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Co-funded by the European Union

DIGIWAY
Geodata for Mountain Safety

EUROPEAN REGION
Tirol Südtirol Trentino
Tirolo Alto Adige Trentino
Tyrol South Tyrol Trentino

DIGIWAY

Geodata for Mountain Safety

Memo

Stakeholder-Day 5. December 2024

2024-E-001-INTERREG-ITAT-62-001-DIGIWAY

Prepared by DIGIWAY Team

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1. INTRODUCTION

This document provides a summary of the key activities, discussions, and outcomes of the DIGIWAY Stakeholder Day, held on December 5, 2024, at the NOI Techpark in Bolzano. The event brought together around 60 stakeholders from across the Euregio to offer initial insights into the DIGIWAY project and its objectives.

1.1 Purpose of DIGIWAY

The DIGIWAY project seeks to enhance alpine safety and improve the mountain experience in the Euregio (Tyrol, South Tyrol, and Trentino). The main objective of the DIGIWAY project is the consolidation of GIS data on hiking trails from the three regions into a unified dataset. This dataset, referred to as the DIGIWAY-Product, will be made publicly accessible as open data through the Open Data Hub at NOI Techpark. By dynamically integrating data from diverse systems, the project addresses the growing need for accurate and seamless data, which forms the basis for reliable digital tour planning tools across regional and national borders. Case studies, such as the E5 long-distance hiking trail and the Fassa Valley, will serve as test areas for developing and refining innovative approaches. Furthermore, DIGIWAY is exploring the concept of Living Lab and aims to establish a Living Lab in the Euregio.

1.2 Purpose of the Stakeholder Day

In addition to presenting the planned activities and the current status of each work package, the DIGIWAY project emphasizes fostering collaboration, knowledge exchange, and networking among stakeholders and the DIGIWAY team. DIGIWAY aims to create a learning environment where stakeholders can share their knowledge and skills, discuss current challenges, and contribute to collective progress. Participants are invited to actively engage with DIGIWAY and foster further cooperation activities among themselves, making the Stakeholder Day a key event in the DIGIWAY project.

The Slides from the DIGIWAY Stakeholder Day 2024 can be downloaded through following link:

https://portal.tirol.gv.at/tlrftps/main.html?download&weblink=0f9a2f54c485e4c273d7184e4e92cd22&realfilename=DIGIWAY_StakeholderDay_051224_all_presentations.zip

1.3 Outline

The document is organized into eight sections, each summarizing key aspects of the DIGIWAY Stakeholder Day.

- **Section 2 - Welcome & Greetings:** Opening remarks by Euregio President Arno Kompatscher, followed by the signing ceremony formalizing the collaboration between the DIGIWAY and E5 Green & Digital projects.
- **Section 3 - Overview of the DIGIWAY Project:** An introduction to the project's objectives and work packages, including the Datalake, Open Data Hub, Euregio Living Lab, and two case studies: the E5 long-distance trail and the Fassa Valley.
- **Section 4 - Regional GIS Approaches:** Presentations by stakeholders from Tyrol, South Tyrol, and Trentino, completed by a brief panel discussion on regional challenges and opportunities.
- **Section 5 - National Projects:** Insights from Italy's CAI and Switzerland's BFU, highlighting lessons learned for DIGIWAY and the broader community.
- **Section 6 - Parallel Workshop Sessions:** A summary of the four interactive workshops conducted during the afternoon session of the Stakeholder Day.
- **Section 7 - Next Steps:** Key takeaways and a roadmap outlining the upcoming phases and objectives for the DIGIWAY project.
- **Section 8 - Feedback from the Participants:** Feedback from the participants regarding the Stakeholder Day.

2. WELCOME & GREETINGS

The event began with welcoming remarks from the institutions, setting a warm and engaging tone for the occasion (see Figure 1).

Figure 1: Opening of the DIGIWAY Stakeholder Day. (photo by *USP/Daniel von Johnston*)

Following the introductions, a signing ceremony took place, marking a significant milestone in the collaboration between the Interreg DIGIWAY and E5 Green & Digital projects. This formal act underscored the shared commitment to fostering innovation and sustainable development in the region. A press release was published for the Stakeholder Day, available at: Link_Press_StakeholderDay_DIGIWAY

2.1 Greetings from Euregio president Kompatscher

The President of Euregio and Governor of South Tyrol, Arno Kompatscher, extended greetings on behalf of the institution he represents (see Figure 2).

Figure 2: The president of Euregio and South Tirol province Arno Kompatscher at the DIGIWAY Stakeholder Day. (photo by *USP/Daniel von Johnston*)

In his address, he emphasized the importance of the DIGIWAY project, highlighting its role in enhancing cross-border collaboration. He noted that as more people explore the mountains, digital tools for planning hiking trips are becoming increasingly essential. The project aims to ensure that relevant services can access reliable and standardized data across the entire Euregio, improving information on hiking trails and promoting safer and more seamless hiking experiences in the region.

2.2 Signing ceremony: DIGIWAY and E5 Green & Digital

Euregio President Arno Kompatscher and Josef Günther Mair, President of the Cooperative for Regional Development and Education of Sarentino, signed a cooperation agreement between the Interreg projects DIGIWAY and "E5 Green & Digital" (see Figure 3).

Figure 3: The Euregio president Arno Kompatscher on the right and Josef Günther Mair (GRW SARNTAL's president) on the left. (photo by LPA/Daniel Von Johnston)

The "E5 Green & Digital" project focuses on enhancing sustainability and attractiveness along the E5 long-distance hiking trail through digitization. Planned activities include improving trail infrastructure, creating tourism packages, and developing digital solutions to promote cross-border tourism and slow, green travel.

This collaboration aligns closely with DIGIWAY's goals and will play a crucial role in fostering sustainable development and innovation within the Euregio region.

3. DIGIWAY PRESENTATIONS

Section 3 provides an overview of the DIGIWAY project, outlining its key objectives and activities. The following subsections summarize the presentations given by the DIGIWAY team during the Stakeholder Day, each representing a different work package of the project. The slides can be downloaded via the link provided in Section 1.

3.1 Overview of the Project – Matthias Fink

The DIGIWAY project is the result of a consistent evolution in the analysis of gravitational natural hazards in alpine regions. The starting point was the preliminary project R.A.G.N.A.R. (2019–2021), which provided a detailed risk analysis of gravitational natural hazards. Within the framework of the Euregio program "Fit for Cooperation" (Fit4Co), the need for the project was defined and refined.

A key milestone was the subsequent Euregio project "Natural Hazards in the Mountains," where the Stakeholder Day in 2022 was used to establish the priorities for the future DIGIWAY project.

The next phase began with the development and submission of the project proposal for the INTERREG DIGIWAY project between 2023 and 2024. The project officially started on January 1, 2024, and will run until January 31, 2026, with a budget of EUR 650,750 and a team of three staff members.

The project's goals include:

- Developing cloud-based web services for the secure exchange of validated data.
- Accessing know-how and technological solutions from the NOI Techpark (Open Data Hub, LivingLab).
- Testing innovative technologies in pilot regions such as E5 and the Fassa valley.

Important clarification: DIGIWAY does not aim to develop end-user products with an interface and currently excludes specific requests, such as satellite-based snowfield detection.

With a clear focus and ambitious goals, DIGIWAY contributes significantly to the advancement of risk management in alpine regions.

3.2 Datalake – Lucia Felbauer, Christoph Kovacs, Francesco Parente

The DIGIWAY project aims to create – in the long run - a standardized, accessible data infrastructure for mountain trails across the Euregio region, improving hiking safety and trail management through reliable digital information.

Work Package 2 (WP2) of the DIGIWAY project addresses the challenges of creating a unified and reliable data set for hiking trails across the Euregio, encompassing North Tyrol, South Tyrol, and

Trentino. By bringing together diverse already published datasets and ensuring their availability as open data, WP2 aims to enhance the safety and experience of mountaineers and hikers.

Current Tour Planning & OSM: Today, most of digital tools use OpenStreetMap (OSM) as their primary database. OSM, being free and open-source, relies on user-generated content contributed by volunteers. While this approach offers accessibility and flexibility, it also introduces critical challenges, such as inconsistent data quality, gaps in coverage, and varying levels of accuracy and reliability. Examples of these issues, such as incorrect route information or mismatched infrastructure locations have been shown. These challenges highlight the urgent need for reliable, high-quality data to ensure accuracy and enable the development of advanced hiking services.

The Importance of Reliable Data: Reliable data are the basis of effective trail management and digital services. They ensure the accuracy of information presented to users and they could be the basis for various further applications (e.g. route planners, trail closure systems, ...). To achieve this reliability of datasets, frequent quality checks and the use of certified data sources is a must have. Collaborating with governmental organizations, stakeholders and regional experts ensures that the data is both trustworthy and up to date.

Initial Situation in the Euregio: The existing situation in the Euregio reflects a fragmented situation of geospatial data management (see Figure 4). Each region operates its own GIS system, resulting in differences in data features, quality, update intervals, and metadata.

