

## ROAD DOCTOR 3.4

New Road Doctor 3.4 continues our ongoing task to develop better and more efficient tools for analyzing, interpreting and managing traffic infrastructure data not excluding also needs of our other clients in other sectors like in universities and geological research institutes and companies.

Some features have already been available for some time in our beta releases of the software, and in even in some test releases of the previous version of the software during the last year, but now they are officially released for public.



We have put lot of efforts to make large GPR data set and our RDSV data linking much faster and more automatic and precise. Also, the support of 360 videos and images helps users to take benefit of the newest innovations in the technology. Version includes also some other powerful video tools, which were finished for this version. Linked data classification operation helps users to divide data based on year or type or any other selected parameter, making large multi-year data set handling easier. Also, our GPR data frequency analyze tools have got some new features, which helps users in diving deeper into the signal content.

The software includes also a large amount of smaller changes and bug fixes, which make the program operate faster and more reliable than previous versions. The on-line manual was also revised for this version of the software and should offer a better help understanding the operations and functions in Road Doctor. In the next chapters some major new features are explained. The needed module is written inside parenthesis ( ).

## Major New Features

### Batch Link GPR (GPR)

Batch link GPR operation comes with GPR module of Road Doctor. It automates GPR data linking from given GPR data source folder to active, existing or new projects. After initial settings, the operation automatically processes ground and air-coupled antenna data, reversing and rescaling it if necessary, finds the correct project and line based on GPR co-ordinates and links it. Currently the operation works with multichannel GSSI data and with single channel other data types.

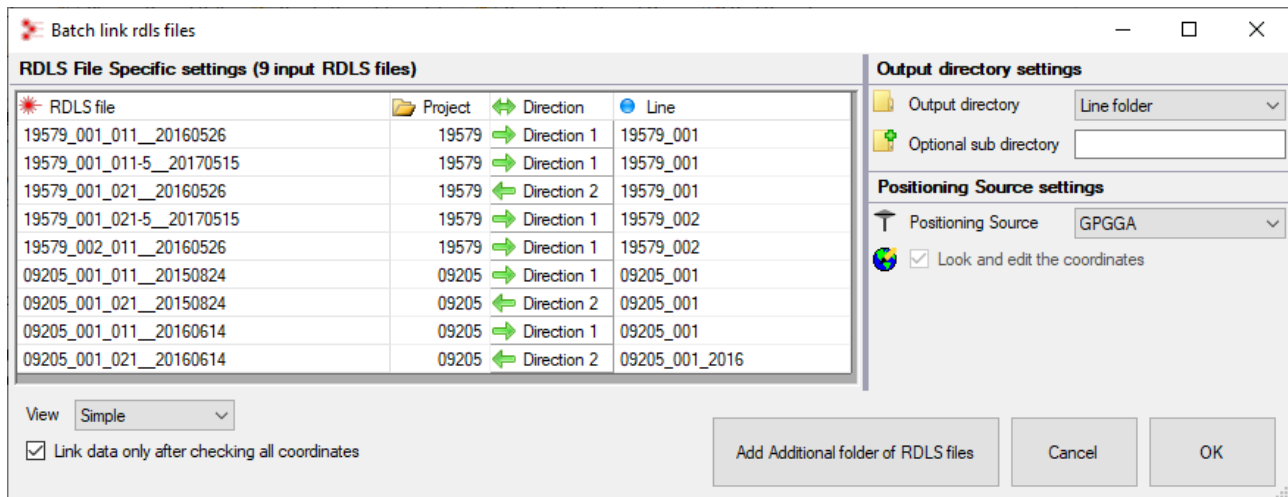
GPR File	Direction	Line	Metal plate file
P00004_448-506_011_20180411A	Direction 2	4_448 - 506	No metal plate file
P00004_448-506_011_20180411AC_NrTr	Direction 1	4_448 - 506	No metal plate file
P00004_448-506_011_20180411AC_NrTrS	Direction 1	4_448 - 506	No metal plate file
P00004_448-506_011_20180411AS	Direction 1	4_448 - 506	No metal plate file
P00004_448-506_011_20180411ASC	Direction 1	4_448 - 506	No metal plate file
P00004_448-506_011_20180411B	Direction 1	4_448 - 506	Not applicable
P00004_448-506_011_20180411BS	Direction 1	4_448 - 506	Not applicable
P00004_448-506_021_20180411A	Direction 2	4_448 - 506	No metal plate file
P00004_448-506_021_20180411AE_1	Direction 2	4_448 - 506	No metal plate file
P00004_448-506_021_20180411AE_16800-18800	Direction 2	4_448 - 506	No metal plate file
P00004_448-506_021_20180411AE_16800-18800R	Direction 2	4_448 - 506	No metal plate file
P00004_448-506_021_20180411AE_16800-18800RC	Direction 2	4_448 - 506	No metal plate file
P00004_448-506_021_20180411AE_19900-23000	Direction 2	4_448 - 506	No metal plate file
P00004_448-506_021_20180411AE_19900-23000R	Direction 2	4_448 - 506	No metal plate file

