WG 3
Environmental Dosimetry

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EURADOS AM 2018, Lisbon 5th February – 8th February

Plans 2017

Subgroup WG3-S1 "Spectrometry systems for Environmental dosimetry"

- **Task 1.1. Report/publications on Comparison of methods for calculating *H**(10)** at different reference stations and spectrometric monitors.
- **Task 1.2. Report/publication on Comparison of automatic tools for spectra analysis** such as FSA (Full Spectra Analysis), peak-based nuclide identification and automatic energy re-calibration techniques**.**
- **Task 1.3. Report on Harmonization and uncertainties** of dose rate meters and spectrometric monitors. Collaboration with **CONFIDENCE** and **EURDEP**.
- **Task 1.4 Preparedness project.** Development of mobile spectrometric monitors for unmanned aerial systems, "drones", and calibration procedures.
- **Database and MC simulation** transversal issues

Subgroup WG3-S2 "Passive Environmental dosimetry"

- ***Task 2.1**. **Peer-review publications** based on the achievements of WG3-S2 including the **1st Intercomparison 'IC2014env'** and results from **surveys by questionnaires**.*
- ***Task 2.2**. **Preparedness project** preparation of an **intercomparison** of passive area dosemeters (October 2017).*
- ***Task 2.3**. **Intercomparison** of calibration methods for passive area dosemeters **'IC2017calm'** coordinated by KIT (Summer 2017).*

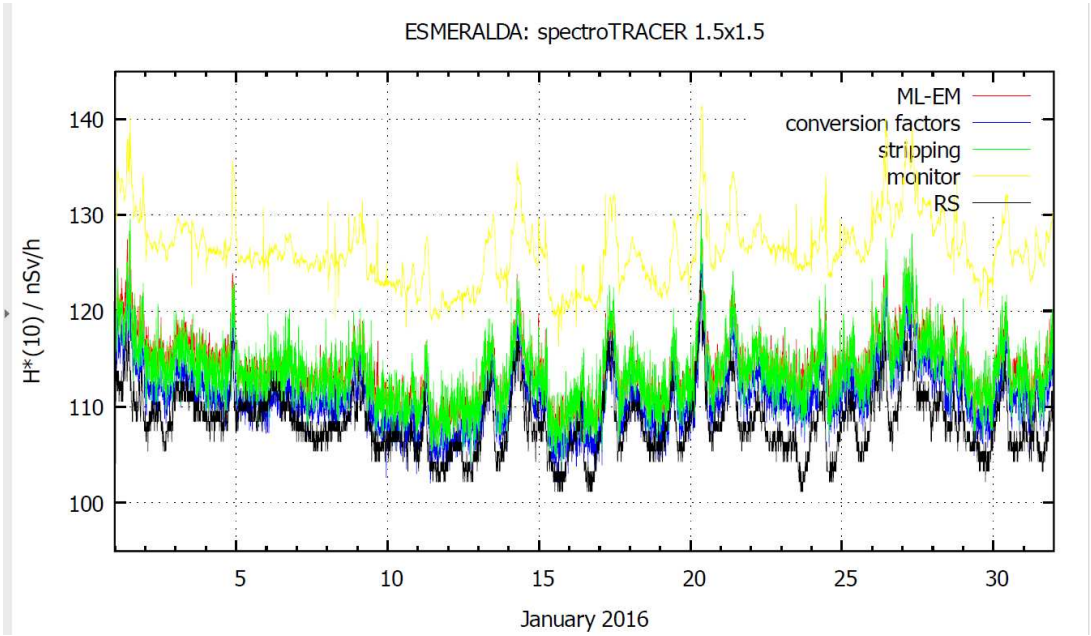
Other issues in Environmental Radiation Monitoring

- **Radon:** WG2+WG3+WG7

S1-WP1 "Methods for calculation of *H**(10) of spectroscopy monitors"

Task 1 Report/publications on Comparison of methods for calculating *H(10)** at different reference stations and spectrometric monitors

1. ADERbs: **Band method** to calculate ADER from **spectra**
2. ADERss: **Stripping method** to calculate ADER from **spectra**
3. ADERns: total nuclide specific ADER **from peak based method** as **sum of nuclide specific dose** of all identified nuclides (after conversion from activity concentration to H*(10))
4. ADERfs: total nuclide specific ADER **from FSA method** as **sum** of nuclide specific dose of all identified nuclides
5. ADERgn: gross ADER obtained from **classical** detectors