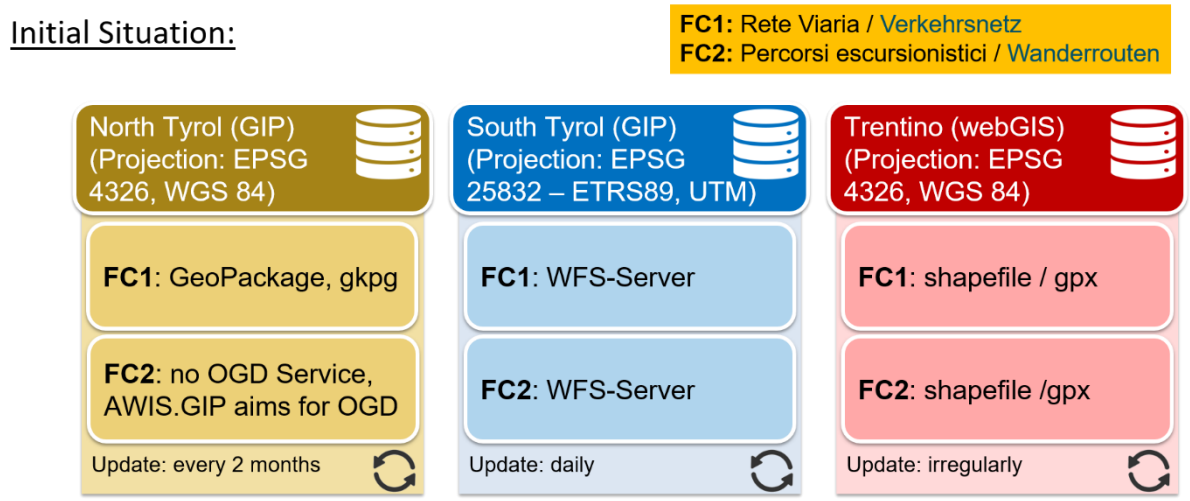

Figure 4: The initial geospatial data management situation in the three territories of Euregio: Tyrol, South Tyrol and Trentino. FC refers to feature class or emphasizes a GIS layer.

Key Objectives of WP2

- **Developing a Unified Data Catalogue:** This involves defining a consistent structure for datasets across the three regions, such as for hiking routes (FC2).

- **Centralized Data Flow System:** Consolidating the regional published data into a single, cohesive dataset that ensures dynamical updates, multilingually and easy access.
- **Publishing Data as Open Data:** Making the unified dataset, referred to as the DIGIWAY-Product, freely available through the Open Data Hub at NOI Techpark.

Implementation and Progress: WP2 focuses on building a system capable of dynamically requesting, transforming, and consolidating datasets from governmental offices and key stakeholders, including regional alpine clubs and tourist organisations. This system integrates various types of data, such as the general trail network (FC1), hiking routes (FC2), and additional datasets like APIs for trail closures. Progress has already been made, including the visualization of test datasets for the E5 long distance hiking route across all three regions. This visualization serves as a prototype for the DIGIWAY-Product, showcasing its potential for cross-regional use.

Take-Home Message: The ultimate goal of WP2 is to produce the DIGIWAY-Product, a unified geospatial dataset with consolidated, reliable, high-quality data from already published open data across the Euregio (see Figure 5). The DIGIWAY-Product will be published as open data via the Open Data Hub (WP3), being accessible to all and acts as basis for further digital services.

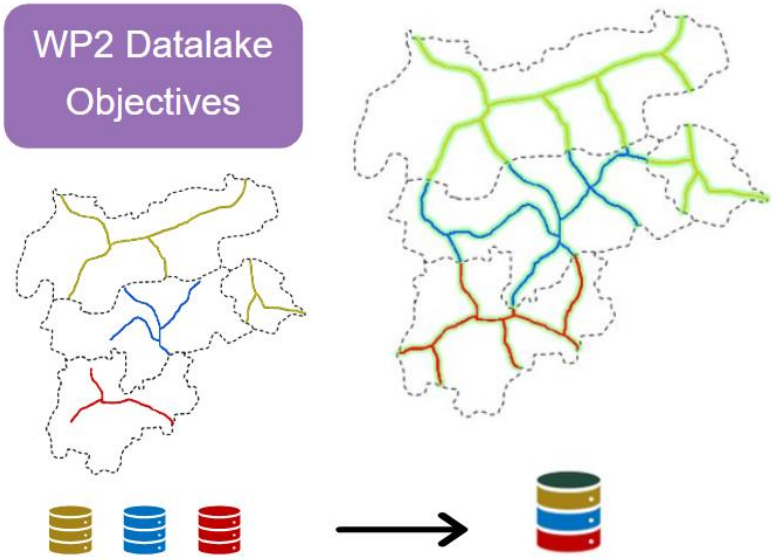

Figure 5: Visualization of the DIGIWAY WP2 main objective: on the left the initial data situation in the regions, on the right the region data connected and implemented to the DIGIWAY-Product.

3.3 Open Data Hub – Roberto Cavaliere

The presentation covers the Open Data Hub platform and its integration with the DIGIWAY project, presented by Roberto Cavaliere from NOI Techpark.

Key Features of Open Data Hub:

- A cross-border digital platform connecting data providers with data consumers

- Provides real-time data access through a unified API
- Offers three main services: Data Access, Data Sharing, and Data Visualization
- Integrates various data types including mobility, tourism and soon agriculture, energy, and food & health as well

Current Applications (examples):

- Extensive winter sports information (ski area status, webcams)
- Interactive maps with real-time updates
- Tourism facility operations monitoring
- Web components for easy integration into other projects

DIGIWAY Integration (see Figure 6):

- Connects three regions: North Tyrol, South Tyrol, and Trentino
- Implements data harmonization standards (FC1, FC2, FC3)
- Manages dynamic data such as:
    - People counting
    - Trail closures
    - Weather forecasts

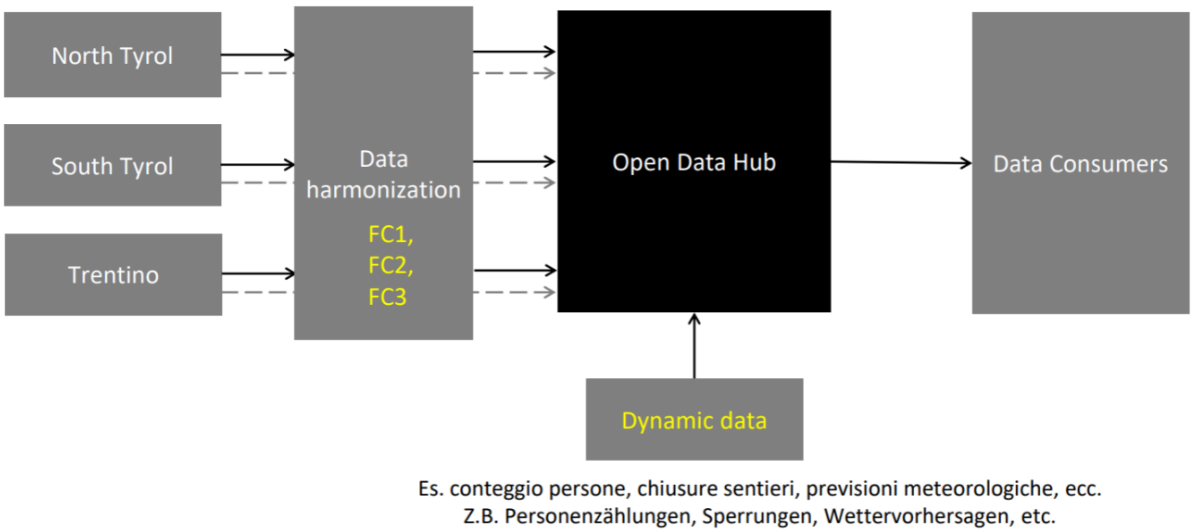

Figure 6: Visualization of the planned data implementation into the Open Data Hub: On the left the GIS data sets of the regions (FC1, FC2, FC3) and at the bottom dynamic datasets.

Example of potential application: "Door-to-Peak" service that will combine hiking routes with public transportation, taking into account real-time factors like weather conditions, crowd levels, and facility closures.

3.4 Euregio Living Lab – Sebastian Mayrgündter

Year after year, since 2014, experts have been addressing essential questions and future topics concerning the European region, forming the EuregioLab as the think tank of Euregio. The EuregioLab is a working group consisting of scientists, cultural professionals, and representatives of interest groups from all three regions, changing annually, who engage with the main theme of the Tyrol Day in preparation for the European Forum Alpbach. This forms the strategic basis for establishing and further developing the EUREGIO LIVING LAB.

A Living Lab is an innovative environment where new ideas, concepts, and technologies are developed and tested in real-life situations (see Figure 7).

