EURAMET
European Association of National Metrology Institutes

TC for ionising radiation

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Euramet GA, Reykjavik 27-30 May 2013

NPL

Statens strålevern
Norwegian Radiation Protection Authority

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Overview of the TC-IR

- Reorganisation of the TC-IR
- EURAMET projects
- EMRPs
- Strategic planning (3 roadmaps)

Reorganising of the TC-IR

- At the last Contact Person meeting the TC-IR changed its organisation from three Sub-Committees to Working Groups
  - WG CMCs and Comparisons, Convenor István Csete (IAEA) and member Bruno Chauvenet (LNE-LNHB)
  - WG Health care and new dose quantities, Convenor Jean Marc Bordy (LNE-LNHB)
  - WG Radionuclides and Dosimetry in Energy, Industry and Environment (nuclear and non-nuclear), Convenor Franz-Josef Maringer (BEV).
- Members of the groups will come later

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EURAMET projects

Euramet TC-IR projects			No of institutions		Status
Refr.no	Title	Coodinator	EURAMET	Non-EURAMET	
1257	Comparison on the activity concentration of the same 166mHo solution	Karsten Kossert (PTB)	5	0	Agreed/ started
1243	The interlaboratory comparison of the radionuclide calibrators	Arunas Gudelis (VMT/FMC)	2	0	Proposed
1221	Comparison of air kerma measurements for diagnostic X-ray beam qualitiesis	Igor Gomola (IAEA)	2	0	Agreed/ started
1219	The peer review of the QMS of the IAEA Dosimetry Laboratory	Joanna Izewska (IAEA)	4	0	Agreed/ started
1200	Comparison of air kerma measurements of the medium energy X-ray radiation in radiation protection measurements	István Csete (IAEA)	2	0	Agreed/ started
1177	Comparison of calibration of KAP meters in terms of air kerma area product	Costas J. Hourdakis (IRCL/GAEC-EIM)	11	8	Agreed/ started
1132	Comparison of the ambient dose equivalent rate for photon radiation	Oliver Hope (PTB)	16	1	Agreed/ started

