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CITISTRA - Data Management Plan (DMP)

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Abstract

The Data Management Plan (DMP) of CITISTRA project describes the main strategies and techniques for data sharing according to the FAIR (findable, accessible, interoperable and re-usable) principles. It also includes security, regulatory and ethical issues of data management. The DMP describes the types of data generated as well as operational procedures concerning how data will be handled, stored and shared. The process of quality assurance is also described. PIANOFORTE CITISTRA DMP is based on the template of the DMP of PIANOFORTE Partnership and takes into account all its basic principles and recommendations.

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1. Aim of the document

1.1 Introduction

CITISTRA project was selected for funding in the frame of the PIANOFORTE first Open Call for research projects answering the topic 3: “Development of risk assessment and risk management approaches and technological capabilities to cope with scenarios arising from threats due to war or armed conflicts situations or natural disasters taking into consideration social, ethical and legal issues”. The full title of the project is: “Citizen measurements as complementary radiation monitoring strategy in threats due to armed conflict or natural disasters”.

The Project coordinator is the National Radiation Protection Institute (SÚRO), Praha, Czech Republic. Project partners are the Henryk Niewodniczanski Institute of Nuclear Physics, Polish Academy of Sciences (IFJ PAN), Krakow, Poland as the Affiliated entity to the Central Mining Institute – National Research Institute, Katowice, Poland and the Slovak Medical University in Bratislava (SZU), Bratislava, Slovak Republic as the Affiliated entity to the National Radiation Protection Institute (SÚRO), Praha, Czech Republic.

The project aims to analyze the feasibility and procedures of employment of citizen measurements with regard to different national legal frames, social and cultural habits using experimental study in three countries – Czech Republic, Slovak Republic and Poland. The project addresses challenges in using citizen radiation measurements:

- quality, accuracy, and reliability of the data collected and analyzed by citizens,
- ethical, legal, and social implications of sharing and using radiation data in different countries,
- adequate training, support, and feedback to citizens involved in radiation measurement activities,
- preconditions of the sustainability of a system built on measurements by volunteers.

The developed radiation detector CzechRad will be distributed among selected citizen groups together with simple software. Training will be provided on taking measurements, data processing and interpreting. Practical guides for training and measurements in different emergency scenarios will be designed and tested. In addition to the living environment, the self-measurements of thyroid glands, food, feed and personal items of daily use etc. will be considered. The public attitude to citizen measurements will be monitored using sociological surveys. The effect of the self-measurement availability on a public sense of security and fear about ionizing radiation shall be determined.

The results of the project will be summarised in following deliverables:

Deliverable 1.1 (M12) - Public report - Sociological survey to define trusted public group

Deliverable 1.2 (M36) - Public report - Experiences of detector users

Deliverable 2.1 (M36) - Public report and publication - CzechRad detector parameters, acquisition and use of data

Deliverable 3.1 (M24) - Public report and publication - Social and legal issues of citizen radiation measurements

Deliverable 3.2 (M36) - Public report and publication - Possibilities of citizen measurements in monitoring of thyroid glands, food, feedstock and personal objects

CITISTRA project Data Management Plan (DMP) describes the principles for the management of data within the project and was created in full compliance with the policy adopted by PIANOFORTE using the PIANOFORTE DMP (as described in Deliverable D5.2) as a template.

1.2 Objectives

CITISTRA Data Management Plan (DMP) defines the tools for managing the data generated during and after the end of the project. The DMP clarifies the technical and organisational aspects of managing project data. This document defines the main strategies and tools to ensure secure, transparent, and efficient storage, maintenance, sharing, and use of data. It was prepared in alignment with the project objectives and data structure. It represents a living document, which will be updated during the course of the project, if significant changes occur.

2. Data summary

2.1 The purpose of the data generation/collection

Data generated and collected during CITISTRA project realisation will be disseminated with the aim to maximise the impact of performed research. All the data measured by CzechRad detectors will be available publicly for re-use.

