Lidar Mapping Suite—Professional

Lidar and Photogrammetric Processing Software

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Geospatial data production of high resolution lidar and imagery products requires a high-performance workflow to support best in class sensor technology. Critical to the success of geospatial data collection projects is an efficient, intuitive, performative, and flexible workflow. Teledyne Geospatial's Optech Lidar Mapping Suite Pro (LMS Pro) solves these critical challenges for users and enables you to produce high accuracy data for all Teledyne Optech sensor in one platform.

Optech LMS Pro is a comprehensive data processing platform for the calibration, boresight and accuracy quantification of lidar and imaging sensors. Designed to serve as a single central processing hub of raw lidar and image data, LMS combines powerful least-squares algorithms with batch processing methods and the latest in distributed and multi-threaded processing routines to automate sensor calibration, compute project-wide accuracies, and maximize data throughput. Embedded data quality assurance and control tools enable the user to comprehensively optimize and validate the accuracy of their data, without the need for external toolsets.

KEY FEATURES

- Designed for commercial production processing
- Integrated processing for lidar/camera sensors
- Quality assurance processes for optimal accuracy
- Quality control tools for efficient and robust project validation

Optech LMS integrates both lidar and image sensor processing methods into a single workflow platform, enabling comprehensive sensor calibration and accuracy quantification

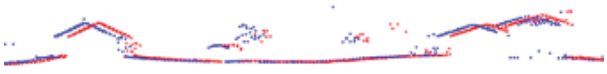
LMS for Sensor Calibration

Proper sensor calibration is a pre-requisite for maximizing the accuracy of data and map products, as well as ensuring proper multi-sensor integration. LMS leverages several key principles in its fundamental approach to sensor calibration and quality assurance, including planar surface extraction from redundant features, rigorous, industry-accepted methods for automatic sensor calibration, and the generation of reliable and repeatable sensor corrections:

- Data redundancy
- Rigorous methodology
- Reproducible results

Lidar System Calibration

The self-calibration engine available in LMS incorporates complex sensor optical models and advanced least-squares algorithms that estimate reliable and repeatable corrections to the lidar system calibration parameters (e.g., sensor and boresight parameters) and measurements (e.g., trajectory position and orientation)

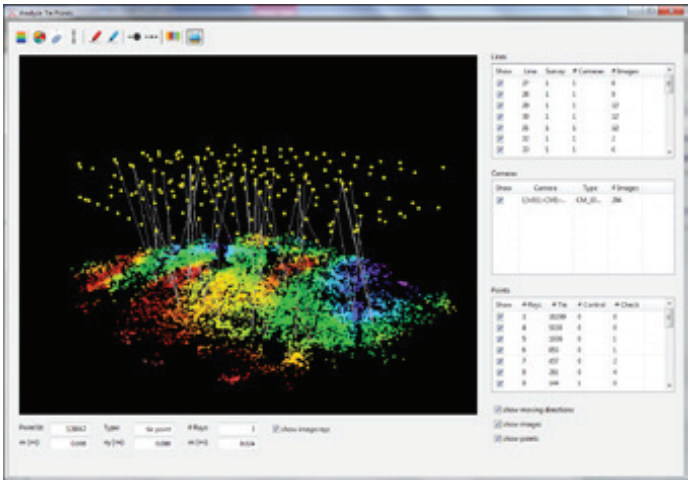


Before self-calibration

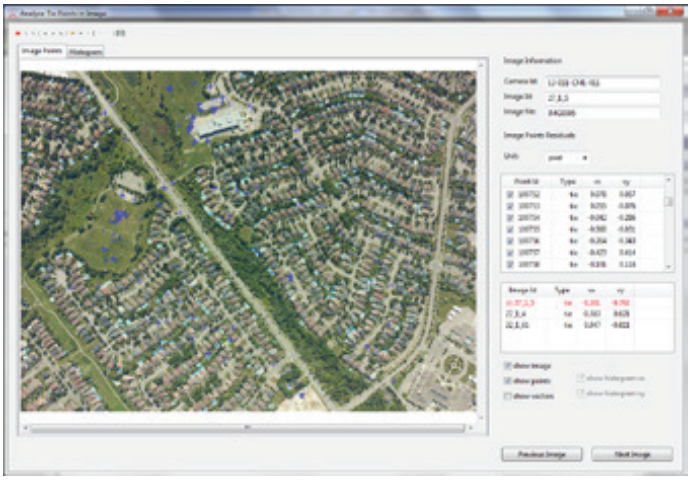
After self-calibration

Photogrammetric System Calibration

The LMS workflow provides tools for photogrammetric bundle block adjustment using GNSS/INS position and orientation information, and incorporates methodologies for photogrammetric quality assurance. With automated tie-point measurement and several 3D graphical analysis tools, the QA process lets users calibrate their photogrammetric system by estimating corrections for their camera's interior orientation, boresight parameters, and trajectory position. The outcome from the bundle block adjustment consists of accurate camera interior and exterior orientation parameters, along with the coordinates of the estimated tie points.