GPR File	Antenna type
Example file: P00004_448-506_011_20180411A	Air coupled
Example file: P00004_448-506_011_20180411B	Ground coupled
Example file: P00004_448-506_011_20180411	Channel specific
Channel A Model 42000S	Air coupled
Channel B Model 50400S	Ground coupled

## Batch Link RDLs Data (Surface)

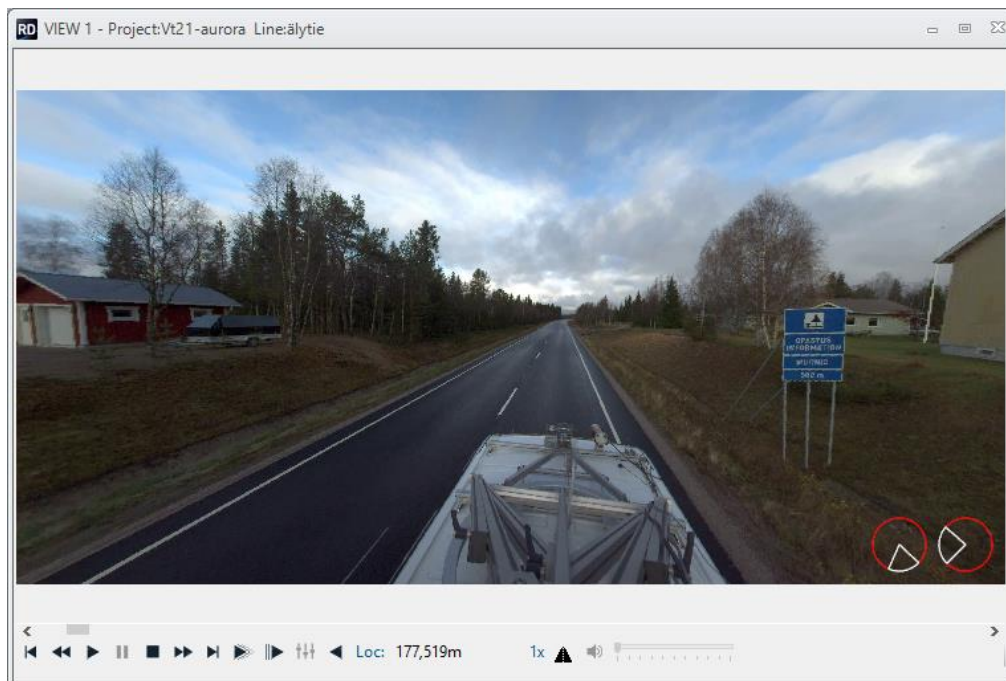
Batch link RDLs data operation automates handling of Road Doctor Survey Van (RDSV) data. It comes with Road Doctor's Surface module. After the initial settings have been given, the program automatically processes the laser scanner, video and accelerometer data and links the data to new or existing projects and lines based on coordinates.