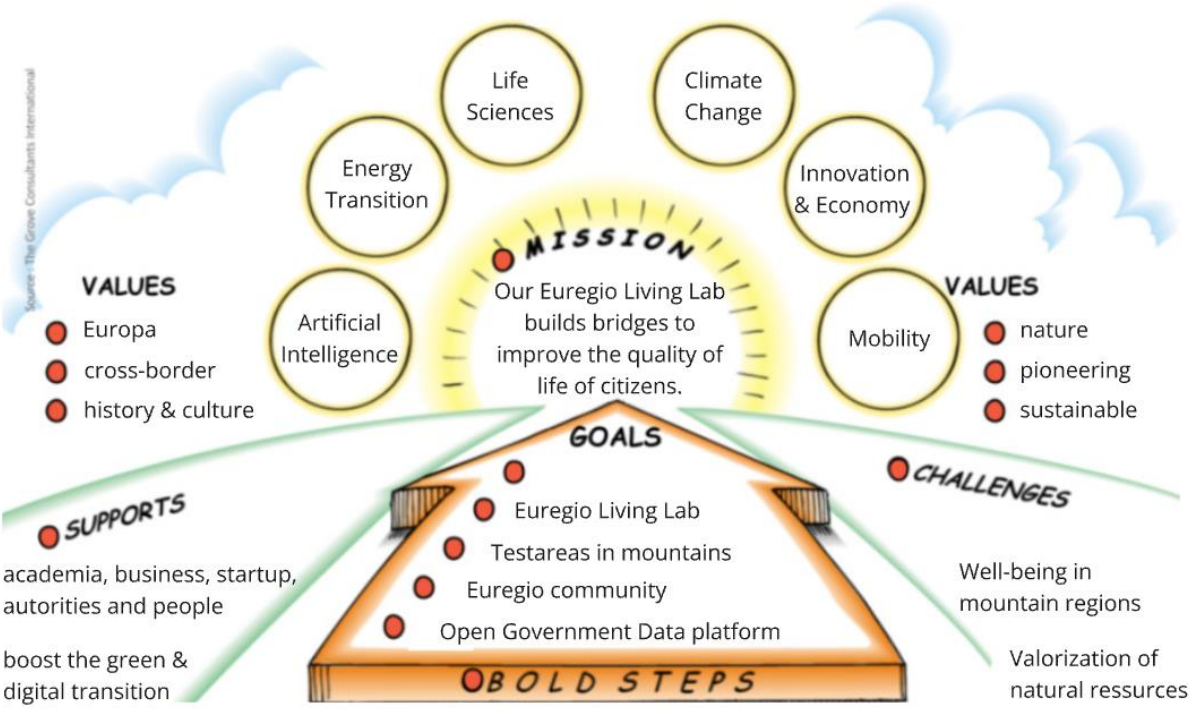

Figure 7: Visualisation of the Living Lab concept, demonstrating its core principles and approach.

Four key actors play an important role:

- **Users:** Users are the central participants of a Living Lab. They provide valuable insights and feedback on the tested products or services, reflecting their daily challenges and needs.
- **Researchers and Developers:** These actors are responsible for designing, developing, and testing technological solutions and innovations. They analyze user feedback and adjust the solutions accordingly.
- **Companies and Startups:** Companies bring their products and services into the Living Lab and benefit from the collected data and feedback. They support development through funding and resources.

- **Public Institutions and Policy Makers:** These actors create the framework conditions and support the Living Lab through policies, funding, and infrastructure. They ensure that the developed solutions meet legal and societal requirements.

This collaboration among the four actors promotes the development of user-centered, realistic innovations and contributes to greater community involvement in the innovation process.

The Living Lab concept offers numerous advantages. Through the joint development of solutions, we can minimize risks and ensure the sustainability of our projects. Core characteristics of a Living Lab include:

- Participation and user involvement
- Experimental approaches in a real context
- Joint knowledge creation

To achieve the goals of the Living Lab, we have developed a clear methodology. The diverse services of NOI Techpark enable us to implement projects efficiently and continuously improve the results.

In Workshop #3, action plans for concrete initiatives will be presented.

3.5 Two Case Studies: E5 and Val di Fassa – Arezia Ronchini, Klaus Pietersteiner / Lucia Felbauer

Work Package 5 (WP5) focuses on developing and testing innovative concepts, while generating new ideas, datasets, and methodologies based on real-world case studies. The emphasis is on trail classification systems, frequency measurements, and trail closures—key topics identified during the Stakeholder Day 2022. Two primary case studies have been selected: the E5 long-distance hiking route and the Val di Fassa in the Autonomous Province of Trento.

3.5.1 Case Study E5: Long-Distance Hiking Route

The E5 trail was selected as a case study due to its characteristics, including its widespread popularity and recognition. Additionally, it offers diverse attributes, such as spanning all altitude levels and difficulty classes. The E5 traverses the three regions of Tyrol, South Tyrol, and Trentino, exemplifying the spirit of cross-border cooperation within the Euregio.

Case study E5: Challenges in Trail Classification

Hikers plan their trips using various resources, including local knowledge and regional systems for classifying trail difficulty. For example, in Tyrol, the hiking and mountain trail concept categorizes trails into three levels of technical difficulty: Hiking Trails, Intermediate Mountain Trails (red) and Difficult Mountain Trails (black). Each category is defined by a detailed description of its key features, including difficulty and other relevant aspects. Trail difficulty is marked on-site using yellow signs, but this

classification system is not uniformly integrated into digital maps. The challenge becomes more complex when planning cross-border hikes. Trentino uses a different regional system of trail classification, while South Tyrol currently lacks a formal difficulty rating.

Case study E5: Vision for a Unified Approach

To address these challenges, WP5 aims to develop a methodology for translating between existing trail difficulty systems. This would enable hikers to view trail classifications in their familiar system, even when planning routes in other regions. For example, hikers from Tyrol could view trails in Trentino using Tyrol's difficulty rating system.

Case Study E5: Key Activities Include:

- **Method Development:** Creating a system to translate difficulty ratings between existing regional systems.
- **Data Collection:** Recording key features for trail classification data along the E5 in Euregio.
- **Visualization:** Integrating the data into the DIGIWAY-Product developed in WP2 for interactive visualization.
- **Stakeholder Engagement:** Collaborating with regional stakeholders to refine the methodology.

The E5 case study serves as a testing ground for developing and refining a new method for translating difficulty ratings between different regional systems. It provides a practical example of cross-border collaboration, where stakeholders can assess the proposed system and provide feedback. Depending on the results, the approach can be improved, accepted, or rejected, making it a case study.

3.5.2 Case Study Val di Fassa: Overview

Val di Fassa is one of the main touristic destinations in Trentino. Despite the small population of about 10.000, annual arrivals and overnight stays are high and constantly increasing. A lot of tourists arrive here during both winter and summer for several activities; hiking is one of the main and most attractive of them.

Case Study Val di Fassa: Main goals

The first ongoing step is looking for partnerships with local stakeholders that are already into tourism and trail network. Having the support of local stakeholders and getting to know their knowledge are considered important tasks of WP5.

Case Study Val di Fassa: Main topics of interest for the Val di Fassa case study are:

- **Trail survey:** A punctual and clear survey of new and existing trail tracks and further adjustments, like data cleaning and analysis will be carried out.

- **Trail closures:** getting to know how information of trail closures and re-opening is communicated to tourists and locals and how this information flow could be improved.
- **Trail use:** estimating the trail use frequencies by hikers and bikers during the year.

These operations are important to achieve the data consistency necessary for integration into the DIGIWAY-Product developed in WP2.

Case Study Val di Fassa: Next steps

The experience gained in the case study Val di Fassa will be very useful not only for the WP5 but also for the whole DIGIWAY project. Collecting new ideas and solutions with stakeholders, testing in the real world and meeting the needs of the different stakeholders will make **this case study an active playground to test new methodologies that could be potentially recreated in the entire Euregio territory.**

Not secondary is to bring together local stakeholders and the contracted company with other project partners, such as Bozen's NOI Techpark. In fact, the datasets and the information that will be collected with this case study will be **reachable from Open Data Hub**, **an open data platform developed by NOI.**

4. REGIONAL APPROACHES WITH GEODATA

Section 4 covers regional approaches on hiking path GIS data and informative territorial and environmental systems in Tyrol, South Tyrol, and Trentino. Three local stakeholders presented their methods for managing hiking route GIS data and their geodata infrastructure. This section focuses on sharing knowledge, the importance of quality-checked data, and lessons learned from regional projects. The presented datasets serve as key sources for developing a unified dataset for hiking paths – DIGIWAY-Product (WP2).

4.1 Tyrol: AWIS.GIP – Official data created by volunteers – Johannes Köck

AWIS.GIP is an innovative Austrian project that combines volunteer-maintained hiking trails with the country's official transportation database. The system is managed by the VAVÖ (umbrella organisation of 12 Austrian Alpine Clubs) especially the “Naturfreunde”, Austrian Alpine Club (ÖAV) and the German Alpine Club (DAV) in particular play a leading role. All Alpine Clubs within the VAVÖ collectively maintain about 50,000 km of trails throughout Austria.

The project has two main components:

- **GIP (Graph Integration Platform):** Austria's official digital transportation database that includes public transport, vehicle, cycling, and pedestrian routes.
- **AWIS (Alpine Trail Infrastructure System):** Extends the official database by adding mountain and hiking trails.

The workflow is straightforward: volunteers maintain and digitize trail information, which goes through quality assurance before being imported into the GIP system. The data will be published as free Open Government Data (OGD) and updated every two months. At the moment the data is not published as OGD as there are still some quality checks needed. OGD data is expected to be published next year (2025).

