Road Doctor® 3 new features and bug fix list since October 2015

This list includes new features and bug fixes. Some of the bugs may not have appeared in released versions. Some of the items apply only to certain modules of Road Doctor. In some cases, the module name is mentioned, but not in all the cases.
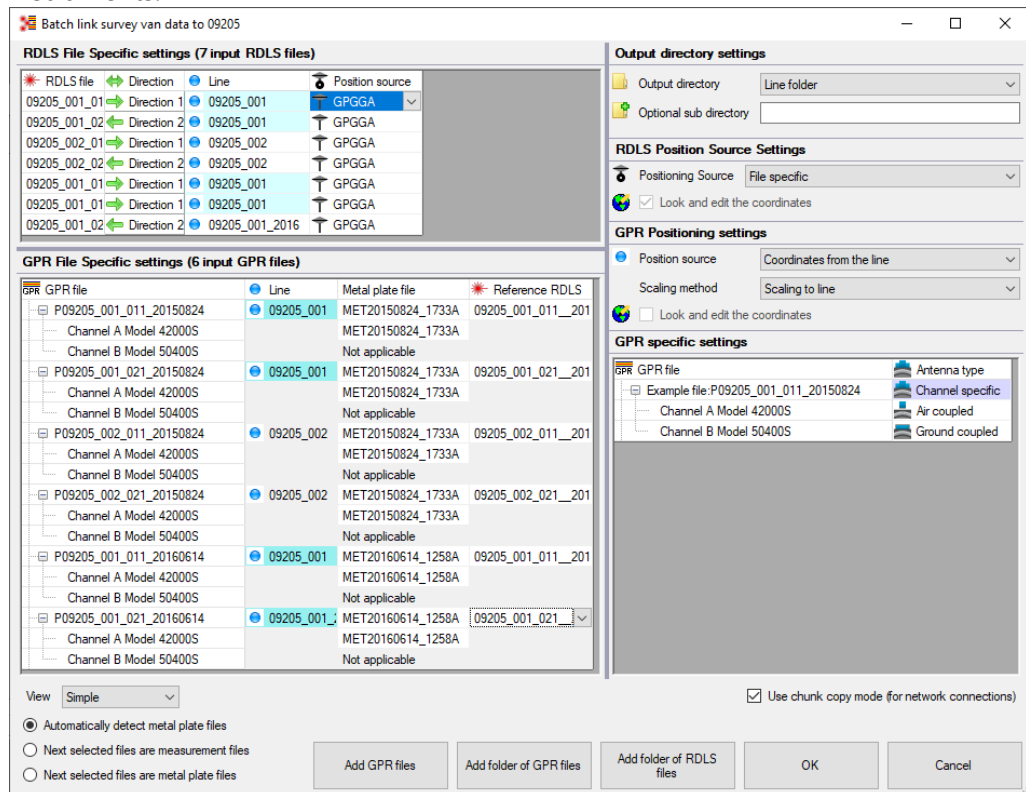
3.5.50 – 2020-12-22

New Features:

A. Batch linking:
   1. Batch link RDLS and GPR:
      i. Batch link Survey Van data: New option to link RDLS and GPR data simultaneously. Main purpose: To be able to use IMU data when determining the location of GPR instruments.

ii. Editing coordinates: Will now show the name of the file/line you are editing the coordinates for in the title.
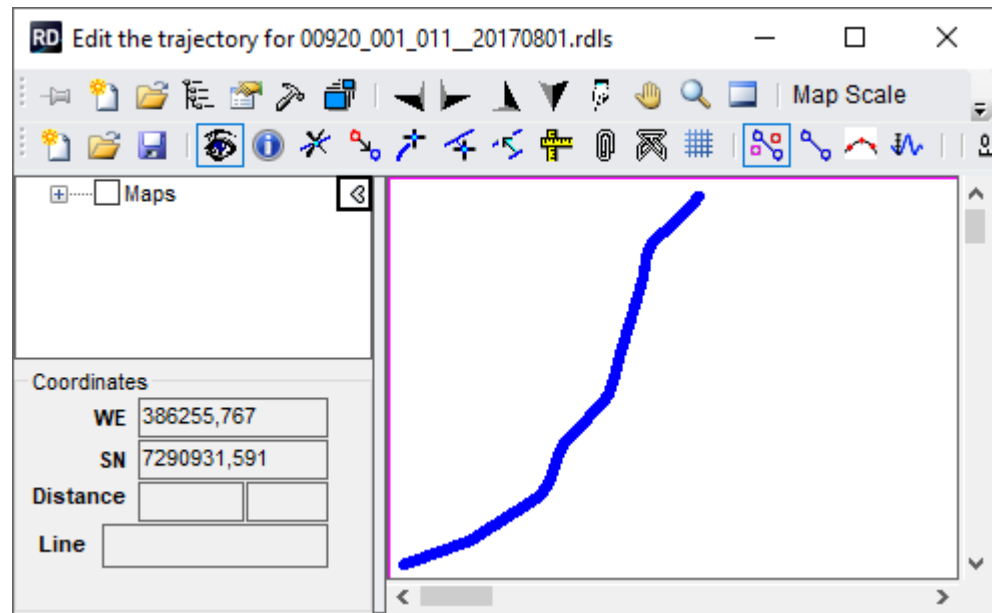
iii. Advanced settings now have an option to determine if the user should edit the coordinates based on the maximum or average offset to the line. This is also possible in advanced laser scanner reading.
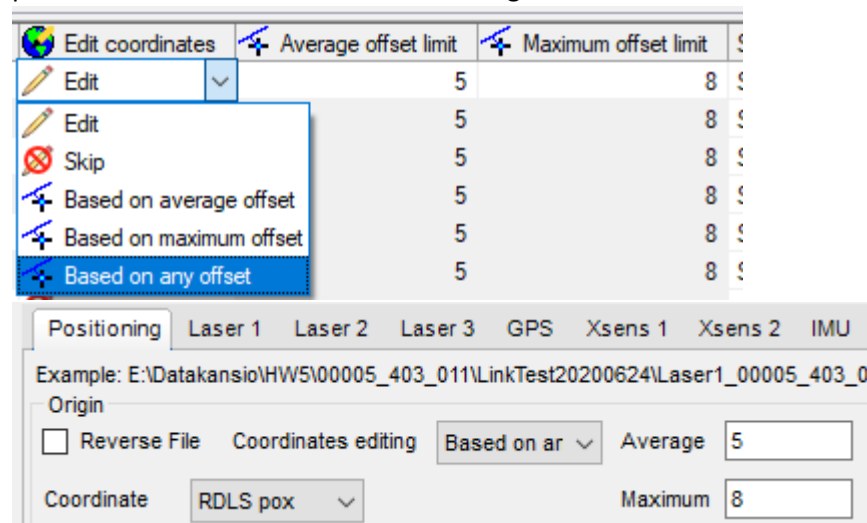
iv. Advanced settings have the possibility to not create a directory for the new line you are creating.
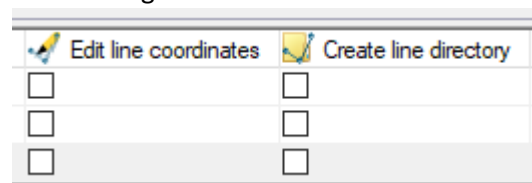
v. Hovering over a line cell tells the length of that line of approximate length if the line doesn't exist yet.

vi. Hovering over a project or a line cell tells the path of that project or line
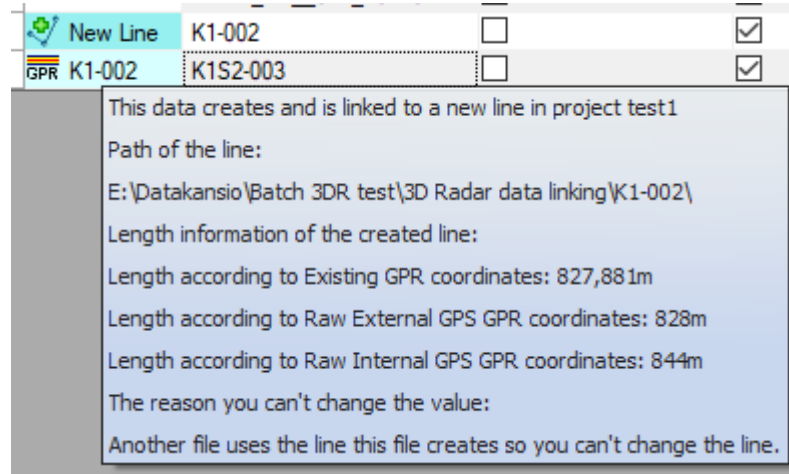
vii. New checkbox only in advanced side: "Use Default values". This controls whether other cells change to their default values based on the change you made to the settings or not.
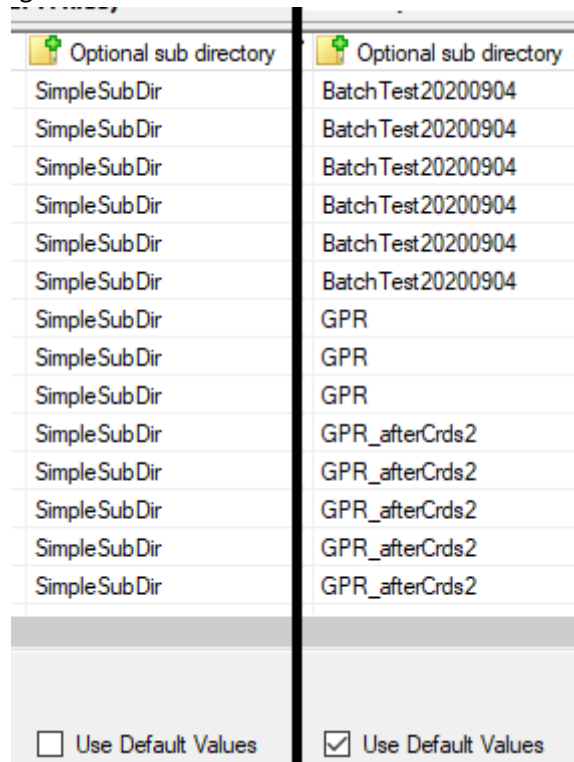
viii. Added Different highlight statuses for cells:
   1. Red: There's something wrong or bad quality about this cell
   2. Blue: The row is from the same measurement (measured exactly at the same time)
   3. Cyan: The line where the data is linked is the same as the selected line
ix. Added additional tooltip information to the main file column and GPS/IMU columns
x. Advanced settings now have a possibility to edit the line coordinates separately from the trajectory when creating a new line.
xi. When linking to a line another file creates, will now display the name of that line instead of the name of the file that creates it.
2. Batch link GPR:

    i. Added 2 settings which were previously only changeable when linking the GPR files individually: Trend filter and 1st Er multiplier

Trend Filter	1st Er Multiplier	✳
☐	1	C
☐		

    ii. If GPR antenna ABH values are obtained from RDLS, will now display which antennas are not in use according to the operator

(mm)	Channel Geometry Source	↗ Channel distance A (mm)	↗ Channel distance B (mm)
3200	Channel specific	0	0
	⚠ Num1Chan1 Sir-30	6040	1383
	Num2Chan2 Sir-30	5050	1449

The selected GPR within the selected RDLS file is used to obtain the geometry information for this.

Number of the GPR in the RDLS file:1

Channel number: 1

Model: Sir-30

Antenna type: 4200S

According to Matti, the operator,

this GPR was not used in the measurement

    iii. Added option to calibrate temperature drift based on the result of direct wave difference. This option is used by default.

Calibrate for Temperature Drift	Temperature drift calibration limit	S
Based on direct wave difference	2	☐
Based on direct wave difference ∨	2	☐
OFF	2	☐
ON	2	☐
Based on direct wave difference	2	☐
Based on direct wave difference	2	☐

    iv. Edit coordinates step will now show the linked line as a reference line by default

    v. Will now prevent the user from adding the same metal plate file more than once.

    vi. The result form will now display the air coupled processing information only if you link AC data.

    vii. The settings will now properly display the waiting cursor when loading

    viii. Performance improvements to many settings in UI functions

    ix. Collapsing the GPR specific node now also changes the vertical scrollbar height.

    x. Added information to the main file column tooltip about the length of the channel according to pulse encoder.

    xi. Now you can always see the position source and metal plate file columns if they are relevant even if all the cells in that column are disabled. (Because only 1 position source or no metal plate files added yet)

    xii. Adding a folder of GPR files is now disabled when the next selected files are metal plate files and the view is simple.

3. Batch link RDLS:

    i. Will now warn if videos are missing (requires data to be captured using Camlink 7.3.11 or newer)

    ii. Batch link RDLS: Will now warn if GPS doesn't have RTK fix or the IMU quality isn't good.

B. RD Web Connection
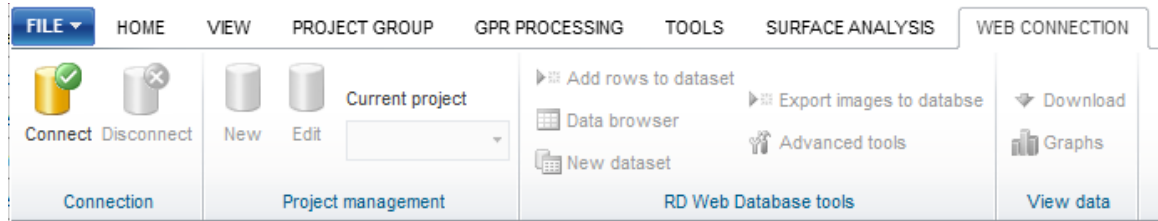
A new tool added which makes possible to transfer data directly from Road Doctor to Road Data center web server for displaying data. This is a great tool to deliver and show the results to final client. Also downloading data to Road Doctor is possible. The use of the web connection needs a separate license and monthly fee.

C. Displaying data:
1. Link views: Now grid table views can also be linked with data view. Clicking location in data moves the cursor to the corresponding grid table location.
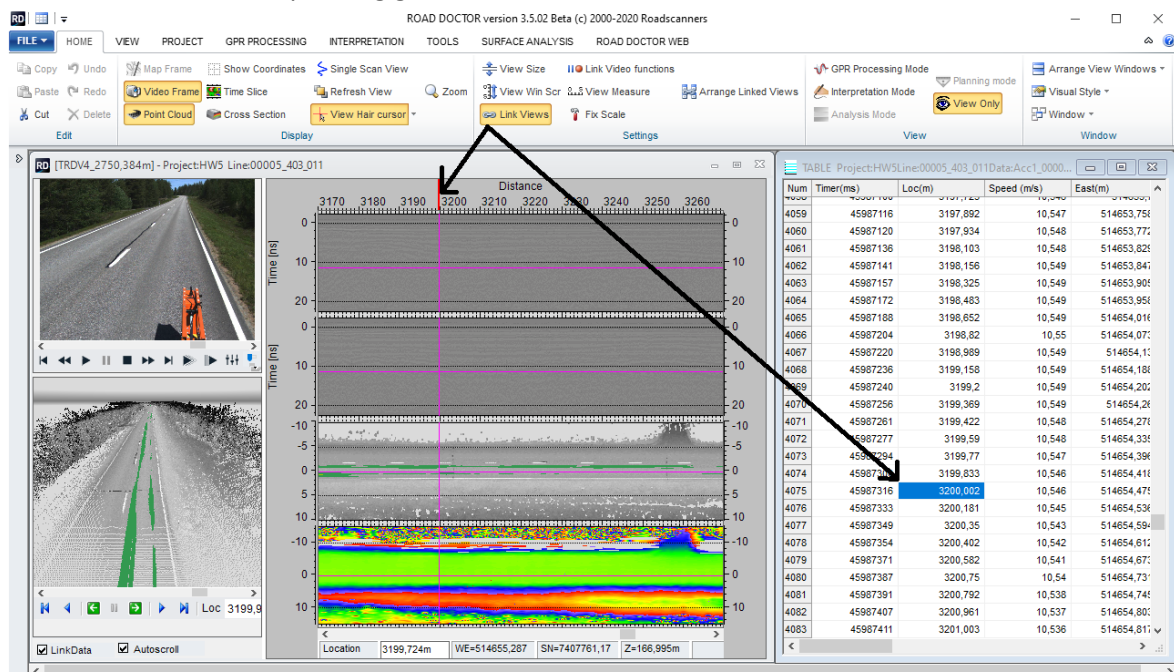
2. Database rescaling: Added options for different interpolation methods.

3. Point cloud - Show position cursor: Now also shows the north arrow
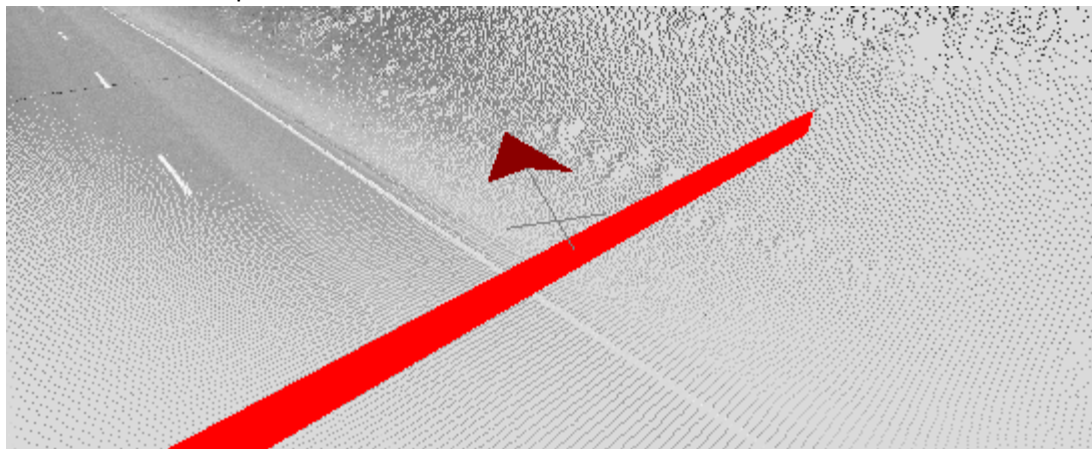
4. RDPC to data view: Defaults - Remission will now interpolate gaps up to 12m wide in both directions.