Some of the operations can last a long time with all the included calculations and a considerable time can be saved when the computer can do the data processing and linking by night or in the evening. The time consuming and error susceptible clicking work is decreased significantly.



## Support for 360 videos and images (Core)

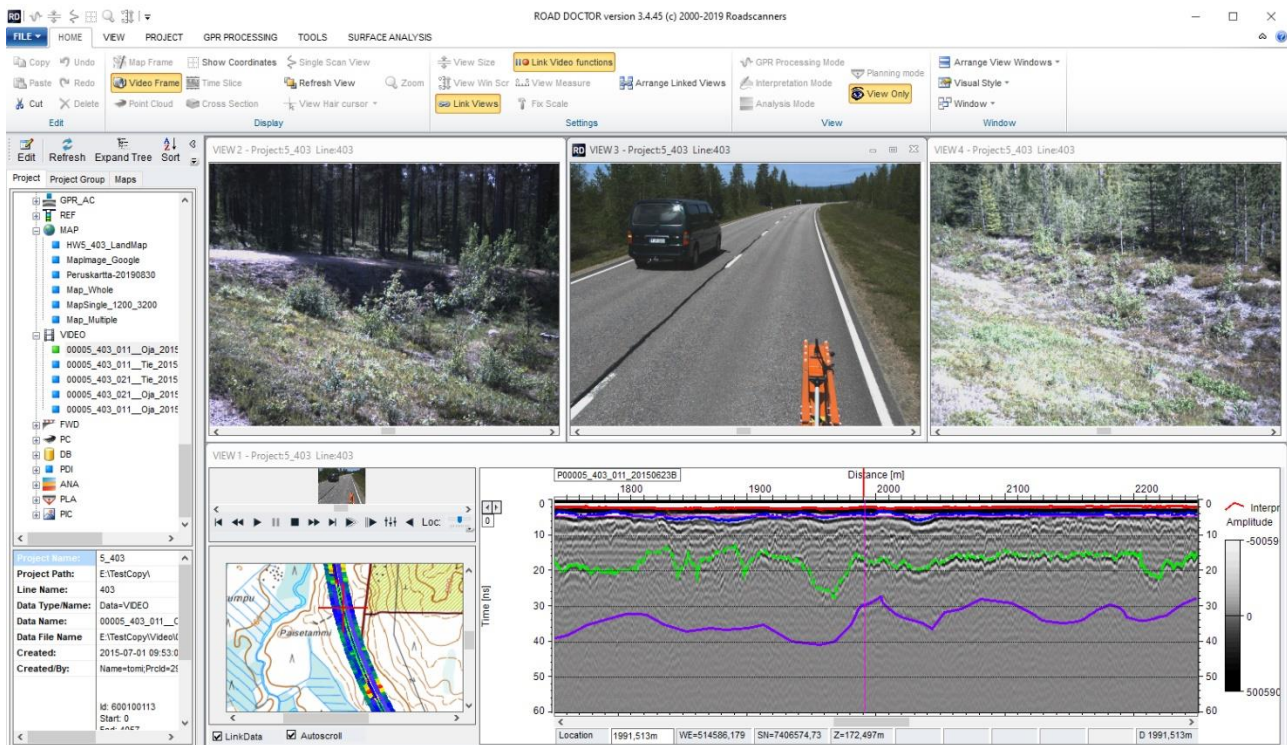
Road Doctor includes now a video and image player, which also supports 360 cameras and videos. The feature comes with the Core version. The video is zoomable and changing angle of view and view direction is quick.



## Video setup saving with views and synchronized Video starting and pausing (Core)

Road Doctor allows multiple views and videos on the screen to be linked together so that they run synchronized. As a new feature it is now possible to save the video setup with view and open it afterwards, exactly as it was shown when the data view was saved.

