



WP7 Innovations in cemented waste handling and pre-disposal storage

WP7 WEBINAR

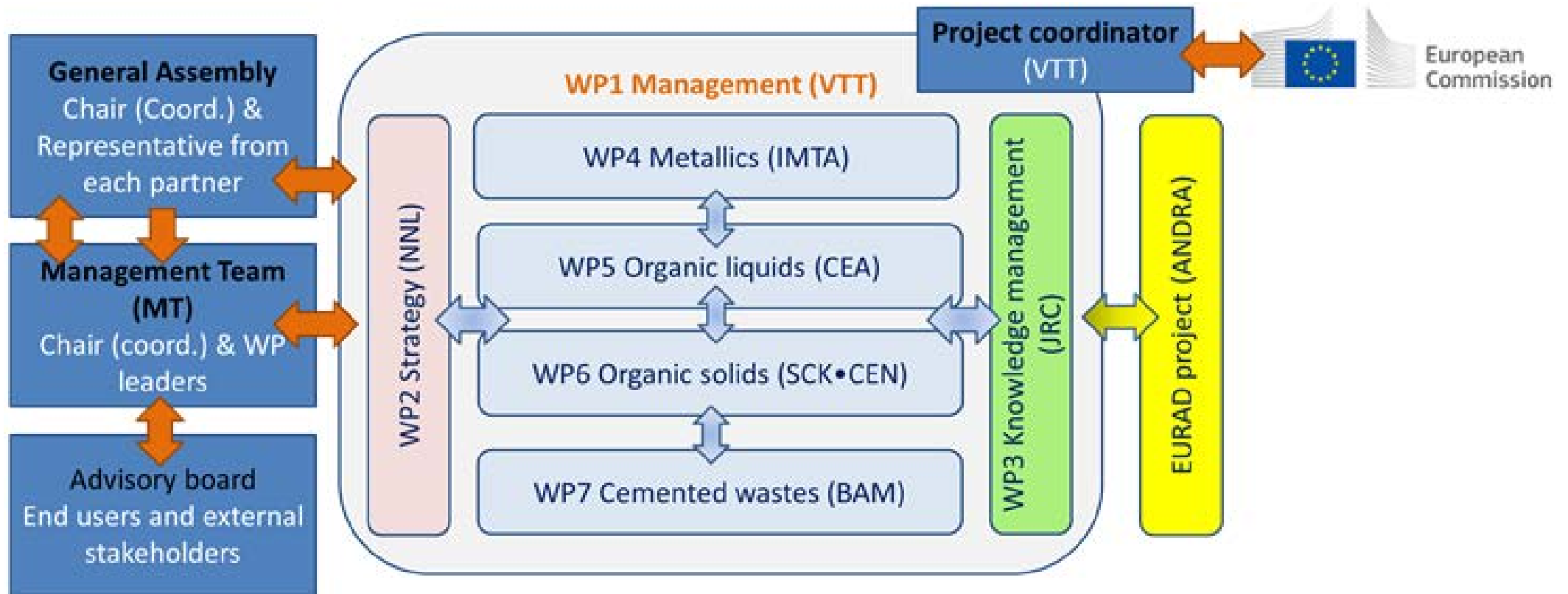
JAN 10TH 2021

ERNST NIEDERLEITHINGER & ALL WP7



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 945098.

