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EMPIR JRP 16ENV04:

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

(„Preparedness“)

Stefan Neumaier, PTB (Preparedness coordinator)

There is still the need for Preparedness

In case of a nuclear emergency,

reliable and traceable radiological data

are of key importance for any governmental decision!

WP1: Unmanned aerial monitoring systems are required to protect the health and save the lives of first responders

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

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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 aerial detection systems for the „Health protection of emergency workers"
Reliable radiological data on dose rates and contamination levels at the earliest possible stage

Radioactive plume, Majak, 1957

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 sourced 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)

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 dosemeters 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 a 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

Transportable air-sampling systems

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

WP2

Survey of contaminated areas and radioactive plumes

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

Passive dosimetry

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

WP4

Management and coordination

Objectives and WP structure

- WP1: Remote measurement of dose rates and radioactivity concentrations, by unmanned aerial detection systems installed on drones and helicopters
- WP2: Transportable air samplers; Development and validation
- WP3: Metrological relevance of non-governmental dose rate measurements („crowd sourced monitoring“)
- WP4: Passive dosimetry (WP4); Long-term survey of contaminated areas
- WP5: Uptake and impact; Improvement of the related metrological infrastructure in Europe
- WP6: Management and coordination

Preparedness-project has started in August 2017 and has a duration of 3 years.

All WPs has started their work and first results will be presented in this meeting:

WP1: Arturo Vargas (leader of WP1)
WP3: Steven Bell (leader of WP2)
WP3: Giorgia Iurlaro (Poster for WP3)
WP4: Recently, an intercomparison exercise of passive dosemeters was finished at PTB (no results yet).

WP5/WP6: Poster presentation by
Patrick Kessler and Stefan Neumaier

Preparedness consortium

17 partner institutions from 11 European countries

6 NMI/DI (internal): **PTB**, CMI, NPL, JSI, IRB, VINCA

10 external: AUTH, BfS, CLOR, EHU, ENEA, Kromek, MTI, UPC, NUVIA and EC-JRC (Ispra; Geel)

1 unfunded: SCK·CEN

+ about 10 potential collaborators;
further collaborators are welcome!

