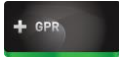
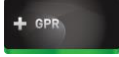


System Requirements	<p>Operating System: 64bit Microsoft Windows (MS) 10, 64bit MS Windows 11</p> <p>CPU: 64bit Intel, 64bit AMD or equivalent 64bit Intel Pentium compatible CPU with minimum of 2,0 GHz. Multicore recommended.</p> <p>Memory: Minimum of 8 Gb, recommended 16 Gb RAM , 500 GB Free Hard Disk Space for Data processing. 64Gb RAM and 2Gb SSD drive recommended for 3D data.</p> <p>Graphics Adapter: Minimum of 1920 x 1080 pixel resolution with 32 Bit Colour Depth and 1 Gb Graphics Memory, recommended Full HD, double screen with 4Gb memory.</p> <p>Interfaces: 1 free USB-port; Direct or USB-Hub for software security key. Also web based activation key possible.</p>	General	Requires: Road Doctor Core
	<p>Tree view: Air-coupled and ground coupled data are saved to different branches in the tree. Each channel in multichannel data handled as a separate channel although physically in the same data file.</p> <p>Log keeping: program keeps record of all the linking and preprocessing operations the interpretation operations done to data, also operators' user id and RD license number is recorded.</p>	Supported GPR Data formats	<p>GPR: Geophysical Survey Systems Inc. (GSSI)'s 8,16 and 32 bit formats, Malå GeoScience's 16 and 32 bits formats (.rd3, .rd7), Sensors &amp; Software (.dt1), IDS (.dt), Kontur (.3dra, .vol), Utsi Electronics. User Defined format 8, 12, 16 or 32 bits signed or unsigned integer or single or double precision IEEE floating point value having 32 - 8192 samples per scan. Supports sample and scan aligned multi-channel Data.</p> <p>Images: Supports IDS Image lists recorded at the same time as GPR.</p> <p>GPS: GSSI, IDS and Malå GPR GPS file format. And any other with NMEA output</p>
Project Handling		GPR-Data Interpretation	<p>Coding: All interfaces can be coded as values from -99 to 999 and have different names, layer quality (1-20) and material Er-values. All values are editable. All layers can be set to have a different colour.</p> <p>Interface tracking: manually or semi-automatically using user-defined tracing parameters.</p> <p>Interface tracking on several channels simultaneously: Cross-section or time slice view can be used to trace layer horizons in the case of multiple channels. Tracked points can be filtered and corrected,</p> <p>Objects: Layers are tracked as vectors, which can have start, end and breaks, or as table values in the case of Air-coupled data. Single reflectors can be marked and annotated with text. Up to 1100 different interfaces can be coded, 4 for Air-coupled data. Interpretations from different channels can be combined, even if measured using different type of antenna and different time range. Rectangular object can be marked with transparency colour</p> <p>True depth calculation routines take into account the dielectric value variation and antenna separation.</p> <p>Undo - Redo operation: Undo – redo operation is automatically activated. It can revert a maximum of the 20 last operations. If necessary, it can be deactivated.</p> <p>Editing: Vector Points and Annotations can be edited and deleted separately or multiple at once.</p> <p>Dielectric value estimation: Dielectric value can be</p>