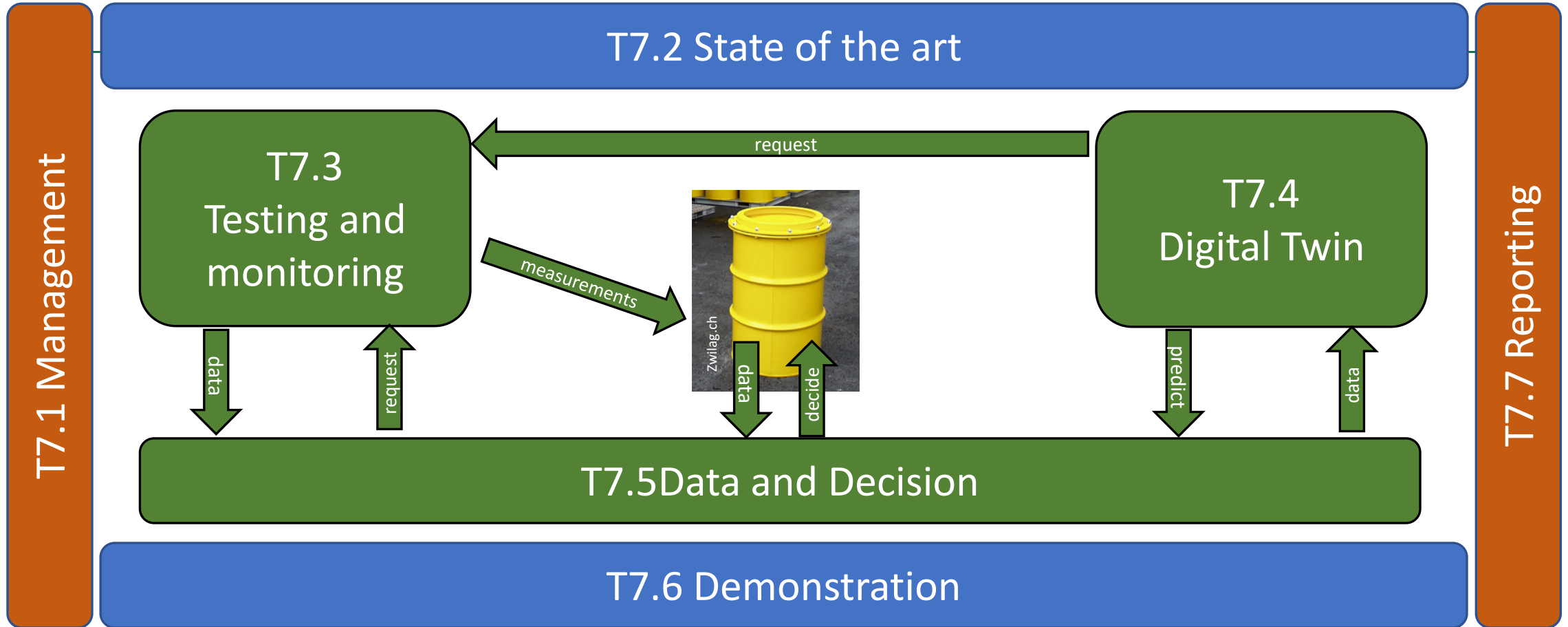
PREDIS and WP7



WP7 Objectives

- Compile information about the **state of the art** of current methods and procedures for cemented waste management with specific focus on monitoring/long-term storage
- Identify, evaluate and demonstrate store and package **quality assurance (mainly NDE) and monitoring** technologies
- Adapt and demonstrate **digital twin** technology
- Develop and demonstrate methods for **data handling incl. decision framework**
- Identify opportunities for increased **store automation**, reducing human exposure to radiation
- Identify options for **post treatment** of packages and potential approaches to **improve package** design, construction and maintenance.

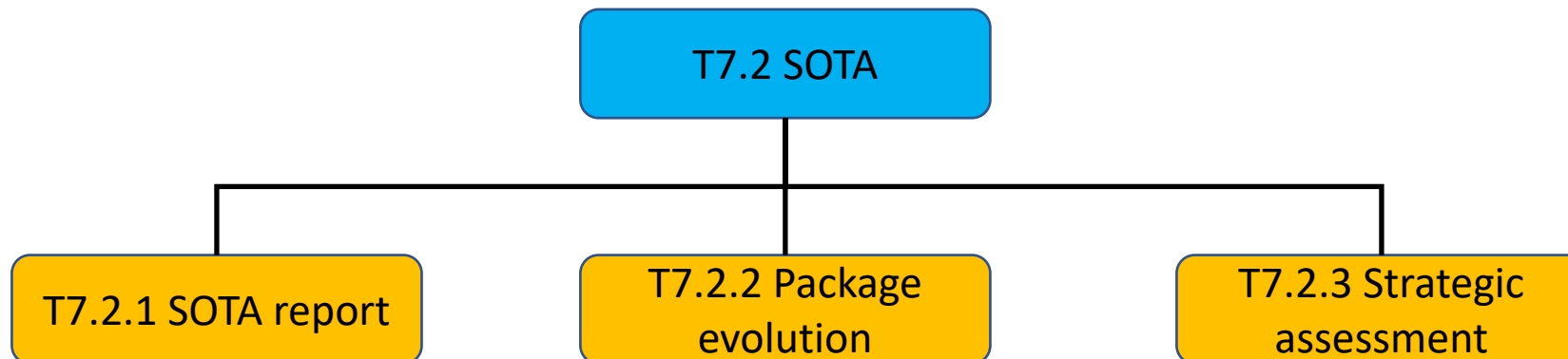




Task 7.2 State of the art

T7.2 State of the art in packaging, storage, and monitoring of cemented wastes (GSL, SOGIN, NNL, BAM, PSI, Orano, UJV) (M1-M42)

