

One-Stop-Lab CENAGIS: from Calibration of Surveying Devices and Application Testing to Large-Scale Geodata Computation

Jakub Markiewicz, Dariusz Gotlib (Poland), Sławomir Łapiński and Miłosz Gnat (Poland)

Key words: Engineering survey; Geoinformation/GI; GNSS/GPS; Laser scanning; Photogrammetry; Positioning; Calibration of surveying devices; navigation application testing; IT cloud-based infrastructure

SUMMARY

As a part of the CENAGIS project (Centre for Spatial and Satellite Analyses) conducted at the Warsaw University of Technology, several unique, interconnected laboratories have been designed to enable testing, calibration, and accuracy assessment of various surveying devices and sensors (e.g., cameras, laser scanning systems, rangefinders, GNSS receivers) as well as testing of positioning systems (outdoor/indoor) and navigation applications. In particular, the laboratories enable testing of Mobile Mapping System solutions. Additionally, laboratories are connected to the Center's geo-cyberinfrastructure (cloud solution), which allows for efficient big data processing and computations, especially with artificial intelligence methods.

The laboratories are equipped with the calibration test fields located inside and outside the centre building, namely a photogrammetric calibration field for evaluation of mobile and static laser scanners, a calibration field for UAVs, a 250-meter base for testing rangefinders, and a test field for indoor positioning systems (using WiFi, BLE beacons, UWB technologies). The calibration field complements allow for validation and quality assessment of each sensor individually and the multi-sensor platforms. Thanks to this innovative application, it is possible to evaluate the tested devices comprehensively.

The laboratories offer, among others Industrial laser interferometer (Laser Tracer) for high-precision 3D measurements (API), enabling real-time point positioning with an accuracy of 10 mm + 5 mm/m and tracking objects in motion with a measurement frequency of 1000 points per second, BOSCH-REXROTH Linear Rail Systems for linear and non-linear movement of objects on the measurement base at 5 m/s, a precision test field for the calibration of optical measurement sensors according to VDI/VDE standards and a top-class satellite simulator/generator Spirent (GNSS

One-Stop-Lab CENAGIS: from Calibration of Surveying Devices and Application Testing to Large-Scale Geodata Computation (11469)

Jakub Markiewicz, Dariusz Gotlib (Poland), Sławomir Łapiński and Miłosz Gnat (Poland)

FIG Congress 2022

Volunteering for the future - Geospatial excellence for a better living

Warsaw, Poland, 11–15 September 2022

9000).

In the laboratory, VR/AR devices are also available for users in the navigation application testing lab, e.g., Microsoft HoloLens, HTC Vive Pro Eye, Vuzix M400.

The idea was to create a place where surveyors and developers of various geodetic measurement systems can carry out a comprehensive research and development work as possible in one place - from instrument inspection to application testing to advanced data processing using two computer clusters (MERCATOR and ROMER).

Thus, this type of solution can be described as One-Stop-Lab mainly for geodetic R&D teams. The created Center aims to intensify the cooperation between industry and science. The paper will present the idea of such a centre and discuss selected R&D works conducted in collaboration with entrepreneurs.

One-Stop-Lab CENAGIS: from Calibration of Surveying Devices and Application Testing to Large-Scale Geodata Computation (11469)

Jakub Markiewicz, Dariusz Gotlib (Poland), Sławomir Łapiński and Miłosz Gnat (Poland)

FIG Congress 2022

Volunteering for the future - Geospatial excellence for a better living

Warsaw, Poland, 11–15 September 2022