisory Entity (EAE)) **October 2013**
- Go-between Administrator Operator GAO(EU) **November 2013**
- RTD call preparation meeting (President of **HERCA** chair, EC official, EAE representative)-----> call ----> GAO + copy to EC **November 2013**
- GAO organises publication of call (journals, MELODI Website) **Dec. 2013**
- External EC experts, choice by **HERCA**-----> evaluation of call **April 2014**
- **OPERRA** coordinator negotiates inclusion of new beneficiaries (if alright with EC and HERCA) **May 2014**
- **OPERRA WP5** monitors RTD activities -----> reports to the EC **June 2015**

OPERRA: Next steps

15 April 2013:

End of negotiation with EC

1 June 2013:

Start of the OPERRA project

17 June 2013:

Meetings of WPs 2 and 4

18 June 2013:

Kick-off meeting of the OPERRA project (in Paris)

End of 2013:

Call for projects on low dose effects

End of 2014:

Call for projects covering all domains of radiation protection

After 2014:

Launching of European calls for projects on radiation protection for the EC.

Conclusion (1)

MELODI in concert with Alliance and NERIS is piloting the new **European umbrella structure OPERRA**, thus managing European research programmes in radiation protection, based on the achievements of **MELODI** as well as **Alliance, NERIS** and other existing networks

- to foster synergies and **promote joint programming** of national & European research in radiation protection
- to further engage academic & professional institutions, New Member States, RP authorities and stakeholders in the RP area of research
- to maximise use and **access to Europe-wide research infrastructures** within and outside the radiobiology community
- to exploit opportunities for **international & national joint funding**
- to determine the most suitable conditions for better integration of **E&T** with research activities in radiation protection (expertise and recruitment).
- to promote **cooperation between radiation and non-radiation research communities**
- To organise in **2013 a transition competitive call for low-dose risk research**

Conclusion (2)

MELODI together with OPERRA promotes:

- Scientific work centered around questions on important radiation protection issues (SRA)
- An integrated and concerted effort at the European level
- Inclusion of other relevant scientific disciplines (to increase scientific interaction and exchanges)
- Coordination of national and European programs
- Dissemination and Knowledge management
- Education & Training programs: development and maintenance of competences
- Management and development of suitable infrastructures
- International interaction
- Effective use of available resources for research in radiation protection, radioprotective measures, prevention, therapy, recovery, reestablishment and reconstitution of contaminated sites
- General improvement of radiation protection of man and its environment.

Thank you for your attention!

For more information:

MELODI (<http://www.melodi-online.eu/>)

DoReMi (<http://www.doremi-noe.net>)

Websites

- DoReMi courses: http://www.doremi-noe.net/training_and_education.html
- Further enquiries: doremi.training@pv.infn.it



Multidisciplinary European Low Dose Initiative





Multidisciplinary European Low Dose Initiative



DoReMi Training and Education initiatives and purpose

- To help attract and support the top-level well-trained research scientists who will spear-head the low-dose radiation risk research community for the coming decades;
 - To contribute to dissemination of the DoReMi RTD through T+E courses and events based at the centres of excellence in the DoReMi consortium;
 - To facilitate the networking of training and research institutions by focusing on multi-centre events and courses;
 - To provide funding support to T+E in a way that maximally benefits both the DoReMi RTD programme and also the larger European research community in the longer term.

DoReMi Training and Education: Strategy

- DoReMi will facilitate and promote training and education in support of the research programme within the project, and also make more widely available training opportunities in order to help attract top-level students into the field.
- Develop a sustainability strategy in collaboration with the MELODI platform to ensure support for low-dose radiation risk T+E beyond the completion of DoReMi.

DoReMi Training and Education: Strategy

Develop a portfolio of support initiatives that includes:

- Support for short-course single topic modules;
- Support for Bologna-compliant multi-institution degree course/s
- Support for multi-institution PhD programmes
- Career-path support (DoReMi fellow/s)
- Support for workshops, summer schools, infrastructure access tutorials
- Ad hoc travel grants, student transfer, etc.
- Develop a sustainability strategy in collaboration with the MELODI platform to ensure support for low-dose radiation risk T+E beyond the completion of DoReMi.

DoReMi Training and Education: Strategy

Develop

- Support for multi-institution PhD programmes
 - Career-path support (DoReMi fellow/s)
 - Support for workshops, summer schools, infrastructure access tutorials
 - Ad hoc travel grants, student transfer, etc.
 - Develop a sustainability strategy in collaboration with the MELODI platform to ensure support for low-dose radiation risk T+E beyond the completion of DoReMi.

DoReMi Training and Education: Courses (1)

- DoReMi Training Courses will be open to any postgraduate student or researcher interested in a research career in the scientific disciplines related to radiation protection. Students outside EU can be accepted if there is space. The admission will be decided case by case.
- Following the successful series of short courses sponsored by DoReMi in **2011**, and **2012**, a further nine courses of up to **3 weeks** duration on single topics related to the research programme will be held between **December 2012** and **June 2013**.

DoReMi Training and Education: Courses (2)

The courses to be held are:

- **10-21 December 2012:** Inter-individual variability of radiation-sensitivity: Mechanisms and Biomarkers. Institut Curie & CEA, Paris, France.
- **28 January - 15 February 2013:** Training course in Radiation Epidemiology and Radioecology. HMGU, Neuherburg, Germany
- **18 Feb – 1 March 2013:** Radiation-induced effects with particular emphasis on genetics, development, teratology, cognition as well as space-related health issues. SCK-CEN, Mol, Belgium
- **18-29 March 2013:** Molecular mechanism of radiation carcinogenesis. HMGU, Neuherberg, Germany
- **22 April - 3 May 2013:** Cellular effects of low doses and low dose-rates with focus on DNA damage and stress response. SU, Stockholm, Sweden

DoReMi Training and Education: Courses (3)

The courses to be held are:

- **6-17 May 2013:** TIETO Non-cancer effects of low dose radiation. HMGU, Neuherburg Germany
- **27 May – 7 June 2013:** Modelling radiation effects from initial physical events. UniPv, Pavia, Italy
- **10 – 21 June 2013:** Interdisciplinary radiation research. BfS, Neuherburg, Germany
- **24 – 28 June 2013:** Environmental Radiobiology (5 ECTC accredited course) UMB, Oslo, Norway
- There will be no course fee. There will also be some limited support for accommodation costs at most of the participating institutions.



Multidisciplinary European Low Dose Initiative