- Task leader: Slimane Doudou, GSL
- Aim is to provide context for tests and demonstrations on cemented packages to be carried in subsequent tasks
- 3 subtasks



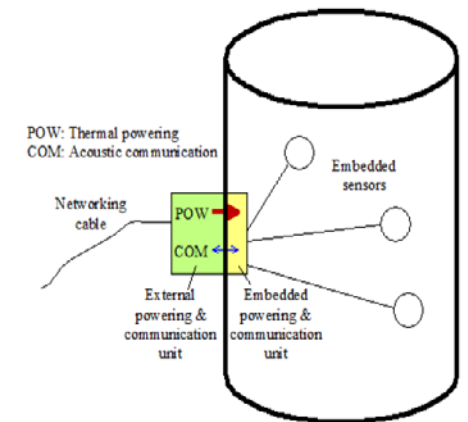
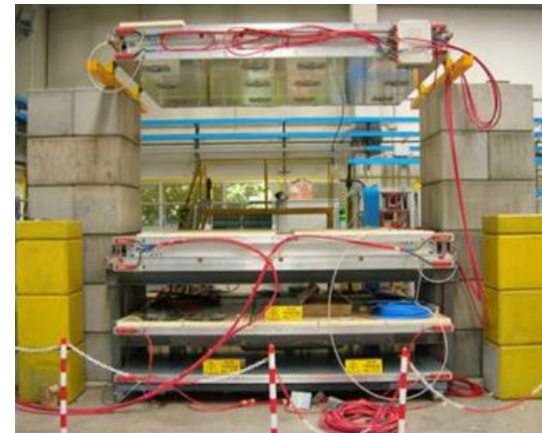
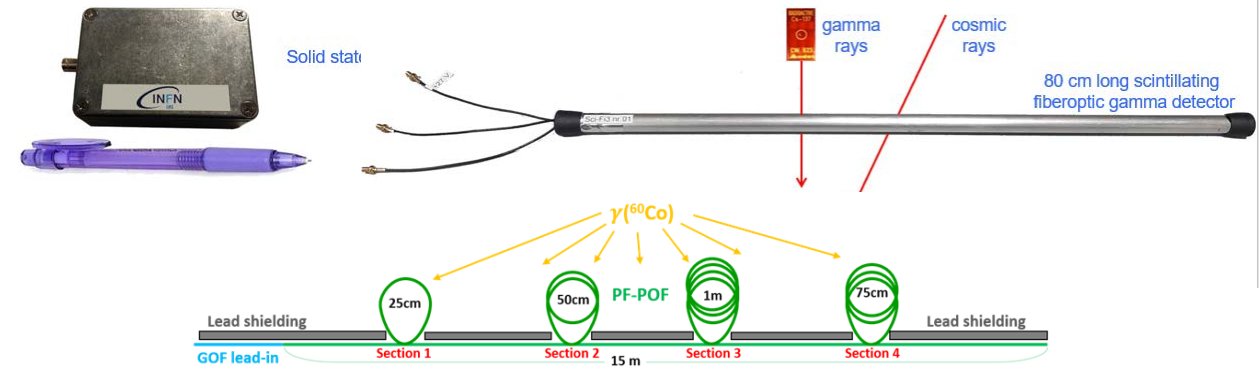
Task 7.3 Testing and Monitoring

Task leader:
Ernst Niederleithinger
with Tyler Oesch
BAM



T7.3 Innovative integrity testing and monitoring techniques (BAM, INFN, MAGICS, UJV, VTT, UNIPI) (M3-M42)