This project successfully bridges the gap between volunteer-managed trail systems and official infrastructure databases, creating a comprehensive and reliable public resource for Austria's transportation and trail networks.

4.2 South Tyrol: GIP-South Tyrol as official data base – Renate Marmsoler

GIP-Südtirol is a comprehensive mobility data platform that evolved from its first digitization in 1990 to become the official database for South Tyrol's mobility projects. The system manages:

- 34,000 km of road network
- 16,165 km of hiking trails

- Various infrastructure data (cycling paths, tunnels, bridges, gas stations)

Key features:

- Centrally managed, quality-controlled database
- Multiple stakeholders (provincial administration, municipalities, various organizations)
- Used for traffic management, civil protection, and mobility planning

Current priorities include improving data quality, expanding content, legal consolidation and strengthening collaboration between stakeholders, all while maintaining a unified database that serves as the foundation for regional mobility projects.

4.3 Trentino: PAT Data Infrastructure and Trentino geo-cartographic Portal – Nicola Orsi and Daniela Ferrari

SIAT (Sistema Informativo Ambientale Territoriale): SIAT is the territorial and environmental information system for the Autonomous Province of Trento, providing an integrated platform for managing and sharing geographical and environmental data. The system is built around a central database (DBGP) connecting multiple department services.

The main goals of SIAT are:

- Optimization of resources allocation
- Enhance data quality
- Standardize territorial services
- Facilitate information sharing among SIAT components
- Complete data production activities
- Promote data dissemination and accessibility
- Support cross-cutting projects, such as "High-Value Data" (HVD) and the "National Digital Data Platform" (PDND)

The main Access Platforms of SIAT are:

- Geocatalog for metadata management: archive in which metadata are collected.
- WebGIS Trasversale (WGT) with 19 themes and 337 layers: platform for data visualisation, data search, grouping, overlapping and comparison of different layers.
- ArcGIS Online (AGOL) for thematic publishing: AGOL (ArcGIS Online) is a proprietary platform (ESRI) that allows for the publication and updating of specific thematic.

SIAT Key points:

- The advantages of using DBGP: data are shared, updated, validated and available for use: the system effectively combines comprehensive territorial data management with accessible public interfaces, serving both government and public users.
- The data update is not instantaneous and there is a risk that the searched data is not always up-to-date.

4.4 Panel Discussion – Johannes Köck, Renate Marmsoler and Arianna Sommadossi

As part of the regional approaches section, a brief panel discussion was held with key stakeholders from Tyrol, South Tyrol, and Trentino to discuss GIS data infrastructure for hiking trails.

The representatives from Tyrol and South Tyrol were the same as those who presented earlier: Johannes Köck from VAVÖ (Association of Alpine Clubs in Austria), representing Tyrol, and Renate Marmsoler from the Department of Informatics at the Autonomous Province of Bolzano, representing South Tyrol. Joining the panel for Trentino was Arianna Sommadossi from SAT (Società Alpinisti Tridentini), responsible for managing SAT's hiking paths.

Due to time constraints, the discussion focused on a single key question: How is GIS data managed, maintained, and kept up to date within your systems?

Renate Marmsoler explained that in South Tyrol, the administration oversees GIS data, including hiking paths, within the GIP South Tyrol system. Trained personnel carry out ongoing maintenance to ensure the data remains up to date, where the greatest challenge lies in coordinating the various administrations.

Johannes Köck highlighted that most of Tyrol's hiking paths rely on established easements (ersessenes Wegerecht), and that the exact knowledge of the location of the trails is a top priority in order to prevent the loss of this right. These paths are digitized in the GIP Austria system, but tracking changes in a timely manner is difficult, often causing delays. He emphasized prioritizing data quality over immediacy, ensuring only verified information is entered. Köck also stressed the importance of a centralized system where all responsible organizations contribute and maintain data. He invited other entities, such as tourism organizations, to integrate and manage their GIS data for hiking paths within the same system.

Arianna Sommadossi noted that in Trentino, much of the work carried on by SAT depends on volunteers who maintain paths in their free time, limiting the scope of tasks they can undertake. She emphasized the importance of collaboration between landowners, organizations, and nature parks to

keep the data current. Effective communication and a standardized process for reporting changes are essential for ensuring accuracy and efficiency.

The panel concluded with a shared understanding of the importance of quality-checked and regularly updated GIS data as the foundation for reliable digital tools. All three participants agreed that data quality is the most critical aspect. The discussion also revealed differences in how each region organizes GIS data for hiking paths but underscored common challenges, such as timely updates and coordination among stakeholders.

5. NATIONAL PROJECTS – LESSONS LEARNED

Section 5 takes a broader view beyond the Euregio, featuring two presentations on hiking path digitalization projects. One presentation covers the Rete Escursionistica Italiana (REI - Italian hiking trails network), organized by CAI (Centro Alpino Italiano) in Italy, while the other discusses the development of an assessment method for Swiss hiking paths by the BFU (Beratungsstelle für Unfallverhütung) in Switzerland. Both speakers provided valuable insights and shared lessons learnt that are also relevant to the DIGIWAY project.

5.1 Italy: Italian Digital Cadaster of hiking paths and Mappa Digitale Sentiero Italia – Lorenzo Bassi (CAI)

SOSEC (Struttura Operativa Sentieri e Cartografia), a division of the Italian Alpine Club (CAI) is responsible for managing and development of the Italian hiking trail network (REI).

Key SOSEC Goals:

- Definition of standards and guidelines
- Development and sharing of activities
- Training and updating
- Implementation and management of the **REI Cadastre INFOMONT**

REI Cadastre INFOMONT goals:

- Promoting sustainable tourism
- Enhancing inland areas
- Ensuring the safety of hikers

Key Facts (see Figure 8):

- OpenStreetMap serves as the foundation for initial data collection
- OSM2CAI acts as a validation and quality control platform
- INFOMONT functions as the official trail database and public interface

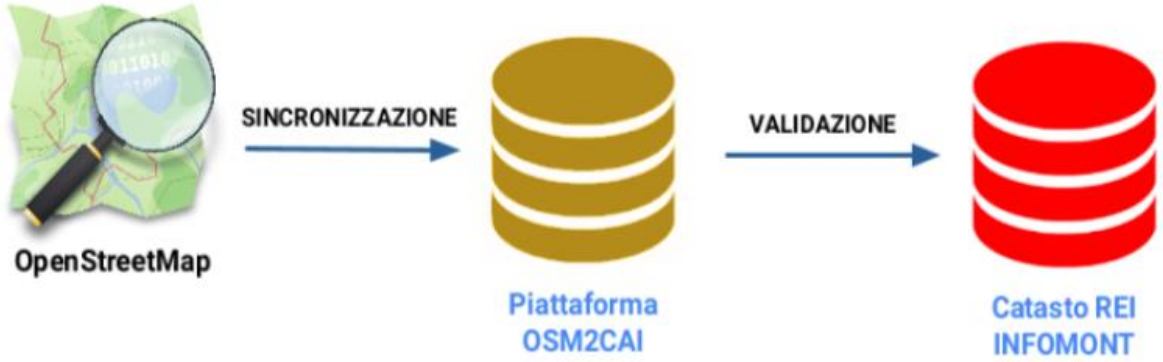

Figure 8: Operational information flow for REI digital cadastre INFOMONT

The system uses a detailed validation process with five status levels (0-4):

- Level 0: Initial unverified trails
- Level 1: Basic trail information entered
- Level 2: CAI Surveyed but missing difficulty ratings
- Level 3: Complete trail information
- Level 4: Fully validated and imported into INFOMONT

Current Coverage:

- Spans 107 provinces across Italy
- Manages 282 distinct areas
- Includes over 23,000 trails, with 13,553 fully validated
- Encompasses more than 113,354 kilometers of trails

The system's strength lies in its hybrid approach: it utilizes open-source technology and crowdsourced data while maintaining professional standards through a structured validation process. This makes it particularly effective for CAI's volunteer-based organization while ensuring reliable information for public safety and trail management.

Each trail in the system contains detailed metadata including:

- Technical difficulty ratings
- Route information and waypoints
- Infrastructure details (bridges, tunnels, etc.)
- Safety information
- Maintenance status

The system provides this information through various platforms (web, mobile apps) to serve both trail managers and the hiking public, making it a comprehensive solution for modern trail management.

5.2 Switzerland: Development of an Assessment Methodology for Hiking Trails – Flavia Bürgi

As presented by Flavia Bürgi, mountain hiking remains a significant safety concern with 40,000 injuries and 54 deaths reported every year. A key issue identified is the "mismatch" between hikers' capabilities and trail difficulties. The BFU (Swiss Council for Accident Prevention) is working on improving mountain safety through better information on trail requirements.

To address this, BFU has developed a new evaluation system that separates trail assessment into two distinct aspects: technical difficulty and danger level. Both use a 1-5 scale, but measure different criteria:

- **Technical difficulty** evaluates practical hiking challenges like ground conditions, obstacles, and path steepness - essentially the risk of stumbling or slipping.
- The **danger level** mainly focuses fall hazards, considering factors like the risk of sheer drop.

This system has been field-tested on 30 different hiking trails with four different assessors, showing promising consistency in evaluations. The study found that standardized assessment criteria led to reliable ratings across different evaluators.