5. Multiple Maps and Maplists RDMap to data view map. The drawing is now done using the same drawing engine both in external map and in data view map. Shows also the distance poles along the line.
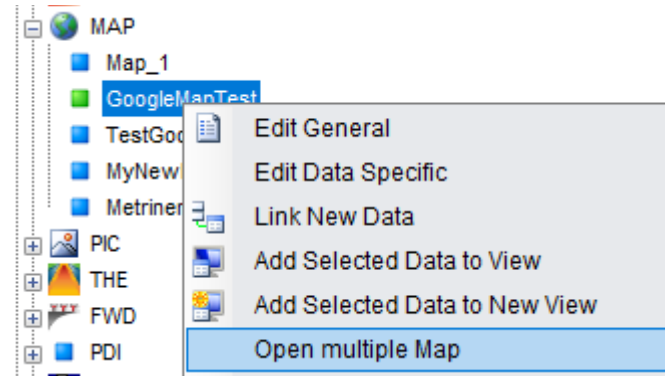
6. Point cloud: color from RGB (Requires las data with RGB values)
7. Jumping in view: <Ctrl> <A> forwards view now 0,85 times view length, correspondingly <Ctrl><W> reverses 0,85 times.
8. Moving video frame by frame using keyboard: Now pressing <Q> button moves the video backward frame by frame and pressing <E> forward, if the video is paused and on the screen. (<Space> pauses/plays)
9. Digitize in a window - Digitizing a new point: Will now show exactly where the new digitized point will go before mouse up.
10. Digitize in a window - Digitizing a new point: If points aren't automatically sorted, will now draw a line showing how the digitized line forms
11. Digitize in a window - Digitizing a new point: If you drag an area to the right with Ctrl + shift, you can specify the area where the shift operation takes effect.
12. Digitize in a window - Digitizing a new point: If you hold down Ctrl + Shift, RD will show you the affected area.
13. Linking a point clouds individually: The form is now resizable
14. Data view: If the mode is view only, left mouse button will also update the cross sections
15. Cross Section from point cloud can be added to data view like image list
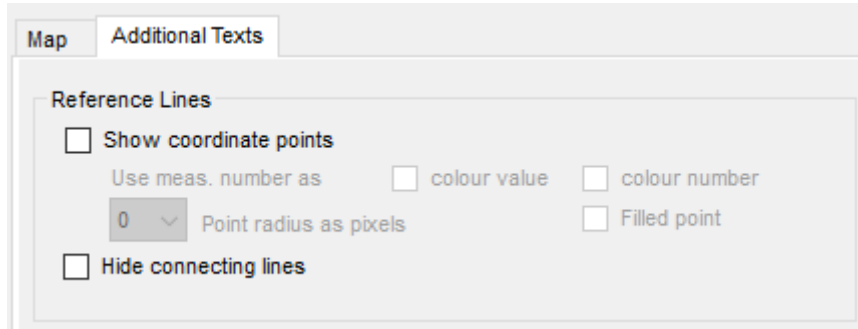
D. GPR
1. Single Scan view.
   i. Now it is possible to see multiple scans in single scan view from the same location if there are more than one gpr data window available.
   ii. Now it is possible to draw on the screen a selection and see the time difference between down and up button clicks .
   iii. Zoom in and Zoom out possible with mouse wheel combined with control key. Wheel directly moves location up and down on the screen.
2. Tools - Chainage adjustment: Now accepts GPR files as well as DB files
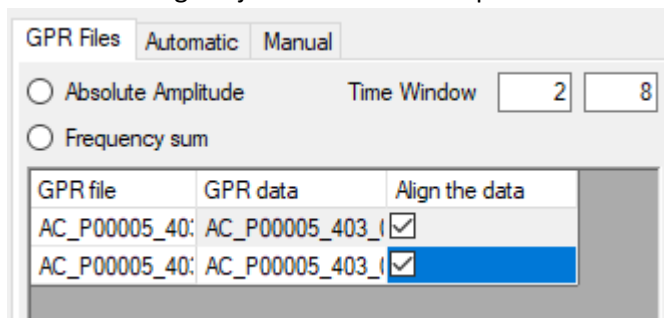
3. 3DR linking (Normal and batch): Improved the performance of Road Doctor reading 3DR trigger files (.trg and .trgx files)
4. GPR Chainage adjusting: Parameters for GPR chainage adjusting for setting fixed processing and the horizontal background removal for data Finger print calculation
5. Interpretation point copy: Possibility to copy interpretations between sub-windows.
6. 3D Cleaning and interpretation operation: Some new options for copying data between sub-windows
7. Changes for GPR Display: Possibility to change the shown GPR-channel in the case of single profile GPR View,
8. GPR Time slice and Cross-section: Operation now uses true offsets for GPR cross-section and slice view drawings
9. GPR Sliceview and Cross-section view: Mouse is now tracked also in the case of true variable offsets
10. File Cut operation: Possibility to cut also ERA-file. Only available if single cut section is marked.
11. GPR Layer tracing: Now Road Doctor saves the taught layer parameters after every new click at interface, not only after double clicking layer. The deactivating teach button now works as designed originally. Earlier it did not save new parameters, if teach button clicked instead of double clicking the layer
12. Reading GPR Markers to GPS points: Now program shows all marker types from GPR markers. The program takes always the first marker type for GPS-points.
13. GPR automatic Interpretation: Now program allows the interpreted layer sample reflection length being at least 10
14. GPR Interpretation Drawing: Now program draws also to Annotations the actual point, where the text is attached as circle, when displaying interpretation points as circles is activated. No changes to UI.
15. SIR-30 Channel splitting operation: The program informs when the channel is selected, if the channel might be empty. The program shows the min, max, average amplitude levels.
16. Vector Interpretation Header File correction: Now program corrects the invalid Vector interpretation header file (.rnt) when rereading and updating the GPR header file, if it is damaged.
17. GPR Updating operation combines possible other AC and GC files. Operation now supports possibility to combine GPR ground coupled and air coupled files interpretations, if they are at the same offset distance (+-10cm). The program assumes that the combined file has shorter time range. There is possibility to select which codes are combined. The combining is done only to vector interpretation. The initial interpretation files are not changed. Optionally also text annotations are combined.
18. Slice view settings: Parameters for setting some Slice view settings.
19. Drawing vector in GPR-Slice data: Draws now vectors using defined code color in the slice view.
20. Slice view vector Interpretation: At given offset location empty channels are now skipped.
21. If there is more than 10 GPR data in a saved view, only first 10 is shown in view settings text in Project tree view. Rest of GPR data is marked as '...' text
22. GPR Plain Scan View - Creating Frequency spectrum of View length of GPR data from shown time window added to be GPR General feature instead of a special module feature.

E. Coordinate handling and map view

1. Map view settings: Reference line settings enabled
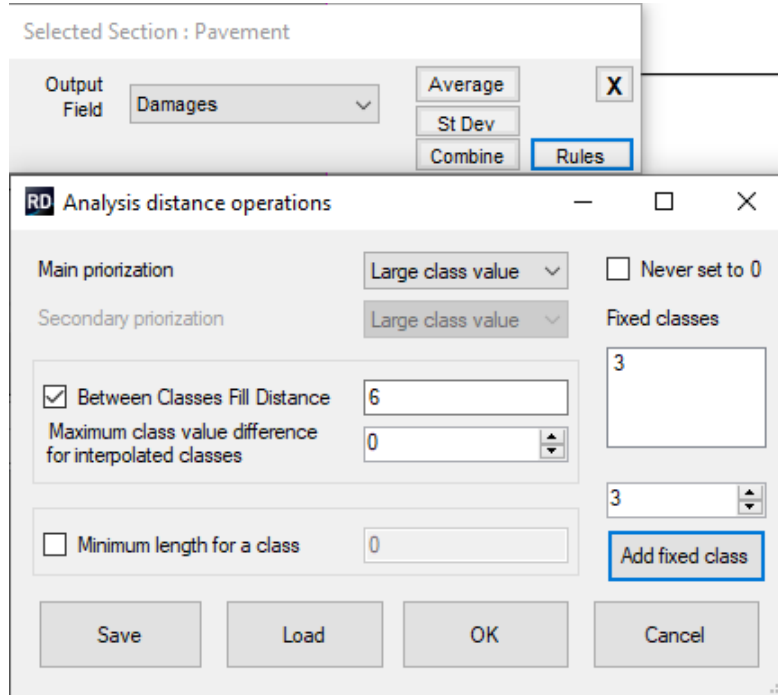
2. Selecting coordinate system - Select displayed coordinates: The form is now resizable
3. Map control shows separate Map and Line EPSGs even they are same
4. External map view: During linking of certain data, will remember the old location of the map view.
5. Maplist EPSG: A new selection added to be able to enter the Maplist epsg-number for grid format
6. The data view map was changed to use the same technique as external Mapview, all the maps, maplist etc. are handled the similar way. the map can now also be directly moved by pressing left mouse button down and dragging. The map size is fixed to 2000x2000pix for multi-selection maps and maplist. Map image can be made smaller by setting the Zoom when the map is loaded. No visual changes for Interface.
7. Adding Map to data view: Now operation checks if maplist is available for image and shows its activation button only if maplist is available.
8. Edit Coordinates, Create an Areal Rids-file from pox-files. Now it is possible to create an Areal coordinates file from pox-files using "Combine Multiple Pox files" menu option in Grid. Set "R" in "Data Order in Row" options text box. The program will try to extract the Road, Section and carriage way from the name. If not available uses the file number and name for road address.
9. Map in Dataview drawing - now the map size can be set using zoom factor when opening the data. Default at 100% pix resolution is 2000x2000 pixels, otherwise the bitmap size is value/100% * 2000x2000 pixels. for example 200% = 4000x4000 pixels. Minimum bitmap size is 1000 x 1000 pixels, max is 5000x5000 pixels. The program can show the mouse pointer at map-location if data is in slice data format. The map cross is following the mouse movement in data.
10. Map zoom size - can now be set manually to be between 1 - 600% earlier was 10-600
11. Possibility to link Maplist file .RDMap to project when the file is created in Map Control.
12. Distance poles can be drawn to Data view Map if distance is given. The interval is automatically defined. The given interval is minimum interval. The true interval will be max 100 pixels in the map scale

F. Other
1. Combining columns from several databases to one database possible using a new tool.

2. Special analysis operations: Added possibility for distance based analysis (combination)
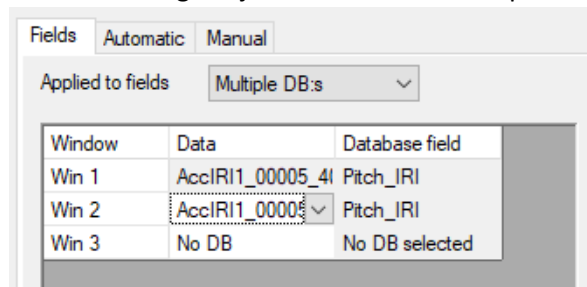
3. Tools - Chainage adjustment: Added multiple DB support
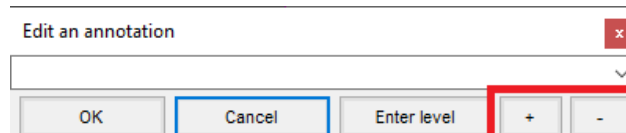
4. Adding or editing annotations: Added + and - buttons to add and remove items from the
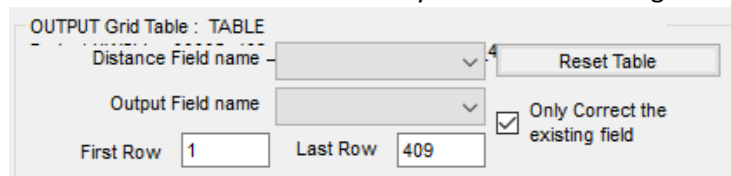
list of items

5. Transfer data between tables: Only correct the existing field

6. Analysis parameters: Possible to reset the values to default

7. Digitized vector arithmetic operation: New output option: Analysis File

8. Correlation and Deviation graph: You can now show the average and standard deviation
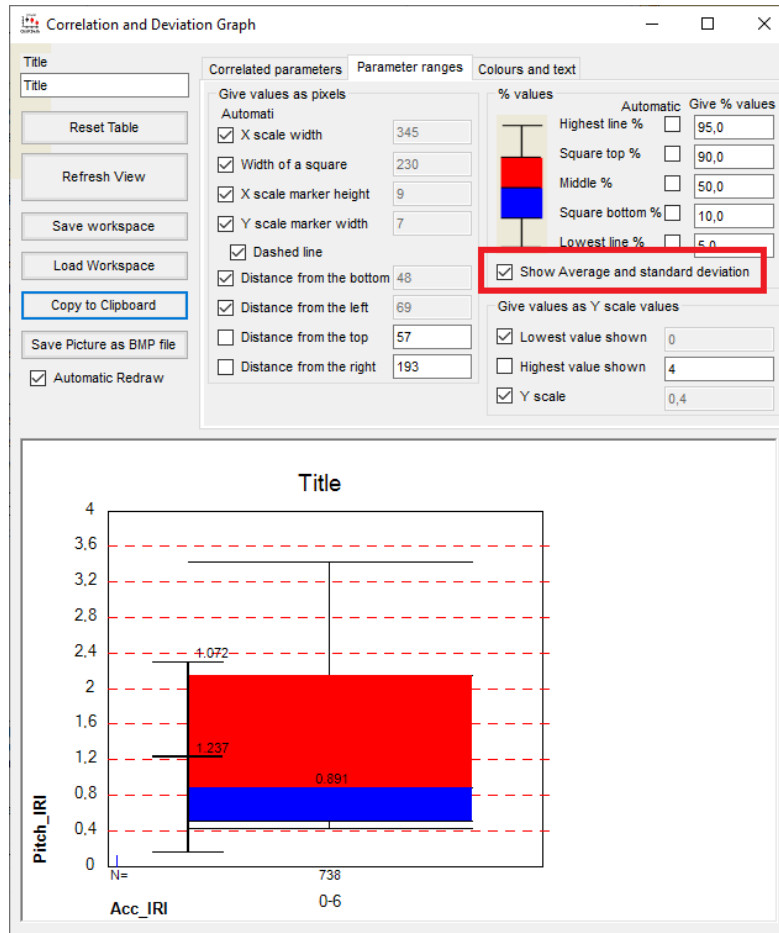
9. Correlation and deviation graph: Added secondary (amount) Y-scale options
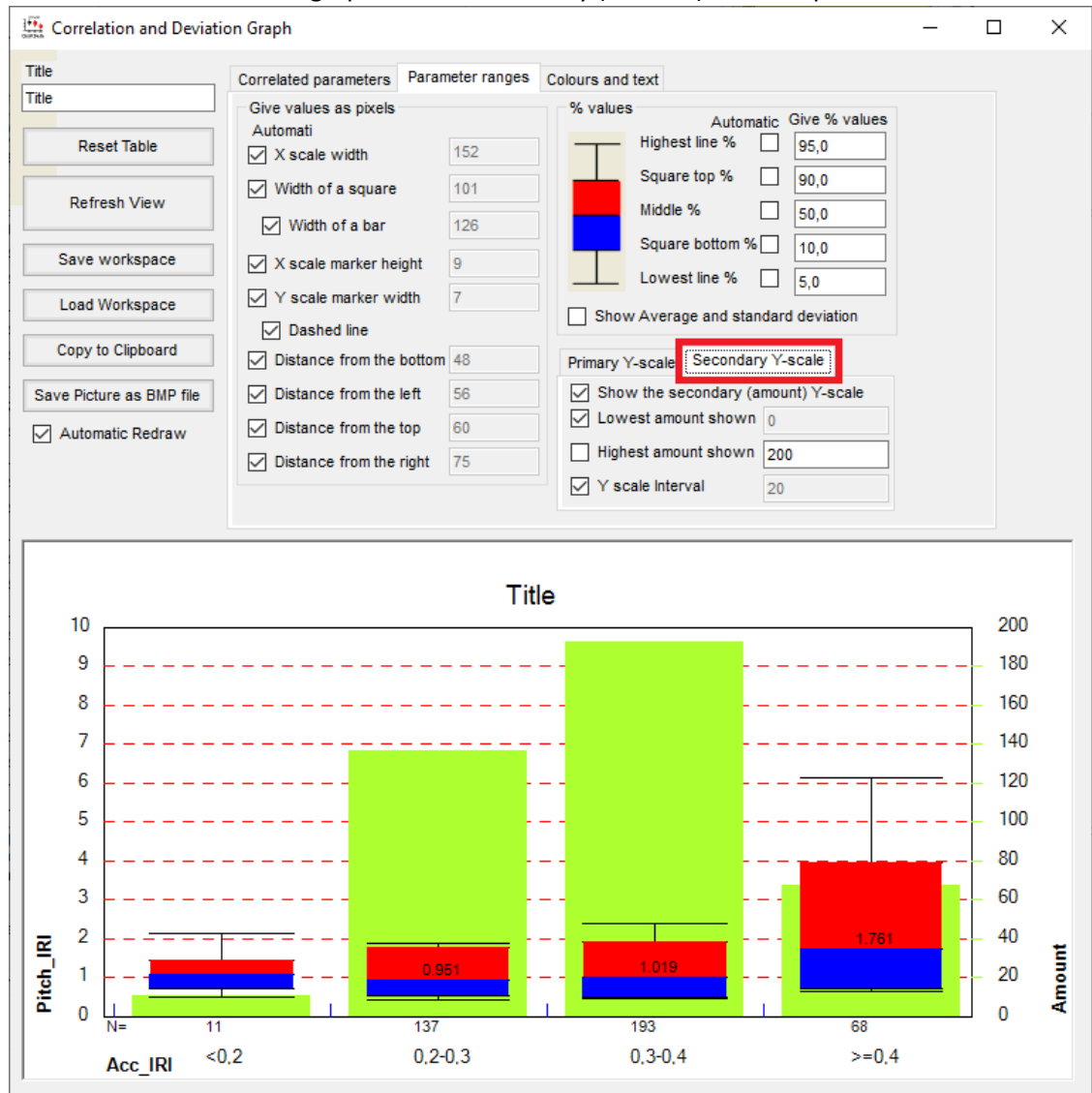
10. More graph parameters - Rutting - Compare point to another with offset shift: This value is multiplied by -1 for calc area 2.
11. Combine DBs: user can select path and filename to combined database. Also, date location in column header can be set
12. Combine DBs: Added progress bar to show progress when a lot of lines/databases or slow network
13. Combine DB: Possible to append data to existing combined DB with same columns and settings as previous combine, updates project information.
14. Multiple Ana and DB fields to same KML file
15. Ana output: Possible to print annotation to own column in grid
16. Multiple places: Made small forms re-sizable to better fit longer data names
17. MSI analysis extended to manage analysis values larger than one digit.
18. Improved the performance of creating a shape file
19. Invalid video now sometimes gives a better error description.
20. Read only projects now give a better error description

Removed feature:

A. Combine 2 laser scanner data is now removed. It rarely worked and when it did, the results weren't good. Instead, if this function, use "Read chainage for RDPC", "Fine tune RDPC distances" and "fix RDPC to pox" functions depending on the specific need.

Bug Fixes:

A. Surface analysis:
1. Create pox from RDPC: creating a text file caused the view to go on top. Bug introduced in 3.2.47
2. View settings - More graph parameters: Help did not open.
3. RDLS linking: Did not handle properly laser scanners which do not measure remission data.
4. Simple RDLS linking settings: If the GPS quality was 1, incorrectly set the GPS quality to unknown instead of average.
5. Batch read RDLS: The enabled status of "database type" and "edit coordinates" columns was not updated properly.
6. Linking RDLS files: Will no longer ask to recalculate distances during the edit coordinates step of linking (will do it automatically)
7. RDLS reading: IMU yaw did not take into account the difference between north direction and coordinate system north direction.
8. RDLS reading: IMU always added the geoid to the elevation.
9. Advanced laser scanner settings: Will now set the proper tab to be selected when wrong values are input and OK is pressed.
10. Advanced laser scanner settings: set constant elevation did not set the to-elevation properly.
11. Ditch tracking - Start tracking from current: If the current location was before the start of the line, the tracking did not start.
12. Linking a point cloud individually: If you were combining multiple las-files to a single PC file, the program showed an error after successfully combining the files.
13. Convert scanner data: All output Las files had the same number of points according to their header.
14. Advanced point cloud tools: Getting trajectory information from a multi-trajectory point cloud caused an error.
15. RDLS reading: Program now accepts coordinates that are on top of each other (Vehicle stopped).
16. LAS file linking. Linking third party LAS files (Norwegian) did not find poles from line position file, due to chainage reading bug. Now using proper point distance calculation.
17. Batch rutting calculation, Bug fix, added extra fields regardless of user request

B. Displaying data:
1. When there was an error opening a point cloud file, the error message displaying the error did not display the error properly.
2. When opening a view, closing the form caused problems
3. View options - General settings - Import data to point cloud: Didn't work properly with from-to type data
4. Cross section view: If zoomed close far away from 0, the program could freeze in an infinite loop.
5. Digitized vector arithmetic operation: Overwriting an existing vector didn't remove the old vector from memory.
6. Digitizing in a window: Automatic sorting of digitized points only worked if DB or PC data was in the view.

