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PIANOFORTE CITISTRA - summary of the current status and project achievements



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National Radiation Protection Institute (SÚRO), Prague, Czech Republic

on behalf of the research team

April 2026, Paris, FR



Co-funded by
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Citizen radiation measurements in the Czechia - history

- 2011 - Fukushima Daiichi nuclear power plant accident in Japan, non-profit organization Safecast founded
- 2013 - Safecast introduces the bGeigie Nano detector with GPS
- 2015 - SÚRO buys the first bGeigie Nano and starts measuring and uploading data to Safecast
- 2015-2019 - RAMESIS project - citizen radiation measurements for schools etc., free loans of bGeigie devices, data acquisition and processing,



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number of bGeigie Nano devices in SÚRO increased to ~60 units

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Citizen radiation measurements in the Czechia - history

- 2020 - bGeigie Nano production discontinued, SÚRO needs a replacement
- 2021-2024 - development of the [CzechRad](#) device, 1000 pieces produced as part of the [IMPAKT](#) project
- 2024/2025 - 300 CzechRads produced within the [CITISTRA](#) EU project

Note: all measured data is now part of the [Safecast](#) dataset under the [CC0 Public domain](#) - i.e. further use is not restricted

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CITISTRA project

*CITizen measurements as complementary radiation monitoring
STRategy in threats due to armed conflict or natural disasters*

The project addresses the following questions:

Can citizen 🚫 measurements help us in emergencies/armed conflicts?

Which groups are trustworthy? How to train these people? 🤔

Can we expect usable data from them?

Participating institutions:



National Radiation
Protection Institute



CITISTRA



SLOVAK
MEDICAL
UNIVERSITY



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THE HENRYK NIEWODNICZAŃSKI
INSTITUTE OF NUCLEAR PHYSICS
POLISH ACADEMY OF SCIENCES



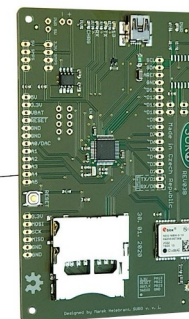
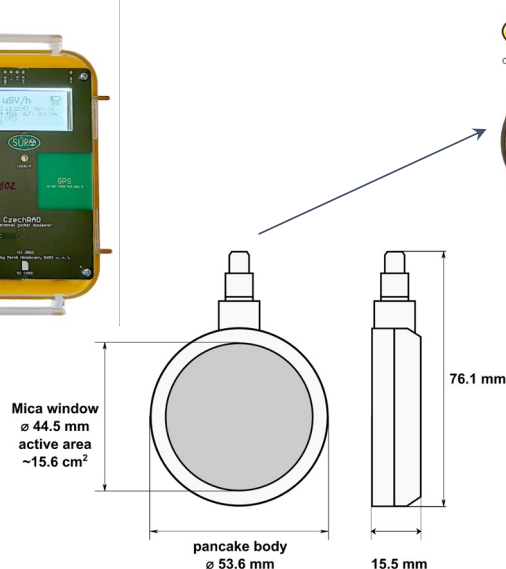
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CITISTRA - CzechRad detector

- CzechRad is a portable detector inspired by the SAFECAST bGeigie Nano
- rechargeable battery, GPS and automatic data recording to SD card
- GM pancake tube, weatherproof housing