S1-WP2 "Harmonization of dose rate monitors and spectroscopy detectors"

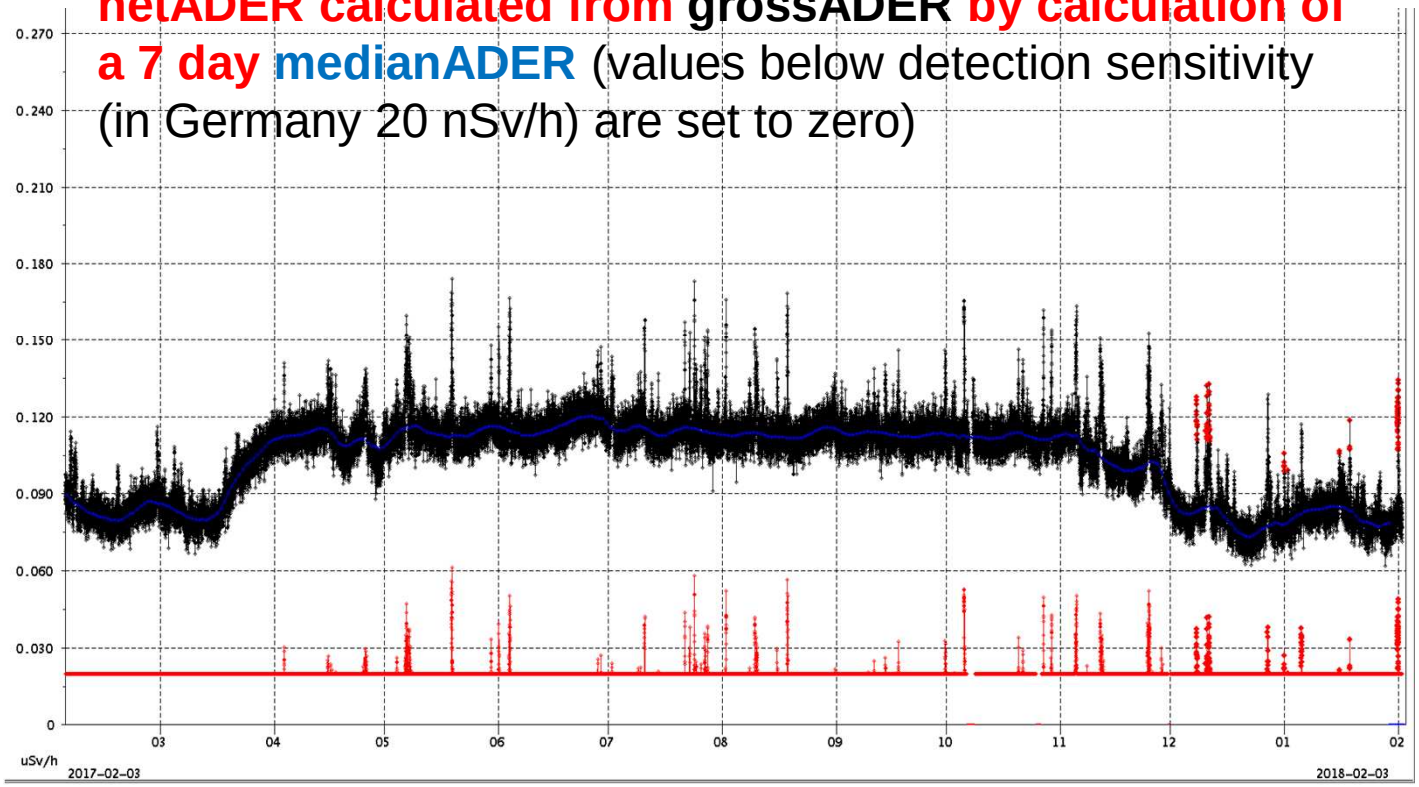
Task 2 Report on Harmonization and uncertainties of dose rate meters and spectrometric monitors

Data from spectroscopy and classical detectors will be used to compare the different methods – discrepancies need to be discussed.

netADER will be investigated

The proposal is to use the **netADER** as a simplification for data harmonization.
In a first step it is planned to **extend this work to the EURDEP network** and in a second step to include spectrometric detectors

netADER calculated from grossADER by calculation of a 7 day medianADER (values below detection sensitivity (in Germany 20 nSv/h) are set to zero)