7. Digitizing in a window: A new digitized point had the distance value from mouse down instead of mouse up.
8. Video player: When the program set the video player to a specific position, it still remembered the old position in some cases. This caused issues with frame advancing operation.
9. Printing view to picture: Selecting landscape mode from the printer did not correctly apply landscape mode settings.
10. Use View template: PC data in PC view did not work with view templates
11. PC view: Color scale editing selected the wrong color scale
12. Opening a view: Cross section was not opened to the view if there was no GPR data in the view.
13. Data view: Going from interpretation mode to view only without selecting an area didn't disable the selection
14. Data view: Interpretation mode caused the right marker to also be set
15. Data view: Changing the shown values of FWD data did not properly update the internal "Reverse Y-scale" setting
16. View options - More graph parameters - Show in all following cross sections: Sometimes cleared data unnecessarily.
17. A and W not working for moving - Moving in Data view with A and W buttons did not work, if manual GPR interpretation was interrupted (sliding mouse backward) and other mode (View or ana) selected. Also, extra wrong interpretation points could appear, if continued from some other place after forced moving with scrollbar and activation of interpretation again.

C. GPR
1. Batch link GPR: Wrong error message if ERA file was missing. Bug introduced in 3.4.0
2. Batch link GPR: Similar GPR specific position sources did not work properly. Bug introduced in 3.X.X.1208
3. GPR scaling with posd files: the scaling did not use the closest 2 points, but instead used the previous 2 points for linear scaling
4. Batch link GPR: Constant scaling and scaling by chainage did not update the offset values in the GPR pox file.
5. Batch link GPR: If nothing was done to the files, the process did not name the files correctly in the project.
6. Displaying Er-values in Views: Now saving the parameter which sets show Er used in thickness calculations to Views, before it was always reset to show measured Er.
7. View Saving: Saved GPR Slice view did not return correctly the minimum and maximum.
8. Batch link GPR: 3DR data did not provide accurate pulse encoder distance in the tooltip information (Didn't affect actual data)
9. Project handling: Relative path was not correctly update after automatic search of missing data file, GPR output in user defined format. First row was not correctly outputted.
10. Extracting 3DRA files: Manually extracting the files outside the normal linking process didn't work.
11. Help text for Interpretation settings: Corrected help text index
12. GPR: The program did not allow less than 3 GPS points for GPR-file, if operation came directly from GPR linking operation. now minimum is 2 points.
13. Batch link GPR files: The process did not know the difference between empty channels and channels with corrupted header data. Now if the header says that the channel doesn't exist, will check the actual data to see if the channel exists or not.

14. GPR Interpretation - Output to PMS format - Sometimes the to-location was smaller than the from-location. These rows are now automatically removed.
15. Batch link GPR: Odd behavior with the vertical scrollbar when the GPR specific grid was selected.
16. Batch link GPR: Simple view did not use given ABH values if an RDLS file was specified.
17. Batch link GPR: Attempting to link air coupled data without a metal plate file caused errors.
18. Interpretation Output: If only one point in file, the coordinates were not updated. The offset value was not correctly updated to output as with options B and K=8196.
19. GPR HFH, VFI, VFF processing: Program could calculate over end scan or over end sample in some cases and cause erroneous data on the view
20. Bug in drawing GPR data - sometimes data was left on the screen, if full screen or half screen was jumped, although there was no GPR data in that section.
21. Bug in drawing and interpreting GPR at true offset on the screen: The points drawing did not take into account, if the channel really had data in clicked location or not. Vectors drawing did not take in to account the selected "show only at drawing level" parameter.

D. Coordinate handling and map
1. Floating Coordinate window showing wrong distance if long areal crd file used: Floating coordinate tool now uses the same routines as is used for horizontal axes and location textbox. Bug introduced in 3.4
2. Map view: Zooming using mouse scroll wheel while the form was higher than the size of the map picture caused problems
3. Map Control: Map server EPSG was used even if it was not selected in tree view in Map Control
4. Opening video coordinate file: Program crashed if the input file had the same distance in all coordinates
5. Areal coordinates file: support for 2D coordinates
6. Reading RDMap files: Now program reads the map-projection's epsg-number correctly from .rdmap-file
7. Adding DB data to map view - Frequency of data classes - Classify: Didn't properly update the class name
8. Adding DB data to map view - Frequency of data classes - Copy to clipboard: Didn't include class name.
9. Adding DB data to map view - Frequency of data classes - Classify: The points were always compared to the amount of points in all classes. Not all the points. Therefore, the sum of all % values was always 100% even if they contained a fraction of the data.
10. Adding DB data to map view - Frequency of data classes: The minimum value wasn't properly shown on all the rows.
11. Map view: Reset map (Hammer tool) did not work with degree maps
12. Map control: Drag tool hid the mouse pointer during mouse down (That part is as intended) but did not show it after the operation finished.
13. Data view Map not following the horizontal scrollbar dragging: The map was not following the data view scroll bar dragging.
14. Large maplist could cause very long loading time in data view map: Corrected bug by changing the working principle of the data view Map
15. Edit coordinates - correct instrument position: Didn't always remember the previous values
16. Bug in Setting Pole distance for Data view Map - the parameter had no effect if given, or was not always the same that was given before. Now works as intended

E. Other

1. Tools - Chainage adjusting: Sometimes adding new points manually added ghost points at location 0.
2. Grid view - Filter/Interpolate cells - Pick minimum value points: Operation didn't work properly and cleared everything excluding the value after the minimum value if only 1 value was picked.
3. Editing annotation text: correction to bug where combobox text is empty
4. Linking existing analysis file: Linking existing analysis file where the name was less than 14 chars caused an error. The program assumed that there is a date and time in the end of the file name. Now the program accepts also shorter names.
5. Chainage adjustment: Aligning DB type data didn't work properly
6. Create GPR and Video images: Error occurred when creating images from video
7. Closing the program: If there were more grids open than data views, an error was shown.
8. Thermo data: Errors occurred when viewing the data
9. Link coordinates to still images: Caused an error if the images were not next to the pox file and therefore you manually selected the images.
10. Areal Coordinates: modifications due to Australian and Norwegian data
11. Areal coordinates file: Bug fixes due to Australian and Norwegian road data
12. Table view linear referencing - enabled functionality which was disabled in previous versions.
13. Table view linear referencing: reading coordinates from POX file
14. Grid view - Filter / Interpolate cells: Will now warn if location field is not selected when it is needed.
15. Grid view - Filter / Interpolate cells: Fixed distance average did not calculate average if only 1 value fell within averaging distance.
16. Distress/Asset Inventory: Unnecessary errors occurred if the road had not been specified.
17. Distress/Asset Inventory: Double clicking on the created data rows caused the program to crash
18. Linking a new line: Double clicking the OK button created 2 lines.
19. Backup Project to ZIP file: Caused errors if project had valid GPR data and other data in an inaccessible location.
20. Edit coordinates - Right click - Coordinate calculations - Transform all .pox files in folder: Wrong language file index causing wrong text to appear.
21. Edit coordinates: Menu option link combine multiple had wrong language file index.
22. Project window - Undo last: Rearranging sub windows disables this functionality, but the user was not informed why.
23. Distress/Asset inventory: Clicking a button using the mouse caused it to also be triggered the next time space was pressed.
24. Export Analysis: Option "output row by row (GIS) one value per row" did not always export exactly the displayed fields
25. Exporting KML files: Field length was too short for over 100 km surveys. Now accepting survey lines up to 10 000 km
26. Batch rutting calc - cannot find pc file, if path is in different format than "location of projects"

3.4.74 – 2020-06-11

Major new features:

- New powerful table view tool for calculating statistical values from selected columns. Enables also prediction (slope) based on given x at y or y at x (**C:8**). Changed table can also be saved without relinking.
- New much faster 360 video camera support and possibility to change display settings of 360video (**E:1**)
- Possibility to set a video location shift (**E:2**), which makes possible to see the video location from given distance.
- Possibility to use middle mouse button and Spacebar to pause and restart the video. With Control button pressed simultaneously starts the reverse play. (**E:3** and **E:4**)
- New function for single scan view to copy whole GPR data to clipboard from shown distance and time interval as text and paste to excel or table view (**C:15**).
- New function to copy to clipboard the 3d GPR slice amplitude data from set time level (**C:12**).
- Much faster display of slice view from given interpreted time level (**C:16**)
- Much faster project tree update (**F:10, F:11, F:16**).
- Support for huge data arrays (up to 2 Giga values, 8Gb for each GPR file or data channel!), now the limit is set only by computer's memory size and operating system (**F:15**).
- Possibility to use batch linking for 3-Radar data formats.

Known Issues:

- Video display: The video can freeze, if the mouse button is pressed down on top of data and moved quickly backward or forward. This can happen specially, if there is a reverse video on the screen or forward video is played reverse. Click or double click middle mouse or press Spacebar to free and play the video again (Or press play button in frozen video). If the video was reverse playing press Ctrl button simultaneously.
- Cross Section Display: If there is no GPR data available in the view, the cross-section information is not saved with the saved view.

New Features:

A. Surface analysis:
   1. RDLS reading: New option for ACC: Assume constant time shift. This setting is on by default if UTC time isn't available.
   2. RDLS file reading: Better error descriptions
   3. RDLS file reading: Increased the maximum allowed size for the RDLS file. Previously the limit was roughly 2.2GB
   4. Cross section view - Right click - Copy Tracked points to Digitized vectors settings: Pressing the Key D while having a combo-box selected updates all the other combo-boxes to have values to be near the selected value.

B. Displaying data:
   1. Find Data in CS View: Now allows also interpretation only shown data to be used for channel selection in Cross Section view.
   2. Data view: If some other data is loaded to video only view, the video location is reset and view is like a normal data view.
   3. Data view: Now it is possible to change the form size faster so that the video frame size still follows the size of form. Video only frame size follows all the time the size of the form.
   4. Support for not using Areal file for X-Axes presentation, although loaded.

      i.   A new ribbon menu button in Tools to show the name of the loaded areal coordinate file and to activate and deactivate it.

     ii.   Link New Line: Disables and enables the loaded Areal coordinate file status button in Ribbon Tool if loaded or unloaded in the new Line linking.

    iii.   When a new project is loaded where is an Areal coordinates file, the program updates Tools Ribbon bar Areal coordinates status button accordingly. Now it is possible to disable areal coordinate file from project by setting empty file name in Edit Project information dialog.

5. Multiple joined Video display: Possibility to sort videos by Creation date when opening the display settings.

6. Multiple Image View: Added Possibility to select separate imageview for every separate dataview. Makes possible to have almost unlimited amount of multiple imagelists visible at the same time (4 per dataview)

7. Data view Map loading errors shown: Program shows now an error message, if there are some problems with map coordinates.

C. GPR

1. Edit distance correction: Now possible to apply Edit distance correction operation to only an AC ERA file

2. 3D GPR interpretation: New output interface outlook for separating different items in multiple ERA outputting

3. GPR processing: New Processing function for filtering GPR Data horizontally with Savitzky - Golay. S-G filtering is less averaging than current boxcar, is less sensitive for spikes.

4. Edit Distance and Comments operation: If changing multiple data start/End locations simultaneously, will ask if user wants to proceed.

5. Edit Distance and Comments operation: Saving the GPR:s previous parameters for distance (Scale/Beg) to .prc-file

6. GPR data rescaling: Saving also the old information in filename.prc about the Scale and old data start

7. Batch link GPR: Added a results form informing about the results of the update dielectric values step of the linking process

8. Batch link GPR: Metal plate files with only a single scan (STK files) are no longer accepted as a metal plate file in batch GPR reading. (Only the original metal plate file is accepted because the stacked metal plate file doesn't contain the settings how it was preprocessed)

9. Batch link GPR: Added option to not use pulse encoder fix in batch GPR linking. (Set Tire type to "Metal or 4WD")

10. GPR Single scan view: Now possibility to set manually the shown time interval. Program asks the minimum value and Time window length.

11. 3D text output now allows to output also Depth and thickness as Time (ns). Two option buttons for that.

12. GPR Slice view: View settings for Added parameters for enabling amplitude output from set time level to clipboard.

13. 3D interpretation operation: Changes for enabling thickness and depth Time values output

14. GPR Interpretation updating: Amplitude value in vector output was divided by two!

15. Single scan view: Added Possibility to copy whole view data contents (sample values) to clipboard.   Added also a button for setting shown time window in single scan view. Only in Frequency analysis modules: Made faster the Frequency content calculation in a view.

16. GPR Slice view: displaying from an interface level speeded up 5 - 10x.

17. Batch link GPR: Added support for 3DRA files

18. Batch link GPR: Added support for unscalable files (Files will be instead scaled in real time with posd files)
19. Batch link GPR: Added support for unsplittable files
20. Batch link GPR: Added support for unreversable files
21. Batch link GPR: New option if the output files already exist: You can choose rename to add "(1)" to the end of all output file names to avoid overwriting existing files.
22. Batch link GPR: New Columns: "Number of samples" and "Oversampling". These are used in advanced 3DR data linking.
23. Batch link GPR: New Column: "Time window". Displayed in advanced 3DR data linking. Can only be modified by modifying the number of samples and oversampling.
24. Batch link GPR: New Columns: "GPR Origin" location columns. If the GPR instrument has metadata information about the locations of the different instruments, the metadata uses some point as its origin. If metadata is used, RD will need to only know the relative position of that origin point to know the relative positions of the instruments that use metadata.
25. Batch link GPR: New Column: "GPS geometry source". You can use the geometry from an RDLS file, custom geometry or GPR metadata based on availability.
26. Batch link GPR: New value in "Channel geometry source": "From Metadata". This means that the channel geometry is obtained from the GPR metadata.
27. Batch link GPR: Now the positioning source differs from internal and external GPS sources as 2 separate options.
28. Batch link GPR: Adding RDLS files to the process should now be faster
29. 3DRA file extracting: Made the process slightly faster
30. Multiple Channel GPR Interpretation: Output now outputs the AC data reflection Width and bouncing as decimal numbers instead of integer, resolution is higher.
31. Open Multiple GPR data: operation can be used to show multiple GPR Subwindows with the same view settings quickly in the same data opening.
32. GPR Data reloading in frequency analysis: Program now tries to avoid unnecessary data reloading, when reading the data from memory buffer, which already exists.

D. Coordinate handling and map
1. Edit coordinates - Obtain elevation from a RDPC-file (Road Doctor Point Cloud file)
2. Areal coordinate file creation: option to make single part shapes, option to select road network type.
3. Linking new line using areal coordinates file: Allows now also the Road number to be written to the road textbox, if areal coordinate file is used. The section allows also additional spaces.

E. Video
1. Faster and less CPU-intensive 360-video performance when 360 is enabled in videos own metadata. Road Doctor use now dedicated VLCPlayer360 library for videos. Now it is possible to change also the contrast etc. video properties for 360.
2. Video Display: Videos have possibility to set a distance shift, which enables setting the view location in the front of the vehicle instead of it being at camera location. Helps specially with two direction measurements, where the same location can be set to be visible from both directions at the same time.
3. Video Pausing and Playing: Possibility to use Middle mouse button to pause or play the video, when the pointer is on the Dataview. If Ctrl-button is pressed simultaneously with middle mouse button, the reverse play is initiated. If Shift pressed with middle mouse the half speed play initiated, if Alt-key the double speed. Pressing again set speed to 1.

4. Play / Pause video using keyboard: Added possibility to use Shift+Space keys for pausing and forcing play or reverse play for video. Space pauses/plays videos except, if Interpretation is used. Ctrl-Space pauses or starts reverseplay

F. Other

1. Batch link RDLS/GPR: New simpler UI for most cases. Added options to make advanced side as advanced as needed while keeping the simple settings simple.

2. Saves additionally in ERA-processing also file preprocessing settings and preprocessing parameters in .prc-file.

3. New menu item in table view and in Table tool ribbon for splitting a column based on current "km+m" sign or given letter.

4. DB Grid view: Save As and Save functionalities updates columns information to project info if columns are edited. Makes database updating to project trees much faster. Earlier the changed db-files had to be relinked.

5. Transfer data between tables: New checkboxes for possibility to soften data intervals, assuming slowly changing, Specially for Accelerometer data. Also, now possible to Ignore the gaps in data transfer to another table.

6. Filter/Interpolate table values: New selection to soften variations in distance intervals. Assuming change slowly. Specially meant for Accelerometer Data. Includes also a function if the softening is really needed.

7. Table view: Possibility to add larger number of rows for Insert and Add operations in table View.

8. Table handling: Added New Function for Row Operations in Filtering/Interpolation tools. Calculates from selected column interval statistical parameters. These parameters include average, std deviation, median, minimum, maximum, Least square slope, R^2, and prediction based on X at given Y or vice versa.

9. Grid Filtering operation: Added possibility to set also the Columns using a checkbox, which to use for row/column statistics calculation. Now possible to select also increasing/decreasing assumption for Slope calculations.

10. Project tree updating speed improvement. Specially, for the case, when the project file is large (6 - 8x)

11. Project updating: For local connections operation speedup is 30x compared to the older versions. Project group opening speedup is even more significant. Project shows available now only files which have relative paths added. This is standard for all projects newer than 5 years. Also other are available, but they are not marked with blue in project tree

12. Table view: keeps in memory the changes that the user has done and makes possible to update the results to the existing linked data, if the grid data was shown directly from the tree view or if the data was just linked in to the project tree. Save command in Table view is enabled, when save is possible.

13. Project tree: Tree update is faster, the project reading is optimized. The existence of the project files is checked only when project is opened or new Project tree is Refreshed.

14. Deleting multiple data in single type deletion: Now for missing data there appears text NA in the listing for indicating that data file does not exist or was not found in relative path or project path.

15. Multiple places: Increased the maximum size of data which can be stored in memory. This helps any time large (> 2 GB) amount of data is stored in continuous memory.

16. project data information's RDLnk files are saved to own \Project.RDlnk directory. This cleans the folder structure under a project.

17. Timed warn messages: Now the default time for the messages is 0.15 seconds per symbol.

18. Support for Data sub directories: As New feature the program allows data transferred from Project folder to underlying data folders (GPR, FWD, PC, MAP, VIDEO, DB) And the program will find and update location automatically to project tree
19. Multiple places: Changed some forms starting locations to be on the right side of the parent form.

