FOURIER

InnOvative ArtiFicial IntelligencE methodologies for monitoRing and maintaining large scale complex infrastrUctures and obtaining greener, more Resilient and smart societies

D4.1 Website

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Disclaimer

Acronyms and Abbreviations

Acronym/Abbreviation	Meaning
AI	Artificial Intelligence
CI	Critical Infrastructure
DC	Doctoral Candidates
WP	Work Package

Table of contents

List of Figures

1 Executive summary

The FOURIER Project (Project No. 101169429), funded by the Marie Skłodowska-Curie Actions, unites 19 partners across academia, industry, and key stakeholders to drive innovation in digital inspection and smart infrastructure management. With a strong multidisciplinary foundation - spanning civil engineering, computer science, sensing technologies, emergency management, social sciences, and applied mathematics - the project aims to revolutionize the monitoring and management of critical infrastructure (CI).

At its core, FOURIER delivers 15 PhD research projects across 8 European countries, offering a rich, interdisciplinary training environment. These doctoral positions include secondments with both academic and non-academic partners in Italy, The Netherlands, Austria, Germany, Portugal, Croatia, Greece, and Switzerland, ensuring practical exposure and cross-sector collaboration.

Key innovations emerging from the project include:

- AI-driven technologies for intelligent automation and decision-making
- Big data analytics and multimodal data fusion for deeper infrastructure insights
- Augmented reality (AR) tools for enhanced inspection and visualization
- Policy recommendations to shape future EU infrastructure strategies
- Advanced training frameworks to empower the next generation of researchers
- Resilience management strategies for sustainable, future-ready systems

This document is a deliverable of Work Package 4 (WP4), dedicated to the development and organization of the FOURIER project website. It outlines the website's structure, key features, and core functionalities, highlighting its role as a central platform for information dissemination, stakeholder engagement, and visibility of project activities. The following sections provide a comprehensive overview of how the website supports communication and collaboration across the project's diverse network of partners and audiences.

2 Introduction

This deliverable focuses on the development of the FOURIER project website, which serves as a central hub for the dissemination of information related to the project. The website is designed to inform visitors about the details and objectives of the doctoral positions, as well

as to promote upcoming summer and winter schools, workshops, industrial days, conferences, and engagements with infrastructure operators and policymakers.

In addition, the platform will highlight the project's commitment to multidisciplinary training for both researchers and the general public, supporting skill development, knowledge transfer, and cross-sector collaboration. Developed comprehensive Massive Open Online Course (MOOC) will also be promoted, offering microcredentials to participants. The course will highlight the importance of climate resilience in the context of sustainable critical infrastructure, while actively fostering the growth of an engaged and informed community of practitioners.

The website will be continuously updated, improved, and promoted throughout the duration of the project to ensure the content remains current and reaches a broad audience. It will also host a public repository of the project's journal publications, lecture notes, video courses, conference and workshop presentations, and other training materials, providing an accessible platform for knowledge sharing within and beyond the project network.

3 FOURIER Website

The FOURIER website (https://fourier-msca.eu) serves as a central platform for collecting and sharing the most relevant information about the project, including its goals, structure, key activities, and public deliverables. It is designed to ensure ongoing visibility and engagement throughout the project's lifetime and will be continuously updated with news and contributions from members of the Consortium.

This is the initial version of the FOURIER website, which will continue to evolve and be adapted as the project progresses.

3.1 Website structure and content

The website is managed by Infra Plan Consulting, a partner participates in Work Package 4 (WP4), and plays a key role in the project's communication and dissemination strategy.

The current version of the website consists of the following eight sections as pages:

1. Home
2. About Us
3. Research

4. Open Positions
5. Partners
6. People
7. News
8. Results
9. Contact

The following subsections provide a more detailed overview of each section, along with selected screenshots to illustrate the structure and design.

3.1.1 Home

The Home page of the FOURIER website is designed to immediately convey the core essence of the project: AI-driven innovation in critical infrastructure. It features the project logo, which also serves as a clickable link back to the homepage, and a top navigation menu that provides access to the website's eight main sections. The page offers a clear and engaging introduction to the project, presenting its vision, key objectives, and funding support from the Marie Skłodowska-Curie Actions. With a mix of visual elements and concise summaries of current activities, the homepage acts as a dynamic starting point for visitors and ensures quick access to news and updates.

