Interreg
Co-funded by the European Union
North-West Europe

BEPROACT

Building an Ecosystem to PROACTively develop data-driven asset management

- ➤ Built environment
- ➤ Highway pavement
- ➤ Bridge infrastructure
- ➤ Intelligent transport system
- ➤ Water system
- ➤ Waste water treatment

Innovation and resilience

11 partners from BE, DE, FR, IE, LU and NL
Cooperating from 2023 - 2027

EU funding
€6,1 million

Total project budget
€10,2 million

Objectives

BEPROACT aims to revolutionize critical infrastructure by transforming it into 'talking assets'. This innovative approach will equip organizations with the means to assess the health status of infrastructural assets more accurately. This improves maturity and decision making in Asset Management. And prolong these assets' lifespan, preventing failure, upgrade the profession of maintenance engineers and ultimately reducing maintenance costs.

beproact.nweurope.eu

Leadpartner: Rijkswaterstaat
Project management
Raymond Feron & Natalie Oonk

1

BEPROACT Partners

Interreg
North-West Europe
Co-funded by the European Union

BEPROACT

Rijkswaterstaat
Ministry of Infrastructure and Water Management

RÉGION BOURGOGNE FRANCHE COMTÉ

Comhairle Cathrach Bhaile Átha Cliath
Dublin City Council

Die Autobahn

FLANDERS ENVIRONMENT AGENCY

bast
Bundesanstalt für Straßenwesen

LUXEMBOURG INSTITUTE OF SCIENCE AND TECHNOLOGY | LIST

RTC Water
Real Time Control of Water Infrastructure

Université de Lille
1 SCIENCES ET TECHNOLOGIES

TNO innovation for life

GEOSPARC

Associated Partners

Glasgow CITY COUNCIL

US Army Corps of Engineers

Doubs le Département

TU/e Technische Universiteit Eindhoven University of Technology
Where innovation starts

ARNiA
Agence régionale du numérique et de l'intelligence artificielle

SIDEN
Syndicat Intercommunal de Dépollution des Eaux résiduaires du Nord

Goals & main outputs

BEPROACT: providing innovative transnational solutions to address the urgent common challenges faced of "Aging critical Infrastructure".
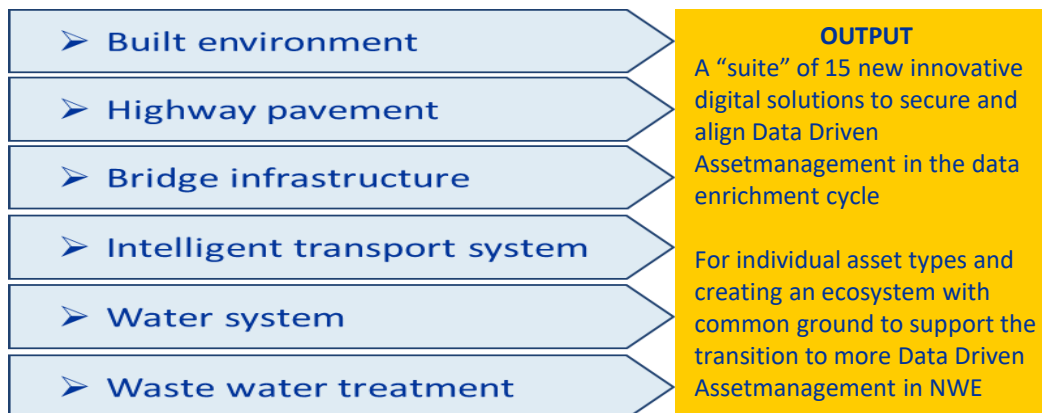
SMART Strategy
  ➢ how to transform to more pro-active and Data driven Asset Management

SMART Assets
  ➢ a "suite" of solutions to support organisations to improve asset management of their individual asset types.

SMART People
  ➢ open and re-usable knowledge products and training material to increase human capital

➢ Built environment

➢ Highway pavement

➢ Bridge infrastructure

➢ Intelligent transport system

➢ Water system

➢ Waste water treatment

OUTPUT

A "suite" of 15 new innovative digital solutions to secure and align Data Driven Assetmanagement in the data enrichment cycle

For individual asset types and creating an ecosystem with common ground to support the transition to more Data Driven Assetmanagement in NWE

BEPROACT:
full coverage of regional as well as national/cross-border infrastructure.