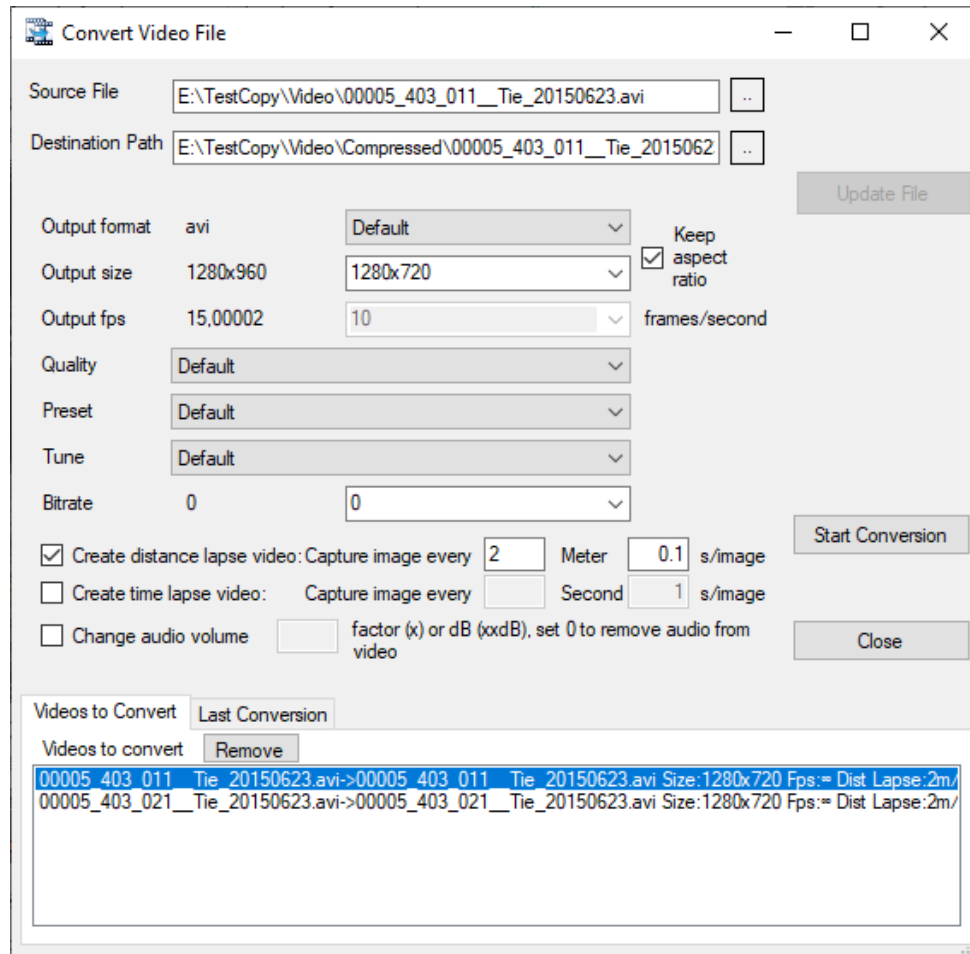
Also, a new operation “Link Video functions” enables starting and pausing videos simultaneously. The linked videos can run also backwards and forward videos and backward videos can be shown together.



## Conversion of Video files (Core)

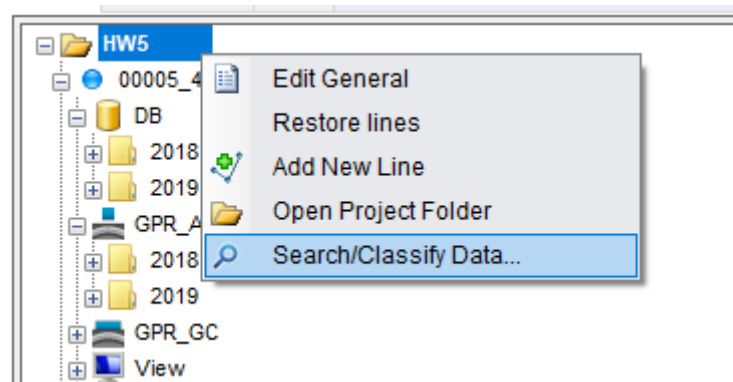
Road Doctor includes routines to compress video files. The video file size and frame rate can be changed. The functions can also be used to create distance lapse videos, where there are frames at fixed distance interval. This is specially a good function for the case where the measurement has been measured so that it has included several sections of slow driving or even stoppings.