3D graphical analysis tools



Automated tie-point determination

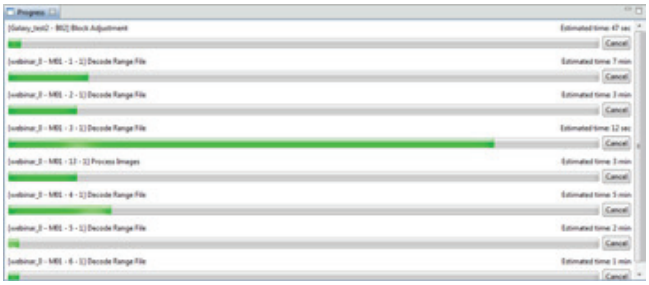
LMS for Productivity

Processing productivity and efficiency are critical to reducing project costs and completing project deliverables on time. LMS incorporates many standard techniques for maximizing processing productivity.

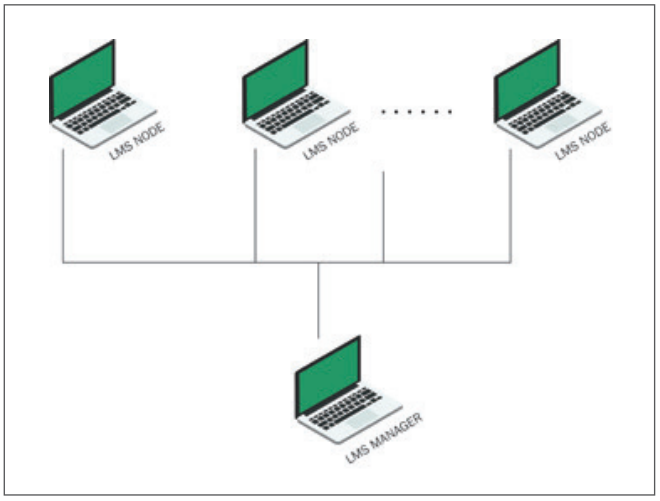
Batch/Multithread Processing

Key production utilities help process large projects cost effectively by minimizing the user interaction required:

- Batch processing for large, multi-site projects
- Parallel and distributed processing for minimizing processing time
- Cloud processing compatibility



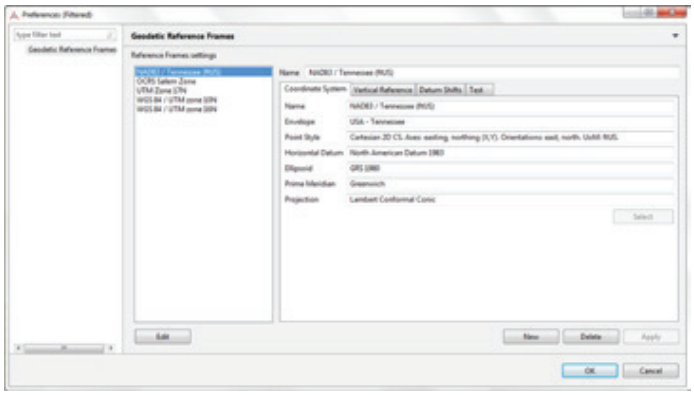
Batch processing



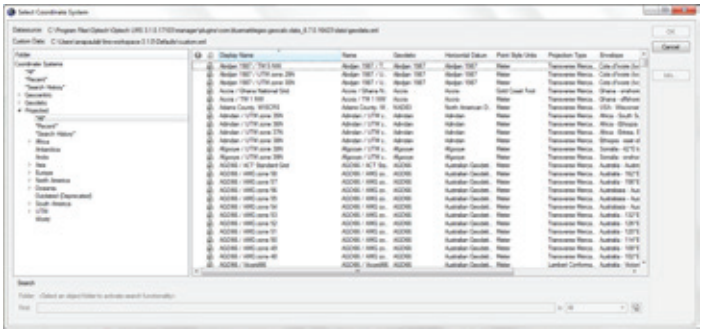
Distributed processing

On-the-Fly Coordinate Transformation

The Blue Marble GeoCalc SDK is fully integrated in LMS, letting the user output their lidar data and imagery in the desired output reference frame. The user has access to an extensive database of geodetic conversions and geoid models that are updated regularly.