Bug Fixes:

A. Surface analysis:
1. Linking individual point cloud files: You could accidentally try to link the same point cloud twice causing the program to crash
2. RDLS Reading: If Microsoft time service was on with camlink and IMU data was in use, the IMU data might not be in ascending time order causing RDLS reading to fail.
3. RDLS Reading: Increased the time required to go backwards to be considered a different day to be 100 seconds instead of 10.
4. Advanced RDLS read - Save Settings: The settings file didn't take to note that laser scanners were missing from the settings data.
5. More graph parameters: Calc area 2 digitized vectors weren't read properly
6. More graph parameters - Rutting - Bar method: Sometimes the bar balanced on the center of the calculation area even though it should have leaned to one side.
7. RDLS reading: Flipped the direction of stretch of handling Xsens-accelerometer times at the same millisecond.
8. RDLS Reading: Assume constant time shift was not cleared when setting RDLS settings.
9. RDLS Reading: If ACC time didn't change at the beginning of a measurement, an index out of range error occurred. Bug introduced in 3.4.57
10. View Loading: RDPC Distance shift was not loaded properly
11. Ditch tracking: Some scenarios caused the program to freeze
12. Ditch tracking: Exception occurred if the whole data row was empty

B. Displaying data
1. Data View: When new data was loaded into new view for the first time, starting was always from the last opened view start location. Now set to 0 as default after view is loaded.
2. Data view: If the view contained several videos, closing data window could hang the program
3. Linked data views: didn't always play videos in correct direction after playing reverse
4. Loading a view: RDPC filtering settings weren't always properly loaded
5. Opening a view: Eliminated the possibility to open the same view twice at the same time. View was corrupted if loaded twice. Bug introduced in version 3.4.46
6. Reading RDPC data to view: Improved the performance for large point clouds
7. Loading a view including an outside video: This caused sometimes the data vertical axes for some other data to appear in a wrong direction.
8. Data View - Image list: Image list was emptied each time Point Cloud data was started to be added into a view
9. Data view: RD crashed, if view was closed while point cloud was left running.
10. ImageList display: Bug fixed in image display, the image path was not correctly sought in project folder. Worked only, if the images were in the same folder as imagelist or in the original locations where imagelist pointed.
11. Image List in view Video Frame: Image Scroll bar was not visible, if imagelist was shown in video frame. Now it is visible and it again possible to drag the imageslist. Bug not in earlier released versions.

12. Rearranging the view windows: If data was exported to point cloud before the rearranging operation, the program could crash.
13. Showing Map in Data View: Informing now if the Map and Line are most likely in different coordinate systems. Program ended up to repeated program error message, if the Line and map Crd:s differed too much (>100km)
14. Undo last: Caused problems if the last data was removed while the PC view was still there.
15. View Saving: Cross section axes name was not saved in views. Now saved and also gives default name for cross section axes
16. Data view - Rearrange sub windows: Will now disable the operation if incompatible settings are found in view. Previously it could cause corrupted views.
17. Data view: Corrected problems when closing the project
18. Show coordinates floating window problem with Areal Coordinates: The floating coordinate window did not always give the correct distance location, if there were multiple road sections in the same view. The location text box and the horizontal axes in the view gave the correct location. Now the program gives the same location also in the floating window.

C. GPR
1. Batch link GPR: Era file wasn't updated properly. This caused errors in distance when exporting GPR data.
2. Batch link GPR: The procedure added geoid to elevation automatically. Now instead it will not add Geoid elevation
3. 3D GPR Output: Caused a crash, if opened twice, without closing at first
4. GPR-AC-pre-processing: Trend filter bug caused GSSI markers to generate corrupted direct pulse information.
5. GPR pre-processing: Trend removal caused problems with GSSI markers
6. GPR Savitzky Golay FIltering: Correction which eliminates the problems with GSSI data markers in Savitzky Golay FIltering, the processing took also the marker bytes in the filtering and caused an interference in the start of signal.
7. GPR Cross section view: Now allows all GPR interpretation points to be drawn in the cross-section view, if single points are shown.
8. GPR Cross section view: All layers were drawn with the same colour, as if they were the same layer, when GPR interpretation was drawn into the cross-section on top of GPR-data or standalone.
9. GPR Cross section view: GPR Interpretation line drawing in Cross-section connected wrong layers and some points were still not shown.
10. Batch Link GPR: Metal plate file is always preprocessed using the settings from the first GPR file
11. Batch Link GPR: Air coupled data without a metal plate file wasn't preprocessed properly
12. Batch link GPR: Dielectric values were always calculated even when they shouldn't (Examples: No metal plate file or Coreless channel)
13. Batch link GPR: GEOID was added to the GPR elevations by default
14. Batch link GPR: RNT file was not always updated properly.
15. Batch link GPR: If absolutely no operations were done to the GPR file, all the relevant files weren't properly copied to the output directory.
16. Frequency analysis calculations: If selected 3D GPR Data included measurement at different sample densities, the frequencies were defined based on the first selected file. Now set separately for each allowing varying time and sample number in the same sub window.

17. GPR Slice view: program crashed in seldom cases, if GPR Data buffer was used and amplitudes drawn using interpreted layer interface.
18. Batch link GPR: preprocessing didn't always use the correct settings
19. Batch link GPR: Instead of warning that interpretation files exist in the output directory, the program will look what files it will create and based on that, will warn if those output files exist.
20. Batch link GPR: If the antenna type of the GPR was initially unknown, pressing OK warned that it wasn't set even though it was.
21. Batch link GPR: Sometimes the time format wasn't correct
22. Batch link GPR: Splitting the file caused the program to think that after the splitting, the channel letter of the file was always A.
23. Batch link GPR: Sometimes the process had issues with measurements that didn't move forward at all between 2 GPS points.
24. Batch link GPR: The country-, Device- and antenna information wasn't properly added to the project file
25. Batch link GPR: Linking preprocessed files has never been supported in batch GPR linking. Now will warn and prevent the user if they are attempting to do that
26. Batch link GPR: Will no longer warn the user that no GPR files added to the list if the user wasn't attempting to. (when adding metal plate files)
27. Batch link GPR: Didn't properly understand "41000SA" as being a valid "41000" GPR model
28. Batch link GPR: Copying geometry sources to other rows didn't always work as intended
29. Batch link GPR: GPR geometry origin was allowed to be from metadata even though no metadata information was available
30. Batch link GPR: Points were not actually deleted, if pulse encoder distance was not increasing and the pulse encoder wheel grip quality was set to poor
31. Multiple GPR data interpretation: output/ERA-output Bouncing was outputted as samples/10 value instead of mm as supposed.
32. Batch link GPR: Oversampling was displayed for GPR models which does not use it. Introduced in 3.4.64
33. Batch link GPR: Similar GPR specific position source wasn't displayed properly and could output position sources which the GPR didn't have available. Bug introduced in 3.4.64
34. Batch link GPR - 3DRA: Didn't work properly if the file already existed in the output directory. Bug introduced in 3.5.0B and 3.4.64
35. Batch link GPR: Adding a folder of RDLS files could cause issues if you removed GPR rows or tried to link GPR files which have had preprocessing done to them. Bug introduced in 3.5.0B and 3.4.64
36. GPR Data Loading: If the offset was the same with multiple data, the program didn't correctly reserve memory and showing dataset sequentially was not possible. Loading to buffer didn't work. Now it works. Still an uncorrected bug which causes the saved view not show correctly the data in sequence. With new loads feature works.
37. GPR Preview Image loading: If Gpr data was not in project folder, the program couldn't find the correct location for preview images in Views. With normal data treeview clicking the operation worked. Operation should now support also .jpg-format GPR preview images.
38. GPR Channel chancing dropdown list was hidden. Now it is shown again and channel selection directly is possible.
39. GPR Data Processing Elevation Correction: The prograrm crashed in Elevation correction operation, if there were less than 200 samples/scan in data, and parallel processing option was used.

40. Chainage editing operation bug: Edit Distance and Comments did not do chainage/coordinate editing if there were no interpretation points file available (.rnd file was missing). This applied both air and ground coupled antennas interpretation.

D. Coordinate handling and map

1. Edit coordinates - Obtain elevation from RDPC: didn't have the proper RD icon
2. Multiple Map select: Last map was not shown in map list
3. Map control: mouse wheel zoom didn't show maps correctly
4. Setting Class limits for Maps and KML-output: The program set point as decimal symbol for class limits, but tried to read them assuming them to be the system (comma). Cause program to malfunction. Now uses always the same as system for output, but accepts point in input.
5. Map opened on the Dataview: If map was in degrees, the program always warned about different coordinate system between line and Map, although line was shown correctly and data linked.

E. Video:

1. 360 Video: Added logging to find issues related to 360 video handling
2. Video player: Playing started from beginning when another video was selected from video file menu
3. Video player: Video file menu location was top left corner of video player
4. Video view: Video location set in to view, which enables automatic rearranging of external video views. Earlier the parameter was not set.
5. Video view: Stopping Video could cause program to hang sometimes. Now program always pauses video before stopping it.
6. Load Multiple Video: operation did not save changes in list of videos, if some video data was restored.
7. Multiple Video Queue list: The last video was not shown
8. Linking Ladybug PGR file as video/image list: Video and video coordinate files/images were not created, when the path of PGR files contained spaces
9. Ladybug camera image extractor: If PGR files' paths contained spaces, ladybug image extractor didn't extract any files from PGRs
10. Ladybug PGR linking: After entering video filename, filename extensions were not updated if user selected another codec (different file name extension) in Video Settings.
11. Multiple video: RD crashed sometimes when playing multiple videos in external form and video was changing to next (also when user moved pointer to another video)
12. There were problems getting video information from some video files
13. 360 Video player: Settings button was disabled
14. Video 360 settings: Paused/Playing video resolution could not set back to original size with selecting 'Original size: Width x Height'
15. Video coordinate file crashing bug: Program crashed, if video coordinates file didn't have any variations in distances. Now added error checking.
16. Adding MP4 format also to list of supported videos formats
17. Adding video to existing video only view: If a video is added to existing video only view, it is not changed to dataview anymore. Bug introduced in 3.2
18. Video freezing specially if multiple videos linked: Temporal change to allow frozen videos to play again. Videos could freeze, if data was clicked and videos moved fast.
19. if video FPS cannot be get from videofile, fps set in project is used
20. Video player: Pause freezing, possibly corrected
21. Multiple video location checking: Now video changes to both directions.

F. Other:

1. Image EXIF location tag: added decimal part to SECONDs to get more accurate image location
2. Fouling module: In some random cases all the parameters were not visible
3. Normalizing FFT spectrum set default. Should work this way even from the beginning. Earlier had to be set always manually.
4. Importing PLAnning data: The operation didn't work.
5. Analysis: Corrupted analysis file header returned error, because of not a valid date. Now sets modified to now and created 1999.
6. FWD surface display: color was not possible to change after showing
7. Batch Link RDLS/GPR: Some columns might not update properly after changes in other columns
8. RD Viewer: Manual didn't open up when F1 was pressed
9. Chainage adjustment: Copy-paste didn't work
10. Design feature, Parameters: Bug fixed in changing colors of operations. Changing colors didn't apply the change to view. The colors were kept the same. Bug introduced in version 3.3.51.
11. Combining GPR AC and GC data interpretations: The program now uses values from linked project .rdp-file for data start and scale instead from .rnt-file header for combining interpretations. Avoids using wrong gpr data start distance in .rnt-file.
12. Grid view: Remove Empty rows operation didn't do anything.
13. View options with database: Database no more hides part of the display activating checkbox when color is selected or row order changed.
14. Opening a new data on the screen and doing project tree related operations: Program now hides and then shows the top forms after operation, when new form is opened using menu buttons. It could happen that these dialogs were hidden behind dialogs on top and no access was possible.
15. DB linking: DB linking crashed, if unsupported characters were in table name without quotation marks for Postgresql connection.
16. Combine DBs: when TransferInterpolatedData fails continues transferring rest of columns anyway
17. Chainage adjustment: Fixed an issue when using the tool to adjust the chainage for a single column.
18. RDLS- and batch GPR linking: Automatically obtaining direction from a file name didn't find upper case characters
19. RDLS- and batch GPR linking: The program didn't understand pehko-format file names if the road was anything else than exactly 5 numbers.
20. Table view: Sometimes "link as database table" was checked instead of "include column headers"
21. Multiple Delete didn't show all data when data was classified and Multiple deleted was selected from Line data
22. Editing Distance and comments: A Bug fixed in Updating distances for Air coupled data interpretation files. A bug was introduced in 3.4 version in November, which caused the ERa and ERX files been left without correction and operation failed.
23. Inventory: Bugfix related to using _rdls.pox as position source for inventory caused new bug in normal procedure
24. Settings text in project information table was not shown correctly when there is lot of text. There were empty space before and after text in Settings text cell.

25. Bug in Frequency Analysis: Program crashed if the data was at same offset. The program was not able to handle the data if it was at the same offset as some other data but in different location. Now operation works.
26. Frequency analysis: Potential bug reading some horizontal averaging parameters in Rock-module.
27. Road Doctor view Scaling problem: Road doctor changed the scaling to mixed state whenever a video, imagelist or pointcloud was opened and played on the screen and the screen scaling was not 100%. Now this is corrected in this version and the scale remains the same as selected in the view settings.
28. File - Save As: menu item submenus in FILE menu were not activated
29. Project view comments and View bugs: Comments were shown only the first line, Comments editing was not possible correctly, the old comment rows were left, View didn't show all information in the info box.
30. KML output: item count can be more than 32767
31. KML creation crashed RD if no classification had been done.
32. Multiple places: Sometimes some forms were moved to the top left corner of your main monitor regardless where the form should have opened at. Bug introduced in 3.3.28
33. Table view menus: If table view was not active, clicking right mouse button above grid showed the pop-up menu anyway, although nothing could actually be selected.
34. Pop-up menus crashed the program: It was possible to get pop-up menu although the data view was not activated. It directed the operation to wrong form and could cause program to crash.
35. Analyze output window: If window was open and distance unit in data window was changed from m to km+m, all distances in output were 0
36. Docking project view: If project view was undocked and then closed using "close cross", and it redocked, trying to minimize it using left minimizing sign "<" caused program to malfunction and cause a crash.
37. Classify data: if errors in classify, continuing is not possible (previously execution continued after errors)
38. Missing Geometry Dataformat in data order: Added GeometryData to Default data order list.
39. Bug in Closing the application: If closing the application was cancelled, some of the windows could be left in an unstable state, which could cause program to crash later. The closed windows were not closed properly.
40. Closing /Changing project: Operation could leave orphan data views and tables, if cancel was pressed when trying to close the views. Data views from different projects could be visible at the same time. It could potentially cause data corruption.

3.4.37 – 2019-10-04

Major new features:

- **Batch link GPR data for GPR module:** After setting your initial parameters, you can let the computer do all the processing of linking GPR data with one UI element
- **Batch link RDLS data for Surface analysis module:** Link multiple RDLS files at once and let the computer handle the opening of projects and other things previously required by the end user.
- **360 Video player:** Display 360 video files.
- **Classify data:**

Classify data depending on different criteria

New Features:

Note that many new features were featured previously with the prefix (3.3B)

G. Surface Module
1. RDLS reading: Added support for angle offset value reading from laser scanner
2. RDLS reading: Added support for a third laser scanner (SICK)
3. RDLS reading: Added support for SICK lasers which output values with other than 1mm resolution
4. RDLS reading: Added support for SICK LMS4xxx laser scanners
5. Initial support for UTC time from XSens data. Not yet fully supported.
6. Now will warn the user, if the point cloud surface grid they is going to be too big.
7. Read chainage for RDPC: This is now done in parallel so performance is improved.
8. Read chainage for RDPC: The function no longer asks the user for maximum distances.
9. Read Chainage for RDPC: The function no longer filters RDPC points.
10. Read chainage for RDPC: Added the possibility to select more than 1 point cloud. If more than 1 point cloud is chosen, will combine them in the output file.
11. RDPC Filter: Added 2 additional parameters: Laser scanner number and scan number.
12. RDPC filtering: Added a new operation: Modulus
13. RDLS reading: Added support for reading sync files, which used GPS to sync data while not measuring GPS
14. RDLS reading: Added option to read paused status from measurements and modifying the frame number accordingly. Currently only taken into account when estimating the frame number for otherwise invalid sync- or RDLS without UTC time file
15. RDLS reading: Added ability to read the frame information from the video file itself. This is used when the sync file has no frame information for that camera at all.
16. RDLS Reading: Improved the performance for determining ACCelerometer orientation by making the process parallel
17. Read chainage for RDPC: Increased the amount of points this function supports
18. Surface drawing: More graph parameters: Added 3 possible calculations to data output: Calculate top-down area, count top-down areas and calculate volume.
19. You can now save a point cloud view as a las- or a txt-file, including the colours and data sets.
20. Creating RDPC files: Slight performance improvement
21. RDPC creation: Implemented slow rotating scanner support for distance value as well. Previously (since RD 3.4.7) all other values took the scanner slow rotation in to account except distance value. Before 3.4.7 the rotating scanner was assumed to rotate fast enough that it assumed that it stayed still during the rotation of a single scan.
22. Position orientation data now has its own file format. POR data is currently only output for RDPC data
23. RDLS read: Added support for IMU in PASHR format
24. Simple RDLS read: Added tooltips to better describe the IMU and GPS qualities
25. Simple RDLS read: will no longer display instruments that were not even supposed to be measured by RD Camlink. This requires the measurement to be done with RD Camlink 7.3.11 or newer
26. Link RDLS/Batch link GPR: Added data specific class name and value pairs for enabling sorting by batchID, MeasurementID or device index

27. RDLS read: Initial support for LMS1104c
28. Some read chainage for X, Y handle better areas where the line curves a lot in a short distance. In addition, this new function fixes some alignment issues changing the RDPC distance values when using fine tune RDPC distances.
29. New button under surface analysis: Create RDPC digitized vector from pox-position file
30. New button under surface analysis: Batch read RDLS, for batch processing and linking of RD Camlink generated Sick laser scanner files.

H. Displaying data
31. User can set hair cursor type for data window in the main and cross section view. The cursor can be hidden, horizontal and vertical, pure horizontal or pure vertical.
32. Track Geometry filtering has now possibility to output also the Frequency spectrum of data to Table
33. Database filtering has now possibility to output also the Frequency spectrum of data to table
34. Printing with Areal Coordinate file: possible to print whole view length from start even there is no data for whole view length, corrected handling printing start position (Printed distance -> Start).
35. Accepts wider cross-section windows (max 1000 pixels was 700 pixels) or user mouse given distance >1000 pixels.

I. GPR
36. Batch link GPR: Added option to Reverse polarity of the signal
37. Savitzy-Golay GPR data filtering now allows larger values, longer data filters
38. Outputting ERA files: Informs now about errors in user defined output, if they occur.
39. Now supports better also reverse coordinates for GPR
40. Supports now also reverse locations in posd-files for GPR
41. Supports now more than 512 channels in a GPR slice view (max 1023)
    GPR vector interpretation drawing now made faster and possible to show the dashed lines also in long distance views. Also averaging made possible for view display to avoid noisy lines.
42. GPR Background calculation made much faster and also takes 2D processing in to account, maximum of 130000 scans for background possible, before limit was 65000 scans.
43. Added batch GPR linking to GPR processing tab to enable much faster linking of multiple GPR-files, that need to be processed the same way.
44. Batch GPR linking can now get the position origin from a CSV-type coordinate file. That requires the user to know the coordinate system of the CSV file.

J. Coordinate handling and Map
45. Added toolbutton to hide connecting lines between coordinate points in a Map view. Possibility to load a pox/pos file as a point cloud to Map view, to show it with variable colors based on scan number or elevation.
46. Map view: Hiding the lines now also hides the lines in Coordinate validation tool
47. Coordinate validation tool: Added a better error message when coordinates are too close to each other and attempted to interpolate.
48. Map: Possibility to copy points from selection grid to clipboard

K. Chainage adjustment: Available in Tools with Surface and Track Geometry module. Replaces similar existing tool, but brings possibility to do the operation semi-automatically.
49. Added the possibility to find peaks for the added fixed point.