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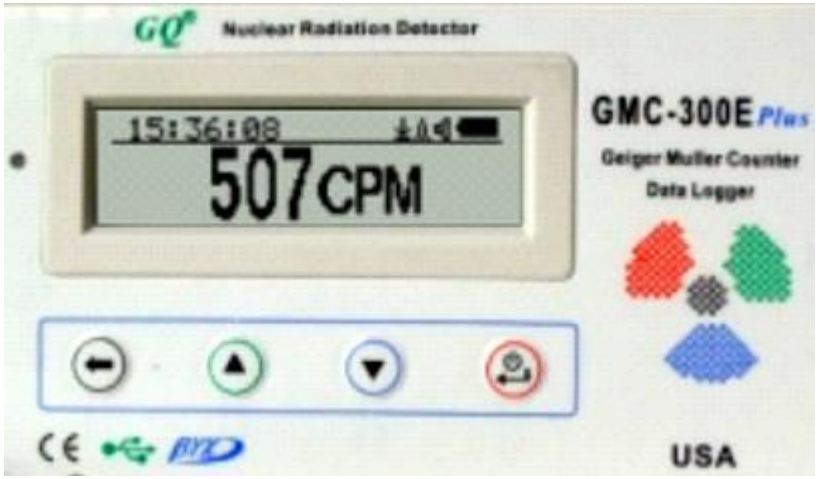
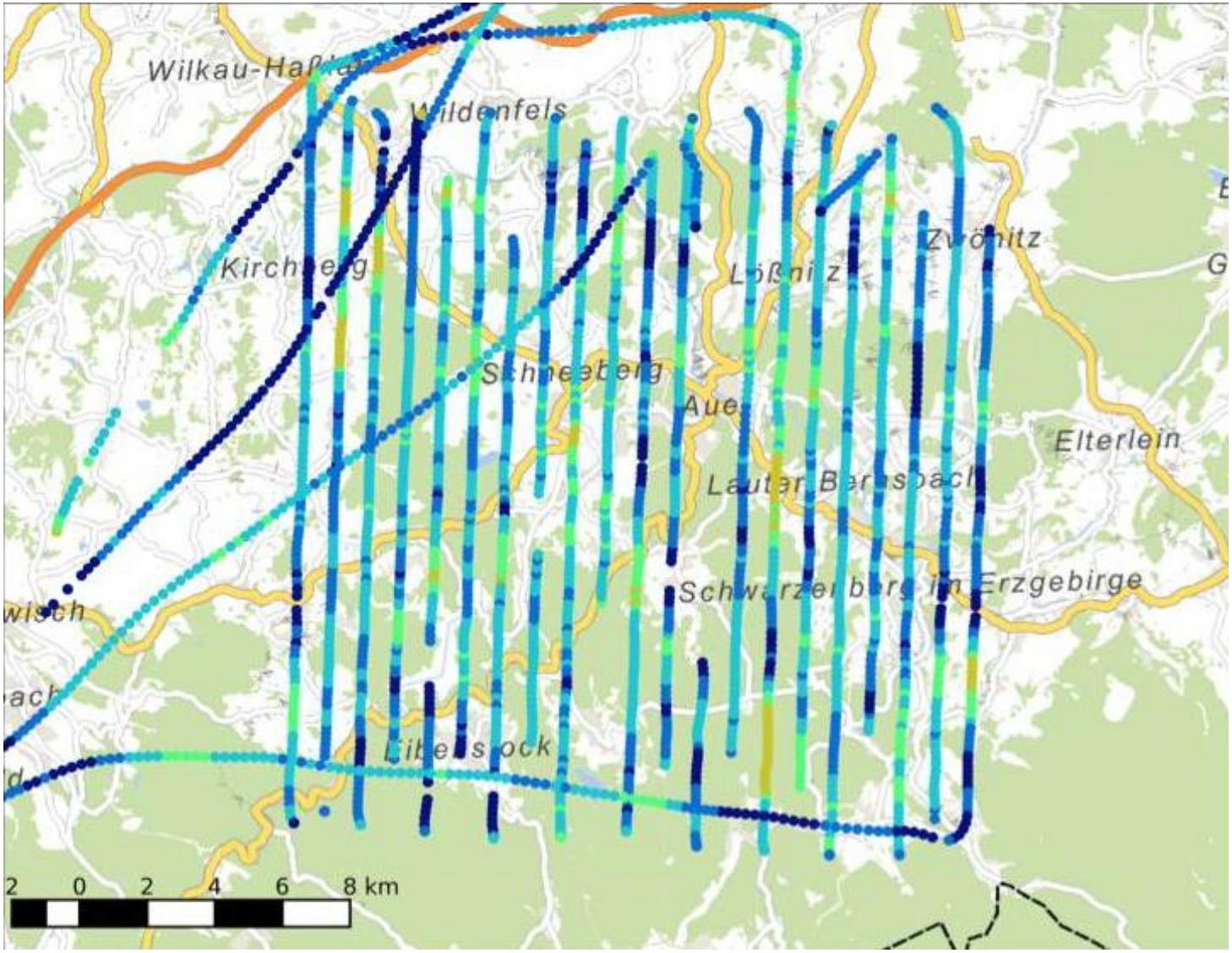
EMPIR 16ENV04 „Preparedness“ Kick-off meeting

WP3: Non governmental dose rate monitoring

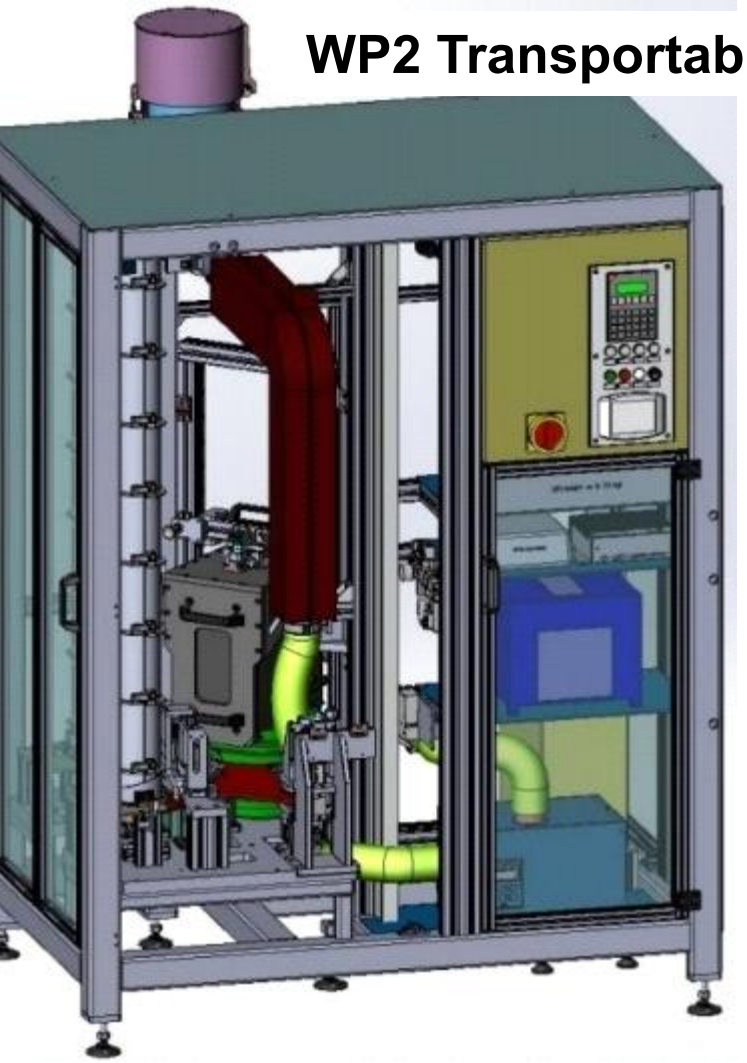


Investigation of the metrological reliability and relevance!

