DeloitteStiftung

Initiative D21

DIGITAL FUTURE CHALLENGE

DFC #6 – Use Case aconium

aconium GmbH

USP of aconium: Berlin-based aconium GmbH sees itself as a bridge builder between administration, politics, and technology. The company combines technological expertise with in-depth knowledge of the challenges of regional development and municipal structures. With experience in broadband, mobility, smart region projects, and subsidy management, aconium uses AI-supported documentation software and other innovative solutions in a practical way. Its particular added value lies in a holistic approach that combines technical feasibility with transparency, participation, and social acceptance.

Employees: 380

Industries: Consulting / Digitalization / Regional Development

Thematic focus of the use case

Robotics

TITLE OF THE USE CASE

Smart Countryside Scouts: Robots document infrastructure in public spaces

SHORT DESCRIPTION

Local authorities are facing bottlenecks in surveying, documentation, and communication when it comes to expanding fiber optics, energy, and mobility. Incomplete cable and environmental data are particularly problematic. The use of robotics in public spaces—such as ground radar and LiDAR scans—can systematically capture infrastructure and environmental data and make the results transparent via dashboards. This makes infrastructure planning more efficient and at the same time strengthens trust in technology.

#HASHTAGS

#SmartRegion #DigitalCountryside #RoboticForAll #FutureOfInfrastructure

PRACTICAL EXAMPLE

DESCRIPTION OF THE ORGANISATION

aconium GmbH, based in Berlin, supports the public sector in project development in the areas of digitalization, energy, mobility, and education. Its core business is consulting and implementing projects that prepare municipalities, counties, and companies for the future.As a bridge builder between administration, politics, and digitalization, aconium combines in-depth knowledge of the challenges of regional development with technological expertise. Its target groups are primarily municipalities, specialist agencies, state and federal ministries, and partners from industry and research. As an independent moderator between the public sector and industry, aconium ensures that technological feasibility is always linked to social acceptance.

Digital transformation should benefit all people and regions. aconium is committed to ensuring infrastructure equity, especially in rural areas. In view of incomplete infrastructure data, scarce resources in municipalities and the construction industry, and growing demands for transparency and trust, we are working on solutions that create equal living conditions and strengthen innovation capabilities.In addition to supporting traditional infrastructure projects, aconium is increasingly focusing on digital tools such as AI-supported documentation software, open data platforms, and smart mobility and energy concepts. This results in solutions that combine technical innovations with practical (administrative) processes.

VISION OF THE ORGANISATION

aconium GmbH pursues the vision of shaping digital transformation in such a way that regions—especially rural areas—remain sustainable, resilient, and livable. Digitalization should not only accelerate technical processes, but also open up new opportunities for participation for all people. This includes self-determined living in old age, inclusive action in administration and society, digitally empowered citizens, and a culture of openness to innovation.Ethical considerations are a central component of our digital strategy. We see digitalization as a tool for strengthening transparency and trust, promoting democratic participation, and shaping cooperation between the public sector, business, and society on an equal footing.

Technology should not divide, but rather connect – through fair access, barrier-free solutions, and a clear focus on the common good.In the long term, we want to support regions in intelligently networking the potential of digitalization and transforming it into sustainable structures. We see digitalization as an opportunity to develop the courage to embrace new business models, bring innovation to life at the local level, and thereby strengthen not only the competitiveness but also the democratic stability of our society.

PROBLEM SETTING

Local authorities are simultaneously pushing ahead with fiber optic, energy, and mobility projects. Bottlenecks arise in surveying, documentation, and citizen communication—particularly due to incomplete pipeline and environmental data.

To meet these challenges with a forward-looking use case, we have notified the **Smart Country Scouts**, who are recording pipelines and data in public spaces and thus preparing efficiently for expansion:

1. Autonomous systems (robotics) with ground radar and LiDAR technology record cables in project areas (routes for infrastructure cables such as sidewalks, roads, squares), even in hard-to-reach locations.

2. AI systems evaluate the recorded data and create digital images ("twins").

The **Smart Country Scouts** accelerate planning processes for municipalities and specialist companies and support construction companies by improving planning reliability: from efficient reconnaissance of project areas and rapid digital (re)recording of existing infrastructure to support through automated construction documentation.

Self-driving robots in the project area touch on the everyday perceptions of citizens. It is therefore important to generate understanding for innovation and avoid concerns about surveillance by robotics.

Stakeholders involved:

Local authorities (efficiency, less bureaucracy), construction and telecommunications companies (better documentation, risk minimization), citizens (transparency, concerns about surveillance)

QUESTION AND TASK

Your task is to design (walking or driving) robots using technologies such as ground radar or LiDAR that can be used in public spaces.

Think beyond pure efficiency gains: social issues such as transparency, acceptance, and feasibility are also important. Develop creative, responsible, and practical concepts based on the following key questions:

1. How could Smart Country Scouts be designed to systematically record existing infrastructure in public spaces? (Technical requirements, equipment, walking or driving robots, access to hard-to-reach areas)

2. How can the recorded heterogeneous data (radar, scan, photo/video, etc.) be evaluated in such a way that valid digital twins for fiber optic or energy projects are created?

3. What forms of human-robot interaction promote trust and acceptance among citizens?

ADDITIONAL BONUS QUESTION

How can transparency and participation prevent robotics from being perceived as surveillance?

ADDITIONAL

For example, existing guidelines, previous efforts and strategies for responsible AI, digital ethics or digital responsibility.

The idea behind **Smart Country Scouts** builds on existing robotics solutions that have already been tested in pilot projects. The difference to previous approaches is that robotics is not only used selectively, but is intended to move freely in public spaces – for example, to record existing infrastructure or to explore a construction site. The scouts interact directly with citizens, for example when encountering them on sidewalks.

Current areas of activity in the field of data collection and robotics in infrastructure development are listed below:

Autonomous drone docks (BVLOS flights)

In Germany, the first operating license for the DJI Dock was granted in 2023. This enables recurring, fully automated flights, for example to document construction sites. Manufacturers and partners are working on an EU-wide path for BVLOS (Beyond Visual Line of Sight) and are demonstrating initial applications for digital construction logs.

Source: www.flytbase.com/blog/eu-drone-regulations-for-bvlos-operations

Quadruped robots on construction sites

Robots such as Boston Dynamics' "Spot," combined with Trimble sensor technology, run standardized routes on construction sites, create 3D scans and digital twins, and compare this data with the construction plans (as-built vs. BIM).

Source: https://www.globalhighways.com/wh1/news/robot-dog-agreement-trimble-and-boston-dynamics

Pipe and sewage inspection

German suppliers such as IBAK and iPEK have been developing crawler and rehabilitation robots for sewer inspection and maintenance for years. This technology can be directly transferred to monitoring tasks in the course of fiber optic expansion and other civil engineering projects.

Source: https://ipek.at/

Ground-penetrating radar & subsurface mapping

GPR is being used in various smart city pilot projects to detect invisible pipes and update geodatabases. Initial mobile systems (on vehicles or robots), see, among others, Gesellschaft für Boden- und Raumordnung (GESBRO).

Source: https://www.gesbro.eu/