Project idea form - small projects

Version 2.1

Registration no. (filled in by MA/JS only) _____

Project Idea Form

Date of submission 03/06/2025

1. Project idea identification

Project idea name	Innovative Monitoring of Flood Embankments Using LiDAR and GIS Tools to Improve Safety and Resilience of Water Infrastructure in the Baltic Region
Short name of the project	GISLeveeScan
Previous calls	yes ◯ no ◉
Seed money support	yes ◯ no ◉

2. Programme priority

	2. Water-smart societies

3. Programme objective

	2.1. Sustainable waters

4. Potential lead applicant

Name of the organisation (original)	Politechnika Gdańska
Name of the organisation (English)	Gdańsk University of Technology
Website	https://pg.edu.pl/
Country	PL

Type of Partner	Higher education and research institution

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Which organisation(s) in the planned partnership take part in a project within the Interreg Baltic Sea Region Programme for the first time? Please list the respective partners.

Partner from Latvia
Name of the organisation (original) :Rīgas Tehniskā universitāte
Name of the organisation (English): Riga Technical University
Website www.rtu.lv
Country: Latvia
Higher education and research institution
Partner from Lithuania
Name of the organisation (original) : Vilniaus Gedimino Technikos Universitetas
Name of the organisation (English): Vilnius Gediminas Technical University
Website www.vilniustech.lt
Country: Lithuania
Higher education and research institution

5.1 Specific challenge to be adressed

Contemporary challenges related to climate change, increasing extreme weather events, and the ongoing urbanization of flood-prone areas require the implementation of modern, precise, and automated solutions for monitoring hydraulic infrastructure.
One of the key problems remains the lack of continuous and accurate supervision of the technical condition of flood embankments, which constitute the first line of defense against the effects of high water levels and floods. Undetected deformations, landslides, or leakages can lead to catastrophic consequences for the lives, health, and property of local communities, as well as for the natural environment. In response to these needs, the project proposes the use of modern geodetic techniques

to support institutions responsible for water management and the maintenance of flood protection infrastructure in Poland, Lithuania, and Latvia. The goal is to help these entities fulfill their mission in line with the principles of smart water management and sustainable development. The project will employ two complementary geodetic technologies: Airborne Laser Scanning (ALS) and low-altitude photogrammetry using Unmanned Aerial Vehicles (UAVs). The ALS method enables the rapid acquisition of high-resolution 3D data with a high point density, allowing for precise analysis of embankment geometry and the detection of even subtle changes in their surface. This is crucial for the early identification of potential structural threats. In turn, UAV photogrammetry allows for fast, cost-effective, and repeatable aerial imagery acquisition. After processing with advanced algorithms, this imagery enables the generation of orthophotos, surface models, and high-accuracy digital terrain models. The planned integration of data obtained from both methods and its automated analysis will provide a comprehensive geometric overview of the condition of flood embankments. Such an integrated monitoring system will support decision-making based on reliable empirical data, helping to implement smart water resource management principles and ensuring that actions align with the concept of sustainable water governance at a systemic level. The implementation of the project will contribute to building a society better prepared to respond to flood risks, support public institutions in the effective management of water infrastructure, and strengthen the socio-ecological resilience of riverine regions in the face of growing climate threats.

5.2 Focus of the call

The project directly supports the cohesive development of rural areas and small towns in the Baltic Sea region by enhancing flood protection, a key factor in the socio-economic stability of these communities. Many small settlements located along rivers face recurring flood risks, threatening not only infrastructure but also livelihoods—agriculture, local businesses, and public services. By implementing a modern, integrated levee monitoring system based on Airborne Laser Scanning (ALS) and UAV photogrammetry, the project enables early detection of deformations and potential hazards. This allows for timely preventive actions, faster emergency response, and reduced material and environmental losses. The solutions will be tailored to the actual capacities of local institutions, ensuring sustainable use beyond the project's lifespan. In doing so, the initiative fosters knowledge and technology transfer to peripheral areas, strengthening their ability to independently cope with climate-related crises. It reduces the development gap between urban and rural areas and contributes to building resilient, sustainable local communities across the Baltic Sea region.

6. Transnational relevance

Flood safety is a transnational challenge, especially in the Baltic Sea region, where many rivers cross national borders and the impacts of climate change affect all countries. Poland, Lithuania, and Latvia share similar geographical and hydrological conditions – lowland river areas protected primarily by earthen levees. These structures face aging, settlement, and limited monitoring, increasing flood risk. The project aims to develop innovative analytical tools for levee monitoring using airborne laser scanning (ALS) and UAV photogrammetry. These high-resolution data sets require advanced processing, including machine learning, to detect anomalies and structural changes over time. Transnational cooperation will enable comparison of the effectiveness of solutions across different environmental and administrative contexts, support joint algorithm testing and validation, and result

in a universal, scalable monitoring methodology. Standardizing data models and analytical procedures will facilitate the creation of a harmonized flood infrastructure monitoring system across the region. The project fosters knowledge exchange, joint workshops, and capacity-building for local water management institutions. It also enhances the impact and replicability of the results across the Baltic region. Ultimately, the initiative serves as a model for effective transnational collaboration in managing critical infrastructure and responding to climate change impacts, strengthening the resilience and sustainability of local communities across the Baltic Sea region.