Looking ahead, BFU plans to build a comprehensive database of trail information and develop tools for both trail managers and hikers. The ultimate goal is to provide clearer, more detailed trail information that helps hikers make better-informed decisions about which trails match their abilities, thereby reducing accidents and improving overall mountain safety.

This initiative represents a shift from traditional trail marking systems to a more detailed, nuanced approach to trail information and safety assessment.

6. PARALLEL WORKSHOP SESSIONS

Section 6 highlights the four parallel workshop sessions held in the afternoon of the Stakeholder Day. Participants had the opportunity to engage in one of the interactive workshops, each focused on selected topics. The sessions aimed to share insights on regional activities, discuss practical experiences with existing solutions, and identify challenges and requirements for the chosen topics. Additionally, the workshops explored opportunities to integrate potentially relevant datasets into the Open Data Hub and the DIGIWAY-Product.

6.1 #1 Digital Solutions for Trail Closures – Lucia Felbauer, Klaus Pietersteiner

The workshop "#1 Digital Solutions for Trail Closures Management" aimed to explore and enhance digital systems for managing trail closures across the regions of Tyrol, South Tyrol, and Trentino. Approximately 20 stakeholders (see Figure 9) from diverse backgrounds participated to explore existing solutions, share knowledge, and brainstorm improvements for digital trail management systems. The event, facilitated by Lucia Felbauer (Tyrol), featured by regional experts of already available trail closure systems: Tyrol's 'contwise infra' by Christoph Kovacs and Johannes Köck, South Tyrol's 'maps' system by Renate Marmsoler, and Trentino's SAT system by Arianna Sommadossi.

Figure 9: The participants got to know each other by answering questions with yes (green) or no (red) through linked topics on trail closure systems.

6.1.1 Overview & Introduction

The workshop opened with an introduction on trail closure systems and the DIGIWAY project's role in this area (see Figure 10).

Figure 10: Planned DIGIWAY activities related to trail closure systems.

Experts from each region presented the key features and workflows of their systems, explaining how they manage trail closures and communicate the closures to users (see slides through download link in Section 1). This session clarified DIGIWAY's objectives, including encouraging regional systems to provide APIs for integration the data on trail closures to the Open Data Hub and the DIGIWAY-Product (WP2).

6.1.2 Hands-On Mapping: Simulating Trail Closure

Participants worked in three groups, each engaging with one of the regional systems. They were tasked to perform a trail closure based on a simulated trail closure scenario on real-world events such as forest work, construction, or rockfalls on trails. Each group was guided by an expert, who helped them navigate through the system's features and answered open questions, see Figure 11. The participants worked with specific task sheets and reviewed the systems based on provided topics and questions focusing on each system's strengths and limitations (see slides through download link in Section 1).

Figure 11: Performing a closure for a cycling route in South Tyrol based on a scenario due to construction.

6.1.3 Experience Sharing & Group Discussion

After completing the hands-on mapping activity, each group presented their scenario and the system they worked with. Then they shared their experiences and presented the results of their review tasks. The facilitator guided the group discussion, collecting the key notes of each group in a table on a flipchart (see Table 1). The discussion centred on selected topics, highlighting the strengths and challenges observed in each system. This process fostered a shared understanding among participants. Differences between the systems became apparent, and the importance of enabling seamless integration and communication with other platforms and stakeholders emerged as a critical need.

Table 1: Review results comparing the three regional systems on selected topics (first column).

	Tirol / Tirolo	Südtirol / Alto Adige	Trentino / Trentino
B.1. Reichweite / Portata	OGD Echtzeit API vorhanden, Mehrere Stakeholder nutzen Contwise Systeme / API OGD in tempo reale disponibile, Diversi stakeholder utilizzano i sistemi Contwise	Bike Map Südtirol: Offene Daten mit Potential zur Verbindung, API Schnittstellen vorhanden, Bewusstsein für den bestehenden Automatismus ist vorhanden / Bike Map A.A.: Dati aperti con potenziale di connessione,	Keine automatische Kommunikation / no comunicazione automatica

	Tirol / Tirolo	Südtirol / Alto Adige	Trentino / Trentino
		Interfacce API disponibili, Consapevolezza dell'automatismo esistente	
B.2 Komplexität / Complessità	System hat / braucht 3 Schritte: 1. Erfassen: Digitale Affinität & Umgang mit Smartphone muss gegeben sein 2. Verifizierung: Vertrauen 3. Veröffentlichung: / Il sistema richiede / necessita di 3 passaggi: 1. Rilevamento: deve essere presente un'affinità digitale e un'adeguata familiarità con lo smartphone 2. Verifica: fiducia 3. Pubblicazione	System hat / braucht mindestens 4 Schritte: derzeitige Komplexität gering / Il sistema richiede almeno 4 passaggi: complessità attuale bassa	Hohe Komplexität, Viele Schritte, Lange Dauer bis zur Finalisierung / Complessità alta, Tanti passaggi, Lunga durata fino alla finalizzazione
B.3 Verantwortung / Responsabilità	Kommunikation zur "Empfehlung einer Wegsperre" durch das Contwise System bzw. deren App, Wegehalter verifiziert die Empfehlung und dieser spricht die "Sperrung" aus / Comunicazione per la "raccomandazione di chiusura di un sentiero" tramite il sistema Contwise o la relativa app, Il gestore del sentiero verifica la raccomandazione ed emette la "chiusura" ufficiale	Behörde führen das Anlegen und das Aussprechen einer Sperre durch / L'autorità esegue l'istituzione e la dichiarazione di una chiusura	Betreiber oder Zivilschutz / Soggetto gestore o protezione civile
B.4 Stärken / Punti di forza	Mobiles System / App, Vernetzung mehrere Stakeholder in einer Anwendung / Sistema mobile / App, Connessione di più stakeholder in un'unica applicazione	Tracing Funktion, um Sperre auf Karte zu zeigen, Kommunikation an Beteiligte, Internetbasiert, jeder kann dies Anwendung nutzen / Funzione di tracciamento per mostrare il blocco sulla mappa, Comunicazione ai soggetti coinvolti, Basato su Internet,	Genauigkeit bei der Identifizierung des Problems / Precisione nell' individuazione del problema

	Tirol / Tirolo	Südtirol / Alto Adige	Trentino / Trentino
		chiunque può utilizzare questa applicazione	
B.5 Einschränkungen / Limitazioni	Reichweite noch zu gering, Digitale Affinität / Motivation muss vorhanden sein / Portata ancora troppo limitata, Deve esserci affinità digitale/motivazione	Mobil schwer / nicht nutzbar (Eingabe) / Difficoltà di utilizzo su supporto mobile (inserimento)	Langsamkeit, Zu viele Schritte / Lentezza Troppi step
B.6 Verbesserungen / Miglioramenti	Reichweite / Portata	Eingabe intuitiver gestalten, Mobile Nutzbarkeit schaffen, Doppelte Eingabe vermeiden, Informationsdichte sehr groß / Rendere l'inserimento più intuitivo, Garantire la fruibilità su dispositivi mobile, Evitare il doppio inserimento, Densità informativa molto alta	Einheitliche gemeinsame Plattform / Piattaforma unica condivisa

6.1.4 Identifying Key Factors & Improvements

The next activity was a brainstorming session where participants proposed essential features for an effective trail closure management system. Drawing on their earlier experiences, participants identified key features, which the facilitator recorded in a DeepL document for immediate translation. The following key factors were identified:

- **User-Friendly Interfaces:** Simplified and intuitive designs to make the reporting and management of trail closures easier for all users.
- **Transparency:** Clear and transparent communication about trail closures, including the reasons for closures and the affected areas.
- **API Integration:** Development and promotion of APIs to facilitate seamless data sharing between different systems and platforms, ensuring broader user reach.
- **Real-Time Updates:** Fast and timely communication about trail closures to ensure users are informed as quickly as possible.
- **Reach:** Consideration of end-user locations and the most effective methods to communicate trail closures to them - delivering information where it is needed.
- **Offline Functionality:** The ability for users to report or access closure information even when an internet connection is unavailable.

- **Integration with Major Platforms:** Identifying widely used platforms and incorporating trail closure information through APIs or other methods. This should aim for at least European-level integration to ensure broader accessibility and reach.

6.1.5 Next Steps

To conclude the session, participants were encouraged to continue collaborating to enhance their regional systems and share their experiences with one another. **They were asked to provide access to their data through APIs, enabling integration to the DIGIWAY project and the Open Data Hub.** The workshop concluded with a call to action, urging participants to improve existing systems, make them more accessible, and develop them further, drawing on the insights and experiences gained during the workshop.

6.2 #2 Estimation of use and frequencies on hiking routes – Francesco Parente, Filipp Frei

The workshop, conducted on December 5, 2024, as part of the DIGIWAY project, addressed the estimation of hiking trail usage to support sustainable tourism and resource management in mountainous areas (see Figure 12). Its objectives included exploring existing methodologies, gathering stakeholder input, and identifying actionable strategies for better understanding visitor flows.

Figure 12: #2 Workshop group. On the right and on the left the two facilitators.