 **YouTube**
[CzechRad video](#)



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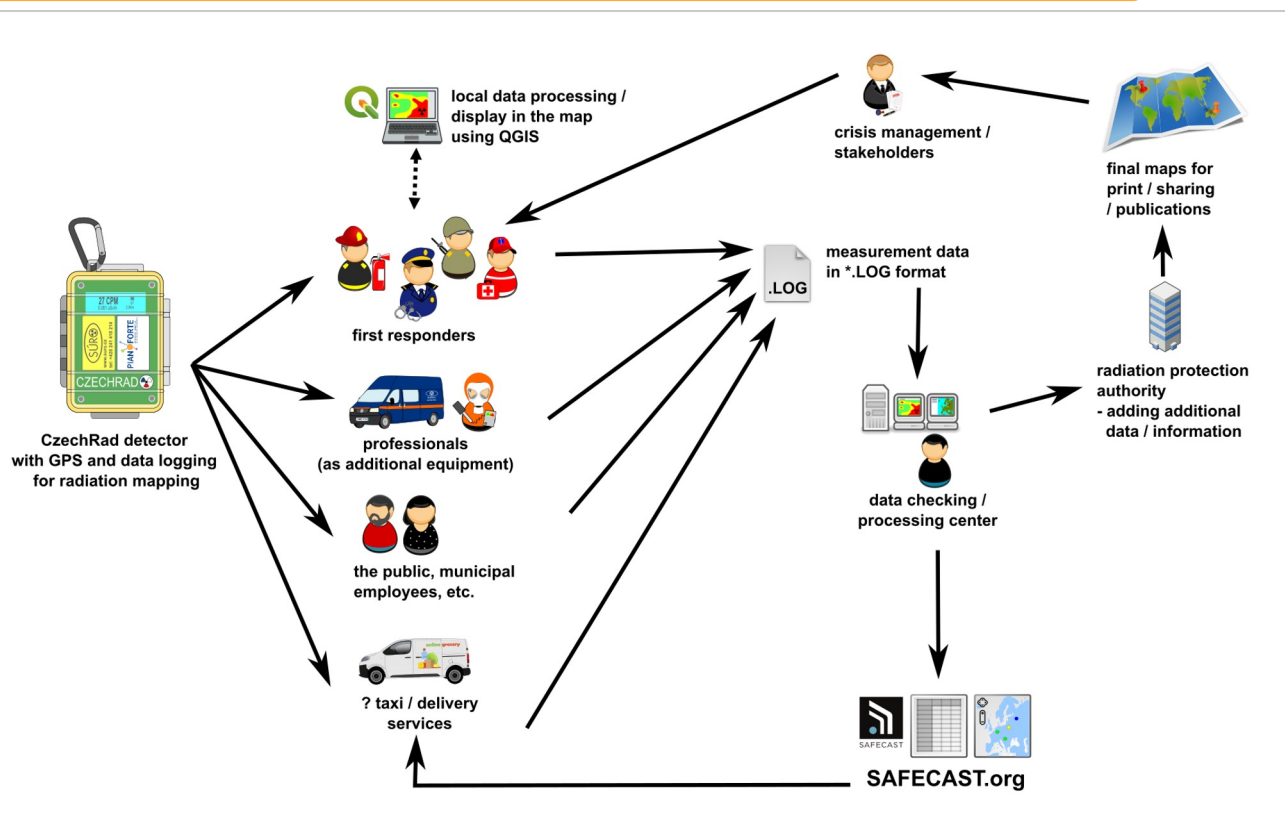


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CITISTRA - CzechRad detector

- implementation of CzechRad detector with GPS
- 200 detectors → Poland
- 100 detectors → Slovakia
- (*Czechia already had 200 detectors)
- use of existing and proven tools
 - QGIS and Radiation Toolbox plugin, Safecast online tools (Safecast Map a API)



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CITISTRA - production of CzechRads

- 300 devices successfully manufactured and distributed
- each device tested with a Cs-137 source
- selected units in detail in SÚRO X-ray and gamma ray laboratory in Prague



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CITISTRA - detector firmware

software / firmware development

- usb mode - no card reader required for data download (usb cable is enough)
- thyroid measurement function (for rough sorting of people in field conditions)



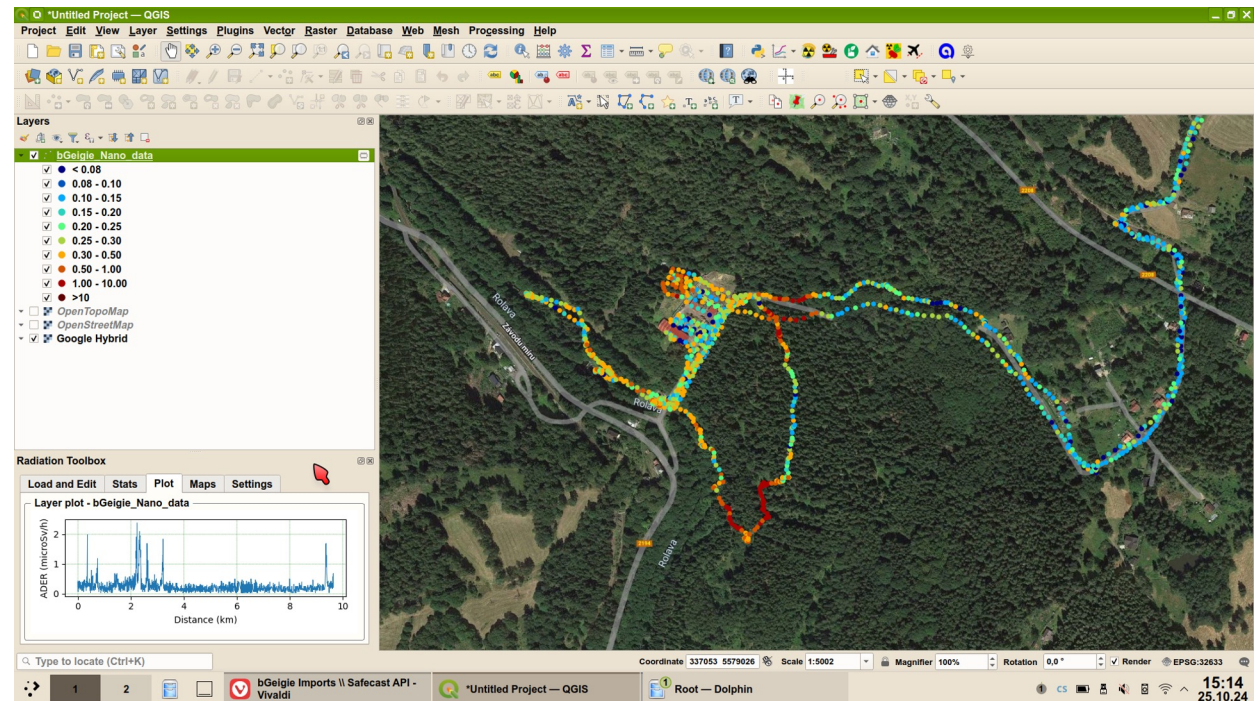
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CITISTRA - QGIS