50. Chainage Adjustment: Added the possibility to skip the result dialog when adding old points or fixed points with peaks
51. Chainage adjusting: Now possible to remove existing old locations by: 1. Having old location visible on screen 2. Having chainage adjusting form open 3. Ctrl + click and drag an area you want to remove the old points from
52. Chainage adjusting: Added tooltips to many components explaining what they do
53. Chainage adjusting: Added the possibility to round the output numbers to N decimals
54. Chainage adjusting: Added the possibility to use RMSE threshold to filter away unwanted peaks.
55. Chainage adjusting: Added possibility to show the calculations RMSE values as a statistics window
56. Chainage adjusting: Added possibility to filter out any old point which is further away from a fixed point than a given value.
57. Chainage adjusting: Added a detailed results dialog when points are filtered away using any peak or old point filter
58. Chainage adjusting: Added option to change the colors how fixed and old points are presented
59. Chainage adjusting: Added option to limit the calculation distance start and end
60. Added more verbose error handling for automatic chainage adjustment

L. Video

62. Video Queue: play several videos as one video
63. Multi video view: Multiple videos in a view are now saved/loaded to the view
64. 360 video player
65. Ladybug support
66. Speeded up capturing frames from video
67. Convert videos made visible for all 3.3 users. Videos can be now converted so that the frames are at fixed intervals.

M. Other

68. Edit data specific for Image and MAP data
69. Possibility to modify linked image-list (PIC) properties (Edit Data Specific)
70. Linking image: Possibility to rotate picturebox image +/-90 degrees
71. Classify project datas by metadata (like measurement day, DB type etc...)
72. Adding classify information in Edit general and when linking data, selecting existing classify information in Search/Classify
73. Batch read RDLS/GPR: If a line is unable to be linked to, will now display why it was removed from the list of possible output lines.
74. Table view: Increased the range of numbers accepted for arithmetic operations (higher maximum and lower minimum)
75. Support for reading multiple Tekla ground truth files at one time for reference points

Bug Fixes:

G. Viewing data:

1. Color wasn't able to be changed in dialogs. Bug was introduced in 3.4.20, So, bug valid only in some prereleases.
2. Change color scale for GPR immediately didn't work when moving mouse cursor over different color scales. Worked only when mouse button clicked.
3. Point cloud settings: Fixed an issue where some settings in UI were hidden behind others.

4. Point Cloud settings: Color scale didn't work properly.
5. In some rare cases the program could crash, if multiple images view was visible. Crash was caused by reference to empty 360 image holder.
6. View options - point cloud: Offset step had a minimum value of 1cm. That's now been decreased to 1mm.
7. View options - Point cloud - Reset data grid: Empty data rows were incorrectly removed from the created grid
8. Video player: Sometimes when the video ended, the video went back to the beginning and continued playing.
9. Link views: Videos didn't properly link. Bug introduced in 3.4.7 and affected only 3.4 prerelease versions
10. Transfer data to PC: Sometimes odd points were added to the point cloud when the layer had gaps in it.
11. PC View: PC settings form size was always slightly smaller than the actual size of the settings component
12. Color scales position was wrong
13. Saving view: Video was not saved to created views (Bug was introduced in 3.4.7)
14. Editing view settings: Point cloud format had the wrong icon in the window/data tree
15. Default point cloud view settings: Calculation between 2 surfaces was not defaulted with PC settings.
16. Default point cloud view settings: Because of the changing pole within a scan, a default longitudinal interpolation was added to all default point cloud settings.
17. PC Surface creation: Some options were never properly read
18. PC Surface creation: Fixed operation which limits the possible interpolated data values to only accepted levels
19. View's point cloud: color scale index was increased by 1 when new color scale was selected (affects when view was loaded next time)
20. View's point cloud: color selector size corrections
21. Bug fixed for in GPR window rescaling. The old values were kept although data was removed from view!
22. Program could crash if the GPR cross-section wasn't shown completely
23. GPR Cross section Drawing was drawing incorrectly cross section, if the left side was more than the minimum of channel locations. Caused also crashing
24. When changing colors and user entered Threshold Min and Max values, property updated textboxes same time and entering correct number was difficult
25. Scroll did not necessarily reach the start or end of the view if dragged from the scrollbar
26. Corrected problem with loading views with areal coordinates, now shows the areal coordinate defined locations also from loaded views

H. GPR:

27. Program didn't allow larger than 9 999 999m x or y coordinates for GPR interpretation. GK coordinates didn't work.
28. Bug fixed in Era output code, Pavement interpretation output didn't start the output
29. GPR interpretation code table's text edit box in table was not always visible after double click. Editing a value was not possible.
30. 3D time slice GPR interpretation: overflow occured after the button was double-clicked on top of slice view in interpretation.
31. Batch link GPR settings: Changing the geometry origin from a GPR channel to custom resetted the ABH values of that channel back to 0.

32. Batch link GPR: Direction 2 data didn't properly take into account the relative posture of the instruments
33. Batch link GPR: The process incorrectly assumed that the GPS data starts and stops at the same time as the GPR data.
34. Reverse GPR file: The position file reversing operation calculated the new scan number incorrectly. This caused the last point to be generally removed and all other points shifted by 1 scan.
35. Batch GPR linking: Project information had the wrong decimal separator.
36. Add multiple GPR data to view: The program now reads correctly also data offsets which do not have dot as decimal sign. Earlier didn't, but returned only the integer part leaving fractional part out.
37. Now shows correctly the spectrum in Table also for byteArrayData
38. Batch link GPR: The setting "Subtract the end (air) reflection" was incorrectly on if you used a metal plate file. Now it's on only with the GPR model 41000
39. Batch link GPR: Not using metal plate file actually used the previously opened metal plate file.
40. Batch link GPR: Updating dielectric values step didn't take into account 32 bit data format.
41. Batch GPR form: Channel dist ABH values looked like they were editable even though they weren't
42. Batch link GPR form: Preprocessing columns were enabled even though metal plate file wasn't used (visual only bug)
43. Batch GPR Linking: Offset was calculated incorrectly if metal plate file direct wave search section was set during that channels operation.
44. Batch GPR read: Bug fix handling existing pox data with scan data not in ascending order
45. Batch link GPR: Selecting the last RDLS file in the geometry origin list caused an error.
46. Batch Read GPR: RDLS channel specific reference GPR contained channel specific value even though that should be a main setting specific value.
47. Batch Read GPR: Changing the reference RDLS file didn't properly update the GPS dist ABH values
48. Some operations could crash if GPR interpretation file was Read Only
49. GPR channel splitting: Now returning always info from latest splitted channel
50. Better handling of position file in GPR data scaling operation
51. Batch GPR: Sometimes position origins with only 1 point were classified as valid position origins
52. Batch GPR: GPR files with only 1 channel and no specified antenna were concidered empty files
53. Batch GPR: If a file already existed, the linking of that file caused an error
54. Batch GPR: Adding more than the initial folder of GPR files caused errors
55. Batch GPR: Bug fix handling the selected GPR from an RDLS file
56. Batch GPR: Fixed a bug which caused unnecessary notifications about invalid lines. Now the notification is only in the tooltip.
57. Saving also to B channel the Er-value

I. Coordinate handling and map

58. Bug fixed in single map-image linking operation: It caused the map re-georeferencing not to work, If the map originally had some coordinates fixed/set.
59. If linked map editing in tree view was activated it could cause crash in some cases.

60. Using GPS in Mapview caused the program to crash. The functionality still doesn't work, but at least it doesn't crash RD. The function has never worked in RD 3.

61. Areal Coordinate dialog: When opening, tried to always to open DB connection if not even needed. Removed the operation.

62. Unsuccessful road registry creation could make whole Road Doctor to crash.

63. Edit coordinates: If you opened an existing position file and a raw file after that, it recommended the existing position files name by default instead of the raw coordinate file.

64. Edit coordinates -> Obtain elevation from RDPC: Didn't properly take into account the last point of the position file if spline was used as the extrapolation method.

65. Map view: The program now correctly draws thematic maps with linear colourmapping of data display.

66. Coordinate validation tool: Didn't properly take into account NaN values

67.

68. External chainage adjustment: Bug fix adding an old location manually when individual column values are not selected

69. Bug fix in areal coordinate file creation

70. KML file creation failed. Bug was introduced in 3.3.52 and 3.4.0 (Build numbers 1105-1138 have this bug)

71. Edit coordinates: Bug fix handling time data not in ascending order with "Synchronize with UTC time" function

72. Coordinate Validation Tool: Bug fix using the interpolation tool with data where the X-axis isn't strictly increasing

73. Areal coordinate file handling: Fixed distance road section creation

74. Edit Coordinates dialog: Bug fixed in changing the WE, SN coordinates. The given values were never updated in memory nor hard drive if changed.

75. Create areal coordinate file: Areal coordinate handling for all clients

76. In some case planning/analysis output didn't output correctly the header row if areal coordinate file was used (km, m was used instead of km+m and use areal was active).

77. Chainage adjusting: The external window might have caused a crash in rare scenarios

78. Chainage adjusting: Chainage adjusting operations now require digitizing to be off. Previously it was possible to digitize and add an old location at the same time.

79. Corrected road carriageway setting to check the road direction value

80. Map data legends were not visible

81. Showing point cloud in map: point color values were wrong after sorting points

82. In some cases, the pox files z-coordinate didn't output correctly because of missing information about existing z-coordinates

83. Visibility correction when adding data to map (was unchecked)

84. Map server settings form opened in different places

85. Bug fix when using automatic chainage adjustment with "Reference field is correct after chainage corrections" option on with only 1 existing fixed/old point pair.

J. Surface Module

86. Linking LAS files with multiple point clouds and converting them to RDPC overwrote the RDPC since output filename was always the LAS file name

87. RDLS reading: Laser scanner data was read even though it wasn't used.

88. RDLS reading: Sometimes the generated RDPC was corrupt depending on the scanner rotation speed.

89. RDLS reading: Bug caused you to be unable to create point clouds with more than 134 217 728 points
90. If LAS file was linked, converting multiple to the same rdpc checking hide erroneously the offset and % of points panel and coordinate grid transform tab page
91. RDLS reading: Reading laser scanner 2 didn't work (Bug introduced in 3.4.20)
92. RDLS reading: Didn't automatically find out the laser model even if it was correctly written in the header.
93. Batch RDLS read: Implemented laser scanner 3 support
94. RDLS reading: Angle offset values sometimes caused an issue.
95. Writing 3d points to LAS-file: LAS output filename was not changed when user changed filename and size of LAS file increased after each saving
96. RDLS reading: Bug fix handling angle offset data without remission value
97. RDLS Reading: Fixed issues with interpreting Xsens UTC time. This caused you to be unable to select xsens as a position origin.
98. RDLS Reading: Fixed an issue which caused RDLS reading to fail. Bug was introduced in 3.4.24
99. Single file RDLS reading: The program didn't notify the user if the position origin was invalid before quitting the operation.
100. RDLS reading: Last coordinate was never used in spline coordinate interpolation.
101. RDLS reading: If the position origin didn't have enough points for RDLS reading, the error message complained about the time instead of the amount of points.
102. Calculate Rutting to table: The process didn't output values before the start of the line or after the end even if the laser scanner data was there.
103. Simple RDLS read: Found videos number was not properly shown.
104. RDLS reading: Wasn't possible to read an RDLS file with only GPS data.
105. RDLS reading: Only linking video files didn't properly refresh the project.
106. RDLS reading: Didn't properly support LMS151. Bug introduced in 3.4.10
107. RDLS reading: When the frame number information of a video was not possible to obtain, the process didn't notify the user of the error
108. RDLS- and batch GPR linking: New lines were created at the elevation of the position origin.
109. Create pox from RDPC: Now has the proper RD icon
110. RDLS read: Bug fix handling IMU and Laser data going backwards in time
111. RDLS read: If posture data isn't available due to any data going backwards in time, will cause an error instead of attempting to position the data with bad quality positions and postures.
112. RDLS read: Bug fix using eltrip position origin with a line which doesn't have strictly increasing distances
113. RDLS read: Bug fix handling position origin data going backwards in time
114. RDLS reading: Sometimes reading IMU data didn't work (Bug introduced in 3.4.12.1133)
115. RDLS read: Road doctor can now handle time going backwards in IMU data
116. RDLS read: Fixed an issue with using IMU roll values without advanced positioning
117. Simple RDLS read: The shown coordinate system wasn't correct when using a pox as a position origin.
118. Batch RDLS read: fixed an issue when creating a new line and another data is linked to the line another RDPC creates.
119. RDPC creation: Rarely the final points were not printed to the RDPC file.

120. Advanced RDLS read: Fixed an issue where "assume accurate eltrip values" didn't work properly
121. RDLS read: Will now read line length information from RDLS header. This is used when the only positioning tool is eltrip and a new line is created.
122. RDLS read: Increased the amount of decimals in the longitude and latitude columns of the projection grid DB
123. Search remission lines: The default values for the operation wasn't updated when the default remission surface values changed in RD 3.3. This caused less points to be found than optimal.
124. Visual bug: Create digitized vector from pox form wasn't finished and showed unfinished assets
125. Yaw value is now calculated correctly even when the line has multiple points in the same place

K. Video
126. Correction to adding 360 image list to view when there is 360 video: Video 360 stayed visible after adding 360 image list
127. Creating image from ladybug PGR-file didn't get coordinates from direction 2 files.
128. Fixed a rare crash when linking 360 video files
129. Old video frame capture (Grab Video) didn't capture frames from some video formats
130. Grab video: could not capture video frame from position 0
131. Video view showed a wrong location value in its textbox occasionally.

L. Other fixes:
132. Project tree: Clicking on a database with a huge number of columns crashed the program
133. _rdls.pox can be used in inventory import.
134. Table - Remove errors from column: Settings form didn't have the RD icon
135. Table - Remove errors from column: The form opened in a random place in your screen. Now it opens on top of the main form
136. Ground truth Data file creation: Now handles better erroneous user data
137. Many forms: Help file didn't open in the correct place
138. Rock module didn't work, if called in "batch" mode.
139. Problem with Rock module not working properly when outputting results.
140. Picture Edit data specific form: Setting image minimum value caused program to crash.
141. Image/picture linking: fixed error related to chainage definition using EXIF coordinates
142. Digitized vectors: Fixed a bug which added a vector 0 to the location 0 value 0 when reading digitized vectors
143. Handling photos: JPG image coordinate decimal separator didn't support national conventions
144. Main form: UI correction, Hair cursor set pressed as default
145. Transfer data between tables: Reset data grid crashed the program if there were more columns than rows.
146. (RD Viewer bug fix): Fixed a rare situation when creating a new project and road doctor was uninstalled, but RD viewer was not.
147. Printing of pictures: the rounding of the distance values didn't round enough.
148. Restore Data: After deleting data Restore didn't work correctly
149. Restore data Cancel button's text changed to Close because it only closes window
150. Elmod link Bugs with not saving correct locations in the output table
151. Language file bug fixes

152. Poisson's ratio value handling corrected in parameter grids
153. Multiple language file corrections
154. Classification form's Apply didn't update color scale in Linear Classification
155. If project information text is too long, it was not shown in project control's project information grid (was showing just an empty row)
156. Batch linking: The process caused errors if the road part of the data file name wasn't a number.
157. Bug fix reading single-type data from a DB when using "." as the decimal separator.

3.3.58 – 2019-02-20

New Features:

Note that many new features were featured previously with the prefix (3.3B)

N. Surface Module
1. You can now calculate RBCSV
2. It's now possible to fix a pointcloud to go exactly where the given position file (pox) goes.
3. Batch RDLS linking now shows the current file being processed
4. Batch RDLS reading has tooltips for each individual cell.
5. Added RBCSV calculation to RDLS reading (Settings can be found in advanced settings -> Xsens tab -> RBCSV tab. By default 80kmh and 60kmh speed limits are outputted)
6. Batch RDLS: If no row in a column is enabled, can hide the column
7. Batch RDLS read can now specify which data you want to output: projection grid and RDPC for each laser data, ACC and IRI for each xsens data, IMU- and video data
8. Simple&Batch RDLS read: Default LS settings now include all points to the RDPC if the scanner was configured to return all scans
9. Simple&Batch RDLS read: Changed default RDPC version to 1.1 from 1.0
10. Batch read RDLS: Moved direction 2 column to be in between project and line columns to make it easier for users to tell the order in which it's the easiest to fill the grid values
11. Batch read RDLS: Initially sets the optimal column width for all columns
12. Batch read RDLS: Added option to add new projects to existing project group
13. Batch read RDLS: Projects are now sorted alphabetically for easier finding of the correct project
14. Batch RDLS: Improved the automatic detection of the road name from a measurement file name.
15. Batch RDLS: Improved the initial directory shown to user
16. Batch RDLS: Added some tooltips
17. Batch read RDLS: Files are now sorted alphabetically within each folder of files you add to the batch process. This doesn't sort files between multiple folders if you link more than 1 folder
18. RDLS reading: During the edit coordinates step, if a line is chosen and the current file isn't the file that creates the line, the existing line will be shown in the map as a black reference line.
19. New button under surface analysis: Create RDPC digitized vector from pox
20. New button under surface analysis: Batch read RDLS
O. Displaying data

20. Capture view to video, Batch compress video files
21. Database drawing: Added support for drawing shapes at line points in data view
22. Database drawing: Added support for changing line thickness
23. Database drawing: New options for bar drawing in data view: Cluster, Overlay, Stack and Stack100%
24. Database drawing: Added unselect all fields from selected downward
25. Video player: If you press shift + forward/backward, the video will move to the next/previous frame.
26. Video player: You can now select the shown video by right clicking on the video tool bar and selecting the video you want to be played
27. Surface drawing type can now be defined. This defines how the data is drawn on surface type and in cross section in between data points. The methods are Automatic, Cubic spline, Linear. Now surface and cross section windows are drawn the same way. Surface type can be set in more graph parameters -> surface type
28. Added opacity setting to database- and point cloud tab to be able to set the opacity for any type of DB output you have
29. Convert videos made visible for all 3.3 users.
30. Point cloud
31. Import digitized vectors to PC
32. Changed how camera bearing (yaw value) changes during turns
33. RDPC filtering: You can now do arithmetic operations for values (Sin() Cos() Tan() ASin() ACos() ATan() + - * /) to control more precisely what points you want to filter out from a point cloud.
34. Project handling
35. Unlinking/Deleting data from a line or project now saves information so that it's possible to restore unlinked/deleted data
36. You can now multiple unlink any type of data. Not just GPR
37. Added ability to create a new project containing only parts of the linked data in an existing project
38. Coordinate handling and map
39. Areal coordinate output: Added "print only this section" option
40. Read Chainage: When using areal coordinate file, can now specify the min and max road number
41. Updated the way line's data property is generated. Relates to line's road information
42. In map, it's now possible to hide the start and end of line markers.
43. Possibility to minus zone value from reference coordinates (zone x 1000000m)
44. Possibility to use mouse roll for zooming in and out in a map
45. GPR
46. Possible to draw database data over GPR view when topography is shown
47. Better Zero location finding for GPR data
48. GPR file editing: New faster Combine Vector Interpretations and Annotations operation
49. Slice calculation is now done as a parallel process
50. Sped up Fourier analysis by using parallel processing
51. Sped up drawing in a special case
52. Improved performance when no rescaling is needed
53. Improved performance of GPR data and interpretation drawing
54. When selecting multiple 3DR files in a project, will now show the original file name in a tooltip

55. Added error checking and handling for corrupted ERA files
56. Support for limiting Er-values for ERA files
57. Now the user can select drawing filter for the GPR-data interpretation drawing. The new way to draw via every point made the layers look like very noisy in many occasions, if a long section was shown on the view. Now user can select how many points are combined for on screen display. Default value is one, which means that all vector drawing points that would drop to the same location are averaged. This operation does not change the interpretation values in the memory at all. For each viewed data the value can be set independently
58. Other
59. You do not need to uninstall a previous version of road doctor anymore before installing a newer version of it. This feature currently works only updating from any RD 3.3 installation.
60. You can now tile windows horizontally without borders
61. Many folder browser dialogs got their initial selected directory to be better than desktop
62. Made adjusting the chainage under database filtering faster in files with less than 51 columns
63. Planning can now export values to analysis files with greater than 19 columns
64. Added new option to add Excel/Txt files in table view form and do coordinate filtering settings support
65. Added new menu option into TABLE ribbon: TABLE | File | Save as -menu "Linear referenced txt", this will open a dialog to define needed parameters to fetch the coordinates from an are coordinate file and attach them to displayed data as a new column. Coordinates are in QGIS supported WKT format. This supports only LINE and POINT features.
66. Shows also the Poissons value and all other as defined with Planning and Analysis in Create Planning/ Analysis file Dialog
67. Printing of pictures: the rounding of the distance values didn't round enough.