The compression utility can save hundreds of gigabytes or even terabytes of storage in larger projects. The routine is especially useful for longer time archiving of video file with projects and also, if the data is going to be shown on-line through internet.



## Project tree Data classification (Core)

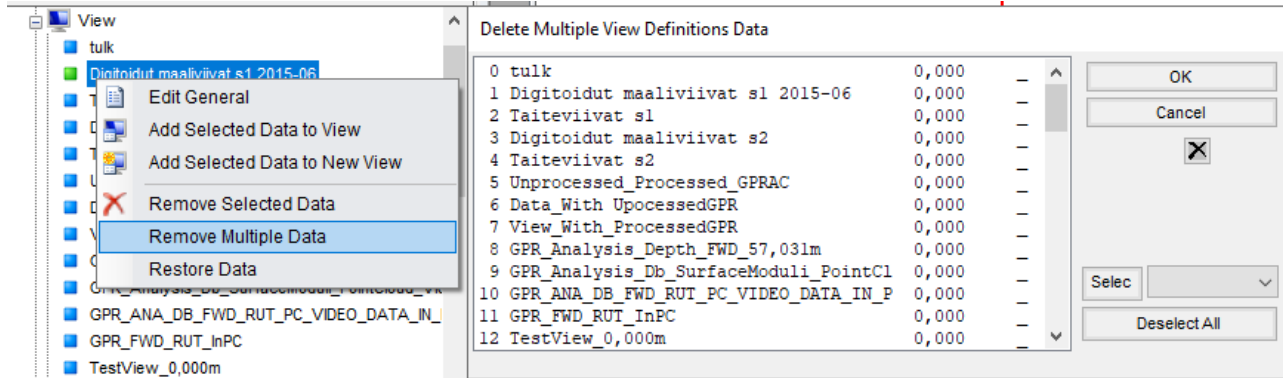
If there is a large number of data available and from multiple years in a project tree, it can become hard to read and handle. Therefore, Road Doctor now includes possibility to set the data to different sub-classes and divide them in to branches under each data group. There are some predefined settings for classification and also possibility to define the own classification parameters. Data can be classified automatically for instance based on the measurement year.