S1-WP3 "Code Developent for spectrum analysis and *H**(10) calculation"

Task 3 Dissemination of developed code

A **complete spectrum analysis framework was developed for automatic and manual processing of spectra from spectrometric** probes reflecting requirements defined within WG3/S1:

1. Development of FullSpectrum Analysis (FSA) method including the capability to obtain quantitative dose rate values in units of H*(10)
2. Implementation of peak based and FSA based method for automatic energy calibration
3. Development of a tools to obtain H*(10) using the stripping method
4. Development of a Mariscotti based peak analysis tool
5. Development of a GUI for geant4-based MC simulations allowing to calculate simulated reference spectra and the stripping matrix for individual detectors

The source code of all components is open-source and witten in ANSI-C (or root)

Since these types of code are not available in general, it **is intended to make this** (and other code developed within WG3/S1) **available to the general public – if possible in the framework of EURADOS**.

S1-WP4 "Application of UAV-based systems including calibration procedures and intercomparison exercises"

Task 4 Preparedness project. Organization of intercomparisons

Barcelona drone Center S = 25 km²

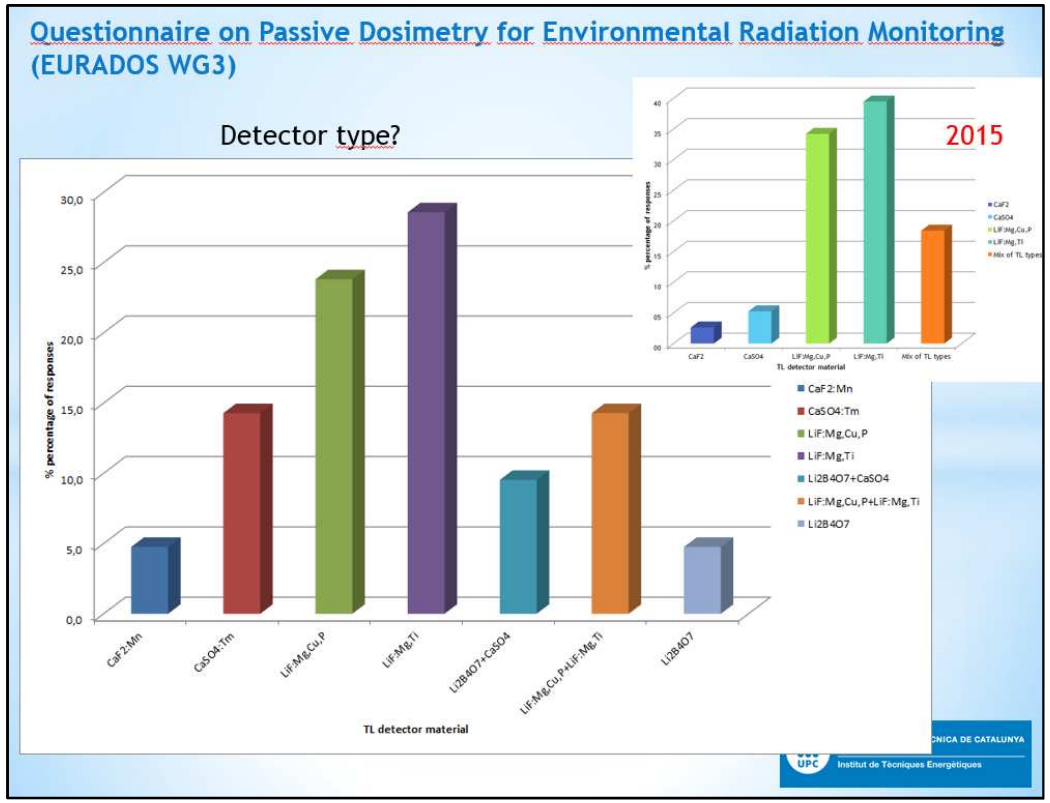
Aerial site of Vyškov – Military Exercise Area S = 0.18 km²