Bug Fixes:

M. Viewing data:
1. Elmod data drawing: Shows very large numbers as NaN on the screen
2. Elmod output prints also E0 in to the Table, earlier it was missing
3. Elmod output prints correctly the deflections now to Table (CD0 was missing)
4. Editing view options: Corrected bug in showing Elmod outputtable windows
5. Horizontal axis parameters: When showing section instead of km or mi is on, but Read chainage based on Areal Coordinates-file is off, will no longer set the "show section instead of km or mi" to be on. This caused an empty horizontal axis as a result. This doesn't fix the actual bug. Only setting the settings. Therefore, any existing views are not fixed.
6. Bug fix when data window was closed before quick settings window
7. Bug showing the distance value in video
8. Bug fix handling special cases when handling the play state of video.
9. Some digitized vector operations didn't update correctly if the main form was moved
10. View was redrawn multiple times when resizing
11. Multiple data in the same window sometimes cleared the layers underneath
12. Sometimes RD behaved oddly/crashed when video playing caused a screen transition
13. Bug when searching for preview file caused slowdown when opening data
14. Correction when setting the distance in the data views distance textbox when using areal coordinate file to display distances.
15. Sometimes video caused an incredible slowdown

16. The chosen color for text type DB output was inconsistent. Now the text color is determined by the column color.
17. Showing data legends corrected
18. If you add data to the cross-section window from other than the main (first) PC data in the window, will properly show the data.
19. Bug fixed for loading view templates with rutting data calculated from point cloud. Now reads the data maximum and minimum distance from data not from Template
20. Video view showed a wrong location value in its textbox, and sometimes didn't update, if reverse direction was used
21. Scroll did not reach the start or end of the view if dragged from the scrollbar
22. Corrected problem with loading views with areal coordinates, now shows the areal coordinate defined locations also from loaded views.
23. When changing colors and user entered Threshold Min and Max values, property updated textboxes same time and entering correct number was difficult

N. Point cloud
24. Now keeps the horizon horizontal.
25. Sometimes RDPC filtering settings weren't copied properly
26. Sometimes point cloud file was left open after read preventing access to the file unless road doctor was restarted.
27. Correction to moving in pointcloud by clicking in data
28. When haircursor is moved in data, Haircursor distance position is set to point cloud control for showing blue cursor in correct angle
29. If playing pointcloud and dragging scrollbar -> playing is paused during dragging
30. RDPC view settings: Filtering point cloud data settings went sometimes a bit off screen causing you to be unable to edit the settings.
31. Camera direction corrections when moving with scrollbar and playing
32. Used the wrong color palette when loading view
33. Bug fix handling. as the system decimal separator
34. RD didn't draw data to point cloud control in second view . Caused if 'Show point cloud in data view' was checked (if checked, shown PC was not primary point cloud (because missing initalize for new layer) and after this data was not shown in point cloud because missing primary point cloud
35. Showing point cloud in map: point color values where wrong after sorting points

O. GPR:
36. Setting the zero level bug corrected in data linking gpr preview window, in the case when the zero-level was not originally zero.
37. Bug fixed in showing location in single GPR-views, Show coordinates floating dialog
38. GPR Data rescaling operation now accepts the situation when only pox-file is available
39. Setting GPR zero point level didn't work properly
40. Bug fix for combining RND files
41. Memory is cleared now correctly and remnants of previous shown data is no more displayed in areas where they do not belong to. Applies both profile and surface views of GPR
42. Shorter GPR data was not shown completely in the view in some cases if it was in another sub window
43. Error handling for 32 bit GPR-AC data
44. Rescaling GPR data removed some scans from the end of the data
45. Saving 3DR-cube data settings didn't work at all

46. If the ERA-Header had corrupted text, the program crashed. Now added error handling to avoid program crashing. If the text or ERA-header is corrupted, default values are used.
47. If the Air coupled ERA-file header was corrupted, the program could not do output. Now the corrupted header is automatically corrected using the actual data header instead of ERA-header
48. Bug fixed that caused the drawing fail to discontinue with mixed GPR data and interpretation drawing, if there were both quality change and continuity break. Continuity break did not work.
49. GPR channel splitting: Now returning always info from latest splitted channel
50. Better handling of position file in GPR data scaling operation
51. In some cases, the coordinate file's z-coordinate didn't output correctly because of missing information about existing z-coordinate

P.   Coordinate handling and map
52. When linking data, gets now correctly the distance location from current line based on the data point coordinate, Bug appeared specially in Reference point editing, but may be interfering also in other linking operations, where coordinates are referenced to line coordinates
53. Correction to showing data in map (in local map)
54. Changing data offset from line drew the new data, but kept the old data there without erasing it.
55. Coordinate validation tool: Fixed an issue where drawing to a window which doesn't support it caused an error.
56. Bug fix loading areal coordinate files
57. Editing shown data coordinates caused an issue if no line coordinate file existed
58. Adding data to map didn't add a line if the line wasn't added before
59. correction preventing the selection of map node when there is no map
60. Areal coordinate output: Some printing operations were not implemented
61. Fix handling Czech/Slovakia coordinate systems
62. Bug fixed which caused map to freeze
63. The "read chainage for X, Y" button in the RD ribbon didn't do anything
64. Map data legends were not visible
65. Showing point cloud in map: point color values where wrong after sorting points
66. Classification form's Apply didn't update color scale in Linear Classification
67. Map server settings form opened in different places

Q.   Surface Module
68. When opening a project in batch linking processes, it's now possible to press the stop button.
69. RDLS linking: Eltrip as a position origin didn't work properly
70. Read laser scanner data go to advanced settings didn't properly set create new line setting
71. Advanced RDLS settings: Checking assume accurate eltrip distances didn't update the enabled status properly of other components.
72. Batch read RDLS: Bug handling projects with 0 existing lines.
73. Batch read RDLS: Error handling empty cell values
74. Batch read RDLS: Bug copying checkbox based values to other setting rows in certain columns
75. RDLS reading: Videos were sometimes linked wrongly to the previous line or to no line at all.

76. Batch RDLS reading: Memory leak fixed
77. Advanced RDLS read settings: Bug fix reading data to a project with 0 lines
78. Batch read RDLS: instability fixed when changing settings after removing some files from output.
79. Batch read RDLS: Sometimes changing the line or project didn't update the list of available lines properly
80. Batch link RDLS: Fixed odd behaviour which occured sometimes when changing settings.
81. Batch RDLS: Bug when changing position origin
82. RDLS read: Bug fix in extremely rare scenarios when no ACC data falls in the measured GPS data area.
83. Simple RDLS read: didn't set the default IRI interval
84. Advanced RDLS read: IRI interval now has a minimum value of 1m
85. Search remission lines: When overwriting an existing digitized vector in the view, it always overwrote the whole line instead of just the calculated area.

R. Other fixes:

86. When linking data, 'Edit coordinates' dialog did not load correctly from areal coordinate linking
87. Image list linking: First image was not saved if multiple images were selected
88. Sometimes didn't find the video FPS from a video file.
89. Undocking project control caused errors when closing RD
90. Grid view: Program crashed when inserting a row when there was only 1
91. Sometimes windows inside the main window moved oddly
92. Bug fix finding video files related to sync files when date is not a part of the name. (Fixed in batch RDLS read and in edit coordinates button "save as video coordinate file")
93. When linking TEXT database, the program did not find correct data type for all columns. After this fix is implemented, all columns with any non-numeric value will make that column data type to Character/String.
94. Now reads correctly the video file coordinates for changed new video in video view
95. Fixed many issues caused by the computer using . instead of : as the separator between hours and minutes
96. Bug fixed in data transfer to analysis/planning file. Now supports also the extended fields for planning
97. Now reads correctly the templates. As new feature shows also the Poissons value and all other as defined with Planning and Analysis
98. Bug fixes for saving / setting correctly the parameters for correct analysis type (PLA, ANA, PDI)
99. Now supports better outputting all 40 planning parameters
100. Restore Data: After deleting data Restore didn't work correctly
101. Restore data Cancel button's text changed to Close because it only closes window
102. Elmod link didn't save the first moduli and deflection values correctly in the output table
103. If project information text was too long, it was not shown in project control's project information grid (was showing just an empty row)

3.3.30 – 2018-04-11

New Features:

Note that many new features were featured previously with the prefix (3.3B)

68. Surface Module: Reading RDLS data
    a. Added video linking to RDLS read
    b. Batch rdls read can now first edit coordinates and after that link the data. This speeds up the time the user needs to interact with the process
    c. Added saving and loading RDLS read settings. You can only save settings in Advanced laser scanner settings. You can read the settings in either advanced RDLS read or batch link RDLS files.
    d. Added output RDPC version as an option to the advanced scanner read settings and convert scanner data form. RDPC version 1.1 contains raw laser angle and distance data which you can use in the upcoming filtering settings or different ways to display the data (For example, elevation instead of offset in Y-scale)
    e. When entering batch RDLS read, will determine the default project using its name if no lines exist in any opened projects
    f. Possible to use eltrip and line coordinates to generate coordinates for the vehicle when GPS quality is poor (like in tunnels)
    g. Ability to use eltrip and an existing line as the source for positioning the vehicle
    h. Added functionality to link IRI data when reading RDLS in any way (simple, advanced and batch)
69. Displaying data
70. Data location values can now display distances directly from areal coordinates file.
71. Added maximum interpolation distance when obtaining location from areal coordinate file
72. Added RDPC filtering functionality
73. Added option to use GPR own coordinate file for data positioning
74. Slight optimization in drawing FWD data
75. Point cloud
76. Holding shift will make you move 10 times slower when rotating and scrolling
77. Drawing cursor position when offset and camera elevation differ from 0
78. Added option to take the RGB value from an RGB las file
79. Project handling
80. Added option to create a project group from a folder of projects.
81. If you save the project group as (home).rdpg, you will instead be redirected to the default project group folder
82. Coordinate handling and map
83. Coordinate validation tool zooming changed to be a single slider instead of complicated 3 textboxes
84. You can now gain offset value from an RDPC file to a pox using obtain elevation from RDPC operation.
85. Coordinate validation tool can now display the INS solution quality when the pox contains INS solution data
86. Will check the grid transform in coordinate editing when calculation operation is done
87. GPR
88. Special surface pulse parameters
89. Automatic support for GTK (CSV) - coordinate file format for linking GSSI GPR data files and creating lines of those files
90. ROCK and Concrete Module: New Settings for FFT operations, possibility to multiply resulting frequency sum by time dependent factor, Possibility to define variable window functions for calculated time section.
91. Rock and Concrete Module: New form for setting FFT parameters

92. Other
93. Surface Module: Outputting coordinates and measurement date are now enabled by default when doing surface calculations
94. Printing bitmaps distance based on areal coordinates file
95. Can add the output bitmaps to an existing zip file
96. Bitmaps can now be printed to own directory
97. Possible to set start and end positions when using an areal coordinates file when outputting bitmaps
98. Areal coordinate file creation operation: Shape data sorting operation added

Bug Fixes:

S. Viewing data:
   1. Error finding the correct distance pole for view axis while using Areal coordinates as source
   2. All data windows need to be closed before changing projects coordinate file
   3. When outputting coordinates to table was active, bringing data to pointcloud got really slow.
   4. GPR data was sometimes drawn to a wrong location
   5. When printing view using areal coordinate file, will no longer stop at the end of the line.
T. Point cloud
36. Video file creation didn't work
37. arrows went to the wrong directions
38. All points didn't load all points to view at all times
39. If the position was changed in the data view, the point cloud position jumped to the beginning after a load
U. GPR:
52. Pavement data output now reads section minimum and maximum distances
53. User defined pavement data output didn't work if empty road
54. User defined pavement files subscript out of range bug corrected
V. Coordinate handling and map
   43. Reference line coordinates weren't properly transformed to degrees when using google maps.
   44. Sometimes some dialogs went behind the main form in special cases
   45. Didn't always save the used settings when closing coordinate validation tool
   46. If you rapidly changed the size of the map, the bitmap didn't properly update its position
   47. Moving in coordinate validation tool should now properly set the map visible area to the center when the map movement option is set to pan
   48. Aerial coordinate file creation should now use more precise double values instead of less precise single values
68. Bug fix in rare scenarios when using the zoom tool
69. Show local map/map server map correction
70. Correction to EPSG checking
W. Surface Module: Reading RDLS data:
86. Simple RDLS read had the wrong text in some of its components
87. Reading country for the new line wasn't read properly causing an error during linking
X. Other fixes:
103. Corrected compressing file without path
104. Bug with pox/Rids file creation
105. When saving a project group file, will suggest the name you gave by default

106.   Correction to video conversion UI
107.   Bug fix handling eltrip data when reading a sync file

3.2.67 – 2017-12-19

New Features:

A. (3.3B) Surface Module: Reading RDLS data
    1. (3.3B) All RDLS read operations: Option to create a new line from the RDLS instead of linking to an existing line
    2. (3.3B) All RDLS read operations: Added additional new line name setting when creating a new line. Previously the new line name
    3. (3.3B) All RDLS read operations: Added additional new line name setting when creating a new line. Previously the new line name was determined by the sub directory.
    4. (3.3B) Batch RDLS read: You can select the origin for projects. You can use the current project if it's open, current project group if it has at least 1 project or create a new project group from the RDLS files themselves.
    5. (3.3B) Batch RDLS read: You can right click a selection to copy the selected row (the only white selection) to all other selected rows.
    6. (3.3B) Batch RDLS read: When you want to create new lines from RDLS files, you can now give them a custom name instead of the same name as the data output sub directory
    7. (3.3B) Batch RDLS read: Now searches for the default project when initially entering the form
B. Displaying data
    8. (3.3B) Multiple videos can now be linked to one pause play button
    9. (3.3B) You can now display offset and relative elevation to scanner as types on how to color RDPC data. Later requires RDPC 1.1
    10. (3.3B) You can now use elevation and relative elevation to scanner as Y-scale values in the data view with RDPC data. Later requires RDPC 1.1
    11. Key strokes are now sent to parent if the active form is PC- or video-view. In other words: A and W keys now should advance the view regardless what is the active form.
    12. Point cloud now has a setting to automatically change view direction to be the same as moving direction
    13. (3.3B) Surface Module: Line tab in more graph parameters.
    14. If you can't display the data due to wrong axes min max settings, the program will now focus on that so that you see that you should change them.
    9. Coordinate handling and map
    15. (3.3B) Added linear coordinate correction to edit coordinates: [New X coordinate] = ([Parameter A] + 1) * [Old X coordinate] + [Parameter B]. Can be done to a group of pox files
    16. When going to check coordinates without having any points, will now set the initial area based on the EPSG number
    17. In map control, pressing shift + click when "Show point info" is active will now copy the coordinate values to clipboard
    18. Performance improvement when moving in Coordinate validation tool using the scrollbar

19. (3.3B) Added support for displaying binary format and multiple columns data when outputting to maps. In other words: Data surface type information now possible to display in map.
10. GPR:
20. (3.3B) Parallel processing for 3D radar Cube data reading
21. (3.3B) New settings for user defined Pavement interpretation output: interface- and parameter name settings (H1A=Pav_ave, etc) and possibility to set output format (F_H1A=0.00, etc)
22. Possibility to define output from combined section ID data (divider for section ID)
23. (3.3B) Era output: Now it is possible to set 7 freely defined text-fields and show the Road and section with zeros in the front. Also Custom Grid is now correctly read from the .pox-file.
11. Added additional information to invalid license dialog: Key number in RDLic and the number of dongles found

Bug Fixes:

A. Viewing data:
1. Bug fix to VLC media player stop and play operations
2. Flat points in PC view didn't always have the proper orientation
3. Reverse Y-scale was forced to be on when showing all RDPC points in data view
4. Having reverse Y-scale off sometimes caused the image to be drawn 1 pixel too low
5. Sometimes the reference data when calculating between DB-type datas in view changed when going to the settings.
6. Adding RDPC data to view changed some settings in that RDPC.
7. If a line didn't start at 0, point cloud didn't work properly
8. When in data view, the visible location values no longer display the road number when it shouldn't

B. GPR:
55. Bug fixed for 16 bit data handling in AC processing
56. Bug fixed for 16 bit AC data undo/redo
57. Rescaling operation didn't copy 32 bit amplitude data information (.ERX-file)
58. Bug fixed in removing air-pulse from data, didn't work at all in previous 3.X versions
59. Corrected rounding error in add/subtract files in memory processing operation

C. Coordinate handling and map
49. custom coordinate systems weren't properly checked that if they were metric or degree coordinates
50. Added error handling for some position functions
51. Pox to shape lost first point in multiline pox files
52. Edit coordinates now doesn't crash when attempting to transfer Czech coordinate system to lat/lon coordinates (not supported operation however).
53. Custom coordinate definition handling didn't support user defined .prj files
54. Custom coordinate wasn't always properly selected in edit coordinates when opening a file with a custom EPSG number
55. Google maps sometimes showed the wrong area in the map view
56. In map view, if conversion to the given EPSG is not possible, will now use the degree coordinates
57. Arrows didn't work properly with google maps

D. (3.3B) Reading RDLS data:

88. (3.3B) batch RDLS read didn't properly read the currently open project group file
89. (3.3B) RDLS read function didn't read the EPSG number from very old pox files properly
90. (3.3B) IMU reading process now accepts other solutions than INS_SOLUTION_GOOD, but not WAITING_INITIALPOS
91. (3.3B) Fixing time from IMU now also fixes the time for rdls pox if IMU is used as the position origin.
92. (3.3B) In rdls reading, if there is at least 2 second difference between valid posture datas, will now interpolate linearly between them instead of using spline.
E. Other fixes:
108. Chinese language support fixed
109. Now possible to create a line on a folder where you don't have the rights to access a sub folder of that line
110. RD didn't boot properly if the INI laser settings weren't there
111. Changing the project rids file now properly loads it to memory
112. Excel file linking in Database linking opearion didn't allow select other than the first sheet in Multiple sheet document. The sheet selection menuitem was disabled.
113. Correction when a DB query returned an empty result
114. Correction to default "Print to bitmap" settings

3.2.63 – 2017-09-20

Bug Fixes:

1. ROCK Module: had a bug which made impossible with some parameter combinations to output the results to disk-file and link to project
2. In some computers, Air-coupled antenna automatic layer tracing caused an "Arithmetic overflow" error message to appear. this was corrected.
3. Sometimes, the automatic direct wave search function picked the second peak in the direct wave instead of the first one, which could cause slight error for the Er-calculation routine. Now the program solves this problem by searching for other large enough peak before, and uses it if found.