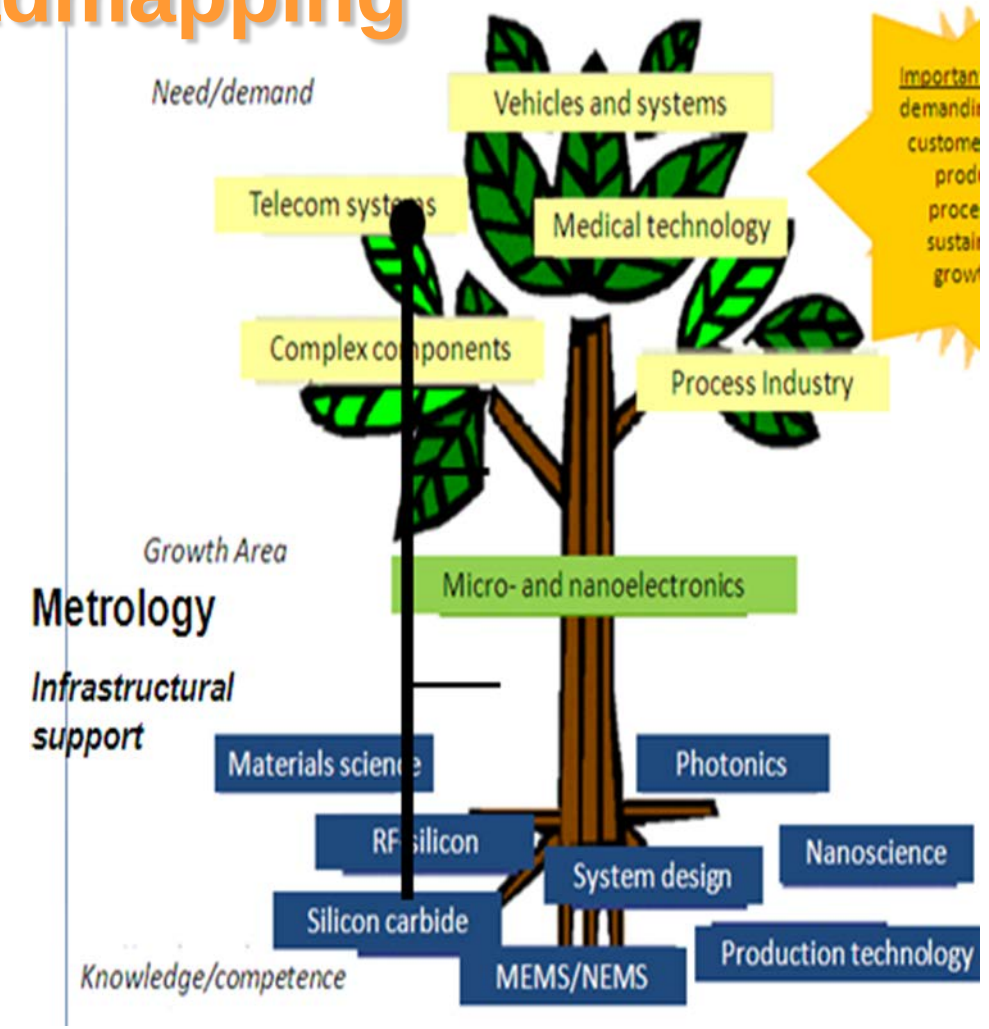
JRPs

EMRP JRPs in progress:

MetroFission, Metrology for New Generation Nuclear Power Plants, coordinator Lena Johansson (NPL), UK, 12 partners
MetroMetal, Measuring radiation in scrap metals, coordinator Eduardo Garcia-Toraño (CIEMAT), Spain, 14 partners
MetroRWM, Metrology for radioactive waste management, coordinator Petr Kovar (CMI), Czech Republic, 13 partners
MRI safety, Metrology for new generation safety standards and equipment in MRI, Bernd Ittermann (PTB), Germany, 3 partners
MetrExtRT, Metrology for radiotherapy using complex radiation fields, Jean-Marc Bordy (CEA), France, 10 partners
MetroMRT, Metrology for Molecular Radiotherapy, Vere Smyth (NPL) UK, 14 partners
BioQuaRT, Biologically weighted quantities in radiotherapy, Hans Rabus (PTB) Germany, 7 partners
MetroNORM, Metrology for processing materials with high natural radioactivity, Franz Josef Maringer (BEV), Austria

