

ECOFFRAME

European **CO**mmon **FRAME**work for Operational
Scientific Data in RWM

WP Board:

TSO: Nadja Zeleznik, EIMV, Nataline Simon, ASNR

WMO: Marie-Anne Bruneaux, Andra

RE: Camelia Ichim, RATEN, Matej Gedeon, SCK CEN

CS: Gauthier Fontaine, NTW



*Co-funded by the European Union under
Grant Agreement n° 101166718*



CONTEXT AND MOTIVATION

- Radioactive waste management $\Rightarrow$ **large and heterogeneous datasets**
 - *Site characterisation, monitoring, laboratory investigations, modelling, facility design and safety assessment activities*
 - *Over many decades, often by multiple organisations and generations of experts*
 - *Several purposes and involved stakeholders*
- Data management: More attention to ensure that future users can understand how data were generated, processed, interpreted and ultimately used to support safety-related decisions
 - *Risks for transparency, reproducibility, knowledge transfer and regulatory confidence*
- Useful foundations through international programs (EURAD-2 KM, OECD/NEA WP-IDKM etc.)
 - *Still no common European approach for showing how scientific data are produced, checked, interpreted, preserved and used in radioactive waste management decisions*

OBJECTIVES OF ECOFRAME



Develop a common European reference approach for the traceable lifecycle management of operational scientific data, supporting their long-term usability and use in safety-related decisions, in line with FAIR principles

Strategic Study on Scientific Data Management in RWM



**Data lifecycle &
Traceability models**



**Societal & ethical
involvement**

*Civil society, humanities and social
sciences, cognitive biases*

EXPECTED ACHIEVEMENTS



Practical recommendations for scientific data lifecycle management, decision traceability and inclusive data governance

Supporting the long-term usability, preservation and reuse of operational scientific data across RWM



Common reference data models, metadata structures and interoperability requirements

Including requirements for metadata, data provenance, traceability and quality assurance



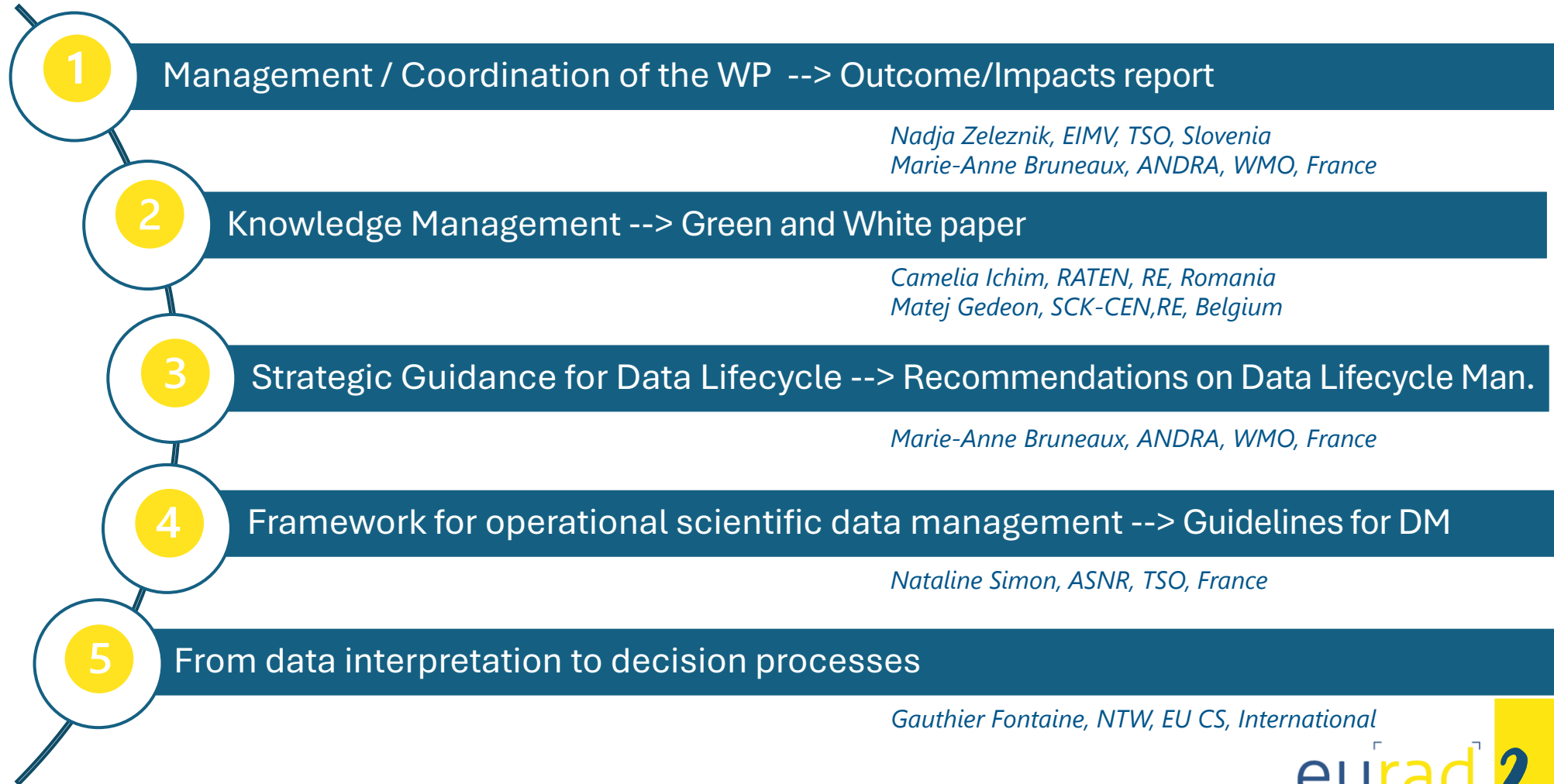
Guidance on data governance, stakeholder engagement and decision traceability