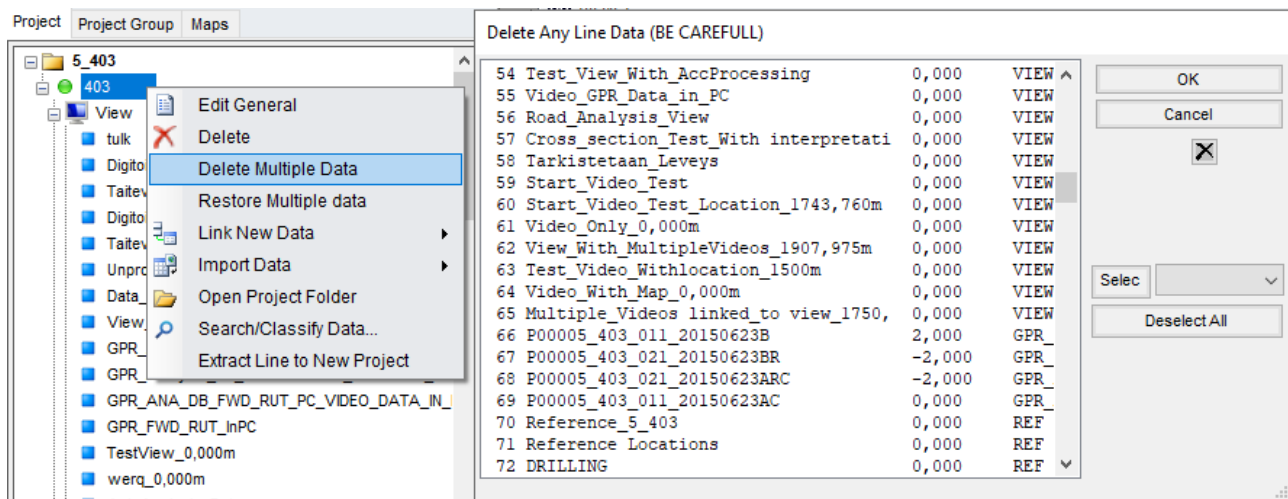


## Multiple Data removing and restoring (Core)

As a new function in Road Doctor it is now possible to remove multiple data regardless of the data type. This was possible previously only for GPR data type. If single data is selected, the program allows to remove data only from that data type. This makes cleaning up projects much easier than before.



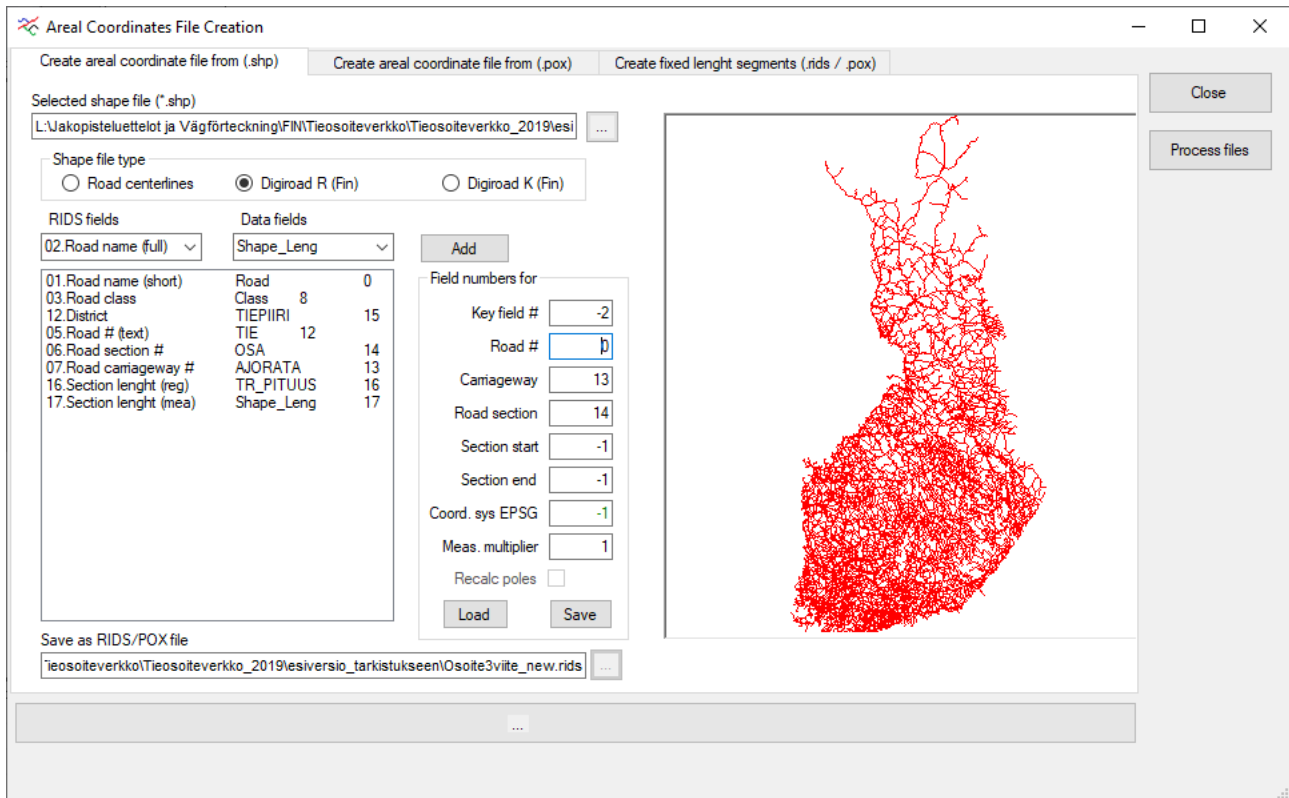
If the line data type is selected, the program makes possible to remove any data type of data from that line. This latter operation can be dangerous for projects integrity and therefore Road Doctor now includes also restore operation, which can be used to bring back to project once accidentally removed data.