3.2.61 – 2017-09-12

Bug Fixes:

1. User defined Air-coupled antenna output had a bug, which prevented outputting filtered antenna elevation data to table.

3.2.60 (3.3Beta8)– 2017-09-12

New Features:

12. Support for Excel .xlsx-fileformat.
13. Also ANA/PLA/PDI, Database and Point Clouds have now a .prc-file for maintaining processing and linking history.
14. Now process history, .prc-files, have the data link ID saved in the line_name.prc-file.
15. Er-update operation now shows the filename.
16. (3.3B) Tool for adding country codes and other country specific settings like, districts, states, lane names, carriage way names etc.
17. (3.3B) Batch .rdls-file reading generates now a .log-file for possible error messages.

18. (3.3B) Now it is possible to do calculations between surfaces which were directly created from point-clouds.

Bug Fixes:

1. Point cloud didn't save correctly multiple Point cloud view settings.
2. Er-updating operation updated only the first AC-datafile in a sub-window, if multiple AC-datafiles were in the same sub-window. Now the program updates always the shown AC-datafile.
3. Program didn't filter correctly out invalid points from grid table output of the data which was created subtracting two tables from each other. The data was shown correctly on the screen.
4. Database linking operation didn't work with automatic setting, if a text file was selected
5. The opened file didn't get a default file name, if it was opened in a table view.
6. The program didn't handle correctly the non SI-units in the printing operation.
7. The Flat-point drawing didn't draw the flat "plates" in correct direction, if all points were loaded, except in the beginning, for data drawing in point clouds.
8. In version 3.2.54 came a bug, which caused the program to crash, if a new video was opened in a data view, where was already a video file and some line data. This is now corrected. This bug caused also program to hang, if image list was loaded in to the video frame and video was switched back to its frame or new video loaded to replace the image list.
9. End reflection or air pulse removal didn't work correctly, but caused an error message, latest when a second file was processed. The file was already open error.
10. Program could crash in some cases when the data view was closed, if both video and point cloud were set to be external and also some line data was in the view.
11. A bug caused the external point cloud view to crash, if the point cloud was moved forward using keyboard cursor keys. Crashing happened after moving some time, and was not depending on the location of the scrollbar. This was corrected.
12. Undo function didn't always redo deleted annotations.
13. Possibility to close channel splitting dialog by pressing "Cancel"-button in the middle of splitting operation could hang the program. Now all the controls except Stop-button are disabled during splitting process.
14. When the program was closed and interpretation or the "show coordinates" tool had been used, the program didn't shut down correctly. The main window was left, as if the program would still be running, although it wasn't. All the opened views showed incorrectly. Now program closes as designed.
15. Diagnostics module: The program didn't calculate Ea and temperature corrected SCI/BCI. This bug came with Automatic analysis update during the Spring.
16. Concrete module: Now the program reads the frequency parameters always, when they are changed. The output filename got additional backslash, which could cause some problems with some local/network storage configurations.

3.2.59 (3.3Beta7)– 2017-08-23

New Features:

1. Pressing ALT when clicking right mouse button over data window, updates also other cross sections, not only DB- or PC-cross sections. Corrected saving Cross section size change + redrawing cross sections when changing cross-section settings.

2. Possibility to Create copies of existing ANA, PLA, and PDI files.
3. Video frame capture works now at full video size mode.
4. Speed up of GPR interpretation file read and write operations specially in the case of Network drives.
5. New "Chunk copy" mode for GPR GSSI Data channel splitting operation. Makes operation faster with Network drives. Usually, no speedup with local drives.
6. Possibility to select multiple files for channel splitting operation at the same time.
7. Reversing GPR files made faster.
8. Support for 8192 samples in Air-coupled data handling.
9. AC-data handling operation has now "INIT" -button for automatically setting processing parameters for bouncing removal. Filtering, Direct wave search distance, min-max search distance, etc.
10. New parameter for setting fixed location for direct wave in the middle of search distance.
11. Support for Camlink 6 files.
12. Impulse Radar data format support added.
13. Data name is now visible for played video.
14. .Tek-file ending added to indicate Tekla-format for Reference points.
15. Added possibility to set min, max, and target ratio for map zooming.
16. Single scan view draws small circles at data points when the vertical distance between points is more than 10 pixels in the screen.
17. Added saving and reading user defined palettes for point cloud data.
18. Numeric keypads can be used for selecting digitized vectors.
19. Surface Module: Added possibility to filter also Pitch value with 10s moving average filter. Removes static error from pitch.
20. GPR-module: Void content calculation can now have maximum of 99 breakpoints. The table can also be copied and pasted.
21. (3.3B) Operation for creating fixed distance video files.
22. (3.3B) Surface Module: Multiple laser support for rdls files and Support for new scanner model (LS511R)
23. (3.3B) Surface Module: Possibility to add coordinates for Rutting output.
24. (3.3B) Coreless Module for AC-data analysis
25. (3.3B) Batch operation for RDLS-data handling
26. (3.3B) Surface Module: New Interface for RDLS reading.
27. (3.3B) Function to create digitized vectors from pox-postion file.
28. (3.3B) Borderless multiple views on the screen function.
29. (3.3B) Coordinate data type added. Used for vector drawings etc.
30. (3.3B) Parallel processing enabled for data drawing
31. (3.3B) 360 camera support for Mediaplayer added.

Bug fixes:

1. Possibility to give own Map sizes for Mapview was corrected. At the same time, the maximum map size was increased to 10000 pixels.
2. Rock Module, Concrete Module, Fouling: Bugs related to data buffering and scrolling in Fourier analysis were corrected. The last view does not create a jump in data anymore.
3. Bugs were corrected related to Data drawing and map server settings and selections in Mapview. The data and map drawing operation was corrupted in version 3.2.47 − 3.2.52.

4. Bug with huge Air-coupled antenna data handling fixed. Files which were more than 2GB, were not able to be surface flattened.
5. Longer number allowed in coordinate's editing operation.
6. Scan number overflow Bug solved in single scan draw.
7. Corrected Ribbon bar expanding always when Table view was opened. Not opening anymore if Ribbon bar is minimized.
8. Bug fixed related to printing short view after long view.
9. Pointer scrolls now smoothly in data view instead of jumping when video is played.
10. Cursor forced visible always in Sigle scan view (earlier could disappear randomly)
11. Video jumping back in the end of line if data view jumps in the end of the view.
12. The view options didn't show correctly the data name, if more than one data was in the view.
13. The Synchronize coordinates operation in Coordinate editing calculated incorrectly the first and last extrapolated distances.
14. Corrections for layer digitizing. Adding digitized vector from other sources might have deleted the last digitized point.
15. Video media player zooms now correctly also for sizes less than 1.
16. View map cursor jumping back and forth made lesser and eliminated in most cases.
17. Single scan view updating made max 10x /s to avoid single scan view locking.
18. Bug in user defined palette saving corrected.
19. Bug fixed for analysis and planning statistics, now shows statistics from whole data set as default, instead of last selected interval.
20. Corrected bug in Analysis View options related to showing single data or two fields. Firs field was dublicated.
21. Automatic Analysis bug related to extrapolating incorrectly data shorter than the line. Now limited extrapolation is allowed.
22. Line names are allowed to have "(", ")", and ";".

3.2.45 – 2017-03-07

New Features:

1. The use of Map server interface was simplified. Now the user can select the Map server only from one place, from the map-tree-view. The pop-up menu was removed.

Bug fixes:

1. IDS image linking operation didn't work correctly. The image list was created and linked, but the program created error messages unnecessarily.
2. Google Maps were not supported in Line and Coordinate editing operations properly. Also, the Map-server list was not populated correctly every time in Map tree-view. Also the selections didn't have effect every time.

3.2.44 – 2017-03-03

New Features:

1. Diagnostics: Automatic analysis operation now supports 100 database and 20 annotation fields compared to 7 and 7 accordingly. Also a new user interface with 4 more available classes were done.
2. Zooming to video and images in the video frame now works without jumps. After the zoom is changed the view location can be changed by dragging.
3. New "Grid" Selection tool in Mapview, which makes possible to select coordinate points and see the values in a grid besides the map. The selected points can be saved also to a position file.
4. Interpretation line width now affects also GPR-interpretation point size, if points are shown.
5. The program shows now a progressbar when loading an areal coordinates file in to memory
6. Better support for GSSI dzg-files and SIR-4k GPR markers. Markers and GPR points files are copied, if the channels are splitted. If the program notices that there is a marker file, the program sets the marker type to FILE also for GSSI data.
7. Reads also $GNGGA command the same way as the $GPGGA in coordinates handling

Bug fixes:

1. The bug which came with previous version in GPR-processing "Operations between files in memory" is now corrected. There is still a bug, which causes the operation to go out of synch leaving incorrectly processed scans in data, if the data is scrolled. Therefore using memory buffer is recommended, if this function is used!
2. Database reread and filter command buttons were re-enabled. In some of the previous versions they were accidentally disabled.
3. Datum shift files made active again for some special coordinate transformation.
4. The rescaling operation using position files corrected. In some rare all or a part of the scan were not handled and file was left too short or non-existing.
5. Road Doctor didn't calculate correctly coordinates from GPR position file in GPR interpretations, if the file had been rescaled using a position file. Now the program calculates the values correctly.
6. The Interpretation toolbox changing Er or code only did not change the current value, unless some other textbox was activated in the dialog. Originally this was intentional behavior, but changed for this version. Now the changed value is always used.
7. If unbound gpr-view and linked dataviews were used in the same session, the program could mix with load data in to memory settings causing errors in processing. Now the unbound views use always data without reading them in to memory.
8. If multiple GPR data was opened and the originally in treeview selected GPR-data was not among the finally selected multiple data, the program used parameters anyway from the selected gpr-data. This could result in having too short measuring time in the 3D-dataset. This behavior was as designed originally, but now changed to work so that the settings from the selected are taken only if it is among the finally selected GPR-files. If not, the program uses the first in the list.
9. Mapserver settings dialog was changed smaller
10. Removing a line caused crash in Mapview, corrected.
11. Coordinates file editing operation "Synching coordinates" between files didn't work correctly for reversed files. The extrapolation didn't work. This was corrected. Also Missed sync-points correction was fixed to work in in the case of reverse locations.
12. Some double questions removed from saving file with the same name as an existing file.
13. GPR vector output form left the append, overwrite etc dialog behind the settings dialog, corrected.
14. The location and location cursor moves directly to correct location in the View Map, when view location is moved to another place. Earlier, multiple clicks in the data had to be done before Map moved to correct location.

15. A new bug had appeared in the program after it got support for maps with degrees (Google) in the end of December. This prevented the Maps which didn't have the fixing point in the upper left corner to work incorrectly. Now this is corrected and works as before.

16. Some stability problems, when closing the views containing point-cloud window clicked out of the data view. This was corrected.

17. Add Data to View-button in the Ribbon bar didn't work. This was corrected.

18. If a view was saved and GPR data was outputted to GPR preview images, the view didn't work anymore after removing the actual GPR Data. This was partly corrected, no more crashes or error messages, but the program reserves still some extra memory for non-existing GPR Data.

19. A text and number input dialog could be left behind some other dialogs, if some other program was started and used while the text input dialog was presented. If the dialog was hidden and user pressed Enter, that could cause also program to given an error message in some cases. This was corrected in every place, where the input dialog is used. Now the dialog is always on top of the parent dialog.

20. The view preview image creation utility didn't show any information from the video image list creation process and the user could think that nothing is going on, because the control was given back to user although the process should not have allowed that. Now the operation shows a progress dialog.

3.2.37 – 2016-12-30

New Features:

1. The program supports now much larger GPR datasets for memory buffer loading. Earlier the limit was 8Gb all together for single view, now each data can be that large. Also virtual memory is now possible to use for loaded data. In practical cases, however, the memory fragmentation limits the size of the needed continuous memory and 8Gb is not possible to get in to use. However, this is not really a big limitation, because very few single files or data from a single channel are that large. (never met such yet)

2. Degrees support for maps in data view.

3. <Ctrl>+<C> and <Ctrl>+<v> work now with table view.

4. GPR slice capturing to video operation.

5. Point information can be read from point cloud data in a Map view.

6. GPR slice view can now show the level also as depth units (mm, cm, m, ft, in).

Bug fixes:

1. Analysis data can now be in the first sub-window in a saved view.

2. Elmod link was corrupted in the previous version. The link couldn't handle the new increased number of subwindows.

3. Edit coordinates operation "Check Coordinates" does not load the background map automatically anymore, because that may last a long time and confuse the user. Nothing seems to happen for a long period of time.

4. Swedish language file was corrupted and some of the file handling dialogs didn't open.

5. Bug fixes for map view: Line disappeared in some cases with degree maps

3.2.33 – 2016-12-08

New Features

1. Gpr: "Update all interpretations" operation is now activated. The program automatically updates all the GPR files in the active view.
2. Google static map support now works in all map operations. Because the Map-sizes are fixed in those static maps (1280 x 1280), Road Doctor will zoom the map to that size if the view size is larger than that. This causes also that all the zooms may not have an effect, because the already used map-size would match best also with the new zoom. The zoom is selected always so that the whole selected area will be included. If <Shift>-keyboard button is pressed, while the area is selected, the program will enlarge the zoomed area to the full map size, not only to shown map-size, which is the default case.
3. Saving video contrast, brightness etc. settings. New command button "Save settings to video" in Video player video settings, which enables saving the video's display settings to a separate file. Multiple settings can be set for a video. Every time the button is pressed, the program saves new settings from that location forward. The settings are saved in a text file, whose name is video_file_name.RDVSET.
4. Road Doctor project file (.rdp) supports Unicode text. The property must be set, when the project is created. This operation makes possible to use Cyrillic and other non-ascii letters in file and folder names, for example.
5. In the table view, the program now saves full table as default, if single cell is selected. If single column is selected, the program asks, if the user wants to save single column or full table.
6. Support for showing .las and .rdpc pointcloud file in a map view. The same settings apply as in the point-cloud view. Multiple point clouds can be displayed. The names of the point clouds appear in the tree view of the map view and point clouds can be separately switched off/on and deleted.
7. Surface analysis: has a new possibility in Create pox from rdpc using digitized vector to save the output as a dxf-file.
8. Surface analysis: new function to convert an rdpc-file to las-format.
9. Support for hectometers in all functions, also in .pol-files.
10. Zooming map using <Shift>-key button pressed, zooms the selected area to whole map area.
11. Diagnostics/Design: Odemark calculation now asks, if user wants to show the calculated data in the view, if it was not shown already.
12. Link as database operation now keeps project's tree view open.
13. Saving and creating .rvc-coordinate-files for multiple video files simultaneously.
14. Added support for linking rdpc-point cloud immediately after creating it.
15. Correlation and Deviation graph support activated for 3.x version.
16. Pulse encoder (GPR) support for laser data handling, in the case when eltrip etc is not available
17. Pulse encoder (GPR) support for correcting GPS positions for GPR data.
18. Void content calculation can now have 99 sections instead of 9.

Major Bug Fixes:

1. Now preview images are supported for GPR data, The "Preview"-folder is supposed to be in the same folder as, where is the GPR data or if not there then the program searches it from the Preview folder under the project root folder (the same where is project's .rdp-file).

2. Map view supports now all the drawing modes correctly. Also the different distance axes drawing modes are supported now.

3. Map size can be other that square. However, this does not work with google maps, which always must be square.

4. 3d radar data format GPS reading was corrected.

5. Video subtitle file creation corrected

6. Bug fix for Tekla format to support also lines without preceding spaces in a line.

7. Map zoom location selection was corrected to point correct location, if the view was not in upper-left corner.

8. Using local maps if no Map server selected.

9. Editing coordinates manually in "Edit coordinates" dialog corrected.

10. Moving Map location using <shift>+ "Hand" tool to up and left in Map view corrected.

11. Bug fixed in calibration file creation in Savitzky-Golay-filtering

12. Percentage of displayed points is now calculated correctly (more precisely) in point cloud view and in the converting las-files to rdpc-files.

13. Displays now the location in Point cloud view using the same location style as in the view (km+m etc...)

14. Corrected function in table view, which prevented showing text-files which had skipped rows.

15. Bug fixes for reading Falling Weight Carl Bro and Dynatest f25 file formats. Also user defined FWD format reading was updated.

16. rdp-file was copied one folder too high in ZIP backup operation, also digitized vectors in a view are now saved to zip.

17. RD now displays MP4 files correctly also in Windows 10.

18. Displaying GPR-preview images made faster by using the in to memory loaded images instead of reading from disk every time.

19. Memory leakage caused by unloaded images and imagelists now corrected.

20. Corrections for map server listing and treeview

Smaller bug fixes and operation updates

- point cloud display and flat/fixed point drawing made show better the points
- linking operation does not return to link dialog any more, if linking operation is canceled.
- UTC time recorded also for 3d-radar data
- IDS bug fixed, so that the program supports better StreamX multichannel system.
- video zooming corrected - may need some more corrections
- vector drawing operation: <Ctrl>+<Shift>+Digitizing+Click moves the current vector to clicked new location.
- map view drawing uses now local settings
- drawing lines in a point cloud with only .las-data now possible
- point cloud view length correctly updated in to view template
- user can now give maximum offset when saving .las to .rdpc file.
- point cloud control is created only when needed. Corrects some error messages.
- colour scale appearing/disappearing in view settings corrected.
- WMS-maps are loaded in another thread to avoid freezing the program when a new map is loaded.
- some additional warnings for table view
- copy/paste to grid corrected, takes away the empty extra CrLfs from the end of the copied text or table.