- QGIS plugin “[Radiation Toolbox](#)”

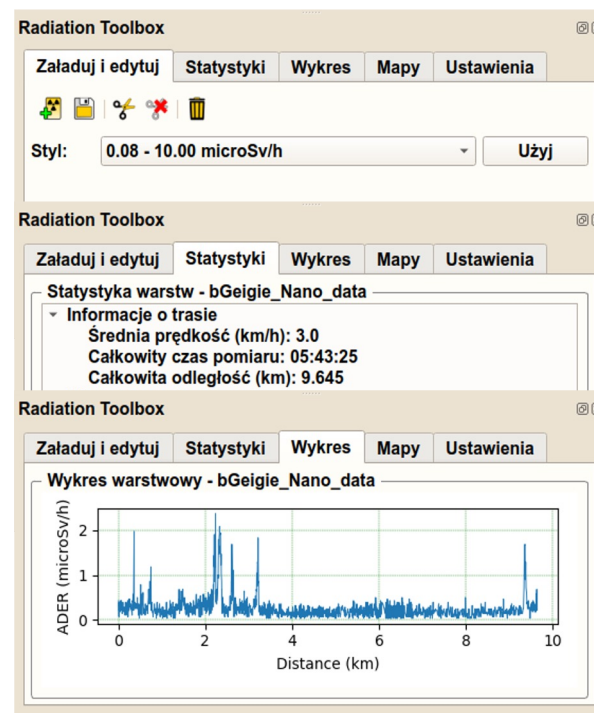
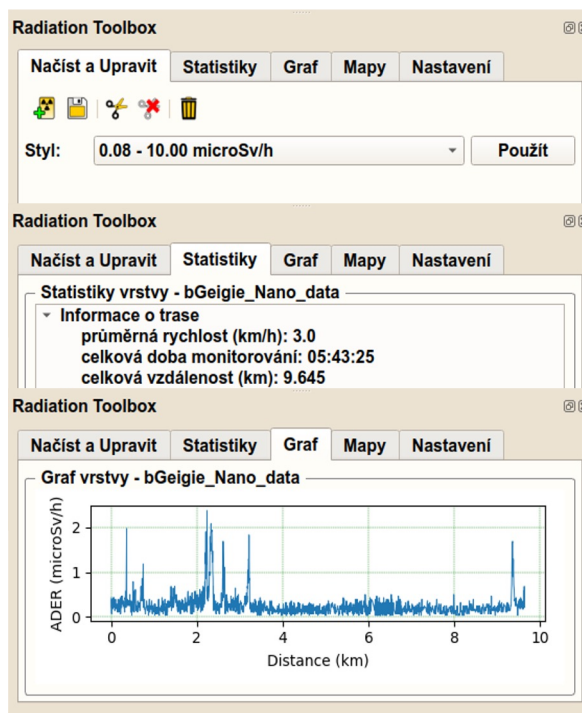
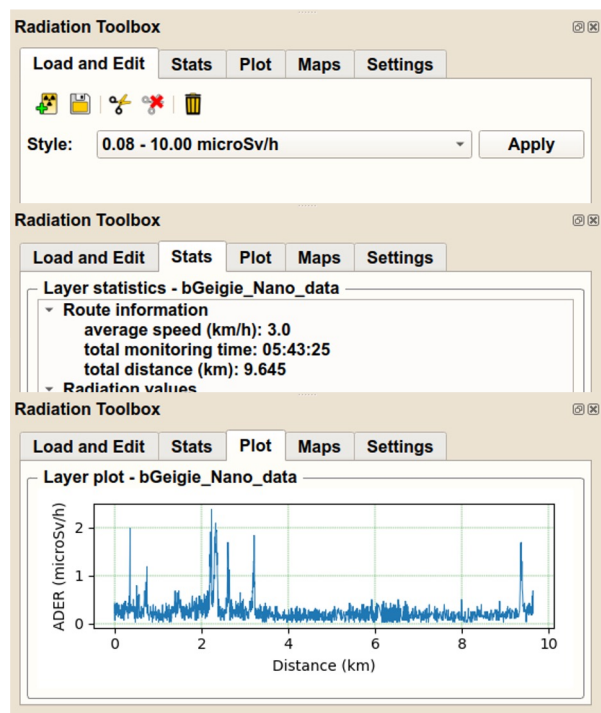
underwent a complete code rework, new features added