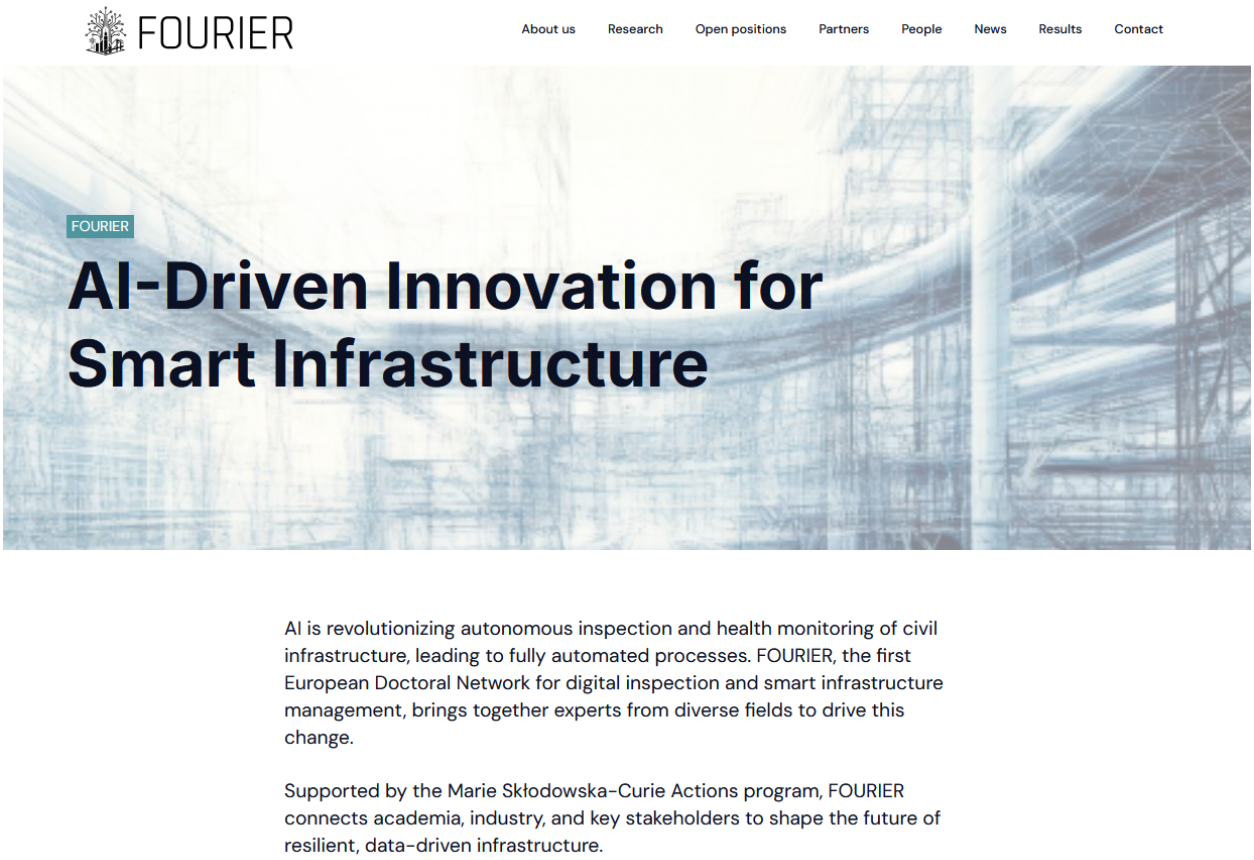

Figure 1 FOURIER Welcome Page

Later on the page, the main objectives of the project are clearly and concisely communicated, including the project objectives, research objectives, and training objectives.

Project objective

The project's mission is to **develop new AI approaches that can be applied to improve current inspection procedures, SHM data processing and resilience decision-making**.

The project will also achieve socio-economic objectives:

- **Contribute to socio-economic impact**by providing recommendations to CEN, ISO, and industry operators on integrating emerging digital technologies into inspection, monitoring, and decision-making processes for resilient infrastructure.
- **Disseminate and communicate research findings**to scientists, industry professionals, infrastructure owners, and operators, fostering a strong interdisciplinary and cross-sectoral collaboration.
- **Engage the public and stakeholders** through interactive events and conferences, promoting awareness of resilience and sustainability within the EU, leveraging data science and emerging technologies.

Research objective

The project is focused on several measurable Research Objectives:

- **Develop Augmented Reality (AR) and Visualization Technologies**: Enhance inspection procedures through immersive AR tools and create digital twins of infrastructure for better analysis and real-time monitoring.
- **Develop AI Algorithms for Data Fusion and Interpretation**: Build advanced algorithms that can merge data from different sources, providing deeper insights into infrastructure performance and health.
- **Implement AI-powered Decision-Making Tools**: Create intelligent decision-making systems that assist in infrastructure management and resilience, integrating not just technical but also social dimensions to ensure comprehensive, sustainable solutions.

