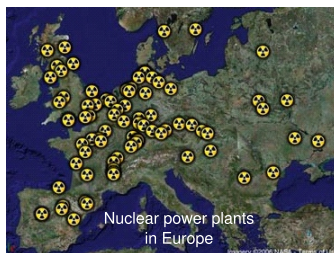


# JRP-v18 - Metrology for mobile detection of ionising radiation following a nuclear or radiological incident

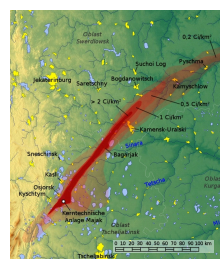


## Need

- Preparedness for a nuclear or radiological emergency to protect people and the environment (EC - Directive 2013/59/EURATOM and IAEA Safety Standards)
- Mobile unmanned areal detection systems for the „Health protection of emergency workers“
- Reliable radiological data on dose rates and contamination levels at the earliest possible stage

## Objectives

- Development and validation of unmanned aerial detection systems installed on drones and helicopters for the remote measurement of dose rates and radioactivity concentrations (WP1)
- Development and validation of transportable air-sampling systems (WP2)
- Metrological relevance of 'crowd monitoring' data on dose rates (WP3)
- Procedures to measure dose rates of contaminated areas by passive dosimetry (WP4)
- Facilitate the take up of the technology and measurement infrastructure developed in the JRP (WP5)



Radioactive plume, Majak, 1957

This requires large-scale approaches beyond the capabilities of single NMIs / DIs.



Low-cost counter and false alarm of a non-governmental network

## Progress beyond the state of the art

Metrologically sound procedures for the mobile and remote detection of radioactivity and ionising radiation

### Impact

Knowledge transfer and uptake by: workshops, training courses, website, publications and ISO / IEC standards



Unmanned aerial radiation detection

#### Environmental:

- Early indication of affected areas
- Quick and appropriate countermeasures

#### Social:

- Improved protection of the population
- Increase of credibility and acceptance of reported radiological data by media and by the general public
- Sound radiological data for appropriate governmental decisions

#### Economic:

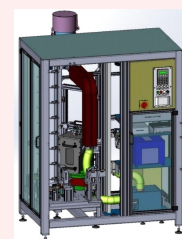
- Reduction of follow up costs by minimisation of exclusion or evacuation zones
- Fast and more reliable determination of contaminated agricultural products and other goods

#### Scientific and technological excellence:

- Novel instrumentation and procedures for unmanned aerial vehicle (UAV) based mapping of contaminated areas
- Pre-series industrial prototypes of transportable air-sampling systems
- Low-cost dosimeters for stationary and mobile use

#### Metrological:

- Traceable radiological data for a quick and adequate response
- Higher accuracy (of dose rate values and ground contamination levels) by at least factor of 2
- Novel metrological infrastructure e. g. radiological test sites for UAVs with artificial radiation
- Information on the quality of radiological data provided by non-governmental networks and the feasibility to use such data
- Harmonisation of passive dosimetry in Europe for long-term monitoring



Transportable automated air-sampler with HPGe gamma spectrometer

WP5

### Unmanned aerial radiological measurements

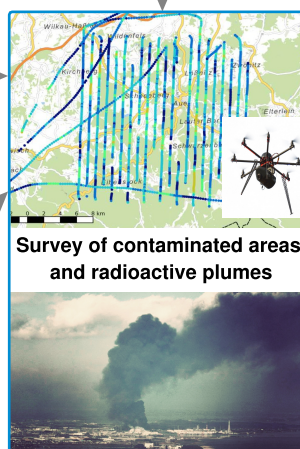
- Novel unmanned airborne monitoring systems
- Hard- and software for data acquisition, transmission and analysis
- Procedures for testing, calibration and validation

WP1

### Non-governmental dosimetry networks

- Evaluation of instruments
- Feasibility study on the reliability of dose rate data
- Development of novel common dose rate instruments for governmental and non-governmental use

WP3



Survey of contaminated areas and radioactive plumes

### Transportable air-sampling systems

- Procedures for in-field use
- Development of transportable air-samplers
- On-site comparison exercise
- Rapid radiochemical separation and analysis

WP2

### Passive dosimetry

- Technical and methodological investigations
- Electret ion chambers
- Harmonisation of passive dosimetry

WP4

### Management and coordination

Six leading European NMI/DI in the field of ionising radiation. JRC and other stakeholders directly involved as JRP-partners. Sufficient further external partners with high-level expertise, essential to cover the broad spectrum of objectives. Considerable interest by the stakeholder community, expressed by 35 letters of support and a large group of potential collaborators.

WP6



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)