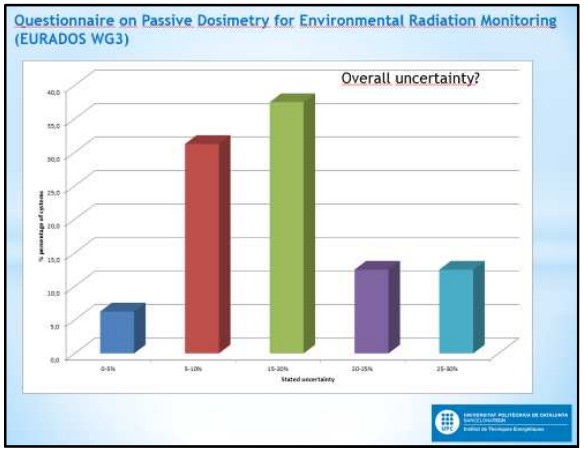
Zirconium Sand. (3000 Bq/kg Ra-226)

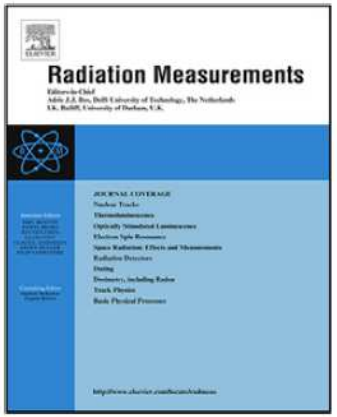
Artificial sources

Co-60 from 10 MBq up to 15 GBq
Cs-137 from 10 MBq up to 3 GBq
Eu-152 0.5 GBq

S2 - Task 1 Analysis of the **updated survey** by an **extended questionnaire** for European passive area dosimetry systems.







Radiation Measurements 106 (2017) 242–245

Status of passive environmental dosimetry in Europe

Maria A. Duch [a, *], Harald Dombrowski [b], Christian Hranitzky [c], Philip Kleinau [d], Stefan Neumaier [b], Mária Ranogajec-Komor [e], Rafael Rodriguez [f]

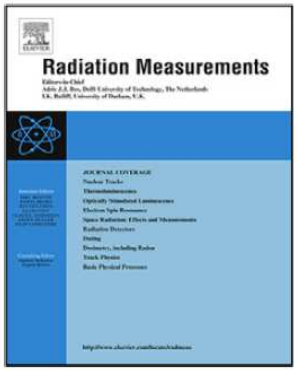
S2 – Task 2 Preparedness project preparation of **intercomparison** of passive area dosemeters (6-monts measurement period October 2017- April 2018)

Collaborators: Agency for Radwaste Management (SL); CANBERRA industries (DE); BGR (DE); Czech Technical University (CZ); Danish Emergency Management Agency (DK); Greek Atomic Energy Agency (GR); NBC Defence Institute (CZ); NPP Dukovany (CZ); Politecnico di Milano (IT); Slovenian Nuclear Safety Administration (SL); University of Extremadura (ES); Sellafield Sites Ltd (UK); X-Gammaguard (IT)

JRP-v18 - Metrology for mobile detection of ionising radiation following a nuclear or radiological incident

EURAMET

European EURAMET project : **Preparedness** coordinator Stefan Neumaier project includes partners from EURADOS-WG3