6.2.1 Overview and structure of the workshop:

The workshop was divided into four parts: an introduction, a review of current practices, a group discussion session, and concluding remarks. Technologies discussed included infrared sensors, applications like Strava and AllTrails, and diverse data sources, such as meteorological data, public transport statistics, and geospatial factors influencing outdoor activities. A notable case study from Montana's Bridger Mountains showcased a hybrid approach combining traditional sensors with app-based and environmental data to estimate trail usage more comprehensively.

6.2.2 Key Findings:

Participants recognized the critical importance of measuring trail usage as a basis for managing visitor impacts and maintaining natural resources. The workshop highlighted that current technologies can provide reliable data, but their integration with qualitative data—such as visitor behaviour and satisfaction—is necessary for nuanced insights. Suggested applications of this data include optimizing trail maintenance, managing visitor density, enhancing service quality, and mitigating conflicts between humans and wildlife.

Challenges discussed included ensuring the quality, accessibility, and interoperability of data while embedding these efforts within broader, strategically aligned initiatives.

6.2.3 Recommendations and Future Actions:

- Technological Adoption: Broader application of existing and innovative data collection tools, ensuring their reliability and scalability.
- Data Integration: Combining quantitative flow metrics with qualitative and environmental data for holistic decision-making.
- Collaboration and Open Data: Fostering partnerships between local authorities, park management entities, and other stakeholders while promoting open data sharing platforms.
- Strategic Planning: Embedding data collection within long-term sustainability projects to ensure cohesive and impactful outcomes.
- Education and Awareness: Developing training for trail managers and educational campaigns for visitors to emphasize the importance of data-driven management.

This workshop underscored the role of advanced data analytics in balancing tourism growth with environmental stewardship, aiming to enhance both visitor experiences and ecosystem protection.

6.3 #3 Mobility in the Mountains: Establishing a Living Lab in the EUREGIO – Sebastian Mayrgündter, Roberto Cavaliere

6.3.1 Action Plan: NEE5D: Cooperation with E5

The main aim of this group is to provide standardised, user-friendly information that is available to visitors before, during and after their hike along the E5 long-distance hiking trail (see Figure 13). This should help to make hiking safer and more enjoyable.

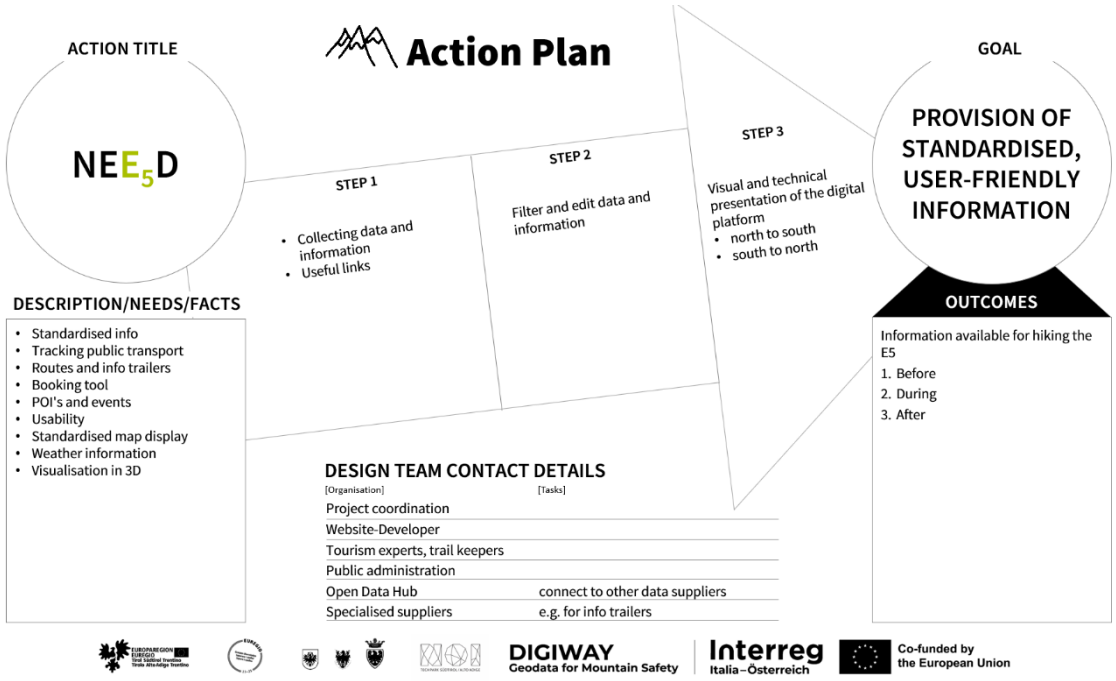

Figure 13: Action Plan describing the cooperation DIGIWAY – E5

The desired result is the creation of a digital platform that serves as a central point of contact for hikers. This platform will offer the following functions:

- Access to up-to-date route information and maps
- Possibility to book tours and accommodation
- Information about POIs and events along the way
- Real-time weather data and safety information

This action plan is expected to strengthen co-operation between the partners and create a comprehensive solution that meets the needs of hikers while increasing safety along the E5 long-distance hiking trail.

OPPORTUNITY FOR DIGIWAY: By working together, the DIGIWAY project and the E5 Hiking Trail project have the potential to create a truly exceptional and safe hiking experience for visitors to the

Euregio region. The projects "E5 Green & Digital" and "DIGIWAY - Geodata for Safety in the Mountains" have identified several synergies:

- **Digitalization and Sustainability:** Both projects use digital technologies to promote sustainable tourism. "E5 Green & Digital" aims to make the tourist offer along the E5 hiking trail more attractive through digitalization, while "DIGIWAY" focuses on harmonizing and validating geodata to improve mountain safety.
- **Infrastructure Improvement:** Both projects aim to improve tourist infrastructure. "E5 Green & Digital" plans to develop tourist packages and improve infrastructure along the E5, while "DIGIWAY" tests technological solutions to enhance mountain safety.
- **Cross-Border Collaboration:** Both projects promote collaboration between different regions and partners. "E5 Green & Digital" connects tourist offers in North and South Tyrol, and "DIGIWAY" creates a platform for data exchange between Tyrol, South Tyrol, and Trentino.
- **Use of Geodata:** Both projects use geodata to achieve their goals. "E5 Green & Digital" captures points of interest (POIs) along the E5, while "DIGIWAY" harmonizes and validates geodata to increase the safety of mountaineers.
- **Stakeholder Involvement:** Both projects emphasize stakeholder involvement. "E5 Green & Digital" develops tourist packages with the involvement of service providers and local centers, while "DIGIWAY" creates a platform where the public, businesses, researchers, and institutions can collaborate.

These synergies show how both projects can contribute to promoting sustainable tourism and safety in the region through shared goals and approaches.

6.3.2 Action Plan: Val Di Fassa goes real

"Val di Fassa Goes Real" aims to develop a platform that utilizes real-time data to improve safety and sustainability in mountaineering within the EUREGIO region. The project will focus on collecting and visualizing data on various aspects, including trail usage, weather conditions, and public transport schedules. Key outcomes include a user-friendly application prototype and the availability of real-time data for third parties such as researchers and tourism stakeholders. The project will prioritize data source selection and develop a comprehensive data strategy to ensure data accuracy and reliability. The action plan (see Figure 14) involves scouting technologies, integrating existing data sources, and developing AI models for predictive analysis and personalized recommendations. Extensive user feedback will be gathered through usability testing and stakeholder engagement to refine the prototype and ensure it meets the needs of mountaineers and promotes a sustainable tourism experience.

Figure 14: Action Plan for a platform for real-time data on trails

Key Benefits of VAL DI FASSA GOES REAL

- **Enhanced Safety:** Real-time data provides timely warnings and updates, ensuring hikers are well-informed about trail conditions, weather, and potential hazards.
- **Sustainable Mountaineering:** By monitoring visitor flows and trail usage, the platform helps manage and reduce environmental impact, promoting sustainable practices. Real-time public transport schedules and route information facilitate travel to and from hiking destinations.
- **Improved Planning:** Access to information on lift and cableway hours, public transport, and hut openings allows for better trip planning and coordination. Data-driven insights can improve decision-making related to tourism development and environmental protection.
- **User Empowerment:** The user application prototype offers hikers essential services and data, enhancing their overall experience and confidence. Personalized recommendations for trails based on individual preferences and fitness levels can improve the experience.
- **Data Availability:** Making data available to third parties supports broader research and development efforts, fostering innovation in sustainable tourism and mountaineering. Real-time data on visitor flows can help optimize resource allocation and manage crowds effectively

These benefits collectively contribute to a safer, more enjoyable, and environmentally responsible mountaineering experience in Val di Fassa.

OPPORTUNITY FOR DIGIWAY: The "VAL DI FASSA GOES REAL" action plan has the potential to significantly enhance the visitor experience, improve safety, and promote sustainable tourism practices in the EUREGIO region. By leveraging real-time data and innovative technologies, the project

can create a win-win situation for all stakeholders, from hikers and mountaineers to local businesses and authorities.