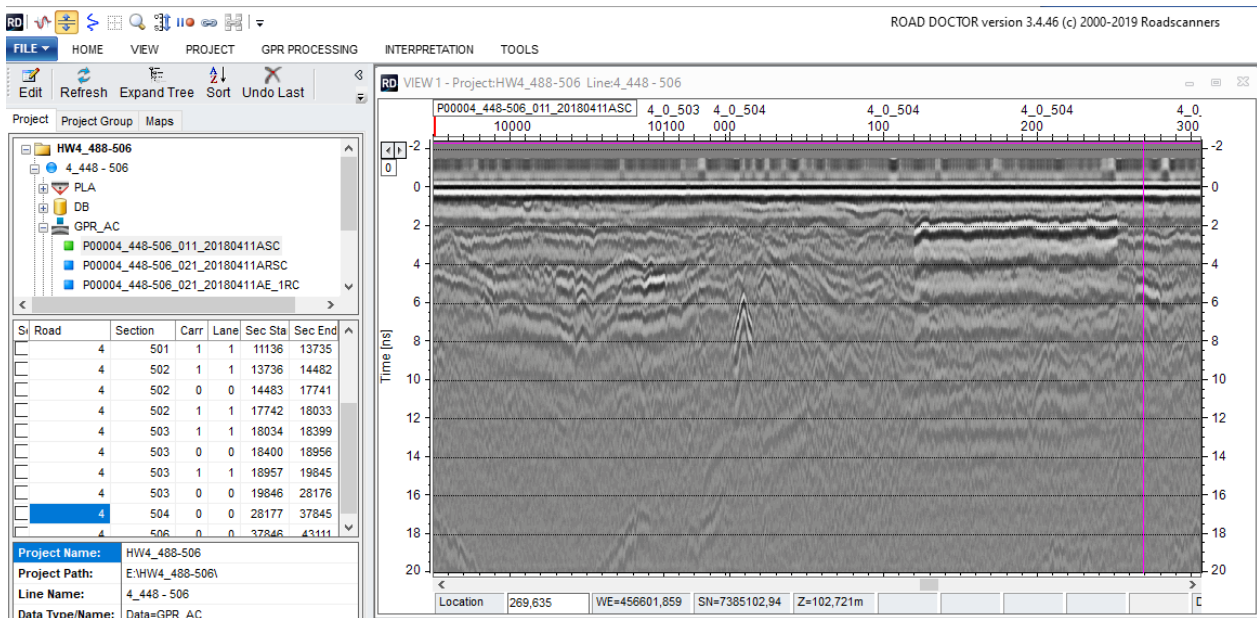
## Areal Coordinates File Creation tool (Core)

Road Doctor has had a capability too use an external file, so called rids-file, with coordinates for defining the true Road chainage based on measured coordinates. This has meant, that several road section or streets in a city could be measured in to one file and the road address or street name could be solved afterwards. Instead of having 100 short profiles 5 – 10 longer continues profiles could do the same job. Until now there has not been any tools available for end users to create the .rids-files. Creation required a lot of manual work.

The imported network can come from an ESRI shape-file, or it can be created from measured Road Doctor pox-position files.