Radiation Measurements 106 (2017) 229–234

EURADOS intercomparison of passive $H^*(10)$ area dosemeters 2014

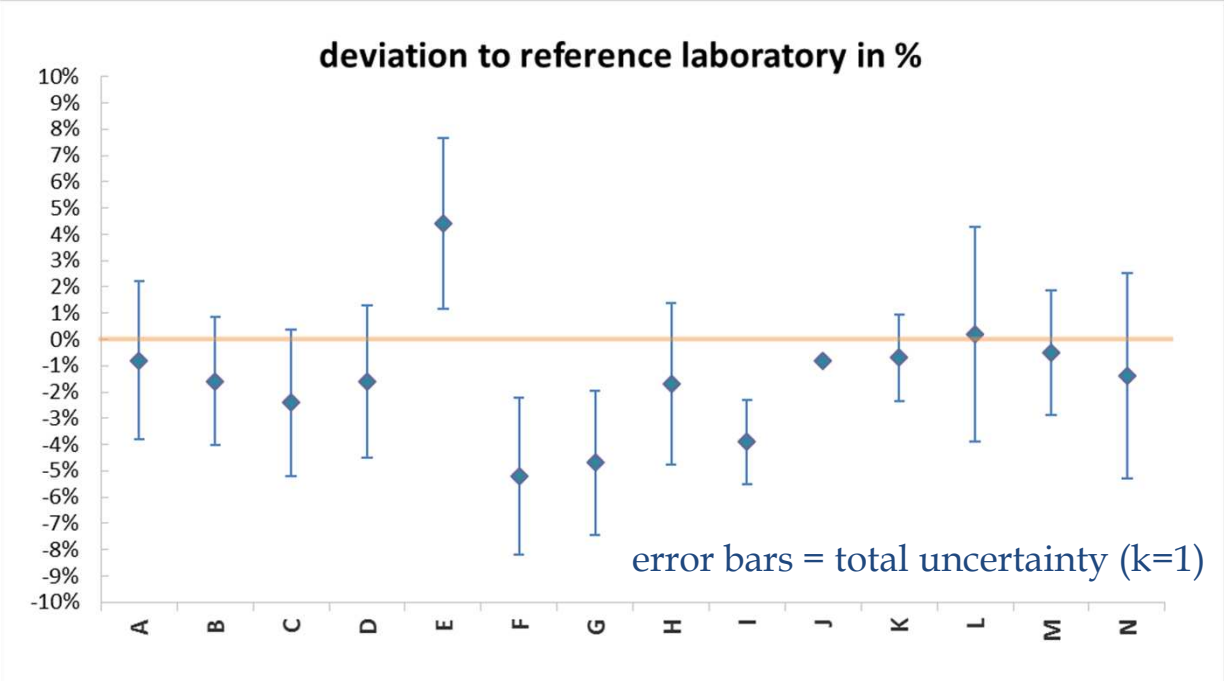
Harald Dombrowski [a, *], Maria A. Duch [b], Christian Hranitzky [c], Philip Kleinau [d], Stefan Neumaier [a], Mária Ranogajec-Komor [e], Rafael Rodriguez [f]

S2 – Task 3 Organization of a first **Interlaboratory Comparison** of calibration methods for passive area dosemeters "**IC2017calm**".

Test Intercomparison (organized within the subgroup) coordinated by KIT

14 participants from 10 different countries + 1 reference laboratory PTB

Goal: 3 mSv Cs-137 irradiation of 5 $H^*(10)$ dosemeter spheres



Subgroup Radon - S3

WG3 decided to propose the creation of a new **Subgroup 3** regarding Radon (55 members attend the meeting today. Similar than in the 1st meeting was in Karlsruhe Am2017)

Responsible: Frank Wissman (BfS) and Anette Röttger (PTB)
Activities:

- Letter of agreement with MetroRadon (EURADOS – MetroRadon)
- Use of the new dose conversion factors published by ICRP
- Organize radon inter-comparisons
- Harmonization between dose and activities (ICRM connection)
- Communication and education

Plans 2018

Subgroup WG3-S1 "Spectrometry systems for Environmental dosimetry"

- **Task 1. Report/publications on Comparison of methods for calculating *H**(10)** at different reference stations and spectrometric monitors.
- **Task 2. Report/publication on harmonization of *H**(10) monitors** including classical monitors and spectrometric detectors**.**
- **Task 3. Code Development.** Dissemination of automatic tools in EURADOS for spectra analisys such as FSA (Full Spectra Analisys), peak-based nuclide identification, energy re-calibration, …
- **Task 4. Drones. Preparedness project.** Development of mobile spectrometric monitors for unmanned aerial systems, "drones", and **calibration procedures**. **Intercomparisons.**

Subgroup WG3-S2 "Passive Environmental dosimetry"

- **Task 1**. **Analysis** and preparation of a final report of the survey of European passive area dosimetry systems by questionnaires 2012-2017.
- **Task 2**. **Preparedness project** evaluation of the **intercomparison** of passive area dosemeters (6 months measurement period until April 2018)
- **Task 3**. **EURADOS intercomparison** of calibration methods for passive area dosemeters "IC2018calm" with KIT dosemeters (summer 2018).

New subgroup on Radon topic WG3-S3

- **Task 1**. Letter of agreement with MetroRadon Project
- **Task 2**. Starting activities in relationship with MetroRadon