6.3.3 Action Plan: START TRAIL

The START TRAIL action plan (see Figure 15) aims to enhance search and rescue operations on the E5 trail by integrating an Unmanned Aerial System (UAS) into existing rescue protocols. The goal is to reduce average rescue time and the number of rescuers needed by 20%. Mountain rescue teams will fly the entire E5 route in South Tyrol, defining optimal routes and identifying suitable take-off and landing sites. UAS recordings will be used for route evaluation and verifiability. The plan outlines the use of an innovative UAS equipped with features like Lifeseeker, extended range, and Starlink for faster location, scene assessment, and remote patient support. Data collected from the UAS will be analyzed to improve future rescue operations and provide data for development of safe alpinism. As a follow-up project, AI algorithms will be employed to analyze the collected data to further optimize routes and identify potential hazards. The action plan includes steps for regulatory compliance, flight planning, risk mitigation, and usability testing.

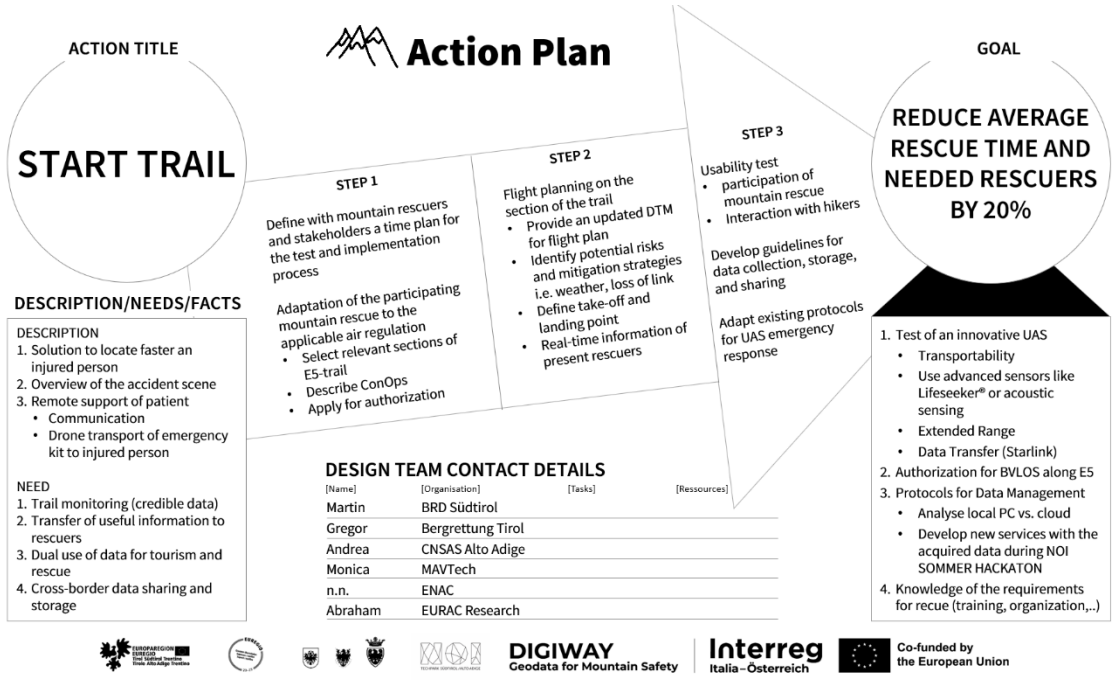

Figure 15: This highlights the key objectives, methods and expected outcomes of the START TRAIL action plan.

Key aspects:

- **Focus on innovation:** Utilizes advanced UAS technology.
- **Multifaceted approach:** Addresses location, assessment, rescue, and communication.
- **Data-driven:** Leverages data for improved operations and tourism.

- **Human-centered:** Includes training, coordination, and community engagement.

OPPORTUNITY FOR DIGIWAY: The START TRAIL action plan has the potential to significantly enhance the DIGIWAY-Project by providing high-quality geodata, improving risk assessment and communication, enabling the development of new services, and promoting cross-border data exchange. The project can serve as a testbed for developing AI-powered algorithms for analyzing geospatial data, such as predicting avalanche risks and identifying optimal rescue routes.

6.3.4 Action Plan: Hiking trail classification

This project idea aims to develop a standardized and user-friendly system for classifying hiking trails in South Tyrol, Italy (see Figure 16). The goal is to create an interregional classification model that is simple and intuitive for hikers to understand. The classification will use a combination of color-coding and symbols to indicate trail difficulty, potential hazards, and special features. The project will involve collaboration with stakeholders, data collection and analysis, and public engagement through a crowd-sourced reporting system. The final outcome will be an open data hub providing hikers with easy access to trail information and enhancing their overall hiking experience.

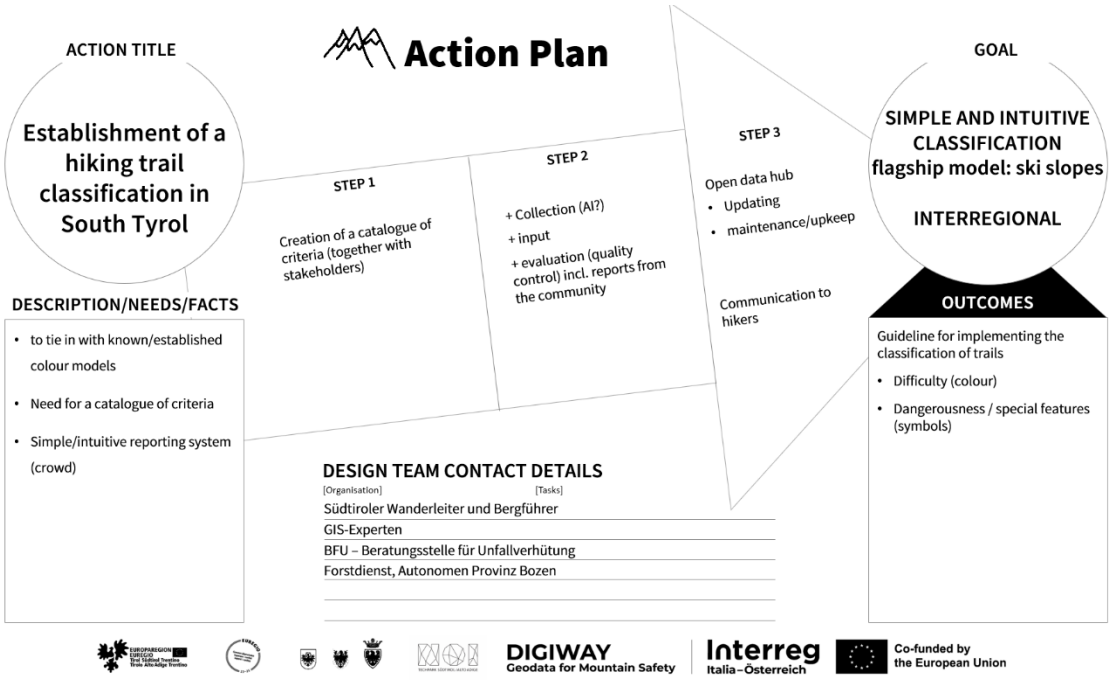

Figure 16: Action Plan for the establishment of a trail classification

OPPORTUNITY FOR DIGIWAY: Combining the project idea with DIGIWAY could not only improve the quality and reach of your initiative, but also make a valuable contribution to the safety and user-friendliness of hiking trails in the region.

- **Data integration** (harmonisation of geodata): DIGIWAY's planned cloud-based web service could serve as the technical basis for the development and exchange of your classification data.
- **Open Data Hub**: Utilising the NOI Techpark's Open Data Hub can increase visibility and access to relevant administrative data that is important for your classification.
- **Interdisciplinary collaboration in the Euregio Living Lab**: The project idea could be implemented in the framework of the Euregio Living Lab, where different stakeholders, including the public, can work together to develop and test the classification.
- **Safety improvements**: With the technological solutions tested in the DIGIWAY project, innovative approaches to improve safety on hiking trails could be developed and implemented.

6.4 #4 Alpine Trails – The Practitioners' Perspective! – Walter Würtl

6.4.1 Introduction

Alpine trails are the backbone of mountain tourism and are therefore of great importance. Due to massive changes in the natural environment, and also due to changes in user behavior and demands, it is becoming increasingly difficult to keep the trail infrastructure in good condition.

Basically, we can say that we are in a field of tension characterized by the following points:

- a very dynamic natural environment (climate crisis)
- a large number of users with very different needs and conditions
- a historically grown infrastructure that is not very resilient to external influences and whose maintenance is not financed on a broad basis.

The aim of the workshop is to get to know the perspective of the "practitioners" (trail owners, alpine associations, ...) and thus the real problems in the different fields of work and activity. To achieve this, a total of 10 questions were formulated, which were then discussed in two working groups (one German-speaking, one Italian-speaking). The results were summarized on flipcharts and then presented to each other. Finally, the main results were presented in the "sum up session".

Figure 17: Participants sharing their results of the group work in a collaborative discussion facing current questions on alpine trail infrastructure.

6.4.2 Worked on following questions – Results

<u>Question 1:</u> How difficult is it to find staff (especially in the voluntary sector)?