Overview of the IR roadmapping

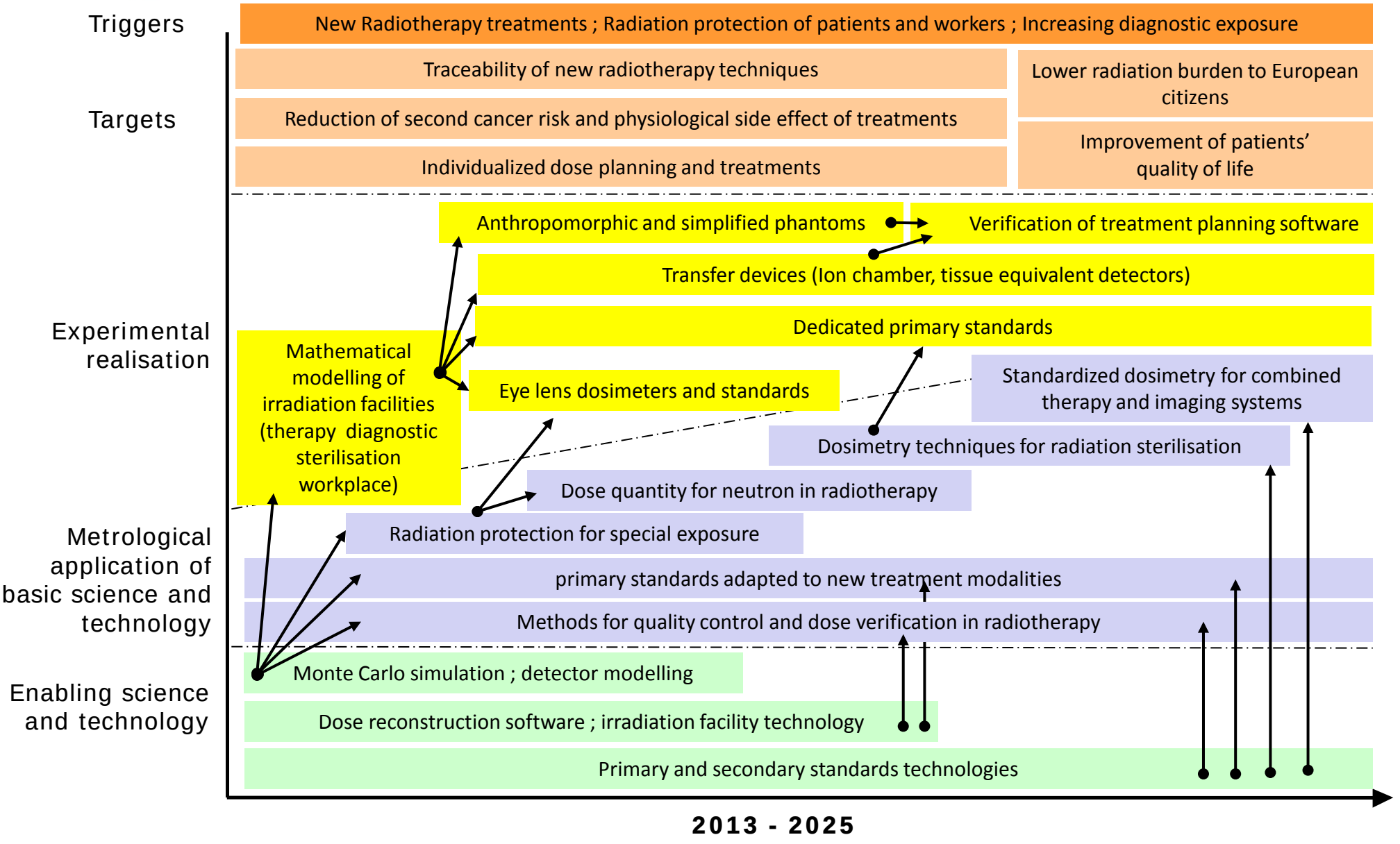
- Revision of the roadmaps started in 2011, chaired by Lena Johansson (NPL)
- TC-IR road map meeting at NPL 19th April 2012



Dosimetry and Radionuclides in Health Care

- Traceability of the patient dose in complex forms of radiotherapy
  - Rotational therapy and robotic techniques using small fields
  - Online imaging (Conebeam CT, MRI linacs)
  - New electron brachytherapy sources
  - Protontherapy, Hadrontherapy
  - Targeted radionuclide therapy
- Novel diagnostic equipment
  - new CT scanners (two tube scanners, 256 line scanners)
  - new or adapted quantities well suited for new diagnostic modalities
- Challenges for radiation protection dosimetry
  - Stricter limits on eye lens
  - Definition of operational quantities

Dosimetry and Radionuclides in Health Care



RM 2: Targets

Anthropogenic and Natural Radionuclides in Environment and Industry

Radioactivity in Industrial Processes

Development of metrology for:

- Consistent and reliable control of naturally occurring radioactive material
- Conformity with recommendations and EU council directives
- Improved accuracy in monitoring networks for radioactive releases

Nuclear Industry

- Improved safety, sustainability and reduced environmental burden in the use of nuclear power
- Better and safer control in Decommissioning operations
- Improved accuracy in waste sentencing
- Reduced environmental impact and socio-economic benefits from better radioactive waste management

RM 2: Targets

Anthropogenic and Natural Radionuclides in Environment and Industry

Homeland Security

Prevention of significant security threats by

- improved detection networks and monitoring of food stuff
- Development of Nuclear Forensics
- Development of quick, specific, high yield chemical analyses
- Improved de-contamination methods