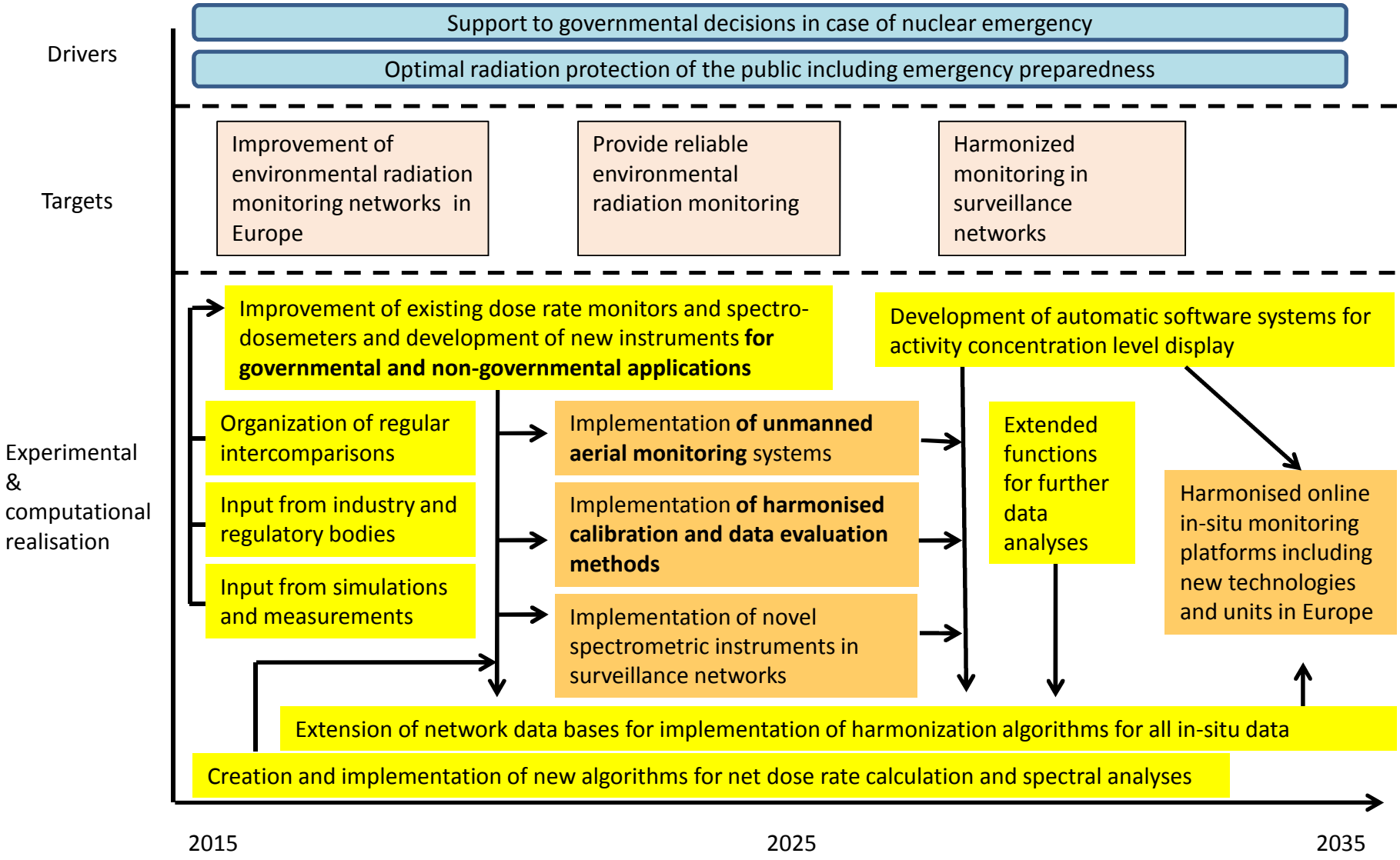
S1 and S2 2018 meetings in Bilbao/Helsinki (S1). Radon with MetroRadon

Budget

Date	Meeting	Number (review number)	Planned	Actual
2-3/2017	WG3 meeting at AM2017, Karlsruhe	40	5000	2500
09/2017	WG3-S1 meeting, Ljubljana	9	2500	2150
09/2017	WG3-S2 meeting, Ljubljana	8	2500	2400
		Sum	**10000**	**7050**

Vision 5: Towards improved radiation protection of workers and members of the public

Challenge 5: To develop accurate and on-line information for in-situ environmental dosimetry



NERIS Research Gap Analysis (3)

- ***Proposal for research activities based on the GAP analysis*** *(related to EURADOS)*
  - Improvement of dose assessment models considering both environmental monitoring data and personal monitoring data (e.g. personal dosimeters, thyroid measurements, whole body measurements)
  - **Improved monitoring including lay people, drones and European wide harmonisation of tools and methods**

THANK YOU!