- support for CzechRad detectors implemented (for correct ADER calculation, etc.)



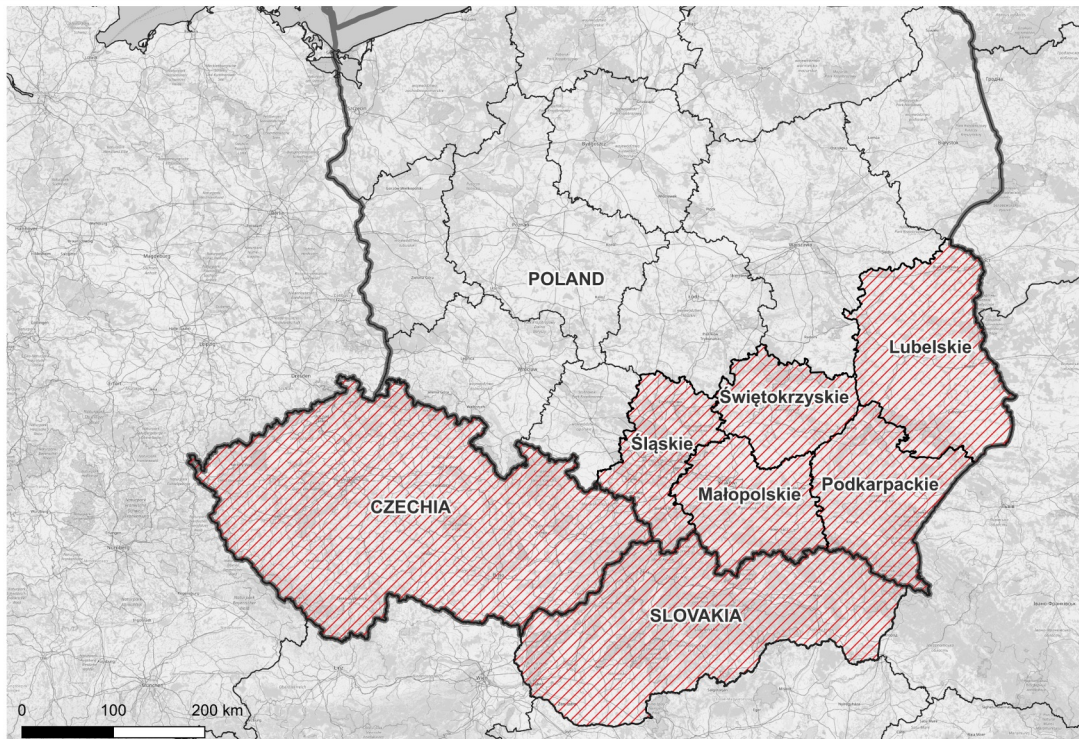
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CITISTRA - QGIS



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CITISTRA - detector distribution



created in QGIS, background map: © OpenStreetMap contributors, administrative data: CZ: ČÚZK, [2024], CC BY 4.0; PL: GUGIK, CC BY 3.0; World: Administrative boundaries by geoBoundaries.org (CC BY 4.0)

- detector distribution completed successfully
- field measurements in progress

- Czechia
- Slovakia
- Poland - selected regions

(PS: traveling is not prohibited :-))

Resources:

Background map: © OpenStreetMap contributors

Administrative boundaries: Runfola, D. et al. (2020)
geoBoundaries: A global database of political administrative boundaries. PLoS ONE 15(4): e0231866.
<https://doi.org/10.1371/journal.pone.0231866>