Training objective

Establish a comprehensive Massive Open Online Course (MOOC) with microcredentials, incorporating knowledge from summer and winter schools, workshops, industrial days, conferences, and engagements with operators and legislators. Provide multidisciplinary training for researchers and the general public, fostering skill enhancement, knowledge transfer, and cross-sector collaboration. The course will promote the benefits of climate resilience in sustainable critical infrastructure and cultivate a community of practitioners.

Figure 2 Project objectives

In the latter section of the page, the consortium members are introduced via their logos, organized into Beneficiaries and Associated Partners (Figure 3). Each logo is clickable, leading users to the respective official website.

Figure 3 FOURIER consortium logos

At the bottom of the page, a News section highlights the latest updates, including announcements, upcoming events, and ongoing project activities.

3.1.2 About us

This section provides a clear and accessible description of the main objectives of the project, presenting them in a way that is easy for the general public to understand. It highlights the primary goals of the project and the tools that will be used to achieve them, emphasizing the strategies for their successful implementation.

Through this section, visitors gain essential insights into the core challenges driving our research, reinforcing our commitment to advancing research and innovation across Europe. It plays a crucial role in offering a comprehensive overview of the project and the key themes it addresses, ensuring a broader audience can grasp the significance and scope of the project.

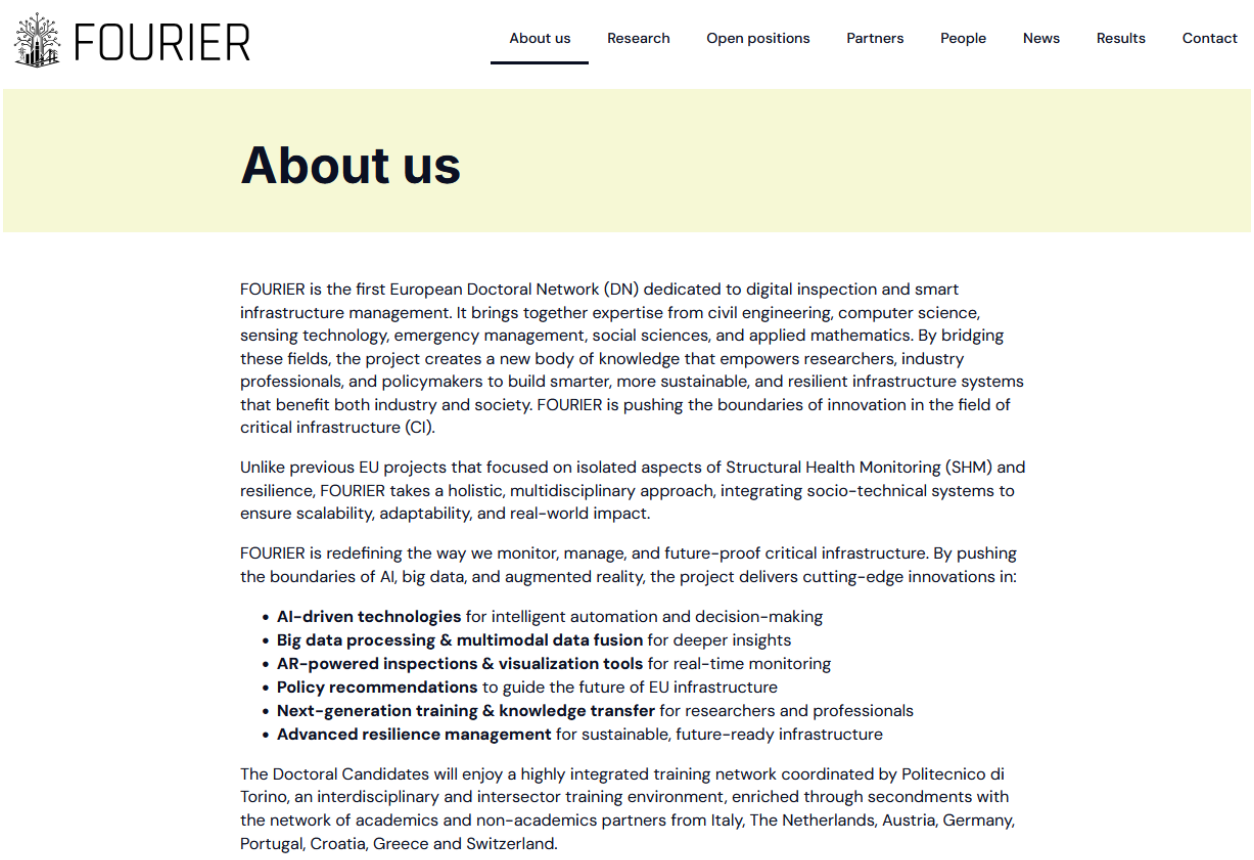

Figure 4 ABOUT US webpage

3.1.3 Research

The Research page outlines the scientific and technical focus of the FOURIER project, providing a comprehensive overview of the core research themes, work packages, and the interconnections between the 15 doctoral research projects (Doctoral Candidates, DCs). This section emphasizes the project's goal of integrating AI, data science, civil engineering, and policy, demonstrating its multidisciplinary approach to tackling critical infrastructure challenges.

The page is divided into three distinct subsections. The first subsection offers an overview of the research objectives, illustrating the project's goals and the direction in which FOURIER is heading. It provides insight into the expected outcomes and how these objectives will drive the project's progress.