- error, when exiting back to edit coordinates without having and saving any points in Map view, corrected.
- user is warned, if no distance field is selected in database linking operation.
- analysis files having no text as "menu" text display now correctly in map view draw data selection dialog.
- if nothing was changed in filtering coordinate points in Mapview, the program does not ask for updating anymore.
- database accepts selection of every 2nd, 3rd, 4th, 5th, 6th row when viewing
- EXIF (location info) for jpg-images
- support for more channels in a single view sub-window in "Edit distances and comments" dialog was 350, now is unlimited (in theory). Practically there is a limit of 2048.
- + some visual fixes and typo corrections etc

3.2.18 – 2016-09-23

New Features:

1. Language files have been updated so that almost all the dialogs are translated also to Finnish and could be possible to translate to other languages too.
2. Maximum number of data sub windows is now 30 instead of 15 in the view. This could be increased if necessary.
3. Point cloud, database, analysis and planning colour tables have now names, which are shown in the colour list.
4. The hidden data sub-windows can now also be included in the saved view
5. Point clouds now support also the exclude minimum maximum limits for surface views
6. Support for reading Tekla format (INFRAFINBIM) reference point format. Reads now also the drilling resistance values, which are not yet supported in the drawing, but saved anyway. The areal coordinates file or loaded pox-file can be used for finding the reference point locations and road sections. The road and road section number/name is now saved with the reference point and can be filtered in the drawings.
7. Default settings for verge calculations
8. Undo/Redo buttons added to Interpretation floating toolbar
9. There are now tools in Mapview to show the reference linepoints as small coloured filled/unfilled circles
10. New FFMpeg encoder with LGPL license
11. SQLite database support added
12. In Point Cloud, looking direction can be changed by right mouse button (vertical rotate chances camera elevation, changing looking direction keeps camera elevation the same but looking direction is changed) Camera offset moves camera sideways, and point cloud's horizon stays horizontal.
13. Extracting a line from a project to a new project is now possible. It can be added to an existing project, but no checking for the same data ids is done!
14. Very large pointclouds can now be created.
15. Coreless information is now possible to copy to set Er-value field from the shown view section. After this, that value is used in thickness calculations automatically.
16. The set Er-value (and therefore the coreless Er) can now be outputted from the AC file to table by user defined format in AC data export. There is now a new tab page for "Set Er value" outputting.

Some major bug fixes:

1. If multiple point clouds are loaded simultaneously, they can now have different break point lengths, which was not possible before. The default breakpoint length is now also set to 10m in creation of Road Doctor point clouds, instead of it being variable as earlier.
2. A colour settings bug with false colour rescaling corrected
3. Point cloud view angle change now more logical with right mouse button (up/down)
4. Bug fixes for video showing
5. Support for IDS data header reading for StreamX multichannel data
6. Corrected drawing pictures in-line with other data, they resize now correctly
7. Point cloud fixed to take into account and show correctly when moved from the scrollbar also after offset or elevation changed
8. All layers can now be deleted from a point cloud so that the point cloud is effectively deleted from the view, and remaking is possible.
9. In coordinate filtering operation deleting coordinate points, if time difference more than 45 seconds, also empty GPGGA rows are deleted to avoid 0,0 coordinates.
10. Bug fixed for Automatic analysis to support more than 20 parameters
11. Critical bug fix for 32 bit AC-data interpretation editing. If 32 bit AC data interpretation was edited (like code, Er, quality changed or fixed), the program cleared all 32bit amplitude parameters from edited part. If the ER-values were updated after the editing, they were corrupted without possibility to return them. (the bug came with undo/redo operation 2years ago!!) This bug didn't appear earlier because people have not updated Er-values after setting or editing the fixed Er-values. For the corrupted files, there is now a possibility to "repair" the file by trying to relink the file and there creating the amplitude information file again with the same name as existing file. The program lets the user to select repair/add metal plate and zero pulse amplitude and after accepting that the needed surface reflection correction is activated by accepting the correction of the surface pulse elevation. This now corrects also the 16 bit versions of the direct pulse and surface pulse reflection. Earlier it was always -1. Press Cancel after trying to link again to not actually link again.
12. Bug fixed for single channel GPR surface view. The bug came with a new feature in GPR Surface view, where the program automatically calculated the minimum and maximum for the vertical-axis.

3.2.12 – 2016-06-27

New features:

1. The new VLC-based video player makes possible to change video contrast and brightness and do gamma-correction and change zoom factor. It should also work with windows 10 without problems unlike Window Media Player. However, the video linking does not yet work in that version!
2. GPR data can be displayed in a point cloud view.
3. The major change is that now it is possible to show also Line and From-To data in the point-cloud view directly. Also it is possible to interpolate in horizontal and in longitudinal direction, which makes possible to have nice looking rutting maps on the screen. Now the maps are very much the same both in data view and in PC view. Though, there are small differences, because Point cloud view uses linear interpolation and data view cubic-spline interpolation. Creating nice looking data displays of interpretations is also much quicker than before, because there is no need to create surface maps for each layer and bring them separately on the screen. Now the data can be

displayed directly from the database line data view. And longitudinal interpolation makes points to be in line instead of zigzagged.

4. The data can also be shown now starting upwards from the surface.
5. The method how the Road Doctor calculated colour values for surface view and From-To view displays was changed. Now the limits are really meaningful so that, if smaller limit is set to some value, also the first colour starts from that value and the maximum limit is the top limit of the last colour. Now the program works the same way as other visualization software.
6. A new method of showing the point cloud added data as fixed and flat-point data. The near data is shown as flat and the further away data as fixed size.
7. Linking point cloud files is now more straight forward and work as with other data.
8. Reading support for new Road Doctor Point CLoud version.

Bug fixes:

1. GPR Buffering now works better, after new data is added.
2. Markers didn't appear although they were found.
3. Datagrid crashed with arithmetic operations, if there were only one column. Now program demands that user must have at least 2 columns.
4. Joining GPR profiles in the view is now possible again. If the GPR data is at the same offset but at different location, it can be shown as continuous file on the screen. This didn't work anymore even in 2.5.
5. Now the coordinate selector has an inital value.
6. Some other additional smaller changes and bug fixes.

3.2.09 – 2016-05-18

New Features:

GPR data buffering: The biggest new feature in version 3.2.09 is the capability to buffer GPR Data. The operation can be activated from the "3DData Set Rescaling Settings", using a new button "Buffer Data". However, the better way could be to set the buffer later using the "Horizontal Axis Parameters" dialog, because there the buffer length can be set directly and the set buffer length can be longer using that method. As default the program uses double of the view length.

The buffering operation can be used with all gpr data and specially with 3D data views, it makes operations much faster. For example a >150m long bridge data can be loaded completely in to memory and data handled without need to wait data loading every time after setting the view longer or shorter or scrolling the data. The maximum size of the data buffer is 2 000 000 000 (2giga) memory points this means 8Gbyte of memory. So the computer should have at least 16Gb of memory to be able to use the whole memory capacity. (120 channels, 1024 samples, 100 scans/m --> 166m). If only the needed number of samples is loaded, then the buffer length as meters can be longer. For normal road measurements, we could estimate 1024 samples, 10 scans/m, 4 channels --> 50km! But of course a shorter buffer is better in practical use.

The memory buffer can be activated/deactivated in "Horizontal Axis parameters" dialog. The checkbox "Use GPR Data Buffer" activates the operation, "GPR Buffer length" defines the buffer length as meters. If the buffer length is resetted using checkbox "Reset Data Buffer", the program

automatically loads all data again in to new buffer. Checkbox "Press <Alt> to load new Data to Buffer" (checked as default) activates operation where the user needs to press the <Alt> keyboard button together with the clicking of scroll bar button to go beyond the buffer extent. This is highly recommended to be kept activated, otherwise the program can start loading new data section accidentally, if the buffer limits are reached.

By clicking <Alt> and scrollbar arrow keys, the data buffer advances one screen-full at a time. The view itself advances normally! If the scroll bar itself is clicked, which causes the view to advance full screen-full, the program loads a whole buffer length - half view length of new data.

This makes possible to scroll backward one half screen-full, without need to load data again.

The operation should work now also with all FFT analysis operations also and with printing operations also. However, during the printing operation the program needs to temporarily remove the data buffering.

Other New Features

1. Surface module: Edge Drop calculation
2. Rock Module: 32 bit data support for EDZ calculations for Rock module 3. "Create pox from Rdpc" to general feature.
3. Diagnostics module: Reading AVI-files as Thermodatafiles
4. RdWeb view exporty and adding exif location for bitmap prints for RdWeb.
5. Support for time origin being from laser scanner (better adjusted data)
6. Elmod support set visible in Tools instead of Diagnostics and Analysis, visible also if GPR module.

Bug Fixes

1. Bug fixes for database handling
2. Map-Servers corrections
3. Show on top fixes for some dialogs
4. Zooming to whole map control bug fixed
5. Text connection bugs (filtering, row order, empty values)
6. Showing pox files in Point Cloud corrected
7. Elmod data drawing corrected (output to wrong sub windows)
8. Fixed custom coordinates handling
1. And many other smaller bug and UI fixes.

3.1.30, 3.2.03 – 2016-02-21

New Features for RD 3

1. Road Doctor 2.5 had support for dragging and dropping certain files to it. This feature with some enhancements is now available also in RD3. The supported files include all GPR datatypes, following table file formats .txt,.csv,.xls and.xlsx, .rdp - rd project file and as a new file format also .rdbat format, which is a new automatic launch file format for road doctor. More below.
1. Road Doctor 3.2.02 has a new tool for coordinate checking.
2. Support for GPS tracking for views. Ths feature was also available in RD 2.5, but not yet properly activated in RD3.

3. .rdbat file format. Below is a sample file and some explanations. '/' slash is used as a symbol for comment rows. Copy these rows below and change the project names and View IDs to be able to use the file. Multiple views can be opened simultaneously on the screen. to launch the file either,

a) Create a short for Road Doctor (Viewer) and add a text /BAT=C:\DATA\Aurora VT21\Testbat.rdbat/ to the name or b) create a shortcut for the .rdbat file directly and when first opened attach file to be opened always with Road Doctor (Viewer) or c) drop the file to Road Doctor

----

/Road Doctor automatic launch file

/Version=1.00

/ View=id number of the view, GPS=-1 = use Internal GPS if available,

/ GPS=-2 use external, GPS=0 or keyword not existing not used. It's

/ enough to have the parameter in the last view, and it should be only

/ in the last view.

/ WinMax=1, means that the window is opened maximized although it

/ wasn't originally opened as maximixed (Winmax=0, means that window is

/ opened as saved in view settings.

/ Next in RD Viewer only: Info=0, RD Advertizement below normally,

/ Info=1, Advertizement without links, Info=2 No Advertizements

/ All the rows where slash is the first letter, are regarded as

/ comments only and skipped

/ The last read View is always the topmost

/ Project name can be full path or relative path from the .rdbat folder

/ If the file name includes double backslash "\\" or ":" it is handled

/ as non relative path.

Project=C:\Data\Aurora vt21\00021.rdp

/ the first view

View=900100256;GPS=0;WinMax=1;Info=2

{

/ This space is reserved for future properties

/ The second view

}

View=900100258;GPS=-1;WinMax=1

```
{

}
```

----

4. Parallel processing is now activated automatically for Road Doctor on-line processing operations. This speeds up the operations several times. The program uses automatically 100% of the processing power. The parallel processing can be switched off in GPR Processing settings dialog. The speed up is noticeable specially with very large data sets. Like 3D GPR views.

And following bug fixes and small enhancements:

5. Utsi GPR file format reading function corrected.

6. Bug fixed relating to mixing the video synch, if video was not loaded as the last data.

7. Bug fixed with single scan view and FFT window. The scan number is not anymore increased every time as the window is resized.

8. Save as database saves now also the relative path.

9. File reversing operation corrected for 3DR data reading operation.

10. The frequency stepping function corrected for 3DR cube file reading operation. The "nominal" frequency was not corrected, but assumed not being need to correct. Now the data looks much better and no more stripes at every 5th or so channel in data.

11. As new feature possibility to edit also the view length in Edit project data operation. View lenght can be shortened or lengthened without resaving the view.

12. A lot of visual changes for dialogs appearing locations and which is shown on the top.

13. remission search functions made faster using parallel processing.

14. Default values added for pointcloud data handling (3.2)

15. A lot of corrections for Pointcloud data viewing.

16. Mixed case support for database (not possible in some earlier versions)

17. Video is started after the whole view is loaded. Earlier video was started immediately it was loaded.

18. Temperature calibration for FWD FOrward calculation enabled and corrected.

19. Grabbed images can have subtitles

20. And many other small ones

3.1.27 – 2015-12-28

Next bugs were corrected for this version

1. 100m was used always as default view length, if point cloud data was included in the saved view. If the first loaded data was other than linedata the program could mess up with the view length in horizontal axes length dialog supposing it to be other that 100m although, although it was 100m. Now the length is always what is saved in the view. However, the maximum saved view length was set to be 5000m instead of previous 10000 meters to avoid out of memory errors in computers having limited memory capacity.

2. Real Road Doctor Camlink camera names are now read from a .sync-file in coordinates editing dialog.
3. The data multiplier factor didn't work with point cloud data. The program could pick up the value from FWD data, for example, but the was multiplier was never used. Now the multiplier works.

3.1.26 – 2015-12-15

After Last version (3.1.25) some more bugs were found and corrected. The bugs were not very critical from the program's stability point of view. This version does not include any new features. However, it is highly recommended that you upgrade to this version specially if you use a lot of point cloud surface data. Speed increase is considerable in changing the settings.

1. If the db-type surface view was created from point cloud, the program unnecessarily recreated the surface database every time, when some settings were changed and Apply or OK pressed for the first time. This caused a time delay of even tens of seconds depending on the data or point cloud size. Now there is no extra delay and view settings are updated immediately. The delay is only because of the drawing.
2. Horn Antenna Coreless calculation operation gave too small values for the dielectric value of the asphalt. Now the result is correct and also the settings are now fixed. The user cannot anymore change the
2. difference between antennas, because they are fixed for GSSI Horn Antenna system. This will change in the future after more systems and antenna configuration are tested.
3. Sometimes Point cloud crashed and became un-useable, although it was possible to continue the program. This could happen, if a lot of data was created from point cloud data and as final step point cloud added to view. This bug is most likely handled now. At least the point cloud view should not become unavailable.
4. Program could crash in a single scan view, if nothing was shown in the just opened view and user tried to save the scan using pop up menu. Now the Popup menu does not appear unless some data is available.
5. The program had always as default the "single colour" for surface data shown in the point cloud. Now the button is unchecked.

3.1.25 – 2015-12-08

Several bugs and some strange behaviours were corrected and some new features added since the last update.

The Next bugs were corrected:

1. Program crashed completely down in database colour selection, if the colour was selected twice in the same changing operation and <Esc> key pressed in the last selection.
2. Fourier calculation in Single scan view crashed, if any of the operation was selected in the view before a scan was visible.
3. In vector interpretation, the free draw (without pressing mouse, after long press) didn't save the points although the line was drawn.

4. Point cloud linking crashed, if linked with close button.
5. Many Icons and added and corrected.
6. AccZ IRI calculation with new accelerometer works now correctly.
7. Las to PC-format crashed, if no coordinate transform was selected.

New Features

1. Load GPR data to memory is now a default selection.
2. Line is suggested for a Point cloud, when it is created and some lines are available.
3. Some Timers added on the screen during GPR loading.
4. In Horn data handling, the program now suggests the metal plate files from the same folder as data, if creation of a new file is selected.
5. Possibility to save to clipboard full frequency spectrum from selected time range from shown view added in single scan view.
6. Some wrong texts changed.

3.1.24 – 2015-11-18

New features:

1. Road Doctor uses now relational path. This means that RD always checks for Relative Path which is marked as keydword "RelPath=" in RD project file row "Unit: " for data and "Special:" for lines. The program checks always, when a new project is attached in the Project group the existence of the relative paths and creates them for data, if they do not exist and data is available in projects folder. The starting path is always the same, where is the project (.rdp) file. This means that, if a project is copied to a local folder from network, the program will use the new location automatically without changing the paths.
   Program always shows the correct path information for data in info box in an open project. Also DataId is now shown, which makes possible to verify which data is linked in a view. View shows only Id for the data. Also now the program shows correctly all linked data in the info table. Video, Map and point cloud data were missing earlier.
2. The default path is always asked for a Line. There is a new dialog in line creation operation for that. The line folder must be lower or at the same level as the project. The new .pox-file is automatically saved
3. there. Also all new ANA, PDI, PLA, FWD, IRI, RUT etc. files are saved in the given folder as default. Database linking from grid still needs the folder and file name be given. This is because the selected line is not known when the file name is asked. This will change in the future. Also video coordinates are always loaded from the same folder where is the video file (.rvc,.rvcm)
4. Language files have been activated and the new version includes quite full Finnish translation version. German translation is coming next. The new version supports also Unicode character sets. So maybe we will have a chinese or japanese version of Rd some day.
5. Support for UTSI data format is updated. Older version supported only data with fixed 256 samples. Now RD reads all sample etc information from the file header.
6. Pointcloud scrolling scrolls also other data.

7. RailDoctor's Fouling module has BB-button visible, which reveals all the hidden features for changing settings and used frequency windows. All Railway features are now moved under Railway Ribbon, which is visible only in RailDoctor.

Major Bug fixes:

7. Creating new colours works now correctly when more colours are added
8. Bug fixes for showing colours with point cloud data in data view.
9. Bug fixed with creating lines which included multiple sections from
1. areal coordinate files
10. Bugs fixed in attach new project, create new project, open external project. Now program informs about closing the open program and marks it closed in .con-file.
11. Bugs fixed with showing the Navigator toolbar
12. Bug corrected with point clouds background colour. Now every point cloud have its own background colour.
13. Bug fixed with creating multiple ana/pla/pdi files. Now creates always the selected format (earlier mixed with formats)
14. Image file checking corrected for liniking map-images. Earlier version didn't recognize any image files, if it or its path inlcuded points ".", except in the suffix.
15. Negative coordinates are now accepted in Map-linking.
16. Rock Module and Concrete module are now shown correctly based on the given license file. Rock module allows calculation from a single given time window, if interval is given and 0 is given for time window and time step.
17. Pointc louds are not filtered anymore out of the project, if data sorting is applied!!!8
18. Some corrections for view opening to prevent extra dense tickmarks in horizontal scale.
19. Reversing button does not cause crashing with 3dr-data linking anymore.
20. Memory leakage issues have been solved more. The memory is leaking less than before.

3.1.23 – 2015-10-21

Bugs fixed:

1. In some case GPR processing operations Migration, Hilbert Transform, and Diagonal Filtering didn't work, but crashed the computer without user being able to continue. !!!
2. The horizontal filtering as background removal operation didn't work correctly wit 32bit data, if the amplitudes were very high (surface reflection was clipped with longer filters). This bug didn't crash the program.
3. The Mapview's treeview display right mouse popup menu selection caused a crash window appear, if it was selected without selecting a data with left mouse button at first. (Continue was possible)
4. An error message appeared in Mapviews data properties referring to "dbNull" value. The properties were not always possible to change.

3.1.22 – 2015-10-19

The last two versions (3.1.21, 3.1.22) corrected a big problem with memory handling in Road Doctor. Road Doctor was "eating memory", making it slower and slower. Finally, it had to be restarted. The program is still eating memory every time a view or a table view is opened and closed, but not nearly that much as before. Also some memory handling was optimized and now Road Doctor should be able to load much larger and longer GPR sections in to memory at one time, if computers memory allows that. Also some other bug issues have been corrected.

However, the last two versions included a bug which crashed the program when a maximized window was closed. the bug did not appear, if the view window was in minimized state. And the bug did not appear either, if the maximized window was the only view window. After the crash, pressing "Continue", let the program to continue, but it might become unstable. This became with the "memory eating" correction. This bug is resolved already and corrected and a new version which corrects this and some others will be available soon (3.1.23).

The new version corrects following bugs:

1. Above mentioned crashing with closing maximized or minimized view window
2. Memory eating problem for most part (was also in earlier)
3. New View tool button becoming unavailable, if Table view was opened
4. Opening an existing view was not possible, if there were a table view as active view
5. Outputting the 32bit amplitudes is now possible in vector output, before amplitudes were divided by 1000. A new file .@xd is created for this purpose in the folders.
6. Map view data settings were not handled correctly in map view settings change operation