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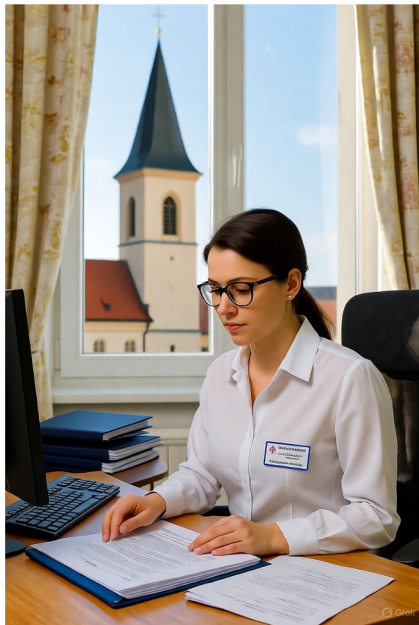


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CITISTRA - detector distribution

Czechia - firefighters, police, local government



- professional firefighters
- volunteer firefighters
- local government
(municipal authorities, crisis management, mayors)
- municipal police

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CITISTRA - detector distribution

Slovakia - ambulances, territorial self-government



- Emergency Health Service (EMS)
- territorial self-government
- students and other volunteers
(Technical University in Zvolen)

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CITISTRA - detector distribution

Poland: firefighters, local government



- 73 fire brigades
- professional firefighters (Państwowa Straż Pożarna, PSP)
- volunteer firefighters (Ochotnicza Straż Pożarna, OSP)
- local government
- sanitary/epidemiological stations (30 detectors)

Photo: IFJ PAN, Source: <https://citistra.ifj.edu.pl/>

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CITISTRA - detector distribution

Poland: Territorial Defense Forces (Wojska Obrony Terytorialnej)



Fot. Adam Guz / KPRM - Święto Wojsk Obrony Terytorialnej (CC0 Public Domain)

- 80 CzechRad devices
- 6 brigades

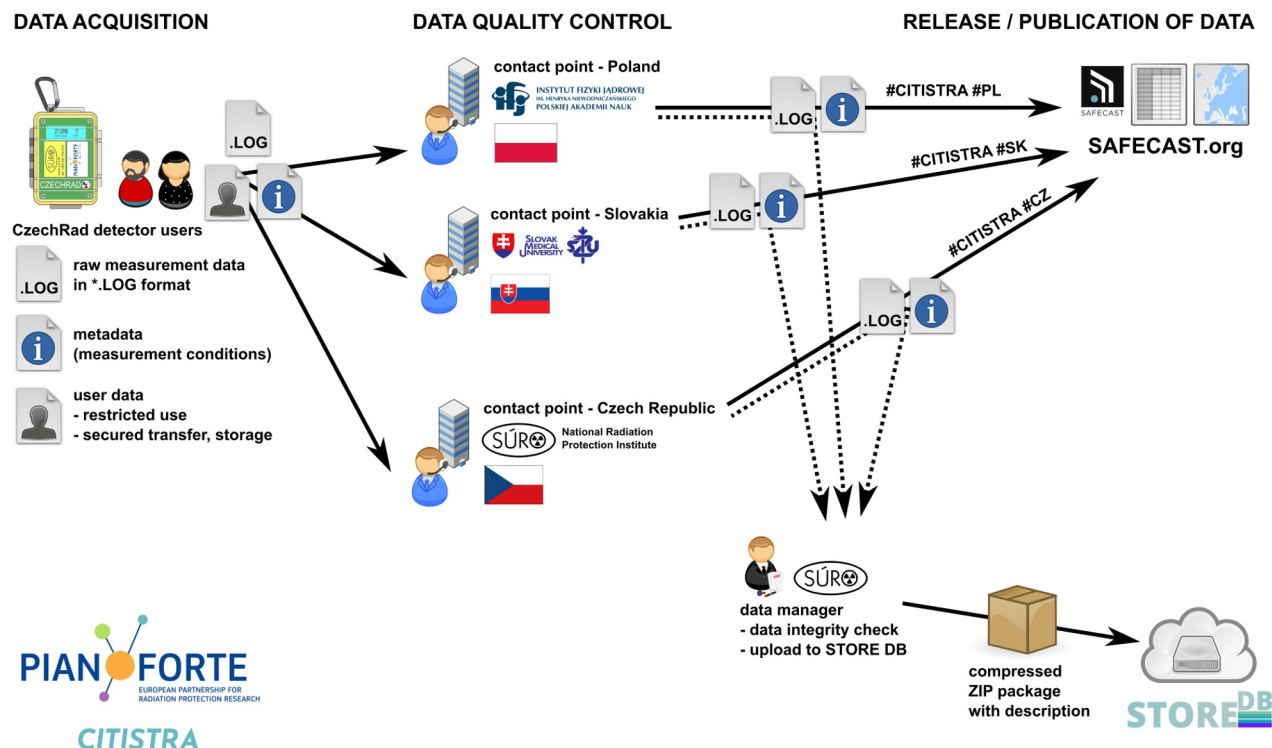


Source: <https://citistra.ifj.edu.pl/>

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CITISTRA - data processing

- measured data - local level
(**detector user**)
(local/offline viewing possible)
- **national contact points**
 - data quality control
 - support, checking hotspots
- **release** of data on Safecast, to the public