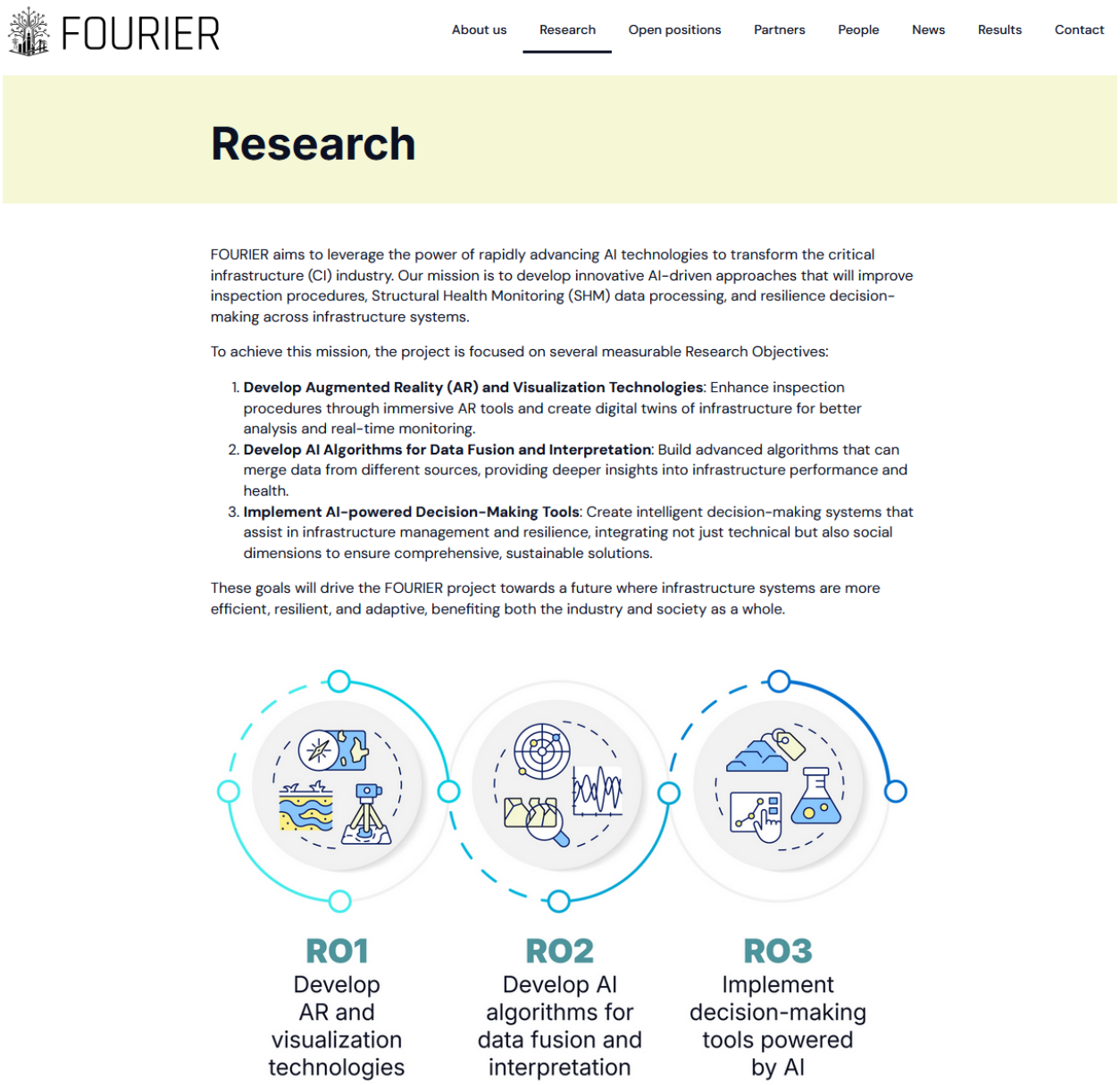

Figure 5 First RESEARCH subsection

The second subsection presents all doctoral research topics (DC1–DC15) offered to prospective candidates applying for PhD positions within the FOURIER project. Each topic is listed by title, functioning as a hyperlink that, when clicked, directs users to a more detailed description - comprising the third subsection of this page.
This third subsection includes the full title of each doctoral project, a brief summary, the host institution, assigned supervisors, specific research objectives, and information on the secondments - i.e., the institutions where the doctoral candidate will spend part of their training period.

Topics:

DC 1 Artificial Intelligence for State Evaluation of Socio-Physical Systems
DC 2 Enhancing Infrastructure Inspection with Non-Contact Sensing, Multi-Modal Deep Learning, and AR Wearable Devices
DC 3 Automated Data Collection for Progressive Collapse Analysis of Communities and Infrastructures Using UAVs
DC 4 Optimal Predictive Maintenance Planning of Geotechnical Systems Based on Explainable AI
DC 5 Super-Resolution Techniques to Enhance Low-Resolution Metering and Inspection Data
DC 6 Training AI Health Monitoring Algorithms Using Large-Scale Synthetic Data
DC 7 Artificial Intelligence Methods for Solving Inverse Problems and Digital Twin Updating
DC 8 Probabilistic Digital Twin and Spatial Data Modeling for Community-Level Risk Management
DC 9 Integrated Big Data Processing and Management of Long-Term Monitoring
DC 10 Decision Support Tool for Resilient Communities Using the Social Dimension
DC 11 Uncertainty in Multi-Fidelity Digital Twins for Infrastructure Management
DC 12 Causal Inference for Resilience Quantification of Critical Infrastructure Networks
DC 13 Automated Hierarchical Hidden Markov Modelling (HMM) for Power Network Components
DC 14 Social-Driven Inspection Digital Tools
DC 15 Decision Optimization for the Management of Risks, Robustness, and Resilience in Transportation Networks

DC 1 ARTIFICIAL INTELLIGENCE FOR STATE EVALUATION OF SOCIO-PHYSICAL SYSTEMS

Hosting institution: Delft University of Technology (TU Delft)

Supervisors: M. Nogal (TU Delft), P. Clemente (ENEA)