2.2 The relation of CITISTRA project to the objectives of the PIANOFORTE partnership

CITISTRA is related to the PIANOFORTE Specific objective 4 “To provide the scientific basis to recommendations, procedures and tools for assuring better preparedness to response and recovery from a potential radiological event or nuclear accident and to improve the know-how to manage legacy sites.”

2.3 Types and formats of data generated/collected

CITISTRA research team will collect geotagged dosimetry data, other generated files will include maps in image format, Excel, Word and PDF documents (Public reports as project deliverables). Personal data (about detector users and survey participants) will be restricted due to General Data Protection Regulation (GDPR), privacy legislation and ethical considerations.

The dosimetry (field mapping) data are stored as plain text files containing radiation values (pulse count per 5 second interval and CPM - moving average per minute) accompanied by date, UTC time, GPS coordinates, etc. Hypothetically, the volume of measured data could reach up to 250 MB per day (from 300 devices), however, this scenario is unlikely as it assumes that all 300 devices would measure continuously. For data storage, it is assumed that compressed ZIP archives will be used, which will reduce the volume of data up to 10 times.

2.4 Re-use of existing data

The majority of the data collected within CITISTRA project will be newly generated data. For some tasks (education, training) existing measurement data from SAFECAST API (api.safecast.org, CC0 Public Domain licensed) may be used together with new measurements.

2.5 Origin of data

Dosimetry and GPS data will be obtained during measurements by consortium partners and citizens. In-field measurements using CzechRad detectors shall be performed by trained citizens. Their personnel data should be collected for legal reasons (liability for damage or lost of CzechRad

detectors). Sociology surveys will be performed by subcontracting company. Personal data about surveys participants should not be available to CITISTRA partners.

2.6 Expected size of the data

Expected size of the data deposited to STORE is several hundred GBs.

Measurement data will also be stored locally and available through SAFECAST online services (Map, database exports, API).

2.7 Data utility: to whom it will be useful

The project aims to analyze the feasibility and procedures of employment of citizen measurements with regard to different national legal frames, social and cultural habits using experimental study in three countries – Czech Republic, Slovak Republic and Poland. The project addresses challenges in using citizen radiation measurements:

- Is there a trustful organized citizen group, which can serve as distributors and volunteers for citizen measurements? Is this interest or professional group identical in different countries?
- Can we use members of this group to distribute detectors evenly geographically and train them to perform and organize measurements?
- How to train volunteers and motivate them to maximize the quality and reliability of the collected measured data?
- How much does such a system of citizen measurements contribute to better awareness and reducing anxiety and panic by educating the public about radiation and its potential risks?
- Can citizen measurements be applied in case of armed conflict or natural disaster to quick measurements of dose rates in a given location?
- Can citizen measurements help in the selection of contaminated persons (especially exposed to radioiodine in the thyroid), which need further professional care?
- Can citizen measurements provide a basis for decisions for interventional activities in use of potentially contaminated food, feedstock or personal daily use items or even in the commercial distribution of it?

Answering those questions shall provide a general guidance on how to assess the potential of the citizen science phenomenon for measurements of radiation in the existing and emergency exposure situation by members of the public, how to take initiative in cooperation with stakeholders that would reflect a local specificity, and how to provide volunteer groups with necessary technical knowledge and information.

In summary, the data generated within CITISTRA project can be useful to radiation safety regulators, local and national authorities and the whole public.

3. FAIR Data

Research team of the CITISTRA project respects the “FAIR” principles for data handling so that data will be findable, accessible, interoperable, and reusable to facilitate effective open science and sharing among researchers, stakeholders, and policymakers. Life cycle of data generated within CITISTRA project is schematically shown in Figure 1.