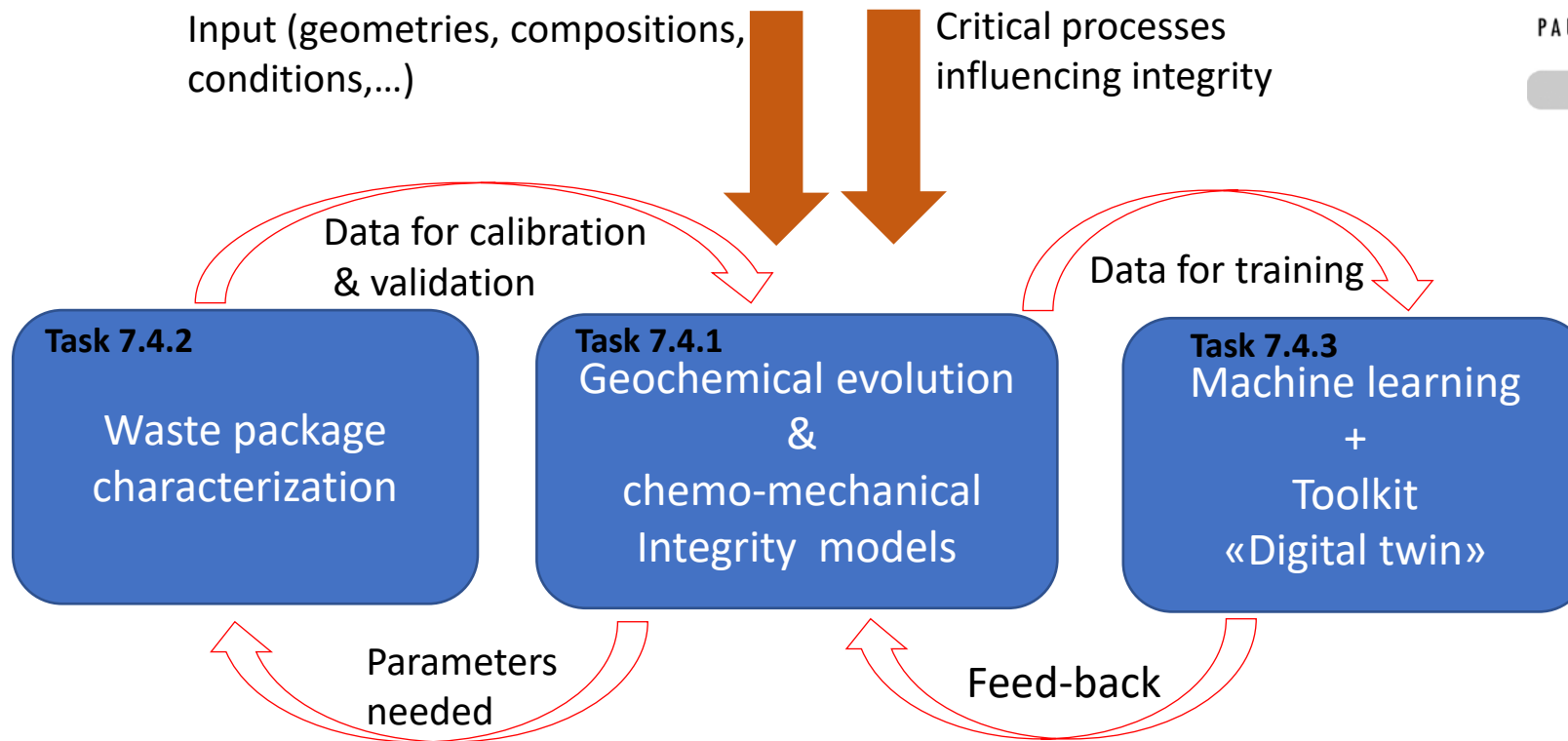
- Subtask T7.3.1 External sensing technologies (BAM, INFN) (M3-M42)
- Subtask T7.3.2 Embedded sensing technologies in an instrumented package (BAM, MAGICS, UJV, VTT, UNIPI) (M3-M42)
- Subtask T7.3.3 Preliminary system testing and optimisation (UJV, BAM, VTT, UNIPI) (M12-M42)



Task 7.4 Digital Twin

T7.4 Digital Twin (PSI, NRG, BAM, KIT-INE, Amphos-21, SCK•CEN, MAGICS) (M3-M42)