Objectives: Develop ASI technologies for autonomous inspection and system monitoring using AI algorithms for remote control and automated data processing in advanced inspection systems.

Description: The development of AI has three stages: artificial narrow intelligence (ANI), artificial general intelligence (AGI), and artificial super intelligence (ASI). ANI is less intelligent than humans and requires intervention. AGI matches human intelligence and operates independently. ASI surpasses human intelligence, performing tasks beyond human capability. This PhD thesis aims to develop ASI-level computational models for damage detection, structural health assessment, and predictive analysis. ML methods will be proposed for model updating, diagnostics, and data interpretation in structural health monitoring (SHM) systems. AI-based SHM methods, like those from the University of Texas at Arlington, use sensors to assess bridge health. Modern infrastructures incorporate weight-in-motion systems with sensors measuring vibrations, strains, and deflections. By analyzing these responses, they estimate vehicle weights and their impact on structural integrity. ML techniques refine load parameters and provide a clearer structural assessment, helping prevent failures like the 2018 Ponte Morandi collapse. An IoT-based SHM system can also detect damage and monitor structural behavior.

Secondments: National Agency for New Technologies, Energy and Sustainable Economic Development-ENEA (IT), Veiligheidsregio Utrecht (NL)

Figure 6 Second RESEARCH section with the complete list of available Ph.D. positions and third RESEARCH section with detailed descriptions of each position

3.1.4 Partners

This section provides a general overview of the academic and industrial partners involved in the consortium. It includes a brief description of each partner, along with their official logo and a link to their website. The section highlights the intersectoral collaboration within the project, showcasing the diverse range of partners, from universities and research centers to industry stakeholders and public bodies. Figure 7 illustrates an example of how Beneficiaries and Associated Partners are presented.