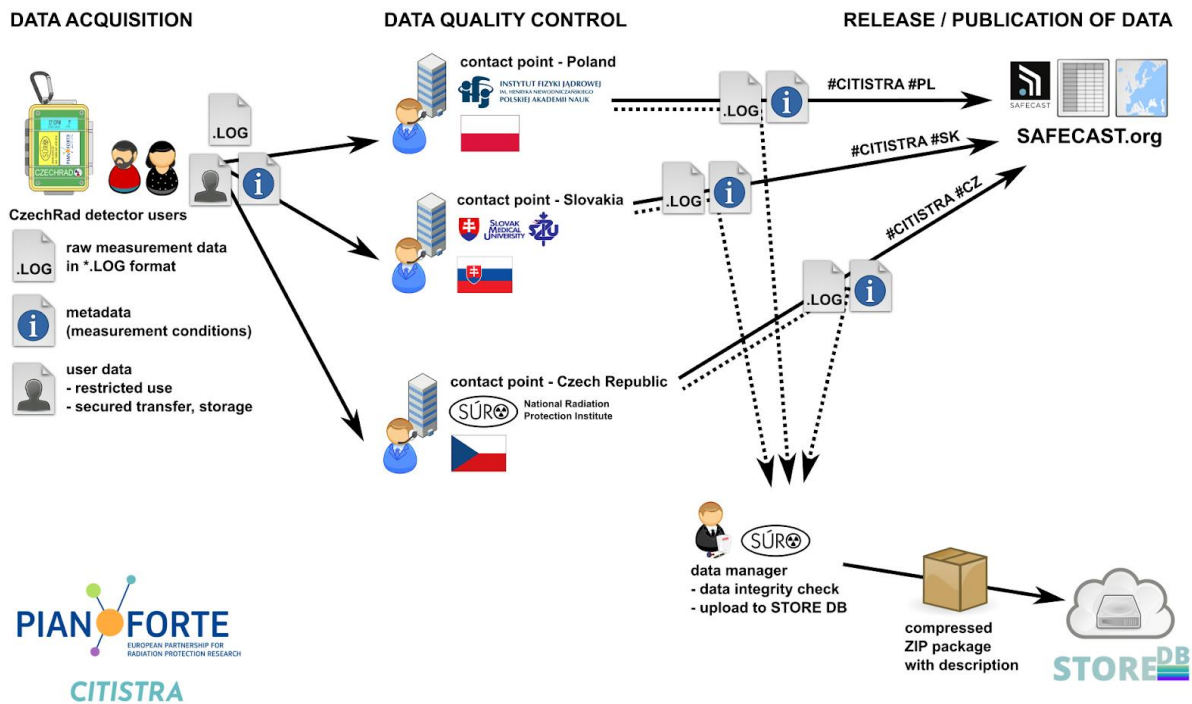


Figure 1. Life cycle of measured and personal data generated within CITISTRA project.

3.1 Making data findable, including provisions for metadata

In order for the data to be findable, CITISTRA will provide well-structured data information. Obtained results will be published in open access regime with a link to a permanent record. To make data findable, a list of all results will be published together with their metadata. We plan to deposit generated data in the public STORE database (administered by the German Federal Office for Radiation Protection, intended to provide a repository of primary data to support publications, protect data at risk of being lost to the community, and maintain legacy data and links to archives to facilitate systematic data sharing and archiving) as recommended by PIANOFORTE partnership. Individuals depositing data will be identified by Open Researcher and Contributor ID (ORCID). Data referenced in publications and reports will be linked via database accession identifiers STORE ID or DOI numbers assigned by the repository. Records in the repository database will be named using a simple naming convention including the number of the work package from which they were generated and versioning using the ISO8601 data format standard. We expect metadata and data or links to them to be available on a public repository database STORE for more than ten years and to remain available after the end of the project.

At the same time, measured dosimetry data will be published in the Safecast database opened to the general public worldwide.

3.2 Making data openly accessible

Data generated within CITISTRA will be deposited in STORE and Safecast databases. The project data will be deposited in STORE as data files or as references to accession numbers/DOIs for the data in other databases. Each dataset and data item will be assigned a persistent STORE ID and a DOI which can be used for reference.