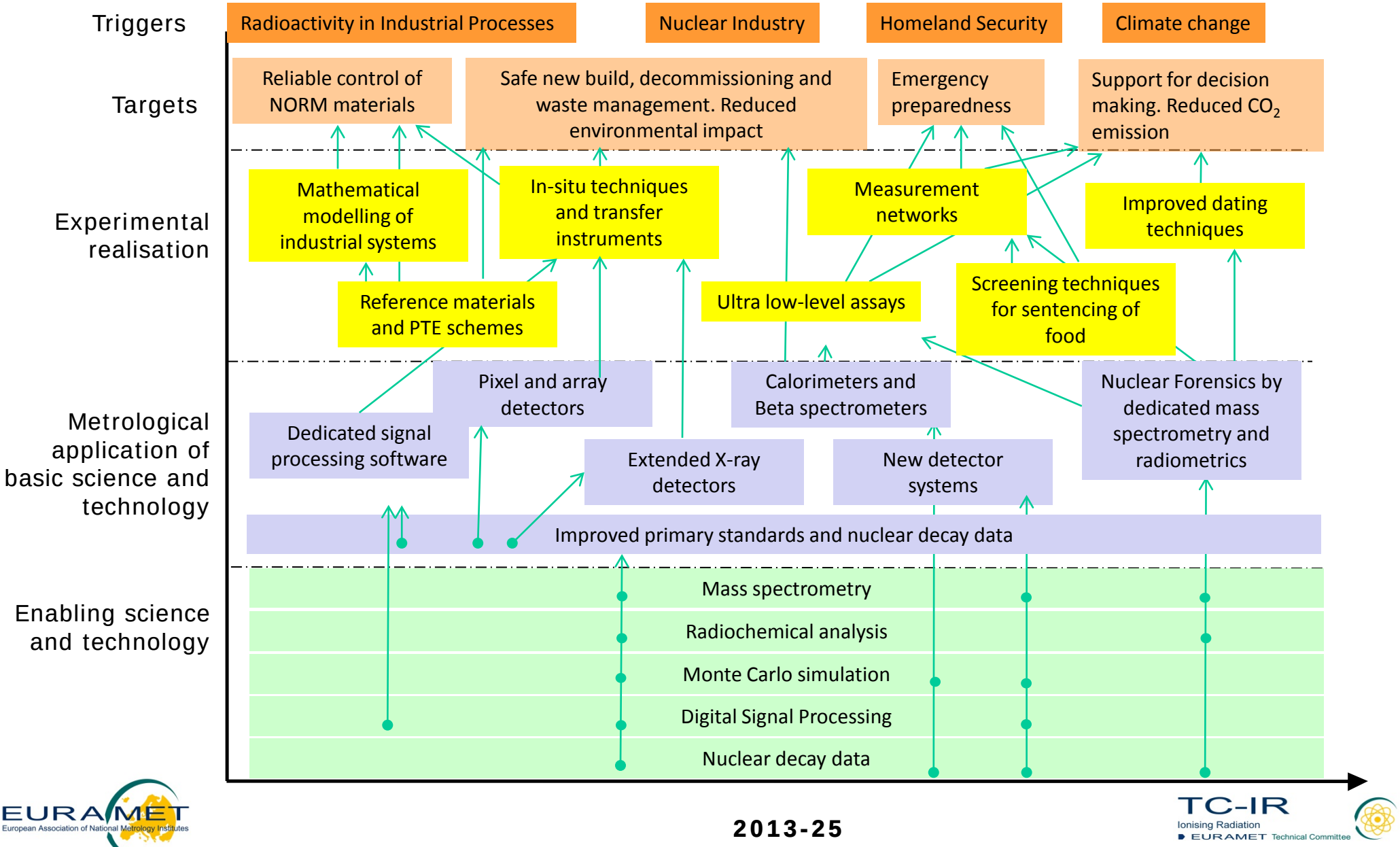
Climate Change

- Development and support for radionuclide tracer methods including low-level techniques and mass spectrometry
- Provide accurate and traceable measurements of radionuclides and isotope ratios for accurate conclusion regarding climate change

Science

- Detector developments applied to other fields e.g. X-ray detection in space applications
- Relation between activity and mass investigated as a unit by implementing new technology such as single atom counting

Anthropogenic and Natural Radionuclides in Environment and Industry



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2013-25

TC-IR
Ionising Radiation
EURAMET Technical Committee

RM 3: Targets

Novel dosimetry concept for ionising radiation interaction with matter

Medical applications of ionising radiation

- combination of different treatment modalities
- optimisation of image-guided techniques in radiotherapy
- development of radio-sensitizers and patient-specific treatment planning based on quantitative measures of individual radiation sensitivity