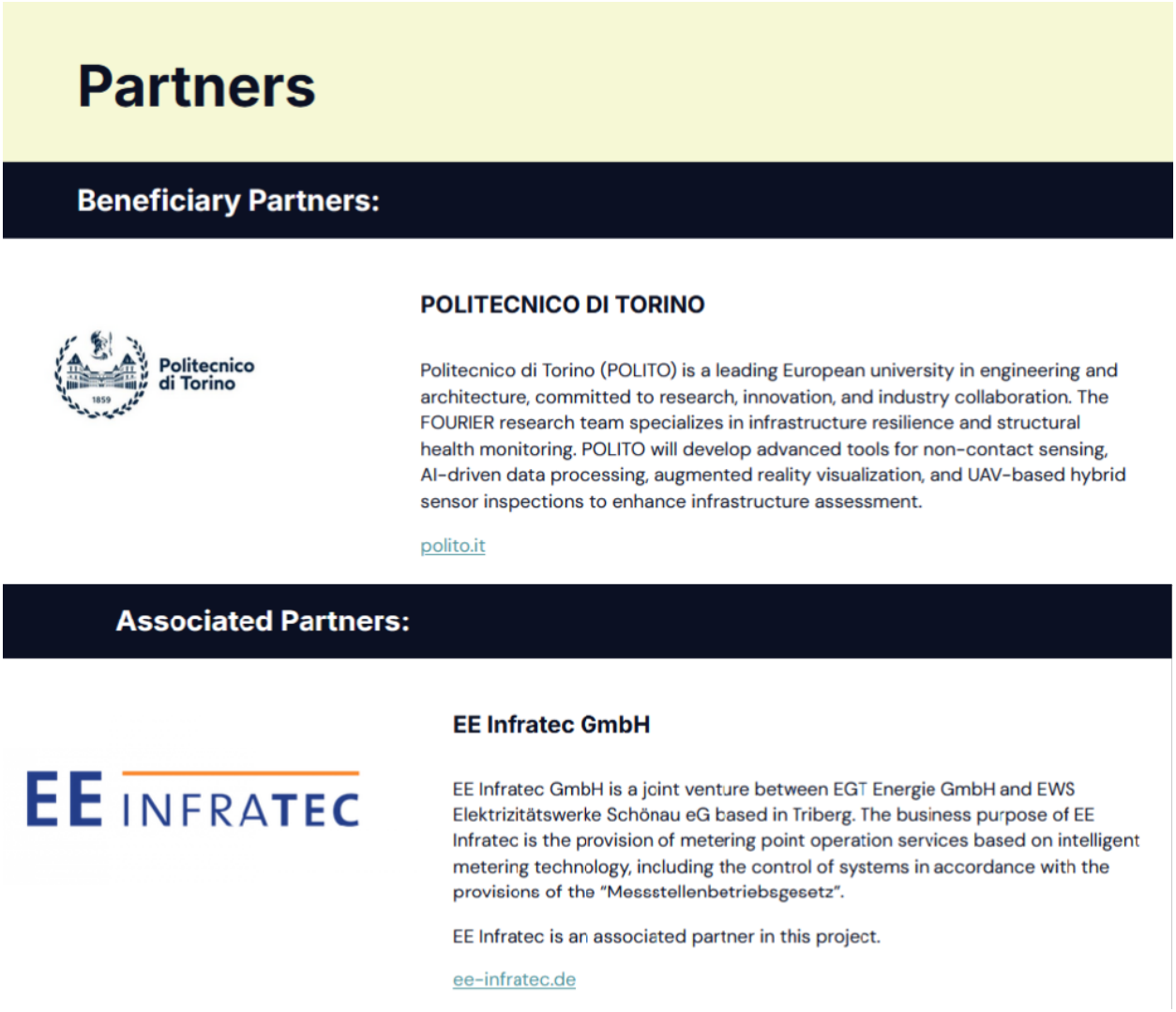

Figure 7 Example of PARTNERS page

3.1.5 People

The People page will feature profiles of selected doctoral candidates and their supervisors, highlighting their roles within the project. This section aims to enhance transparency and visibility by showcasing the key individuals driving the research and development efforts.

3.1.6 News

This section keeps visitors informed about the latest developments and events related to the FOURIER project. It includes updates on consortium meetings, workshops, and the continuous progress of the project, as well as the release of new newsletters. Serving as a dynamic timeline, the News section is regularly updated with announcements, event highlights, achievements, and other important updates from the consortium, ensuring seamless communication with both internal and external audiences.

