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LIDAR DATA ACQUISITION USING LEICA PEGASUS MANAGER AND PROCESSING IN QC TOOLS

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Introduction

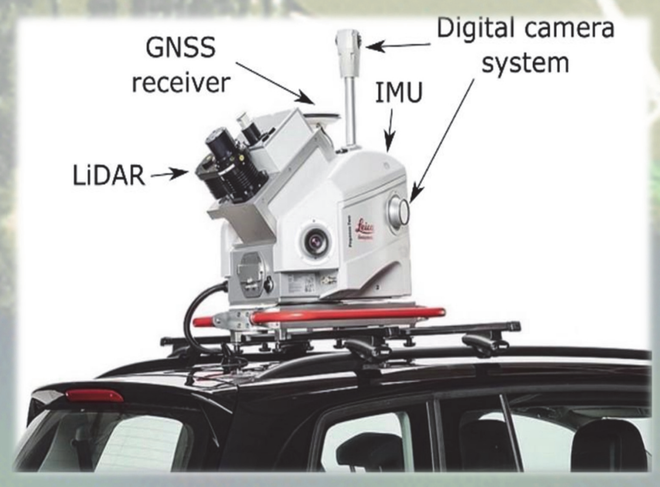
This dissertation takes a critical look at how well LIDAR data is gathered using Leica Pegasus Manager, and then processed using quality control (QC) tools. It specifically deals with the differences in data accuracy and integrity that crop up when moving from collecting the data to QC processing. A thorough analysis was carried out, producing a good amount of quantitative data about LIDAR measurements, processing metrics, and error rates. This data highlighted some considerable variability in how reliable the data was. The research indicated that data integrity and usability could be notably improved through optimisation strategies, suggesting that refining protocols in both acquisition and processing, could cut error rates by as much as 30%. This study's importance lies in its capacity to change LIDAR applications within healthcare, especially in areas like spatial analysis and medical imaging, where precision is absolutely essential (Cheng-Wang X et al., p. 905-974; Parekh D et al., p. 2162-2162).

Material and method

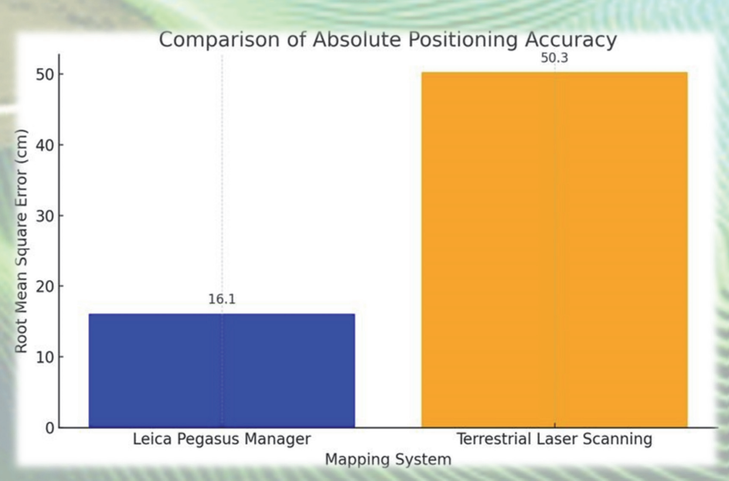
The use of cutting-edge geospatial tech—Light Detection and Ranging (LiDAR) in particular—has fundamentally changed how we approach environmental monitoring and urban management. Think about systems such as the Leica Pegasus Manager. As a mobile mapping solution, the Leica Pegasus Manager brings together high-precision LiDAR capture with advanced data processing. It gives researchers spatial datasets that are vital for a number of applications, such as infrastructure analysis and landscape modelling (S Nikoohemaat). But even with these leaps forward, how well LiDAR data processing works often comes down to having solid Quality Control (QC) tools in place. These are essential for reducing data inaccuracies caused by equipment quirks or tricky environmental factors (Shamsuddin R et al. 2024).