Data will be available as soon as measured by CzechRad detectors, transferred to the researcher in each partner institution and then checked by appointed researchers in each partner institution

(contact point). Using hashtags as additional data identifiers in the SAFecast database will be used - “#CITISTRA” for all the data and possibly country IDs like “#CZ” “#SK” “#PL” to identify a particular project partner.

Data generated within CITISTRA project will be made publicly available also through the following means:

- Research papers published in Open-access regime;
- Open sharing of project results by means of oral or poster presentations at international and national conferences.

The restrictions to the data will be imposed for:

- Embargo until publication;
- Reasonable embargo until intellectual property issues are determined and resolved as specified in the PIANOFORTE guidelines and the individual contracts issues under the Open Calls;
- Proprietary data will be accessed by negotiation with the data holders and owners and by the establishment of licensing agreements;
- Personal data restricted by the General Data Protection Regulation (GDPR), privacy legislation and ethical considerations.

3.3 Making data interoperable

Expected data formats follow community norms and are compliant with generally available software (text editors, Excel, Word, PDF readers). CITISTRA will use standard vocabulary applied in physical sciences (ISO 80000 Quantities and units).

3.4 Making data re-useable

All data types obtained within CITISTRA will be reusable by other researchers and the public except personal data (name, contact information about citizens performing measurements). SÚRO is responsible for FAIR data management within the project. The SÚRO librarian will monitor the quality and integrity of data (files and documents) uploaded to the archiving platform STORE for sharing.

Most of the data generated by the project will be re-usable by any interested users after the possible embargo period specified above. The data will be available through the STORE database for a period of minimum ten years. Personal data will not be re-usable by third parties.

4. Allocation of resources

4.1 Estimating the costs for making data FAIR

Data management costs are expected to be limited. CITISTRA will use the STORE repository and Safecast database for publishing research data (no cost for service and data storage). The costs for data curation, validation and deposition are included in the costs of scientific WPs. The coordinator and principal investigators have personal responsibility for the curation of shared data. Institutional services and support for the implementation of local data management (librarian, IT) will be claimed as a part of the overheads of project partners in the Open Call.

4.2 Identifying responsibilities for data management

The coordinator and principal investigators have personal responsibility for the curation of data generated by the respective partner or generated in collaboration with other partners and data quality assurance. Institutional services and support for the implementation of local data management (librarian, IT) will be employed by project partners. SÚRO librarian as project data manager will be responsible for storing research data in STORE repository and for long-term data preservation.

4.3 The costs and potential value of long-term preservation

Data are intended to be stored preferentially on the STORE and Safecast databases. These databases are maintained without charge for the user. Therefore, the costs of long-term preservation are expected to be minimal and will be covered from the institutional support.

The main value of the long-term storage of the data relies in the fact that CITISTRA will generate in-field measurement series suitable for multiple analysis.

5. Data security and recovery

Data security and recovery fall into two categories: management of the public repository and local institutional data management. Data stored in STORE repository are dynamically mirrored at other geographically distant locations and are frequently backed up. Local data security will be assured by SÚRO. All data will be moved to SÚRO with encryption using Transport Layer Security (TLS) over the deprecated Single Sockets Layer (SSL) to maintain transmission security using HTTPs or SFTP. SÚRO uses a data backup system to own storage space and to long-term archiving (see Figure 1). The system has multi-level security, both software and physical. Sensitive personal data is secured in accordance with the cyber law and the GDPR law valid in the Czech Republic.

Part of the data will be stored on institutional databases. Each partner institution has its own policy for data management and security. Personal data will be stored in compliance with the relevant national regulations also in conformity with EU-based ISO standards. Such data will not be kept on unencrypted workstations, laptops or other media.

6. Ethical and legal issues

All consortium partners will conform to the international, European and national legislations in all aspects of the research and ensure that legal and ethical requirements are fulfilled. The ethical standards of guidelines of Horizon Europe as described in the European Code of Conduct for Research Integrity (ALLEA, 2017) will be rigorously applied, regardless of the country in which the research is carried out.