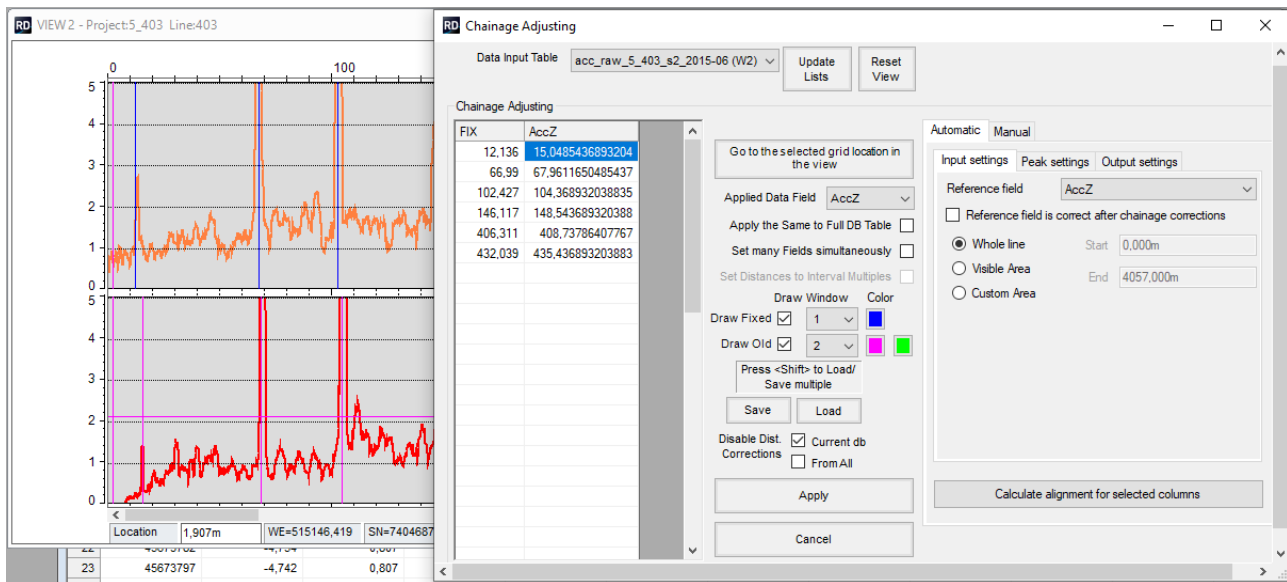


If the areal coordinates file is loaded in to memory and showing road sections is selected from settings, the program can now show the found section breaks in data. The breaks are defined at every road, section and carriageway break point. If some break point is taken from nearby crossing road, it can be removed and the break points recalculated.



## Semi-automatic Chainage adjustment tool for Database data (Surface)

Chainage adjusting tool was taken out from Database filtering tool and set up as an own dialog. It was also updated with a new operation, which enables automatic adjusting of measurements from several years based on anomalous peaks repeated over years.



## Some Minor Changes

### Surface Module

- Some advanced point cloud operations are now possible to do in user defined order
- Added support for third laser scanner in RDL-format
- Added support for SICK-LMS-4000
- Parallel processing enabled in some rechainage operations, which speeds up considerably operations

### GPR Module (Core)

- New options added for GPR – Air coupled data interpretation output, making possible to fine tune the outputted parameters and outputted column names.
- Savitzky-Golay Filtering operation is available now also for horizontal high and low pass filtering. Specially, the low pass filtering enables removal or filtering the noisy single scans.
- Possibility to set “Vector interpretation Drawing Filter” to clean up GPR interpretation lines on the screen. Earlier the routine was showing every point, which caused the interpreted interface look very noisy, if a longer distance of data was shown.
- Dashed line types in vector interpretation (Ground coupled data) now appear correctly even though longer data section is shown on the screen.
- Static background calculation operation made much faster and it takes also 2D filtering operations in to account.

- Attenuation compensation and sampling window function now possible to set for frequency responses in Rock and Concrete modules.
- More data channels supported in 3D views (now max 999)

## Database (Core)

- New display modes for line data view, where line thickness and tickmarks can be set.
- Possibility to show bar graphs as stacked.
- Support for linear interpolation as interpolation type for surface data. Earlier it was always cubic-spline. This applies also to cross-section view taken from surface images.
- Possibility to set opacity for any data base data.

## Other

- Possibility to edit both MAP data and linked Image data specific information
- Support for reading ground truth points from multiple TEKLA-format files and linking them to line based on coordinates.