Easy selection of the appropriate reference frame (i.e., coordinate system, vertical reference and datum shift)



Extensive database of geodetic conversions and geoid models

Integration with 3rd-Party Workflows

The primary objective of LMS is to produce the most accurate lidar point clouds and imagery data possible with quantifiable accuracy measurements, enabling direct ingestion into value-added 3rd-party software. For users interested in making the transition to userdefined post-processing workflows even more seamless, LMS includes the ability to launch 3rd-party executables via a user-specified command file (CMD or BAT). Similarly, LMS outputs to several standard industry formats, including LAS (1.1-1.4), and LAZ.

LMS for Quality Control

LMS makes project validation easy with integrated quality control tools to verify the absolute and relative accuracy of the data collected by lidar and photogrammetric systems, including reports, plots, graphs and visual analysis tools.

Quality Control of Lidar Data

LMS has several tools for the validation of lidar data accuracy.
Relative data accuracy:

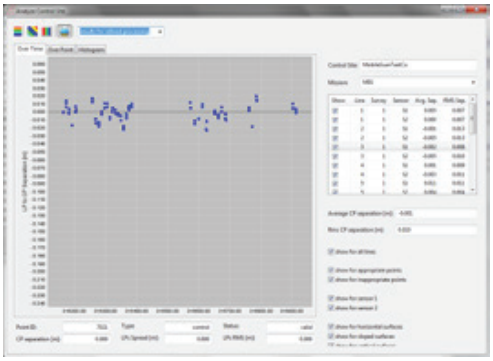
- Detailed reports and plots enable thorough quantitative analysis
- Qualitative analysis tools let users visually inspect overlapping lidar data (e.g., roof plane/ roof line analysis)

Before self-calibration

After self-calibration

Absolute data accuracy:

- Charts and reports enable overall project assessment and comparison to ground control before and after self-calibration, either over time, over point, or as a histogram

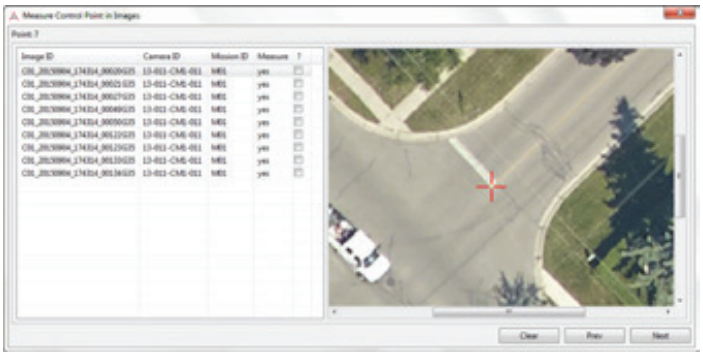


Control site analysis over time after self-calibration

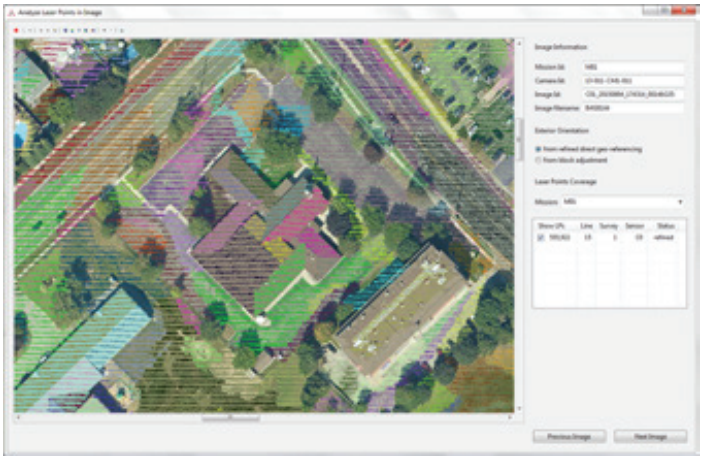
- 3D and 1D views assess the separation between individual control points and the lidar data before and after self-calibration

Quality Control of Photogrammetric Data

Comprehensive reporting tools assess the outcome of the photogrammetric bundle adjustment (observation residuals, estimated parameters and their precision, and check-point analysis). Tools for evaluating lidar/imagery alignment are also available.



Ground control points are used for absolute photogrammetric data adjustment or as check points for quality control



Quality control of multi-sensor data integration