

Terms of Reference

Project: EU “Joint Monitoring for Environmental Protection in BSB countries” is aimed at solving common problems of nature parks and protected areas in the Black Sea Basin (BSB).

Post title: Smart Environmental Monitoring Expert

Duration: 5 September, 2020 – 30 April, 2022

Duty station: Regional Environmental Centre for Caucasus, Armenia

Background: The overall project objective is to contribute to increasing the level of availability of cross-border compatible environmental monitoring data and information in nature parks and protected areas in BSB. The major project outcome will be the creation of an intelligent platform for the collection, processing and analysis of environmental data via Web-based cloud service for automatic data collection from wireless sensor networks and Web-based cloud service for video content. An Online Monitoring System (OMS) for environmental data in BSB will integrate the measurement data and will serve as a platform for the dissemination of the collected information and data. The developed smart technologies and intelligent wireless sensor networks will also be used for conducting a monitoring of the condition of natural habitats and the availability of invasive species, and for distance observation of territories which are most dependent on climate change and anthropogenic influences. The project covers Nature Park Strandja, Bulgaria; Bioserve The Danube Delta, Romania; Dilijan National Park, Armenia and part of protected areas in Georgia.

Tracking the environmental parameters’ variation is essential in order to determine the quality of our environment. The collected data encompass important details for a variety of organizations and agencies. With the results of monitoring, governments can make informed decisions about how the environment will affect the society and how the society is affecting the environment. Internet of Things (IoT) is a concept and a paradigm that considers pervasive presence in the environment of a variety of things/objects that through wireless and wired connections and unique addressing schemes are able to interact with each other and cooperate with other things/objects to create new applications, services and reach common goals. Environmental monitoring applications of the IoT normally exploit sensors to aid in environmental protection by monitoring parameters like air or water quality and atmospheric or soil conditions. Furthermore, it can even include areas like monitoring the wildlife and their habitats.

The purpose of environment observation with drones is to create a web-based cloud service for data collection, processing, storage and archiving. Cloud web-based information system will have the following features:

- Web service to upload video files (video content) shot with drones;
- Ability to archive and store large volumes of video files;
- An Online Monitoring System (OMS) for access to measurement data, video content, and the state of the environment.

The developed smart technologies and intelligent wireless sensor networks will also be used for conducting a monitoring of the condition of natural habitats and the availability of invasive species, and for distance observation of territories which are most dependent on climate change and anthropogenic influences.

A cross-border team of researchers will be formed who will develop a common methodology for monitoring the condition of natural habitats and the availability of invasive species and conduct the monitoring. The methodology will guarantee the collection of compatible data and topical information about the location and size of damaged areas, the types of pressure and the evaluation of potential sources and forms of threat. Project will use distance methods (satellite/drone photographs) for territories most dependent on climate change and anthropogenic influences etc. For each nature park or protected area, permanent sampling control sites will be designated in which experts and volunteers will perform annual field observations.

A smart platform for collecting, processing and analyzing environmental data and data on biodiversity, on the quality of air and river waters will be created under the project. The data will be gathered through monitoring using drones and smart wireless sensor networks, video capture and analysis of zones which are most dependent on climate change (satellite and drone photos).

Based on the collected monitoring information we will develop a Report on the assessed existing and potential sources and forms of pressure on key areas within protected territories of the Black Sea Basin and a List of proposed measures to be undertaken towards pollution preservation and restoration of the monitored key areas.

Expected Outcomes and Deliverables:

The Smart Environmental Monitoring Expert is responsible for the following outputs:

- Develop the technology for monitoring the environment with drones and its practical realization in the nature parks and protected areas of the Black Sea Basin.
- Develop the methods and algorithms for use of drones in forest monitoring, logging, consequences of natural disasters and calamities;
- Provide support in selection of the drones, cameras, sensors, remote controls, batteries and specialized equipment.
- Provide training of Drones Pilots for their use for environmental monitoring according to the developed methodologies.
- Train the National Park's personnel to upload and process video content (video files) to a cloud WEB-based service.
- Develop, test and use of cloud information system for collecting, processing and storing data from drones and wireless sensor networks.
- In the framework of this activities will be developed distance learning course which will introduce the main principles behind UAV flight control, data capture, and image processing and data interpretation through a set of practical case studies.
- Lead development and implementation of technical aspects of activities nationally;
- Respond to technical inquiries related to project work;
- Represent the project and give presentations at conferences and workshops, when necessary;
- Advice and support enhancing the compatibility of data and metadata structures with related systems, standards or regulations;
- In collaboration with team, develop and apply procedures and technology for environmental monitoring. With the help of this technology, video content will be produced which will lead to new knowledge on climate change and its impact on the environment, monitoring of vegetation, forests, mammals and birds in difficult-to-reach areas. The sources and means of verification (MoV) are contracts and reports of experts, screenshots, pictures, data collected, developed analyzes, progress reports etc.
- In collaboration with team conduct 3 online courses, among them design one course curricula for topic "Introduction of the main principles behind UAV flight control etc. flight control etc. through a set of practical case studies",
- Provide training for partner's personnel to upload and process video content to a cloud WEB-based service MoV to collect and report on the output are programmes materials, list of participants, contracts with the trainers' feedback from participants, pictures publications on website of the project, progress reports etc.
- Development and submission of regular progress/final reports (once in each four month) required as per project timeline delivery schedule.

Required Qualifications:

- Degree from accredited university in Geography, GIS Information Systems, Natural Resource Management or another related field;
- Minimum of three years of professional experience relevant in GIS and data management;
- Experience with provision of training on using Drones Pilots for environmental monitoring according to the smart environmental monitoring methodologies used in the project,
- Experience with producing video content generating new knowledge on climate change and its impact on the environment, monitoring of vegetation, forests, mammals and birds,
- Experience in development of distance learning courses introducing the main principles behind UAV flight control, data capture, and image processing and data interpretation through a set of practical case studies,
- Proficiency with GIS software, including ESRI tools such as ArcGIS Online, ArcGIS Desktop, ArcGIS Enterprise and ArcGIS Hubs;
- Strong analytical skills;
- Understanding and experience in GIS mapping and biodiversity/forest sector in Armenia;
- A demonstrated willingness to take initiative and get things done with little guidance;
- Strong interpersonal skills and ability to work with teams of individuals and colleagues from different cultures and in different time zones;
- Ability to travel internationally and organize training events.

Languages: Fluency in Armenian (writing, reading, speaking) is necessary. Proficiency in English (writing, reading, speaking) is also necessary.