Assessing how human, organisational and governance factors influence data interpretation and safety-relevant decision-making

A common European reference framework and practical guidance for managing operational scientific data in RWM

- ✓ *A tested approach demonstrated through realistic scenarios including incomplete or degraded data*
- ✓ *Societal and governance validation*
- ✓ *Including technical experts, social sciences researchers and civil society representatives*

WP TASKS' BREAKDOWN

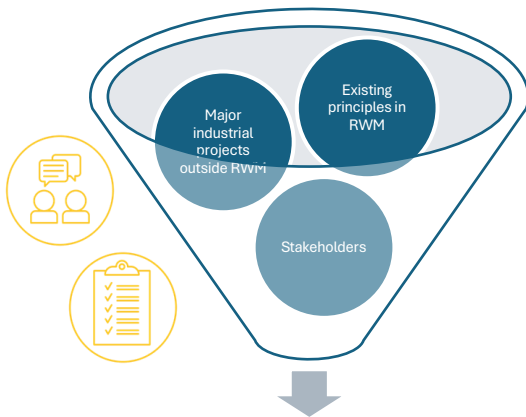


Task 3 - Strategic guidance for data lifecycle

3.1. Analysis of existing operational scientific data lifecycles: building on lessons learned

3.2. Establishing strategic guidance for operational scientific data lifecycle

3.3. Application to scenario exercises



Benchmark current operational data management practices

Identify good practices, gaps and long-term risks

Survey and interview RWM stakeholders

Analyse data curation, validation, traceability and preservation



Recommendations for data lifecycle management

- Dataset curation and validation
- Data governance
- Data catalogues and lineage
- DMP/QMP



Domain-specific recommendations



Test and challenge the proposed guidance through realistic scenarios



Workshop with participation of stakeholders



Scenario exercises



Recommendations for dataset curation and validation

Task 4 - Framework for operational scientific data management

4.1 Mapping of Operational Data Practices and Reference Dataset Inventory



4.2 Design of a Common European Operational Data Framework and Reference Data Model



4.3 Framework validation through European data use cases and stakeholder review



4.4 Framework Deployment, Access and Governance Strategy

Establish a representative dataset inventory and reference data model supporting the design of the framework

Common European operational data framework

Testing and challenging the proposed framework through realistic scenarios

Practical conditions and guidelines for the deployment, accessibility, governance and long-term maintenance



- Inventory of datasets for framework design
- Translation of lifecycle principles into framework requirements
- Reference data model
- Framework-oriented constraints and requirements



- Framework architecture and database structure
- Shared data dictionary and metadata framework
- Reference conventions and data quality mechanisms
- Unique dataset identification system



Workshop with participation of stakeholders



Validation exercises

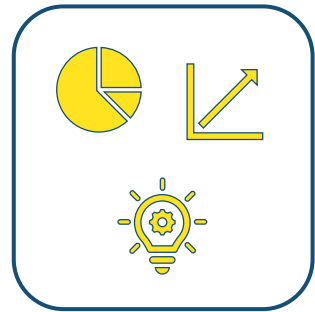


Technical validation (Does it work ?)
Operational validation (Is it useful ?)

