

theGNSSspecialists



GART-2000<sup>®</sup> future

# GART-2000<sup>®</sup> future

*verm/pro f*



### Management of measurement data and coordinates

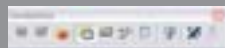
- data import from total stations, levels and other sensors
- analysis of measurement data and plausibility checks
- editor for the editing of point features and flexible additional attributes
- data maintenance in different coordinate systems, epochs and histories
- import and export of coordinates with free definable data formats
- definition of calculation parameters and error tolerances

### Geodetic calculations

- free station
- processing of total station coordinates
- transformation onto a line (2D/3D)
- transformation onto a surface
- reference line: orthogonal setting-out elements (2D/3D)
- bearing and distance
- polar stakeout
- calculation of sections
- calculation of perpendicular points
- calculation of areas

### Specification

- batch processing to record and reproduce calculation processes
- form editor for user-defined journals (MS Office, PDF)
- context-sensitive online help
- user interface in German and English (other languages available on demand)
- administration of projects and users (optional)
- base module available as field solution for Pocket PC (Windows CE)



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## Specifications

- Continuous data flow (recording, processing, maintenance and distribution) for a complete integration of surveying and GIS
- Extensive features for the management of measuring data, geodetic evaluations, visualization and data exchange
- Online recording/control of total stations and real-time GPS sensors
- Scalable from a complex office solution, a flexible use of Tablet-PC up to the use on a Pocket-PC or total station (Windows CE)
- Form editor for user defined journals (MS Office, PDF)
- Efficient data management via central administration of projects and system data bases
- Quality assurance through control of access authorizations, specification of calculation settings and logging of all working steps.
- Standardized data base connection to MS Access, MS SQL Server, Oracle, etc.
- Input assurance through the ArcGISTM – base technology (conform to ISO and OGC) and modular system architecture

## Survey Engineering

### Alignments

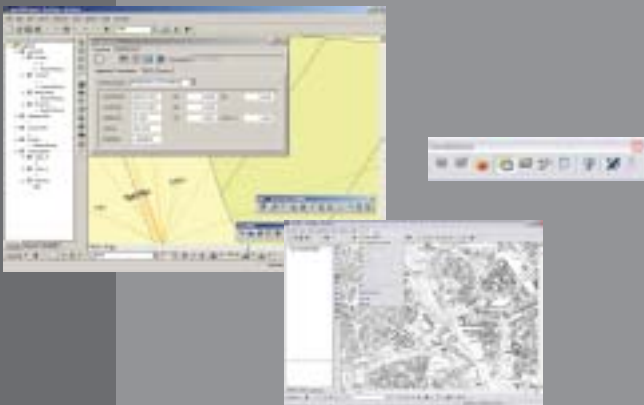
GART-2000® future includes a comprehensive alignment module. The minimal form of a route is an axis (straight line, circle, change of direction, clothoid, cubic parabola, and other special forms of transition curves). Gradients, superelevations, lateral slopes and specified cross-sections can be additionally assigned with variable calculation parameters (perpendicular, vertical). Based on this definition, new points can be calculated and existing ones transformed to the axis. The alignment elements can be directly imported from various surveying and alignment software (CARD1, Verm.esn, etc.) or exported to such software.

### Sections

As an extension to the alignment module, it is possible to generate, manage and output cross- and longitudinal sections with variable layouts using the existing topographical data. The selection of the stations used for the generation of cross-sections can be conducted manually or at regular intervals based on an alignment. In addition, a graph can be generated comparing nominal and actual values based on the alignment data.

### Quantity calculations

Independent of the source of the data (nominal vs. actual cross-sections, digital terrain model), the user can choose between different calculation methods.



# GART-2000<sup>®</sup> future

GART-2000<sup>®</sup> future for the recording, processing and visual representation of geodata is an innovative survey software that is continually adapted to the latest standards by highly qualified software engineers.

## Deformation analysis

This module offers extensive functions for the output and analysis of deformation measurements and geotechnical data. The output can be shown as a graph or in a table. The user can design the layout individually as regards the position and form of the elements (texts, graphics and diagrams).

