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E AMBIENTALE

Prof. Dr. Guenther Retscher

Seminar on:

Assessment of a Dual Frequency Multi-GNSS Smartphone

Date: Friday, May 19, 2023
Room: 033
via di Santa Marta 03, Firenze

Time: 09.15AM

Abstract
Smartphones with dual-frequency multi-constellation GNSS (Global Navigation Satellite Systems) receivers are now available on the market. This study examines their usage in simple surveying tasks, such as data acquisition for GIS, e.g. for a tree cadastre, lantern cadastre, traffic signs, etc., as well as line documentation, such as for underground power lines. For the experiments, the Pixel 5 from the manufacturer Google LLC is chosen. Code and phase observations are recorded in different scenarios. Evaluation in post-processing based on these observations in Single Positioning (SPP) and Precise Positioning (PPP) mode as well as Differential GNSS in an Austrian CORS (Continuous Reference Station Network) network and with an own nearby GNSS reference station are carried out. In the performance assessment, the main focus is led on the achievable positioning accuracies and resulting deviations from reference points serving as ground truth. Apart from these parameters, other criteria, such as the measurement effort and costs, quality, accuracy

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and repeatability of the measurements are investigated. The results of the experiments indicate that the Pixel 5, although it enables the recording of satellite data on two frequency bands, can only be used to a limited extent in practical surveying tasks because it does not meet the accuracy requirements on the centimeter level. The main reason for this is the quite low quality of the observations during the experiments. With long observation times, however, results with a positioning accuracy of less than half a meter are achievable with the smartphone. Thus, the Pixel 5 is capable to achieve the requirements in terms of positioning accuracy and reliability for applications such as data acquisition for Geographic Information Systems (GIS) and especially in Location-based Services (LBS).

Short Bio

Dr. Guenther Retscher is an Associate Professor at the Department of Geodesy and Geoinformation at TU Wien, Vienna, Austria. He holds an undergraduate degree in Surveying, a PhD and a Habilitation (venia docendi) in Applied Geodesy from TU Wien with the focus on Mobile Multi-sensor Systems for Personal Navigation and Location-based Services. Guenther's research interests include positioning and navigation with GNSS, location-based services, indoor and pedestrian navigation, applications of multi-sensor systems, smartphone positioning and sensor fusion. Guenther is currently the coordinator of IAG Special Study Group SG 4.1.1 on Positioning Using Smartphones and the co-chair of the joint IAG Working Group WG 4.1.1 and FIG WG 5.5 on Multi-Sensor Systems.