- Practical options for hosting, sharing and accessing the framework
- Defining procedures for update and maintenance mechanisms

Task 5 - From data interpretation to decision processes

Operational scientific data



Safety-relevant decisions



Technical aspects



Governance factors

Organisational factors

Human factors

Cognitive bias

*Influence on interpretation and decision-making
Practical measures for strengthening confidence,
transparency and reproducibility*

5.1 Scenario definition and dataset selection

- Representative operational scenarios for safety-relevant decision-making
- Reconstruct data-to-decision pathways
- Identify critical decision points, information losses and potential biases
- Map key stakeholders and their roles, responsibilities and interactions



Surveys, meetings and a **multi-actor workshop**

5.2 Scenario-based analysis and extraction of strategic insights

- Analyse how data, models, and stakeholders are interacting in safety-relevant decision-making
- Art of social sciences research linked to data selection and interpretation
→ Human, organizational and governance factors
- Evaluate traceability, transparency and reproducibility of data-to-decision processes



Scenario exercises,
stakeholder seminars and
targeted feedback sessions

eu[r]ad 2

WP PARTNERS

Task	Leader	Sub-task	Leader	Partners/Contributors
1. Management / Coordination of the WP	EIMV Co-lead: ANDRA			RATEN, ANDRA, ASNR, SCK CEN and NTW
2. Knowledge Management	RATEN Co-lead : SCK CEN	2.1	RATEN	EIMV, ANDRA, ASNR and NTW
		2.2	SCK CEN	
3. Strategic Guidance for Data Lifecycle	ANDRA	3.1	HUN-REN EK	HUN-REN EK, GTK, EGIS, Andra, NTW, SSTC NRS, SURO, CIEMAT Additional contributions: [EIMV, ASNR, UNIPi, UTARTU, FTMC, SOGIN, BGE, SCK CEN, BASE, RATEN, MERIENCE]
		3.2	ANDRA	Andra, BGE, EGIS, SSTC NRS, SURO, ASNR, HUN-REN EK, RATEN, EIMV Additional contributions: [NTW, UNIPi, UTARTU, FTMC, SCK CEN, BASE, CIEMAT, GTK, MERIENCE]
		3.3	RATEN	RATEN, NTW, Andra, EIMV, ASNR, SOGIN, UNIPi, MERIENCE, UTARTU, FTMC, SCK CEN, HUN-REN EK Additional contributions: SSTC NRS, SURO, EGIS, BASE, CIEMAT, GTK, BGE
4. Framework for operational scientific data management	ASNR	4.1	GTK	SCK CEN, GTK, SSTC, EIMV, UTARTU, SURO, ASNR, CIEMAT Additional contributions: HUN-REN EK
		4.2	ASNR	UNIPi, SSTC, GTK, ANDRA, ASNR, TUS, CIEMAT, SURO Additional contributions: SCK CEN, EIMV, BASE
		4.3	UNIPi	UNIPi, SCK CEN, UTARTU, NTW Additional contributions: SSTC NRS, HUN REN EK, EIMV, ASNR, ANDRA, BASE
		4.4	HUN-REN EK	HUN-REN EK, CIEMAT, UTARTU, ASNR, GTK Additional contributions: EIMV, TUS
5. From data interpretation to decision processes	NTW	5.1	UTARTU	AGES, ANDRA, ASNR, CEPN, EIMV, HUN-REN EK, GTK, MERIENCE, NTW, RATEN, SOGIN, SSTC NRS, SURO, UTARTU
		5.2	CEPN	AGES, ANDRA, ASNR, CEPN, EIMV, FTMC, HUN-REN EK, GTK, MERIENCE, NTW, RATEN, SCK CEN, SOGIN, SSTC NRS, UTARTU



THANK YOU FOR YOUR ATTENTION!