GPR-Data Processing	<p>File editing: Merging, Cutting, reversing, horizontal scale normalization, channel separation. Measurement georeferencing.</p> <p>File processing: Static Background removal, DC-level removal, Automatic and user defined signal amplification, Arithmetic operations, Time and Frequency domain filtering, Moving background removal, Hilbert transform, Kirchoff-Migration, Trace and Data Section Muting, Correlation filtering operations, Bouncing removal operation, diagonal filtering, Operations between files etc.</p> <p>Up to 63 different processing settings can be set for one file. Each operation can have different start and end trace and sample locations. Operations do not use disk space.</p> <p>Views can be saved with GPR processing settings.</p> <p>Air coupled antenna data processing: Bouncing removal, surface reflection removal, air-pulse removal, dielectric-value calculation and calibration of the temperature drift.</p> <p>For time-slice and cross-section displays the program loads the dataset into memory at a given distance and time sampling independent of the original scans/unit or time window. This makes it possible to load large data sets into memory for fast display and handling.</p>		<p>estimated using hyperbola fitting or ground truth tool. If Air coupled data is used then the estimation can be done using the surface reflection for single antenna or coreless technique for multi-offset antenna configuration.</p> <p>Coreless-calculation: A tool for estimation of thickness and average dielectric values of the pavement layer using two 2GHz air-coupled antenna in multi-offset TX-RX -configuration. Applicable for 8 to 30cm layers thicknesses. The nearest offset data is interpreted manually or semi-automatically and the second layer semi-automatically.</p>
GPR-data Display	<p>B-scan view: from 16 to 256 simultaneous colours, User definable colour transform threshold and selectable from 16 transforms. Multiple profiles in the same view, combined or in different subwindows. Shown distance section freely selectable and independent on the number of scans per unit.</p> <p>Cross-section view: in the case of multiple profiles from the same line. The offsets can be shown for data using true offsets from the centreline. Cross-section can have also topography integrated if it is available in a point cloud format</p> <p>Time slice view: Multiple time-slices at different</p>	Pavement voids content analysis	<p>Air voids content of asphalt concrete is evaluated using air-coupled antenna data. Dielectric value of pavement is calculated using the surface reflection technique. The value is converted to an air voids content value using information from reference samples i.e. calibration samples.</p> <p>The calibration factor can be calculated from several samples.</p> <p>The results can be outputted as an average value at a given interval. The operation can also output the percentile of sections, where the value was too high or too low. Sections that should be omitted, like bridges, can be set.</p>



	<p>depth can be generated from the same multi-channel data. The slice data can be displayed as calculated true varying offset from the common centre line. The slices can also be calculated from a layer level or at a given time difference from the specified layer level. The time window, from which the time-slice is calculated can be defined. The selected value can be an average, minimum, or maximum amplitude from the selected time window. Possibility to buffer the data enables quick zoom and panning in data.</p> <p>Buffer file creation: 3D GPR data can be saved to a buffer file for later very fast optimized access. The buffer file access is almost as fast as for single channel data enabling fast scrolling.</p> <p>A-Scan view: The single scan view is generated from the view of the selected GPR data. The scan view is linked with the original view and moving the mouse pointer in the data view updates the scan shown in the scan view.</p> <p>The frequency spectrum: The single scan view can be divided to include the frequency spectrum from the shown scan. The spectrum can be set so that it is calculated as an average of multiple scans.</p> <p>Displaying GPR slice data in a view integrated Map view. Slice data in the view and in the map synchronized.</p> <p>Er-value, layer depth, layer thickness and reflection amplitudes from air-coupled antenna data can be displayed separately.</p>	<p>GPR Batch link operation</p>	<p>Processing and Linking multiple GPR data in one operation.</p> <p>Automatically or manually define or create the line and link ground coupled, air-coupled or multichannel 3D-Radar data. Even new multiple projects can be created in a simultaneous operation.</p> <p>Does file pre-processing including channel splitting, file reversal, scale-normalization, coordinate linking, air-coupled data bouncing removal, frequency fingerprint calculation etc, if selected.</p>
		<p>GPR Interpretation Output</p>	<p>Vector Interpretation: All layer and set object information can be printed to user defined formats. Formats can be saved for later use. Outputted parameters are for example, layer thickness, depth, code, quality, location as distance, xyz-coordinate, offset, reflection amplitude, vector point number, layer number etc. Dxf-format output also supported.</p> <p>Air-coupled data interpretation: multiple predefined and user defined formats for printing Average, Min, Max and St Deviation.</p> <p>Grid and geographical coordinates can be included with all of the data formats either directly or using a special database tool. The data including coordinates can be exported to Google KML-files and Esri shape files.</p>