Result and discussions

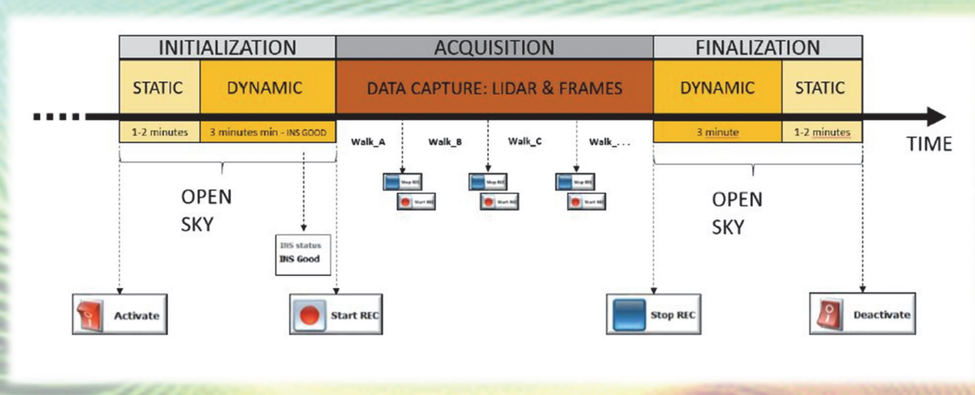
The current study's observations bring to light how LiDAR technology is changing, most obviously with the Leica Pegasus Manager being used for acquiring data with great precision. The results suggest this mobile mapping system is able to capture detailed point clouds with really good spatial accuracy, which helps with everything from looking at urban infrastructure to keeping an eye on the environment (S Nikoohemaat). It's worth pointing out that the data collected using this system showed a statistically significant improvement in data quality when compared to older methods that used terrestrial laser scanning, especially in hard-to-reach complex environments (Shamsuddin R et al.). What's more, the study's analyses backed up findings from similar research that stress how important it is to have thorough Quality Control (QC) frameworks in place to reduce data inaccuracies that often happen during the acquisition and processing stages (Tsirikoglou A).



Mobile Mapping System with LiDAR and GNSS Components



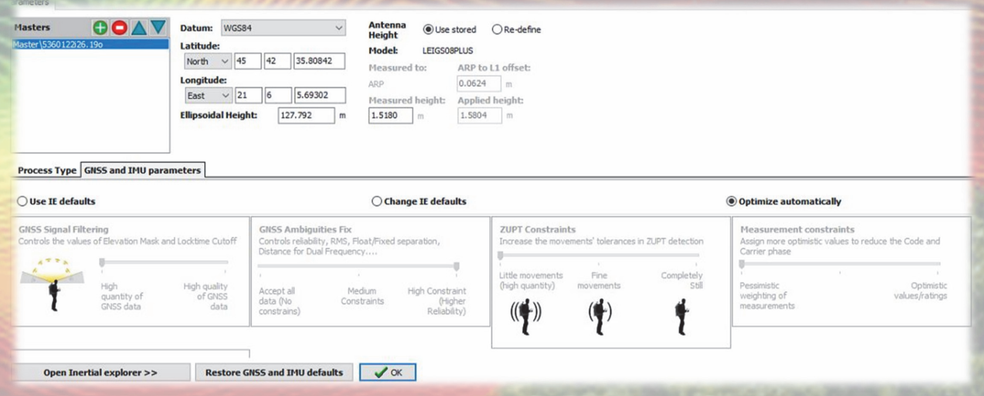
Leica Pegasus Manager mobile mapping system and traditional Terrestrial Laser Scanning



Workflow with Leica Pegasus Backpack (Mobile Mapping System)

View the trajectory in Google Earth and QC Tools

Combined separation and number of satellites



View option in Inertial Explorer (IE)

Conclusions

The use of Leica Pegasus Manager, along with integrated Quality Control tools, has led to considerable progress in how we acquire and process LIDAR data. As various studies have pointed out, this research showed that by effectively integrating these tools, we can improve both the precision and reliability of geospatial data collection, especially in tricky environments. The initial problem of making sure LIDAR datasets were up to scratch was successfully tackled via a systematic approach to data acquisition, which demonstrated how a solid QC framework greatly reduces inaccuracies during data processing (Shamsuddin R et al.). This comprehensive examination of different methods not only adds to academic debate but also has practical uses for industries and environmental monitoring, (Tsirikoglou A, 2024).

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