Task leader:
Jan Tits, Wilfried Pfingsten

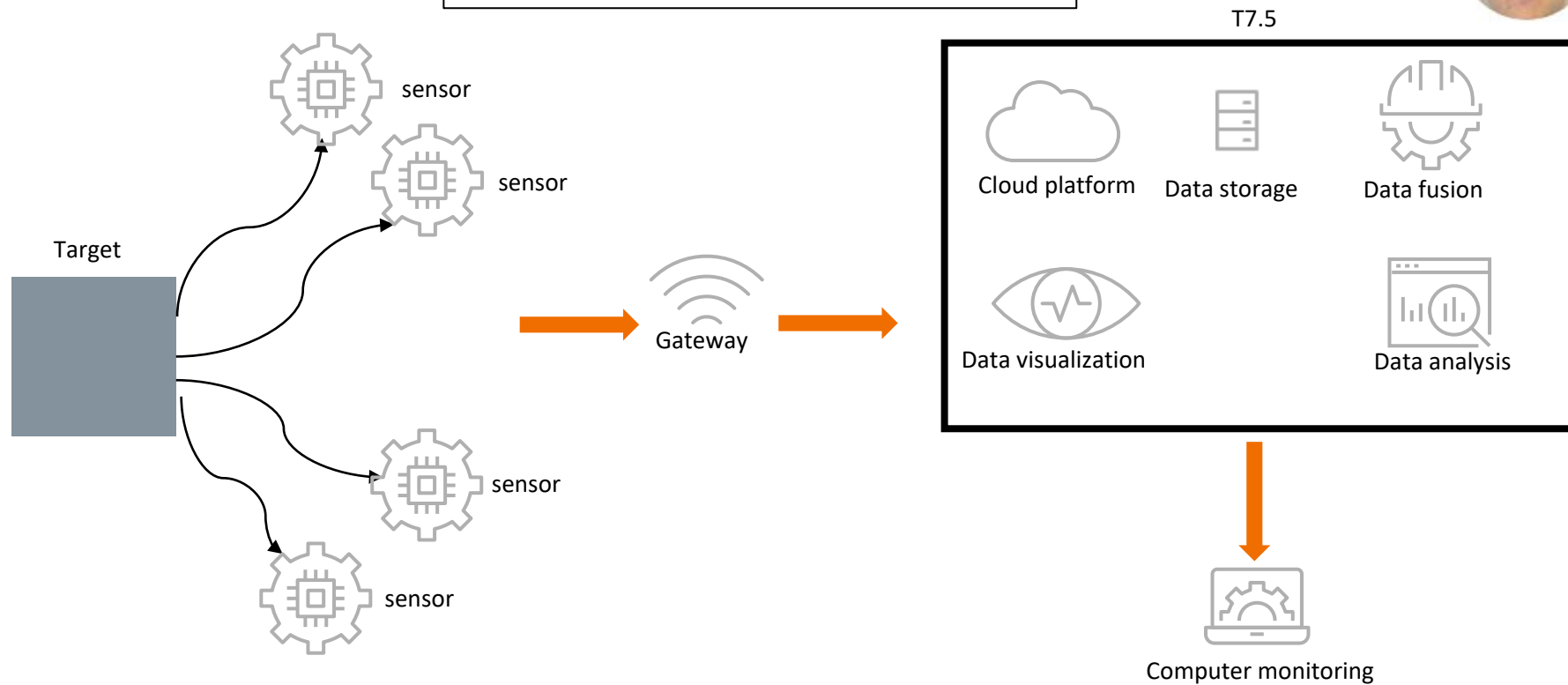


Task 7.5 Data processing handling and fusion

T7.5.1 Data handling, processing and fusion platform
T7.5.2 ML and advanced signal processing
T7.5.3 Decision framework



Task leader:
Tuomas Koskinen (VTT)



Task 7.6 Demonstration and implementation

T7.6 Demonstration and implementation of monitoring, maintenance, and automation/digitalisation techniques (Orano, SOGIN, INFN, NNL, VTT, UJV, UNIPI, IFE, BAM) (M3-M48)