New or redefined operational quantities in dosimetry

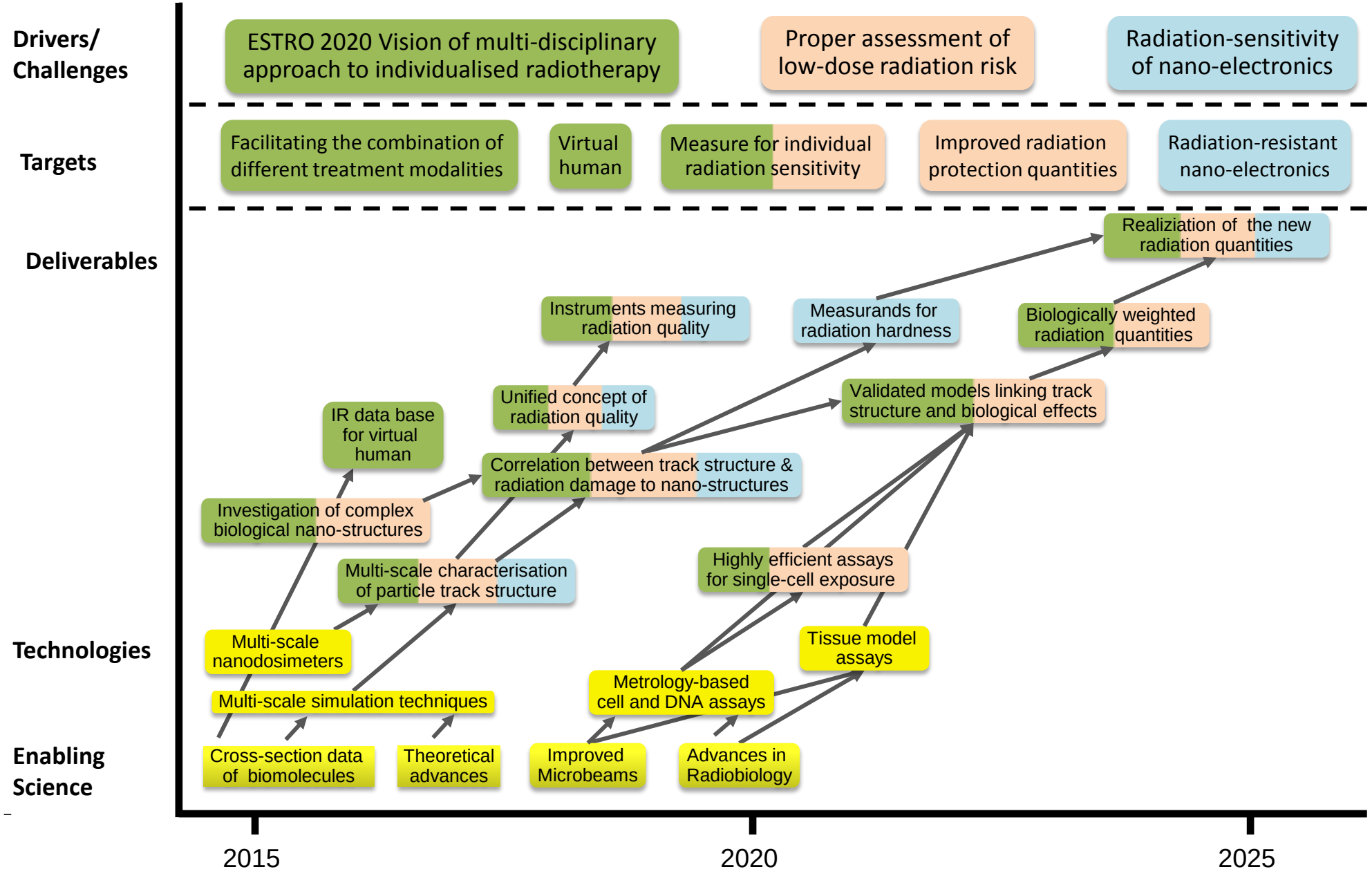
- Improved standards for occupational radiation protection
- Better data base for decision maker and regulatory bodies
- Reduction of radiation risk to occupationally exposed personnel and the general public

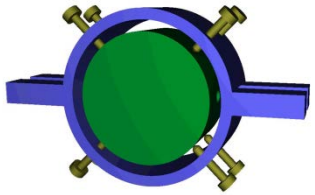
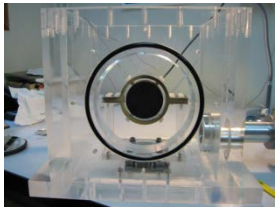
Facilitation the development of radiation-resistant