7. Specific aims to be adressed

Building trust that could lead to further cooperation initiatives

The GISLeveeScan project is built on strong international cooperation, forming a foundation of trust between partners from Poland, Lithuania, and Latvia. Joint efforts—such as pilot implementation of innovative technologies and knowledge exchange—allow for mutual understanding of each country's water management systems. Regular workshops and field tests foster open communication and transparency, strengthening collaboration. By developing common monitoring standards and aligning flood risk management approaches, the project lays the groundwork for future initiatives in the Baltic Sea region. The shared experience and achievements inspire continued partnership beyond the project's scope.

Initiating and keeping networks that are important for the BSR

The project aims to establish and maintain durable cooperation networks among institutions managing water resources in the Baltic Sea region. Joint activities—from equipment inventory, through pilot implementations, to the development of recommendations and a handbook of good practices—foster the building of professional relationships and knowledge exchange. Regular meetings, workshops, and training sessions enable ongoing communication and strengthen bonds between partners, which translates into the effectiveness of actions and the durability of the established networks. The project promotes the transfer of knowledge and technology to peripheral areas, enhancing the region's capacity to independently address climate and hydrological challenges. The developed solutions and contacts will also be usable after the project's completion, forming a foundation for further joint initiatives in the BSR region.

Bringing the Programme closer to the citizens

The GISLeveeScan project, by improving flood safety, has a tangible impact on the lives of residents in riverine areas of the Baltic Sea region. Early detection of levee deformations and rapid response by emergency services help reduce flood risk, protecting citizens' property, health, and lives. The practical implementation of modern monitoring tools, adapted to the capabilities of local institutions, ensures the project's results are sustainable and directly useful for local communities. Training sessions and workshops for public institution staff strengthen local competencies, leading to more effective preventive and rescue actions. The project also raises public awareness about flood risks and the role of modern technologies in protecting the environment and infrastructure, bringing the program closer to citizens and their everyday needs.

Allowing a swift response to unpredictable and urgent challenges

A key aspect of the project is enabling rapid and effective response to flood levee damage. The integrated monitoring system, based on LiDAR and photogrammetry technologies, allows for real-time detection of damage that could lead to potential failures of hydraulic infrastructure. Automated data

analysis in the GIS environment enables immediate generation of reports and alerts for emergency services responsible for safety. As a result, preventive actions can be taken quickly, minimizing material losses and protecting residents' lives. The project strengthens the readiness of institutions to respond to crises and increases the region's resilience to the effects of climate change and extreme weather events.

8. Target groups

The main target group of the project consists of institutions responsible for water management and the maintenance of flood protection infrastructure, such as the State Water Holding Polish Waters and their counterparts in Lithuania and Latvia. These entities are directly responsible for the technical condition and maintenance of flood embankments, as well as for taking action in the event of flood risk. Their daily operational and strategic activities are closely linked to the challenge that the project aims to address. These institutions have the necessary technical resources to carry out tasks related to modern levee monitoring. In many cases, they already possess equipment such as drones equipped with LiDAR sensors and IT infrastructure that enables the processing and analysis of spatial data. Additionally, the staff of these institutions have basic knowledge of GIS tools, which creates real opportunities for implementing the project's outcomes in practice. The aim of the project is not only to design a monitoring system but also to test it in practice and to prepare institutions for its independent use. The project includes training sessions and practical workshops that will allow partners from individual countries to deepen their competencies in the use of LiDAR and photogrammetric data, data integration in the GIS environment, and interpretation of analysis results. As a result, the institutions participating in the project will gain real tools for systematic monitoring of the technical condition of flood embankments, which will directly contribute to increased safety for local communities and more effective planning of maintenance and investment activities.

	Please use the drop-down list to define up to five target groups that you will involve through your project's activities.	Please define a field of responsibility or an economic sector of the selected target group	Specify the countries and regions that the representatives of this target group come from.
1.	National public authority	Institutions responsible for water management and flood protection infrastructure, operating in the public sector, focused on hydrotechnical safety, maintenance, and risk prevention.	Representatives of this target group come from Poland, Lithuania, and Latvia, specifically from regions located within the Baltic Sea basin and areas at risk of flooding along major rivers.

9. Contribution to the EU Strategy for the Baltic Sea Region

Please indicate if your project idea has the potential to contribute to the implementation of the Action Plan of the EU Strategy for the Baltic Sea Region (https://eusbsr.eu/implementation/).

yes ◉ no ◯

Please select which policy area(s) of the EUSBSR your project idea contributes to most.