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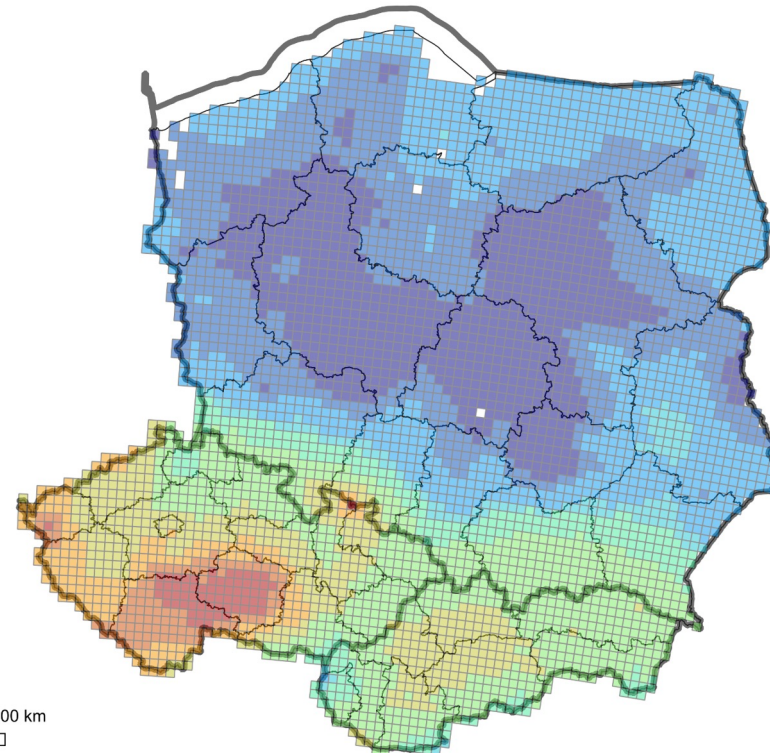
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CITISTRA - what values can we expect?

- Czechia is relatively well measured, Slovakia and Poland less so
- to get some idea, we can check [European Atlas of Natural Radiation](#) which, however, has a fairly coarse resolution (10 km x 10 km grid)

dose rate
(microSv/h)

< 0,030
0,030 - 0,035
0,035 - 0,045
0,045 - 0,050
0,050 - 0,060
0,060 - 0,070
0,070 - 0,080
0,080 - 0,090
0,090 - 0,100
0,100 - 0,130