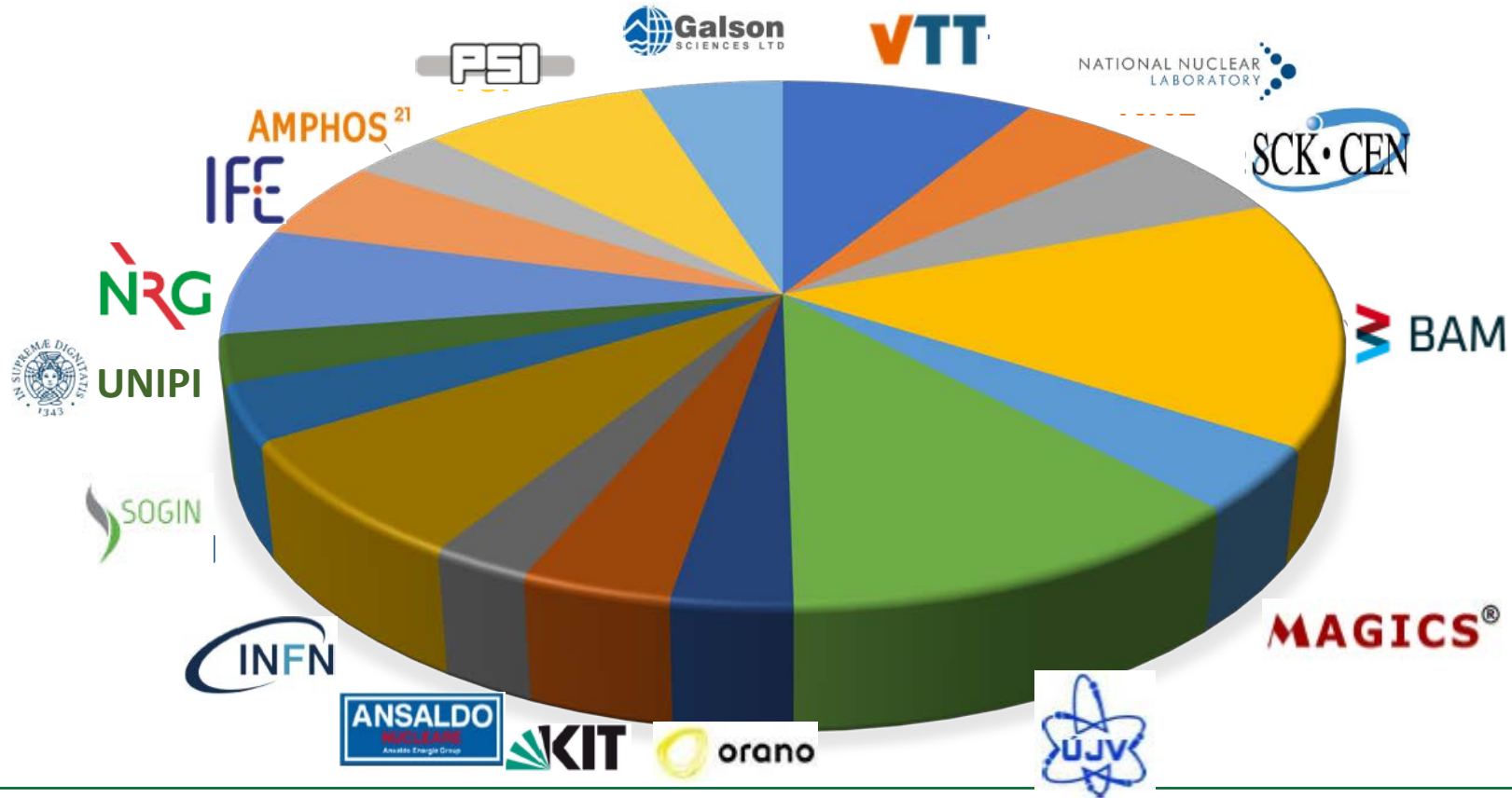


- **Subtask T7.6.1 Evaluation of technologies and developed systems from an end-user perspective** (Orano, SOGIN, INFN) (M3-M48)
 - Develop a waste package prototype for performing large-scale trials,
 - choose and evaluate the most relevant and promising NDE/sensing techniques, and optimize consolidating chemical post-treatment technology to decrease permeability and minimize radionuclide migration and release
- **Subtask T7.6.2 Demonstrating systems and methods** (NNL, Orano, SOGIN, VTT, UJV, UNIPI, BAM, INFN) (M31-M48)
 - Implement the experimental set-up defined in Subtask 6.1,
 - Select the technologies to be validated,
 - perform a series of full-scale trials in a realistic testing environment
- **Subtask T7.6.3 Definition of potential mitigation actions and design improvements** (NNL, UJV, Orano, SOGIN) (M24-M48)
 - Proposal of improved designs that eliminate any weak points identified during the course of the project and conceptual design for the use of the project results in automatized store concepts

Task leader
Sabah Ben Lagah
(ORANO)



WP7 participants and budget share (PM)



Work Package 7 Impacts

- **More versatile and reliable condition monitoring technologies**, which have been demonstrated on operating radioactive facilities and made available to end users
- **Improved accuracy in predicting the behaviour of waste/packages** in stores through the integration of models with store and package monitoring information obtained using digital and machine learning technologies to enhance sampling, monitoring strategies and multi-method data fusion
- **Increased safety**: reduction of exposure time to personnel connected to remediation activities, reduction of risk of RN dispersion (locally or to the environment), gaining local stakeholder trust
- **Reduced cost** (20% or greater reduction in costs related to late-stage detection of damage or deterioration within waste packages)
- **Minimised environmental footprint** resulting from optimised treatment, packaging and store operations.