SMART STRATEGY & SMART PEOPLE

Interreg
North-West Europe

Co-funded by
the European Union

BEPROACT

WP 1: SMART STRATEGY

CURRENT STATE Assetmanagement

Joint Strategy development

| Transnational, regional & cross sector requirements | Benefits & value calculation | Business Transformation Framework | Asset management MODELS | Implementation STRATEGY (organisation & assets types) |

FUTURE STATE

More Data driven Assetmanagement

WP 3: SMART PEOPLE

Training schemes

Digital Transformation & digital expertise built up

| Knowledge products & user manuals | TRAINING „see what can be done SMART" | Boost Stakeholder Readiness Level | Human capital built up |

HUMAN CAPITAL

Ready for Data driven Asset management

Pilot case portfolio POSTERS

https://beproact.nweurope.eu/posters-1

- ➢ Built environment
- ➢ Highway pavement
- ➢ Bridge infrastructure
- ➢ Intelligent transport system
- ➢ Water system
- ➢ Waste water treatment

BEPROACT Roadmap
Action plan for pilot case development

Interreg
North-West Europe

Co-funded by the European Union

BEPROACT

- Built environment
- Highway pavement
- Bridge infrastructure
- Intelligent transport system
- Water system
- Waste water treatment

Test & Validate
In real life conditions at
Asset location

Development
Proof of Concept
Minimal Viable Product
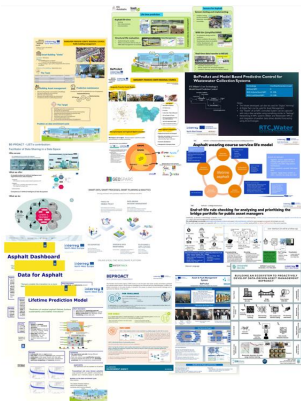
Definition of new
data driven services

OUTPUT

A "suite" of 15 new innovative digital solutions to secure and align Data Driven Assetmanagement in the data enrichment cycle

For individual asset types and creating an ecosystem with common ground to support the transition to more Data Driven Assetmanagement in NWE

- Implementation strategy
- Cross domain and transnational potential
- Business model for uptake
- Training material for upskilling
- Apply stakeholder readdiness tool
- Roadshow & pilot trainings

- Transnational cooperation
- Co-creation workshops
- Business case
- Demonstration & round table events
- Diary of successfull demo's

- Pilot case project plans
- Co-creation workshops
- Requirements & scope
- Pilot case posters & pitches
- Partner & ecosystem MAP

Communication and ecosystem development

2023   2024   2025   2026   2027

BEPROACT

WP1 Maturity Assessment

WP2 Best practices for implementation and training (Demo sessions, expert communities)

WP1 higher maturity of the organization

WP3 Organisation is ready for more data driven asset management with new skills

- Built environment
- Highway pavement
- Bridge infrastructure
- Intelligent transport sys
- Water system
- Waste water treatment

Pilot case DEMO sessions

Training material & online user manuals

Training Recipients & co-creation

Pilot trainings for upskilling

Expert communities & groups

WP2 "Toolbox" with 15 pilot case services and knowledge products for 6 asset types, supported by user manuals and training material.

Measurement of current performance
Real time tagging of data
Cleaning and structuring of data from multiple sources
Smart data analysis for correlations
Model based analysis of data and root causes
Assessment of current technical status asset

Prediction of remaining useful technical lifecycle
Prediction of future development
Combining with financial/business criteria
Recommendations for actions

Planning of actions
Standardized training of staff
Actions in workflow management system
Execution of maintenance/operations actions
Logging of maintenance/operations actions
Evaluation of effectiveness actions
Enhancing service operations

Measurement of current performance

Prediction of remaining useful technical lifecycle

Business decision making

Evaluation of effectiveness actions

Measurement and prediction of technical lifetime
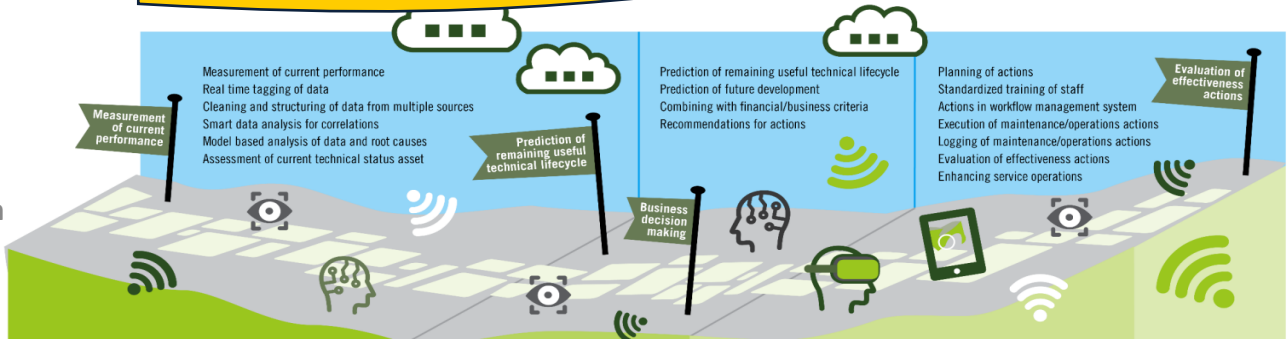
Projection on organisation en human reasources