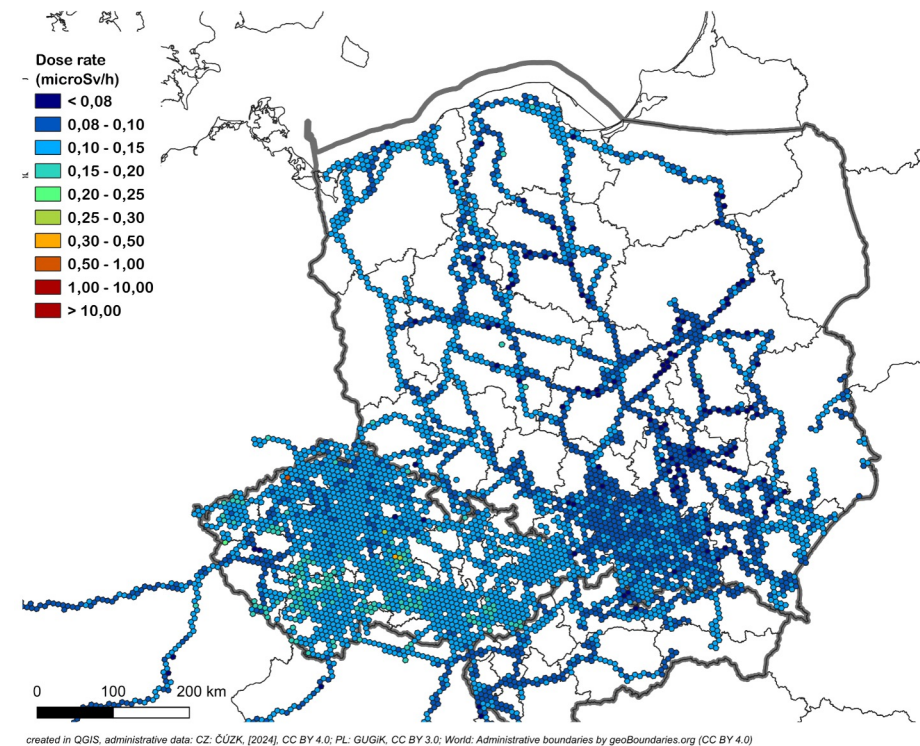
0 100 200 km

created in QGIS, administrative data: CZ: ČÚZK, [2024], CC BY 4.0; PL: GUGiK, CC BY 3.0
Dose rate data: Tollefsen, Tore; De Cort, Marc; Cinelli, Giorgia; Gruber, Valeria; Bossew, Peter (2016): 07. Terrestrial gamma dose. European Commission, Joint Research Centre (JRC)
[Dataset] PID: http://data.europa.eu/89h/jrc-eanr-07_terrestrial-gamma-dose

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CITISTRA - published data - 2025

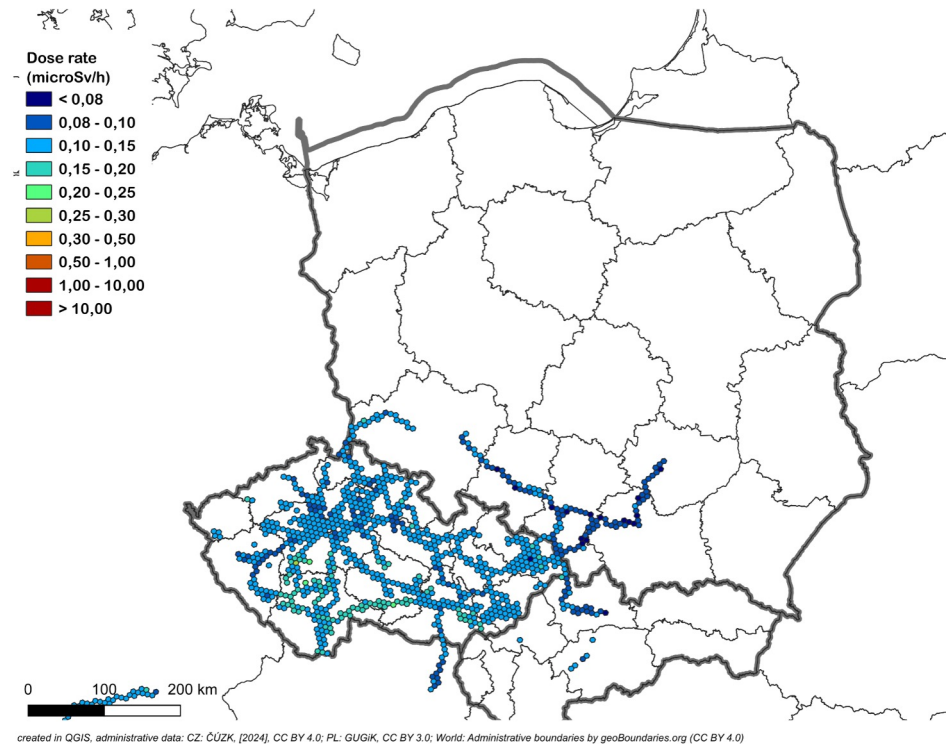
- almost 3000 data files uploaded
(over 4 milion data points)
- Czechia, Slovakia, Poland and other countries



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CITISTRA - published data - 2026

- 23 May: over 600 data files uploaded
(over 500 thousand data points)
(Polish data not yet included here)
- Czechia, Slovakia and other countries (incl. Bolivia 🕶)



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CITISTRA - published reports



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PIANOFORTE Partnership
European Partnership for Radiation Protection Research
Horizon-Euratom – 101061037

WP9 Open Call 1 CITISTRA [D9.1; D75]

D1.1 - Report on public sociology survey to define trusted public group

Lead Author: Ivana Fojtiková (SÚRO)
With contributions from: Jan Helebrant (SÚRO), Marie Davidková (SÚRO), Agnieszka Szumska (IFJ PAN), Renata Kierepko (IFJ PAN), Igor Gomola (SZU)

Reviewer(s): Jan Helebrant
PIANOFORTE Coordination Team (ASNR, WP1&WP9 lead)

Work package / Task	WP 9	T 9.1
Project Acronym	CITISTRA	
Deliverable nature:	Report	
Dissemination level: (Confidentiality)	Public	
Contractual delivery date:	Month 12 31 January 2025	
Actual delivery date:	Month 17 30 June 2025	
Version:	1	
Total number of pages:	37	
Keywords:	sociology, survey, CITISTRA project, radiation, radioactivity, citizen science	
Approved by the PF coordinator:	PIANOFORTE M 37 02 June 2025	
Submitted to EC by the coordinator:	09 June 2025	



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European Partnership for Radiation Protection Research
Horizon-Euratom – 101061037

