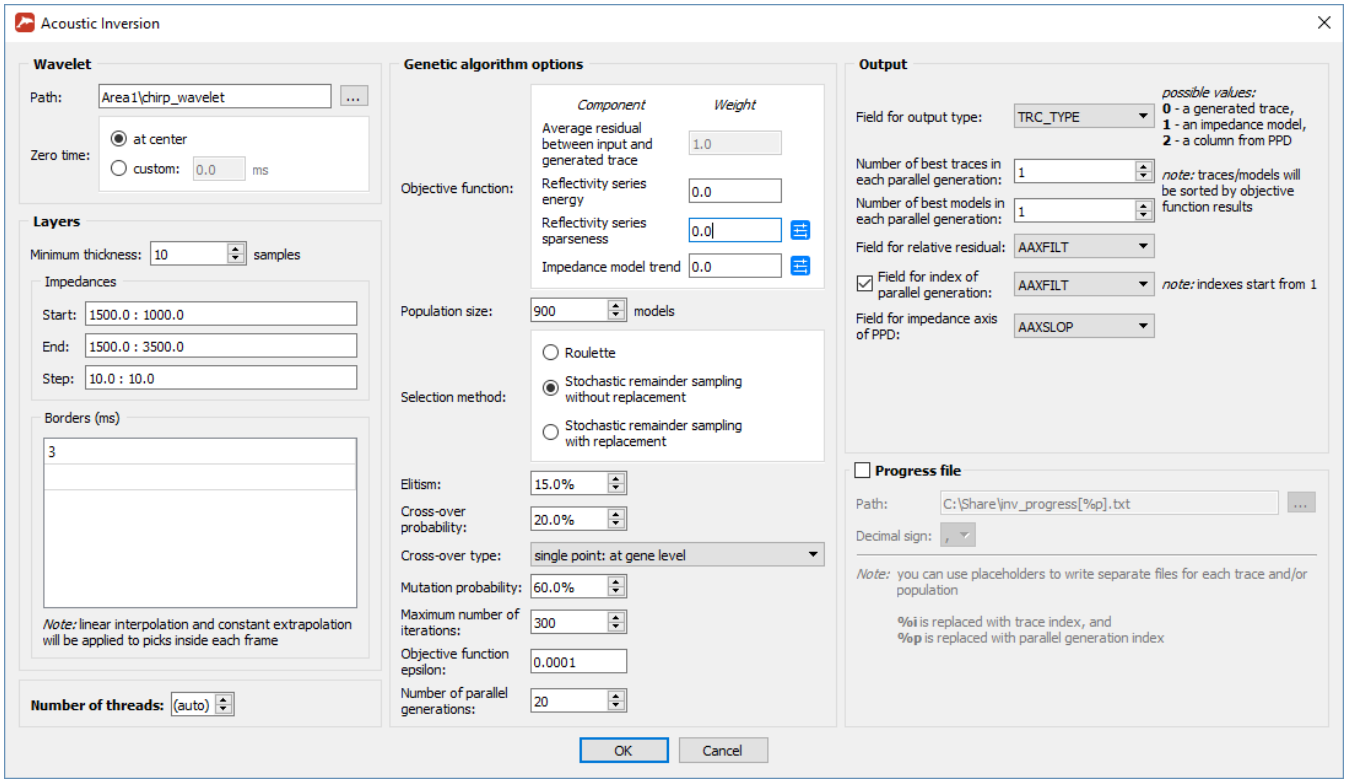
RadExPro 2017.3 release notes

We are excited to tell you that **RadExPro 2017.3** is ready now. There is a lot of useful new features in this release:

- Brand-new **Acoustic Inversion** module implements a genetic algorithm for recovering of impedance model of the media basing on convolutional model of a seismic trace. The algorithm is based on a paper by *Vardy, 2015* with some modifications. You can use several constrains with different weights to utilize geological information about the section and stabilize the algorithm: minimize the energy of resulting reflectivity sequence, maximize its sparseness, use an *a priory* impedance trend as a constrain.