SMART DATA   **SMART WORK**   **SMART PEOPLE**   **SMART BUSINESS**

The data-enrichment cycle
Pilot portfolio & cross domain themes

Interreg North-West Europe

Co-funded by the European Union

BEPROACT

SMART DATA

Measurement of current performance
Real time tagging of data
Cleaning and structuring of data from multiple sources
Smart data analysis for correlations
Model based analysis of data and root causes
Assessment of current technical status asset

Measurement of current performance

Prediction of remaining useful technical lifecycle
Prediction of future development
Combining with financial/business criteria
Recommendations for actions

Prediction of remaining useful technical lifecycle

SMART BUSINESS

Planning of actions
Standardized training of staff
Actions in workflow management system
Execution of maintenance/operations actions
Logging of maintenance/operations actions
Evaluation of effectiveness actions
Enhancing service operations

Evaluation of effectiveness actions

Business decision making

Data capturing & analysis

SMART WORK   cision making

SMART PEOPLE   and ev

- ➢ Pilot case (s) Asset type Built environment
- ➢ Pilot case (s) Asset type Highway pavement
- ➢ Pilot case (s) Asset type Bridge infrastructure
- ➢ Pilot case (s) Asset type Intelligent Transport system
- ➢ Pilot case (s) Asset type Water system
- ➢ Pilot case (s) Asset type Waste water treatment

Joint strategy development

Machine learning

Drones: inspect, repair, predict

Training and implementation

BEPROACT

Search for synergies, cross domain or transnational cooperation

- Invitation for follow-up with 1 or more partners, e.g. specific pilot case Demo sessions or cross domain working group on Machine Learning and Drones

- Invitation to roadshow in 2025/2026

- ???

BEPROACT

Pilot case definitions

Built Environment (A.2.2)
Definition of new service

Pilot Solution: Smart building management platform to centrally monitor buildings, analyze data and define predictive maintenance plans to optimize energy use, costs and user experience. The solution will comprise the following services: 1) remote monitoring of technical infrastructure and equipment, 2) Energy consumption dashboard, 3) vehicle movement tracker and 4) room occupancy detection. The solution will be tested on one representative building (Viotte).

Highways (A.2.3)
Definition of new service
More details on next page

Pilot solutions (5x)
1. Lifetime model for residual lifetime a) top layer b) structural layer capacity
2. Sensors for a) surface and course layers b) detection of heavy goods based on weight in motion
3. Dashboard for decision support a) multiyear maintenance planning of pavement replacement, b) prediction of short term surface damages and c) waranty checking and register.

Bridge Infrastructures (A.2.4)
Definition of new service

Pilot solution: Rapid, Accurate, Explainable Bridge Portfolio Analysis. Development of a rule checking model for assisting the prioritization process of Rijkswaterstaat. The model will by developed as Proof of Concept for a selected bridge type and run on a number of bridges, with rule checking, critical objects and underlying reasons. In later phase the POC can be presented to other partners and other asset types.

Intelligent Transport Systems (A.2.5)
Definition of new service

Pilot solution: Dynamic fault assessment of the DCC Asset & Fault Management System (AFMS). The AFMS contains hundreds of ITS assets on the streets of Dublin. It is a real time data driven fault management system, connecting faults with the appointed contractors. Newly developed services are: 1) Data analysis of snapshots of the AFMS to identify patterns, trends and anomalies, 2) develop and train Machine Learning models to predict faults, maintenance needs and lifecycle stages of assets, 3) Generate actionable insights to make informed decisions in Asset management and prioritise resource allocation, 4) Implement a predictive maintenance system to optimize & reduce downtime.

Water system (A.2.6)
Definition of new service

Pilot solution: Advanced methodology, technology and data-driven services, hence a data-driven asset management approach, in order to operate the MPS more effectively and efficiently while safeguarding the water system. Our final goal is to monitor and safeguard surface water quality with a data-driven approach with three new services: 1) Deploying a smart dynamic alert system, 2) Tracing pollution source in case of a critical alert, both upstream and downstream, 3) Optimizing the lifetime of the multi parameter probes.

Waste water system (A.2.7)
Definition of new service

Pilot solution: Advanced Asset management in sewage system using data mining, parameter evaluation and reporting. The following new services will be developed: 1)"low level" parameter evaluation and reporting, pump and valve performance, comparisons between set-points and realized actions, 2)"Intermediate level" parameter evaluation and reporting, infiltration rates, wastewater generation per population per structure, 3)"High level" parameter evaluation and reporting, load calculations from water usage/wastewater production and rain-data.