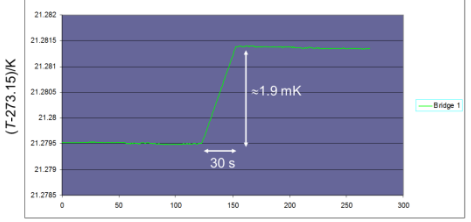
- nano-electronics and other nano-structured devices
- reliable biological-cell based production techniques

Realisation of the components of the virtual human that are related to ionising radiation

Novel dosimetry concept for ionising radiation interaction with matter



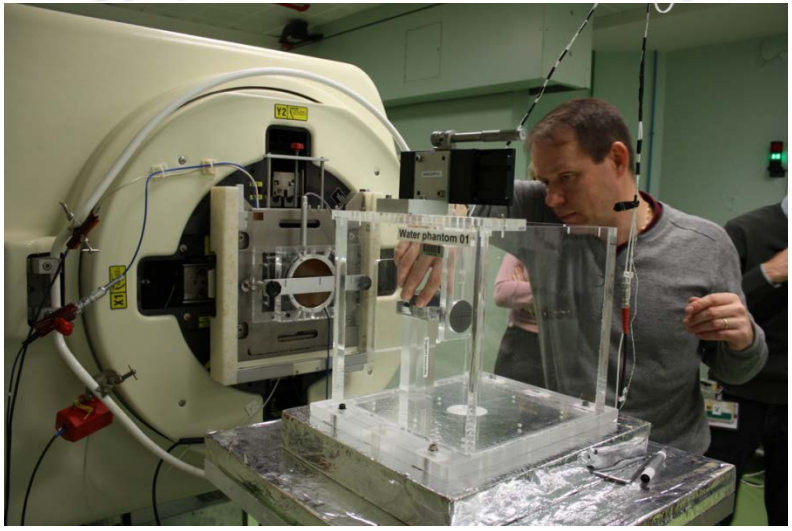



International traceability for high-energy photon dosimetry

Background

For comparisons to be meaningful, the uncertainties need to be smaller than the uncertainty of the standards. In the case of high energy photon standards the uncertainty should be not more than a few tenths of one per cent.



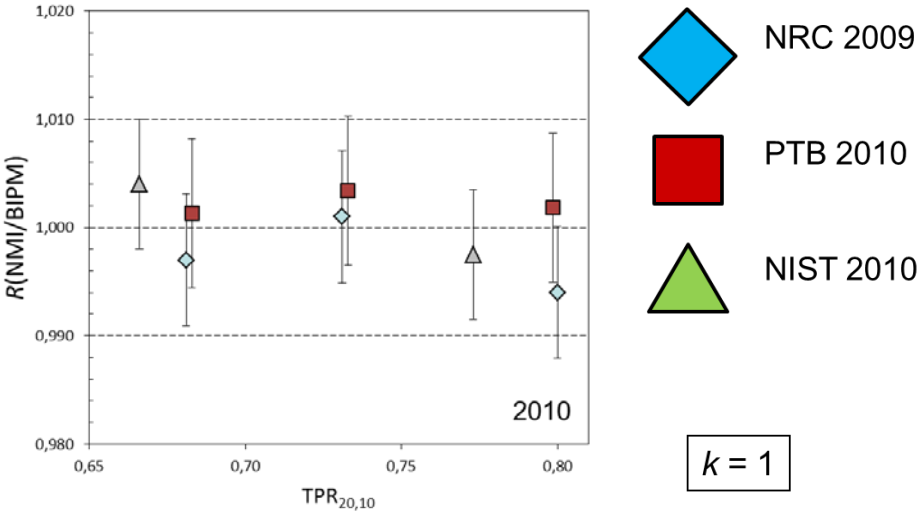
Philippe setting up the water phantom at the LNE-LNHB

Alternative methods for key comparisons – RI(I) K6

a) A reference accelerator facility at the BIPM

b) Using several NMIs as a distributed network of reference accelerator facilities

c) Status quo; the BIPM has a travelling calorimeter facility that can be taken to NMIs



Thank you for your attention - Questions?