## Tunnel

An extension to the alignment module has been designed to meet the specific requirements of tunnel construction. It provides a variety of calculation, management and output options (e.g. measurement and evaluation of as-built surveys, establishment and management of the joint index, and calculations for tunnel excavation stakeouts).

## Geodetic Calculations

### Triangulation

An efficient and intuitively usable triangulation module is available for the adjustment of plane, height and 3D networks. The user can choose between free, dynamic and fixed adjustment. The results are displayed graphically as network configurations with the corresponding ellipses of error (network diagram) and are logged into clearly structured lists.

### Leveling

Leveling lines can be analyzed and processed with the aid of this module. Survey and precise leveling operations are analyzed taking into account the temperature adjustments and the calibration data of the leveling rods.



### Traverses

The calculation of traverses can be generated for traverses tied at both ends, traverses tied at one end, traverses without orientation, and closed traverses. The course of the traverse can be entered manually or graphically, or can be generated automatically by the existing survey data. The user decides between different error distributions during the calculation.

### Transformation

Two options are available to the user for the transformation of coordinates between different frameworks:

- the global 7-parameter transformation of geodetic datums via defined reference ellipsoids
- the local 3- to 6-parameter transformations (with or without residual error distribution) using control points





# Sensor Control

## Sensor control GNSS

The GNSS module serves to control all currently prevalent GNSS receivers in the DGNS, RTK, static and stop&go modus. GART-2000® future performs the optimal initialization of the GNSS receiver for classic base-over operation or for communication with a reference network service. In this connection, both GSM modems and correction data via the Internet (NTRIP) are supported. GART-2000® future transforms the measured values into the user coordinate system in the field in real time. With the new Trans-It module, this is even possible everywhere in an optimized and centimeter-precise manner without the time-consuming need for control points.

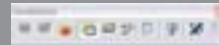
## Sensor control total station

With the sensor control for total stations, data can be recorded in the field with all standard instrument models. The measuring functions support the measurement of direct and eccentric points, sets of angles, and stakeouts, as well as the direct control of measurement information during the recording. The resulting coordinates can be utilized immediately for all following calculations.

# Options

## Interfaces

Alongside the standard ESRI formats (Geodatabase, Shape and Coverage), the user can choose among numerous interfaces such as NAS, EDBS, DXF, DWG, DGN, KAFKA, GRIPS, KOF, GT, BETAN/NEPTAN, VERM.ESN, and CARD/1. Bitmaps can be adaptively inserted depending on the system. The map background serves as a simple orientation in the field and a digitalization of points and lines from the graphic is also possible.



## Languages

In addition to the standard German version, the user interface is also available in English. Additional language versions can be provided on demand at short notice. Localizations and projection adaptations are available including all european and US projections and interfaces to geoid models.



## Cadastral versions

There are special cadastral versions for application in the domain of cadastral surveying. These versions take into consideration the specific country requirements regarding the management of point numbers, calculation, and logging.

## Management of projects and users

The optional project management tool links several projects and thus enables the centralized administration of identical data and configurations. The tool also implements the management of multiple user access.



## Integration of surveying, CAD and GIS using ESRI base technology

The functionality of GART-2000® future is also available as an extension for ArcGIS™ from ESRI.

Under the product name of gl-survey, it is part of the geolution™ product line for the integration of surveying, CAD and GIS.

Future requirements will call for systems that facilitate the seamless processing of geodata from their recording in the field through their processing and maintenance to their distribution and presentation. Distinct synergetic effects occur here in respect of operator convenience, user administration, data security, metadata management, and security of investment.

With regard to future demands, geolution™ provides numerous tools for design and plan editing in addition to its basic surveying functions. Additional modules build upon these features for field



collection (e.g. sensor control) and special applications from the domain of cadastral and engineering surveying.

The system is suitable for deployment in equal measure both in the field and in the office.

The integration of surveying, CAD and GIS using the ESRI base technology ensures a continuous data flow from the measuring instrument to the GIS and back again. The loss of information and quality through elaborate conversions, data redundancies and inefficiency are all things of the past.

Our technology partners for the development of the GART-2000® future and geolution™ products are AB Software and ARC-BERLIN.