Here are some results obtained on the synthetics:

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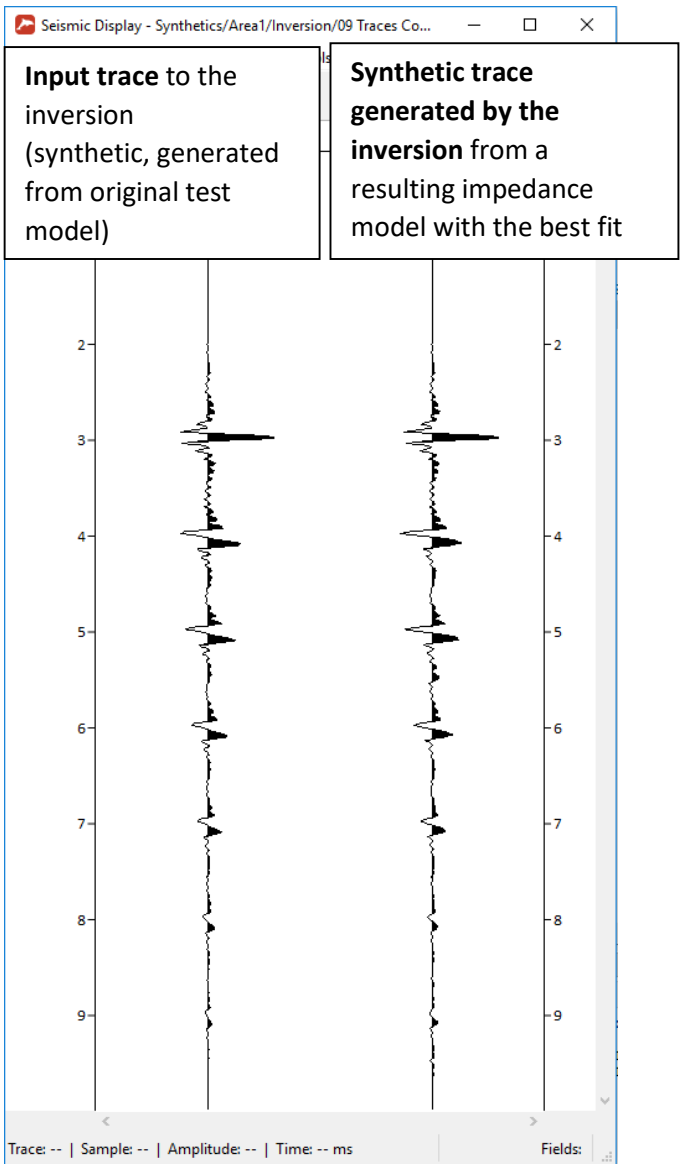
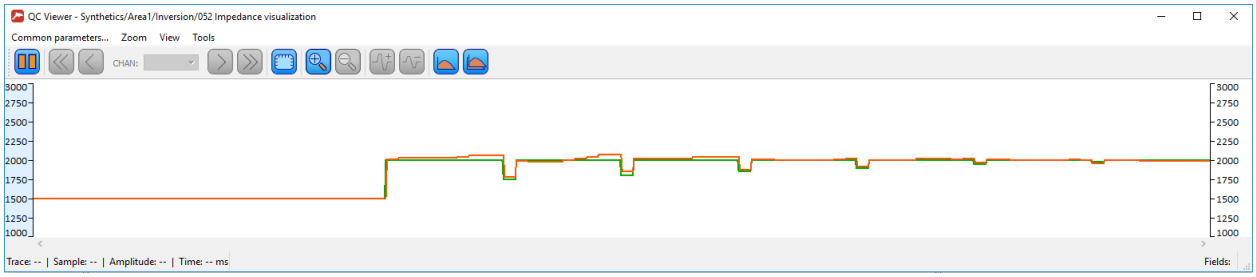
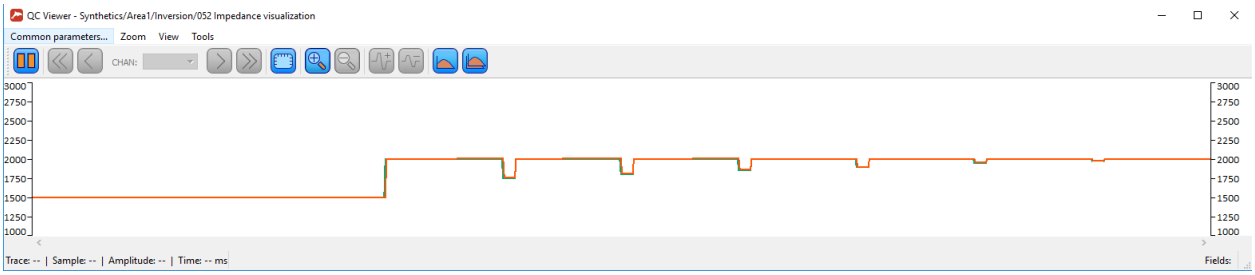