WP9 Open Call 1
Project CITISTRA- D3.1 [D9.4]
- Social and legal issues of citizen radiation measurements

Lead Author: Jan Helebrant (SÚRO)

With contributions from: Marie Davidková (SÚRO), Ivana Fojtiková (SÚRO), Agnieszka Szumska (IFJ PAN), Renata Kierepko (IFJ PAN), Pawel Olko (IFJ PAN), Anna Mrozik (IFJ PAN), Mateusz Krzyśiek (IFJ PAN), Pavol Ragan (SZU), Zuzana Goneková (SZU)

Reviewer(s): Executive board

Work package / Task	WP 9	T9.4
Project Acronym	CITISTRA	
Deliverable nature:	Report	
Dissemination level: (Confidentiality)	Public	
Contractual delivery date:	Month 44 31 January 2026	
Actual delivery date:	Month 44 27 January 2026	
Version:	1	
Total number of pages:	68	
Keywords:	Citizen radiation measurements, legal frame, social aspects	
Approved by the PF coordinator:	16 February 2026	
Submitted to EC by the coordinator:	2 March 2026	

- D1.1 - Report on public sociology survey to define trusted public group
- D3.1 - Social and legal issues of citizen radiation measurements

<https://pianoforte-partnership.eu/citistra/>



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CITISTRA - additional resources



GitHub repository

- documentation, various tools / scripts (free license)

<https://github.com/juhele/CzechRad>



Discord “CzechRad” group

- user support, discussions

<https://discord.gg/NUdhfGvwgG>



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CITISTRA - more details about progress in Poland

- separate presentation: **Renata Kierepko (IFJ PAN)**

“Network of CzechRad mobile gamma radiation detectors in Poland”



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photo: IFJ PAN, Flickr, CC BY-SA



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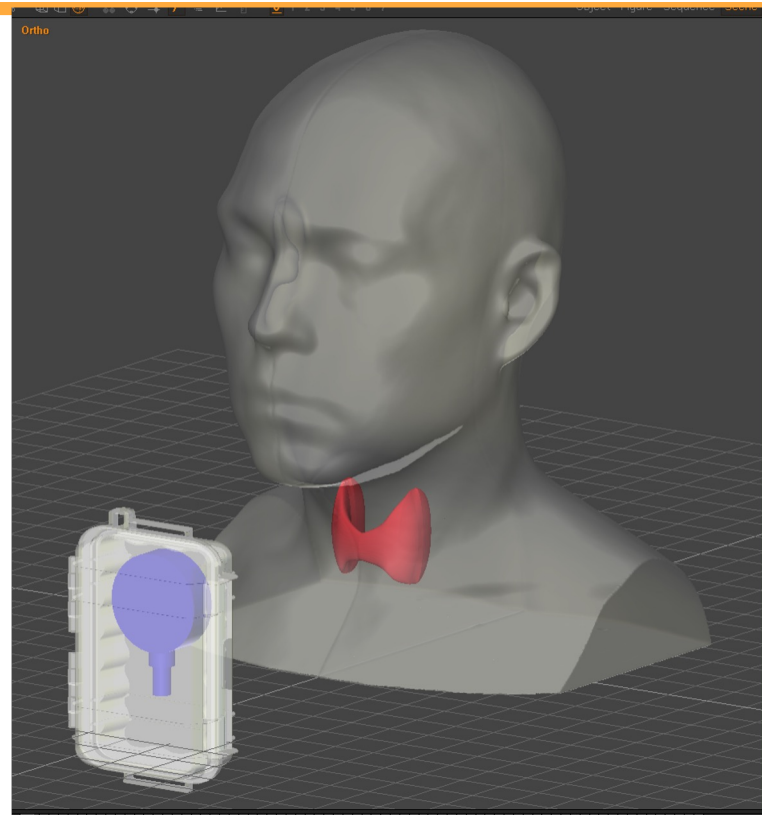
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CITISTRA - more details thyroid measurements

- separate presentation:

Pavol Ragan (SMU)
***“Results of
thyroid measurements with
CzechRad detector”***



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CITISTRA - to be done

- food, thyroid measurements
- 2 reports to be published
- 2 surveys to do (socio, detector user feedback)
- training course (possibly including a field trip to Jáchymov, Czechia)
- publishing all valid* measured field data to Safecast and StoreDB



photo: Marie Davidková, Flickr, CC BY-SA



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Conclusion

As part of the project, 300 CzechRad detectors were successfully manufactured and distributed, field measurements are in progress.

We need to process the results of thyroid measurements, conduct two surveys, and publish two research reports.

And also process and publish a huge amount of other data from field measurements.

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**Thank you
for your attention**