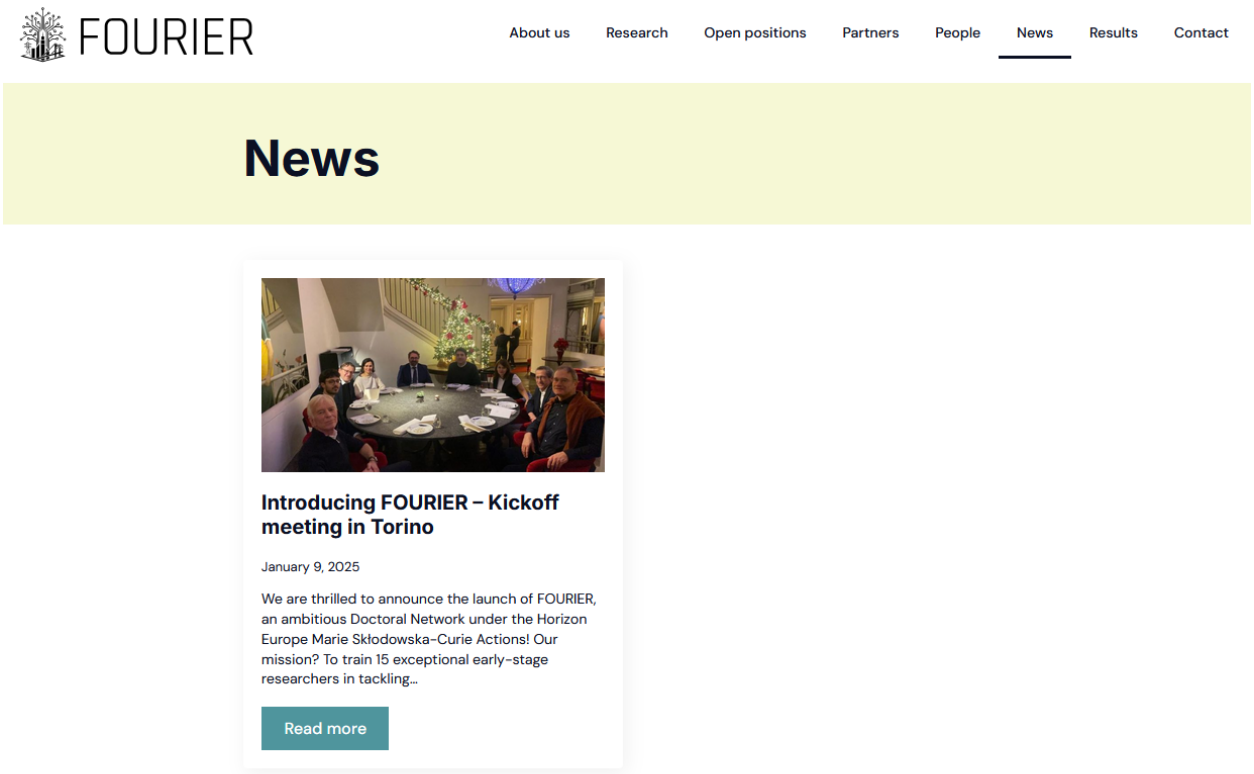

Figure 8 NEWS page

3.1.7 Results

The Results page is divided into three distinct sections, each designed to showcase the project's public deliverables and outputs. This includes journal publications, conference presentations, posters, and similar public documents. It also serves as a hub for training materials such as lecture notes, video courses, and other outreach content. Additionally, the page will provide access to the upcoming MOOC with microcredential content, ensuring comprehensive dissemination of the project's results and advancements.