PA Secure
PA Hazards
PA Spatial Planning

The MA/JS may share your project idea form with the respective policy area coordinator(s) of the EUSBSR. You can find contacts of PACs at the EUSBSR website (https://eusbsr.eu/contact-us/).

☐ If you disagree, please tick here.

10. Partnership

The GISLeveeScan project brings together partners from Poland, Lithuania, and Latvia to improve flood safety in the Baltic Sea region through innovative LiDAR and GIS-based monitoring tools.The Polish partner (lead applicant) is responsible for overall project coordination, development of the monitoring methodology, and implementation of pilot studies in Poland. Lithuanian and Latvian partners (to be formally confirmed) will conduct similar activities in their territories, including field data collection, local testing, and integration of the system into national flood management practices.Involving Lithuania and Latvia is essential due to shared geographical conditions (lowland river basins, aging levees) and similar flood risks. Their participation will ensure that the tools and methods developed are applicable across different national contexts and can be scaled regionally.Partners from Lithuania and Latvia will:Select pilot levee segments for testing;Support UAV and LiDAR data collection and processing;Participate in training and capacity-building activities;Test the developed monitoring solutions in their institutions;Help integrate outcomes into local and national strategies.The project aims to engage public authorities responsible for water infrastructure in Lithuania and Latvia. These types of partners are best positioned to apply and sustain the developed solutions beyond the project, as they have both operational responsibility and technical capabilities (e.g. access to UAV/ALS technology and GIS systems).We are currently identifying the most suitable institutions in Lithuania and Latvia to finalize the partnership. Their inclusion will enhance the project's transnational impact and support the long-term goal of harmonized flood risk monitoring across the Baltic Sea region.

11. Workplan

The GISLeveeScan project focuses on the development, pilot testing, and institutional deployment of

an innovative levee monitoring system using LiDAR and UAV photogrammetry, integrated through GIS tools. The system aims to improve the safety, efficiency, and sustainability of flood protection infrastructure management in Poland, Lithuania, and Latvia.
The main activities include:
1. Needs analysis and resource mapping – assessing the equipment, competencies, and data availability of each partner to tailor the solution to local capabilities.
2. Development of measurement methodology – defining standardized procedures for UAV flights with LiDAR sensors and photogrammetric data acquisition.
3. Pilot testing in three countries – implementing and evaluating the system on selected flood embankment segments in each partner country. This includes drone flights, data collection, GIS-based integration, and analysis of surface deformation and potential structural risks.
4. Data processing system – creating semi-automated workflows for identifying anomalies in levee geometry, using both ALS and UAV data processed with GIS and potentially machine learning tools.
5. Capacity building – organizing training sessions and hands-on workshops for staff of water management institutions, focusing on the use of UAV and LiDAR data, GIS integration, and decision support tools.
6. Final outputs and guidelines – producing a good practice handbook and methodological recommendations for levee monitoring, tailored to institutions in the Baltic Sea Region.
The pilot actions are central to the project and will test the effectiveness of integrated ALS/UAV-based monitoring in real-world conditions. Each country will test the system on at least one levee segment, compare outcomes, and provide feedback for system improvement.
The project will actively involve the main target group: public institutions responsible for water management and flood protection infrastructure (e.g. Polish Waters and their counterparts in Lithuania and Latvia). These institutions will participate in all project stages: defining needs, selecting pilot areas, collecting data, evaluating results, and applying the tools in their workflows.
The final outcomes—a standardized monitoring methodology, data processing tools, and training materials—will be used by these institutions to implement systematic, data-driven levee monitoring practices. The solutions will enhance their ability to detect risks early, plan maintenance effectively, and increase flood resilience in vulnerable regions.
Through this approach, the project strengthens institutional capacity and supports the long-term goal of creating a harmonized, region-wide framework for flood infrastructure monitoring across the Baltic Sea region.

12. Planned budget

ERDF budget (planned expenditure of partners from the EU)	EUR 500,000.00
Norwegian budget (planned expenditure of partners from Norway)	EUR 0.00
Total budget (including preparatory costs)	**EUR 500,000.00**

13. Project consultation

Please indicate if you wish to have a consultation (online meeting) with the MA/JS to discuss your project idea	
	yes ◉ no ◯

14. Questions to the MA/JS

Questions related to the content of the planned project	*(max.1.000 characters incl. spaces)*
Questions related to budgeting and expenditure	*(max.1.000 characters incl. spaces)*
Any other questions	*(max. 1.000 characters incl. spaces)*

15. Additional information

(max. 1.000 characters incl. spaces)

Your account in BAMOS+

Please remember that to officially submit your application you need to access our electronic data exchange system BAMOS+. More information about the process of applying for your account in BAMOS+ you will find here:
https://interreg-baltic.eu/gateway/bamos-account