- Projects / areas of work are getting bigger and more difficult, tasks are changing towards more comprehensive care of trails and users.
- The number of volunteers in associations is decreasing, making it harder to find workers.
- Bureaucracy is growing!
- Funding is getting harder!

In general, the difference between the trail infrastructure of Tyrol, South Tyrol and Trentino is very large in terms of the extent and "quality" or maintenance of the trails. There are also great differences in the way trails are developed and made accessible in the different countries, as there are no binding (uniform) standards and specifications. Purely tourist projects are often associated with "staging" and are extremely elaborate. Some old trails lose their significance and are abandoned.

<u>Question 2:</u> Is there a fear of liability on the part of trail owners?

- There is a general concern about liability after accidents! This also applies to natural hazards. Discussions about the liability of trail owners are often based on completely false ideas and thus spread fear. There are also complaints about the lack of personal responsibility, the delegation of responsibility and the comprehensive insurance mentality on the part of the users, which then manifest themselves in court cases.

Question 3: How difficult is it to maintain or renew trail infrastructure?

- Funding is always a challenge! Safety is often used as an excuse for new construction projects, even to build attractions (e.g. suspension bridges, viewing platforms, ...). In fact, it is easier to organize funding for a "suspension bridge" than for a normal hiking or mountain trail!
- Nature parks (national parks) tend to want to abandon trails, while tourism (tourism associations) also want to build new trails. The alpine associations face great challenges in maintaining their large network of trails and are generally not interested in new trails!
- In any case, it is becoming increasingly difficult to maintain trails in the high Alps due to the significant changes in the natural environment!

Question 4: Are there more accidents on hiking trails now than in the past?

- Definitely "YES"! Simply because more people on the mountains means more accidents, even when no injuries occur—often it is “just” exhaustion. The Mountain Rescue Service itself is also much more prone to carry out rescue missions than it used to be. The fact that most users have insurance that covers the costs of rescue operations also leads to more rescue operations.

Question 5: Are the changes in user behavior in the mountains a problem?

- "YES"! Social media trivializes dangers and encourages ‘stupid’ behavior. Bad behavior (e.g. using bad equipment in high mountain areas) becomes common practice.
- So-called "Instapoints" that attract large crowds are also a big problem.

Question 6: What problems do animals (cows, bears, ...) cause on the trails?

- The biggest problem is grazing livestock, especially in combination with visitors walking with dogs. There is a need for extensive education on correct behavior. There is a great fear of liability among farmers due to "cow attacks". Livestock guarding dogs are also a problem for hikers.
- The large bear population in Trentino has led to changes in user behavior, with some areas being avoided.
- In general, ticks and dangerous insects (climate crisis) are a greater threat than large predators.

Question 7: How does mass tourism affect hiking and mountain trails?

- Due to the large number of users, there is more and more garbage and feces in the sensitive natural areas of the mountains.

- With more and more people, the level of development of the trails has to increase, which also increases the maintenance effort and the degree of liability.
- Conflicts of use with nature conservation, hunting, agriculture and forestry as well as the local population increase! Acceptance for tourism activities is decreasing!

Question 8: Are there more and more official closures of hiking and mountain trails?

- Rather not! If there are closures, it is usually on the part of landowners (agriculture, hunting, forestry, ...). Sometimes closures are also due to fear of liability on the part of public officials (e.g. mayors).

Question 9: Are there really more and more natural hazards in alpine areas and forests and what can be done about it?

- Yes! Due to the climate crisis, there are significantly more incidents of damage on hiking and mountain trails, which also involve high costs and effort.
- As nothing can be done against natural events (in the short term), there is a need for better awareness and more personal responsibility on the part of users, especially in terms of preparation and behavior. This is also because the preventive closure of paths will not be a solution in the future.
- The more exposed a trail is, the more likely it is to be affected by natural hazards, as the natural environment changes very dynamically, especially in the high mountains. Melting glaciers often require the construction of new trails.
- Comprehensible risk communication is becoming increasingly important for trail owners, as natural events can never be 100% ruled out.
- The risk situation in the forest is also increasing massively, as the condition of the forest deteriorates due to storms, snow breakage, pest infestation, erosion, ... Even ecologically valuable dead wood can become a danger to hikers!
- Fear of liability on the part of forest owners (forest edge liability) often leads to the closure of trails.

Question 10: What are the dangers of digital maps and digital tour portals?

- The biggest danger is "false information", especially from non-curated authors. This misinformation can lead to accidents, which can then have a negative impact on the users of trails.
- Another danger is the increase in frequency (overtourism) and the negative effects this can have.

7. NEXT STEPS IN DIGIWAY

As of January 2025, the INTERREG project DIGIWAY will reach its halfway point. The first step involves documenting the experiences from the Stakeholder Day, which will be analyzed and discussed at the beginning of the year during a Steering Group meeting. It is crucial that the findings are also shared with the participants of the Stakeholder Day.

Subsequently, the insights must be integrated into the individual work packages of the project, while simultaneously planning the long-term perspective for collaboration within DIGIWAY—specifically, the period beyond the conclusion of the INTERREG project in January 2026.

A central event is planned for autumn 2025 and winter 2026 to present and discuss the progress and results of the DIGIWAY project. In addition to showcasing the milestones achieved, an open forum will be established for discussions and feedback to strategically guide the further development of the project. Experts, stakeholders, and the general public are warmly invited to actively participate and share their perspectives.

8. FEEDBACK FROM THE PARTICIPANTS

To gather essential insights into participant satisfaction, a set of feedback questions was sent to all registered attendees of the Stakeholder Day. A total of 28 participants responded, providing valuable feedback. The insights and conclusions presented below are based on their responses.

The purpose of this survey is to collect valuable input that will help guide the future activities of the DIGIWAY project and ensure that we align our efforts with the expectations of the participants.

Additionally, the feedback will allow us to identify areas for improvement and make necessary adjustments to better serve the needs of the community moving forward. Here are the results of the feedback form sent:

8.1 General Feedback

Overall Satisfaction with Event Organization:

- 1 person was "very dissatisfied" (3.6%)
- 4 people were "rather satisfied" (14.3%)
- 23 people were "very satisfied" (82.1%)

Satisfaction with Content (Morning Session):

- 1 person was "very dissatisfied" (3.6%)
- 7 people were "rather satisfied" (25%)
- 20 people were "very satisfied" (71.4%)

Satisfaction with Content (Workshops):

- 1 person was "very dissatisfied" (3.6%)
- 11 people were "rather satisfied" (39.3%)
- 16 people were "very satisfied" (57.1%)

8.2 Feedback on Workshops

Workshop 1: "Digital solutions for trail closures"

- 6 "very satisfied" (54.5%)
- 4 "rather satisfied" (36.4%)
- 1 "very dissatisfied" (9.1%)

Workshop 2: "Estimating the number of visitors on hiking trails"

- 3 "very satisfied" (75%)
- 1 "rather satisfied" (25%)

Workshop 3: "Mobility in the mountains: Setting up a living lab in the EUREGIO"

- 5 "very satisfied" (62.5%)
- 3 "rather satisfied" (37.5%)

Workshop 4: "Alpine Trails - The View of Practitioners!"

- 2 "very satisfied" (40%)
- 3 "rather satisfied" (60%)

8.3 Project Perception

24 out of 28 (85.7%) participants believe that the DIGIWAY project will definitely add value to the community, while 4 (14.3%) were uncertain.

All participants expressed interest in receiving updates and information about future events related to the project.

Interest in Contributing to the Project:

50% of the respondents do not wish to contribute directly, while the other 50% are keen to contribute with their expertise in alpine matters (e.g., alpine clubs, IT, data processing) and share relevant information and data from their respective organizations.

Expectations for the DIGIWAY Project:

Participants expect the DIGIWAY project to improve mountain safety, hiking planning, and collaboration among the various stakeholders in the alpine sector. Specifically, there is a strong interest in creating a unified platform that provides access to reliable geo-localized information and data, usable across all regions involved in the project. Another key expectation is the standardization of trail information, such as difficulty levels, to ensure that it is easily understandable and consistent throughout the Euregio. Additionally, participants are looking for the development of innovative digital solutions that enhance the mountain experience and safety, while improving communication between different parties involved (such as alpine clubs, rescue services, and tourism providers). Another important aspect is the creation of a shared, up-to-date database that can be used by all stakeholders to access precise, reliable, and regularly updated information on trails and infrastructure.

Possible Contributions to the DIGIWAY project:

The responses highlight several potential contributions to the DIGIWAY project, including the sharing of geographic data (GIS Data and datasets accessible through OGC services like WMS, WMTS, WCS, and WFS), cartographic content and expertise in mountain safety that could benefit the project. There is also interest on the workshop topics (e.g., hiking trail classification) and on future collaboration with the project.

Additional remarks:

The additional remarks reflect positive engagement and interest in the DIGIWAY project, with a strong emphasis on collaboration and coordination among Euregio partners. The exchange of ideas was seen as motivating, with hopes that the vision shared during the event could translate into concrete actions. Only one participant expressed uncertainty about the specific goals of the project.

There was particular support for aligning the project with the European Long-Distance Hiking Trail E5 and interest in collaborating on trail-related aspects, such as GPX track verification (CAIS's SOSEC).