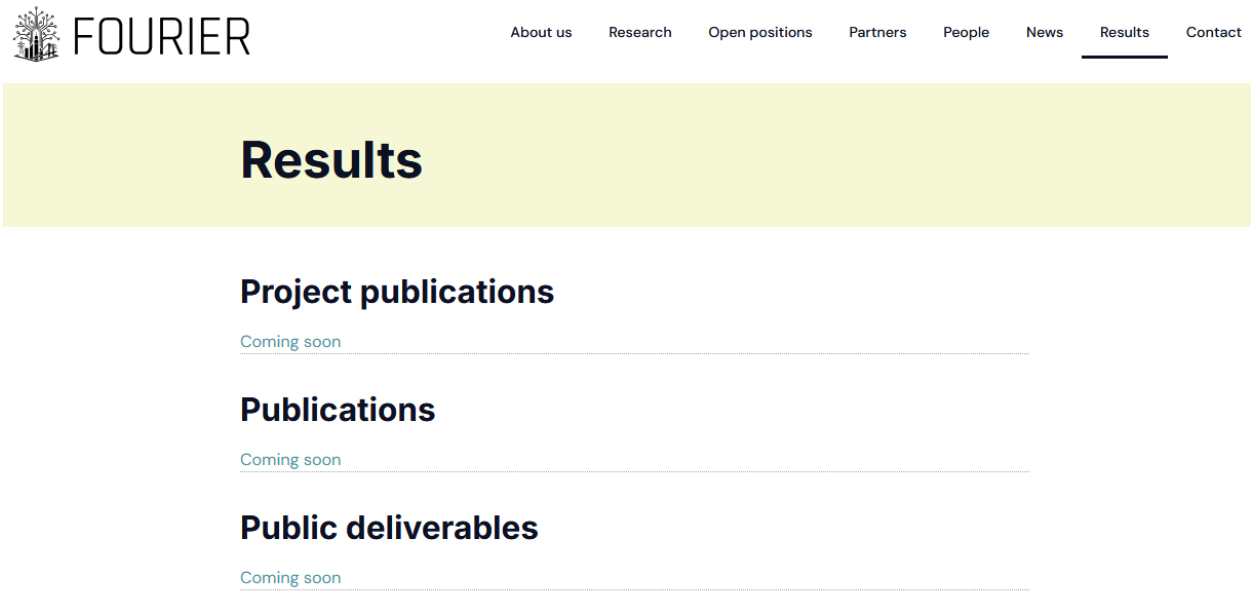

Figure 9 RESULTS page

3.1.8 Contact

The Contact page serves as a vital communication channel between the public and the FOURIER project team. It provides visitors with the key contact details for the project's management team, ensuring that inquiries, comments, and requests for more information can be easily directed to the right people.

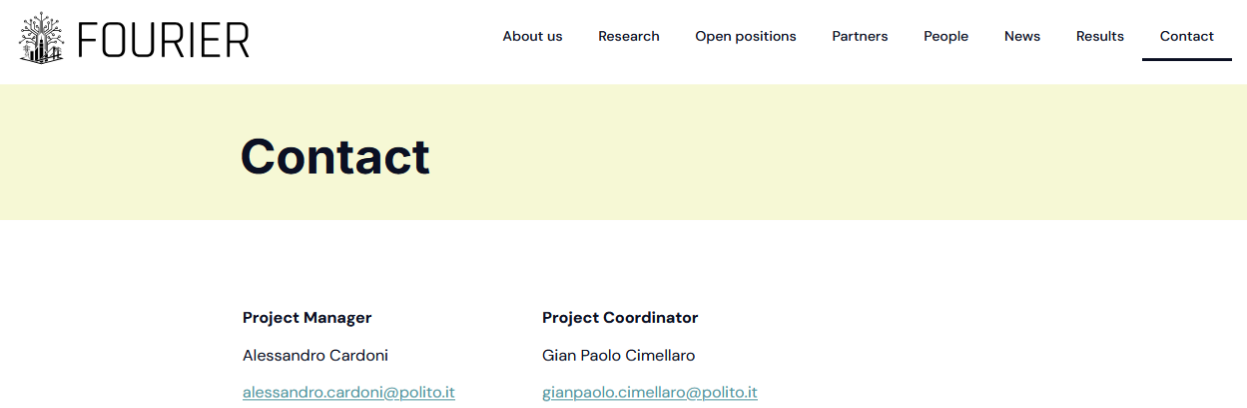

Figure 10 CONTACT page

3.1.9 Banner

Each page of the CLARION project website features a footer banner containing essential elements that support both navigation and project visibility. The banner prominently displays the project logo, which functions as a direct link back to the homepage. It also includes the European Union flag and the official funding acknowledgment statement, reflecting the project's commitment to transparency and full compliance with EU communication guidelines.

Figure 11 Footer banner

4 Conclusion

The FOURIER website serves as a central hub for sharing up-to-date information on the project's progress, results, and activities with the public, academic community, and key stakeholders. With its primary goal of maximizing outreach and making project content easily accessible, the website plays a vital role in supporting effective communication and dissemination.

As the project advances, the website will continue to evolve. New sections will be introduced, including dedicated pages for the enrolled PhD candidates and announcements of upcoming project-related events. This strategic development ensures that research findings and project achievements are not only available to technical audiences but are also communicated in an engaging and accessible way to the broader public.

By maintaining a dynamic and inclusive platform, the FOURIER website reinforces the project's commitment to transparent, impactful, and far-reaching dissemination of its outcomes.