

Is there any Role for Surveyors in Sustainable Environment Management? Case Study of the Silva Nympha Polish-Turkish Project on Sustainable Forest Use and Management

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SUMMARY

Traditionally, surveyors are associated with map-making, land subdivisions, construction works, quantity surveying, and less so with environment management, which involves monitoring environmental variables, decision-making, and even prediction of the future state of the environment. However, the recent development of new surveying-grade tools, including Light Detection and Ranging (LiDAR), GNSS receivers, robotic total stations, drones, and datasets, including the state-of-the-art multispectral/hyperspectral aerial/satellite images, invites surveyors to become active agents participating in multidisciplinary teams in charge of the environment business. Many new tools and datasets for environment management join the latest technology, the Internet of Things (IoT), and the rapidly developing artificial intelligence (AI). The presentation will demonstrate a setup and the first results of deploying the aforementioned tools and technologies for “Sustainable use and Smart Forest Management,” which is the title of the Polish-Turkish research, Silva Nympha for short. Silva Nympha is a two-year project funded by the Polish National Centre for Research and Development and Turkish twin – TÜBİTAK. An international consortium of seven institutions from both countries has formed, including research institutions and businesses acting in forest management and surveying. The leaders represent the Wroclaw University and Technology, Poland, and Yildiz Technical University, Istanbul, Türkiye. Selected test forest test fields in both countries have been observed using a multilayer set of sensors, including Remote Sensing multispectral imagery, aerial/drone RGB+NIR orthophotography, ALS and TLS LiDAR, and in situ sensors for monitoring of tree trunks expansion (dendrometers), soil moisture/temperature, light intensity under the forest canopy, ambient temperature and other main meteorological parameters. This ultra-temporal resolution and multivariable monitoring system feeds observations to a cloud wirelessly or using Bluetooth® protocol for further processing and use. Data analysis focuses on threats to forests in both countries, including forest fires, drought, insect infestations, canopy thinning, and soil and nutrient erosion. Data sets collected by the system

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are placed in the context of historical, long-term meteorological data available from the government's meteorological agencies. This allows for the application of machine learning methods to predict the future forest status quo in the ubiquitous climate change regime and civilization adverse factors. We conclude that surveyors have plenty of work to do in sustainable forest management and, in broader terms, in sustainable environment management.

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