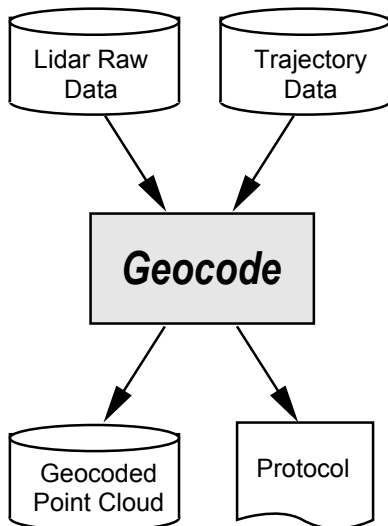


Geocode

Geocode™ is the software tool for processing the raw waveform data collected by *ELMAP* laser-scanner systems and converting it into geocoded point clouds in a map-projected coordinate system.

Geocode is a stand-alone application for Microsoft Windows that interfaces smoothly with *TerraScan* and other lidar post-processing tools. *Geocode* imports native lidar waveform data, and pre-processed trajectory and attitude data, to calculate 3-D point coordinates in the selected geographical reference frame. Output is generated in the standardized *LAS* format for lidar data, the native binary format of the *TerraScan* lidar data post-processing software for rapid data transfer, or the *Normalized Waveform* file format that combines geocoding information and indexed waveform data for subsequent processing.



Geocode has been designed for ease-of-use and efficient production. After selection of the input files, processing and output parameters, it does not require further user interaction. All parameter settings may be saved to “flight” savesets for later reference and re-use. Also, a batch mode is available for processing data based on one or several previously defined flight savesets, so that large projects can be processed efficiently over night.

The transformation and projection, and waveform analysis algorithms have been optimized for speed to provide time-efficient processing. Furthermore, the user has control over which processing steps are to be executed to minimize processing time during iterative processing segments. *Geocode* also provides the option to limit processing to *segments* of large raw data files, so that time-intensive processing can be limited to the relevant sections.

To ensure the accuracy of the geocoding results *Geocode* uses the full calibration information available from the sensor. Installation and flightline offsets may be used to compensate for misalignment errors and GPS-effected variations in the trajectory, and to thereby further maximize the geometrical fidelity of the generated data products. Environmental parameters (air pressure, temperature) may be taken into account to compensate for variations of the speed-of-flight and refraction due to atmospheric conditions, to enhance measurement accuracy further.

Currently, transversal-mercator-type projected coordinate systems (UTM, Gauss-Krueger) are available, whereby the user can select from a number of pre-defined ellipsoids, datums, and projection parameters, or define his own. Other projection types can be implemented upon request.

Features

- Reads native *EL-MAP* lidar data files and pre-processed trajectory and attitude data files (various formats supported).
- Optionally imports and applies geoid data
- Extracts surface returns from waveform data and determines the accurate location of the return
- Detects and eliminates outliers with a set of user-configurable filters
- Applies sensor specific calibration data and environmental parameters for improved geometrical accuracy
- Provides control over installation-specific boresight offsets.
- Provides true surface reflectance at the laser wavelength by scaling return intensity by range.
- Outputs pulse width for surface slope and roughness analysis and classification.
- Selection of preset and user-defined ellipsoids, datums, and projections available.
- Output of geocoded, map-projected point clouds in several formats (ASCII, TerraScan BIN, LAS)
- Output of geocoded *Normalized Waveforms*
- Generation of processing protocol and output data statistics for quality control.
- Batch processing of multiple survey flights using flight parameter savesets
- Incremental flight parameter sets can be used for modifying only few parameter

File Input

- Single or multiple binary raw data files from EL-MAP laserscanners
- Binary or ASCII lidar trajectory and orientation files (.LPO, .POS, SBET (*.out), .NCOM etc.).
- Lidar sensor description/calibration files (optional)
- Linelist files for automatic filename assignment and line adjustment (optional)
- Geoid file (optional)

File Output

Available output formats:

- ASCII point records (.ASC)
- Terrascan binary format (.BIN)
- LAS1.0, 1.1, and 1.2 binary formats (.LAS)
- *GeocodeL Normalized Waveform* file format (.LGC, .LWF)
- Terrascan binary trajectory format (.TRJ) for geocoded trajectory or segments output

User settings

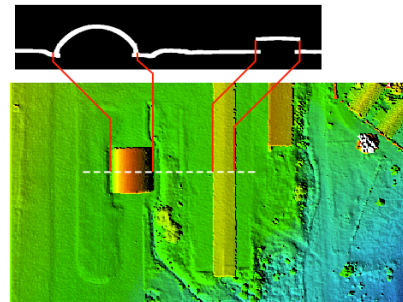
- Installation offsets for
 - boresight angles,
 - translational offsets,
 - timing offsets
- Environmental conditions
- Geoid file
- Sensitivity of echo detection
- Return selection (first, intermediate, last return of each laser shot)
- Range gate and noise/outlier filters
- Output ellipsoid, datum, map projection
- Definition of custom ellipsoids, datum transforms, and map projections
- Output file type, path for point cloud and trajectory outputs

System Requirements

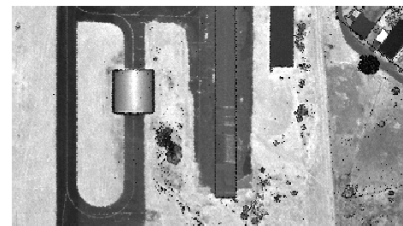
- Hardware:
 - Intel based computer
 - NTFS-formatted harddrive for file sizes larger than 4GB, SSDs recommended for speed
 - 512 MB RAM
- Operating systems:
 - Windows 10 and above

Maintenance & Support

- 12 months of free maintenance (bug fixes and updates) and e-mail support included.



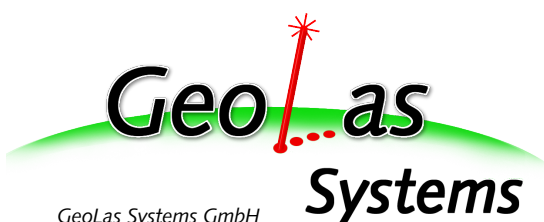
Elevation



Reflectance



Slope / Roughness



GeoLas Systems GmbH
Bernauer Str. 37a, D-83229 Aschau, Germany
Tel: +49 8052 178 1485 Fax: +49 8052 178 2020

Managing Director: Dr. Christoph Hug
Registration: HRB 28319, Amtsgericht Traunstein
E-Mail: systems@geolas.com URL: www.geolas-systems.com