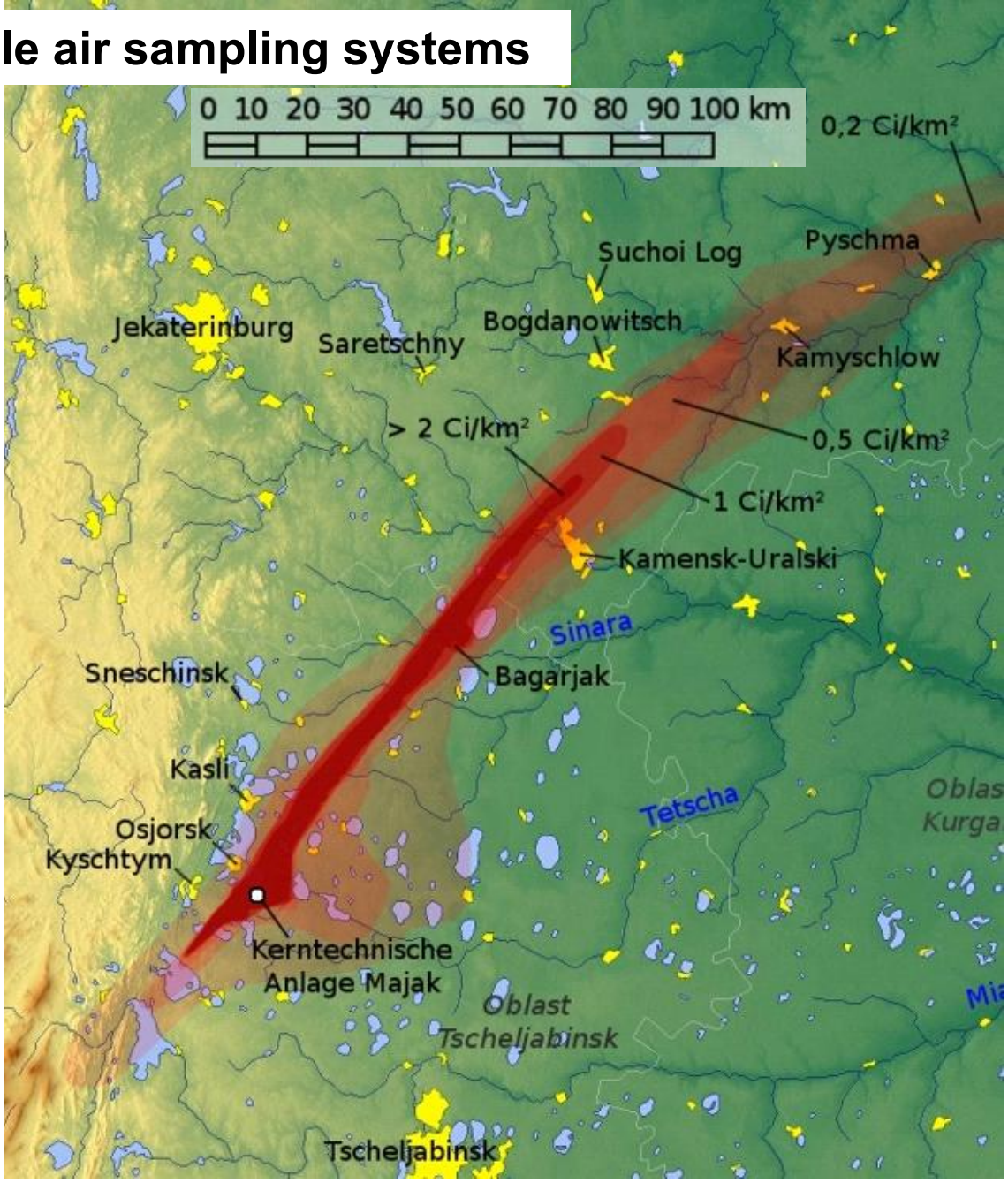
Remote mapping of contaminated areas



WP2 Transportable air sampling systems



Transportable fully automated air sampling system with online capability (HPGe detector, CMI)



Long-term monitoring of contaminated areas may also require passive dosimetry (WP4)