Below, the green plot is the original test impedance model and the orange line is the absolute best-fit model generated by the inversion:

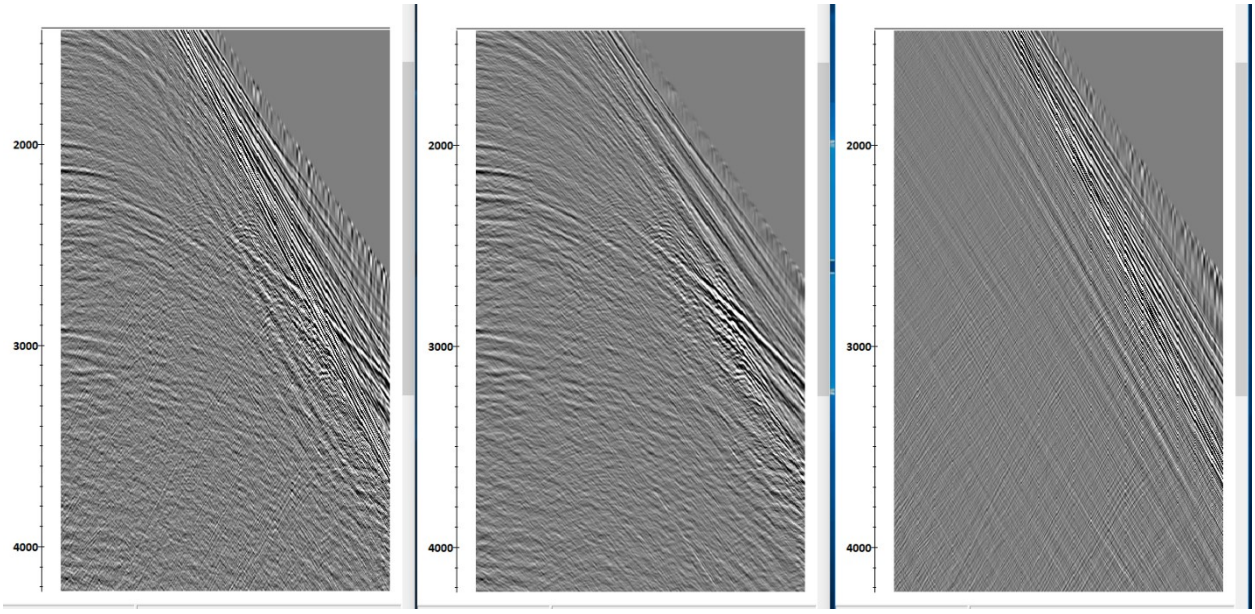


On the next figure, the green plot is, again, the original test impedance model and the orange line is the median of the best-fit models from 200 parallel generations:



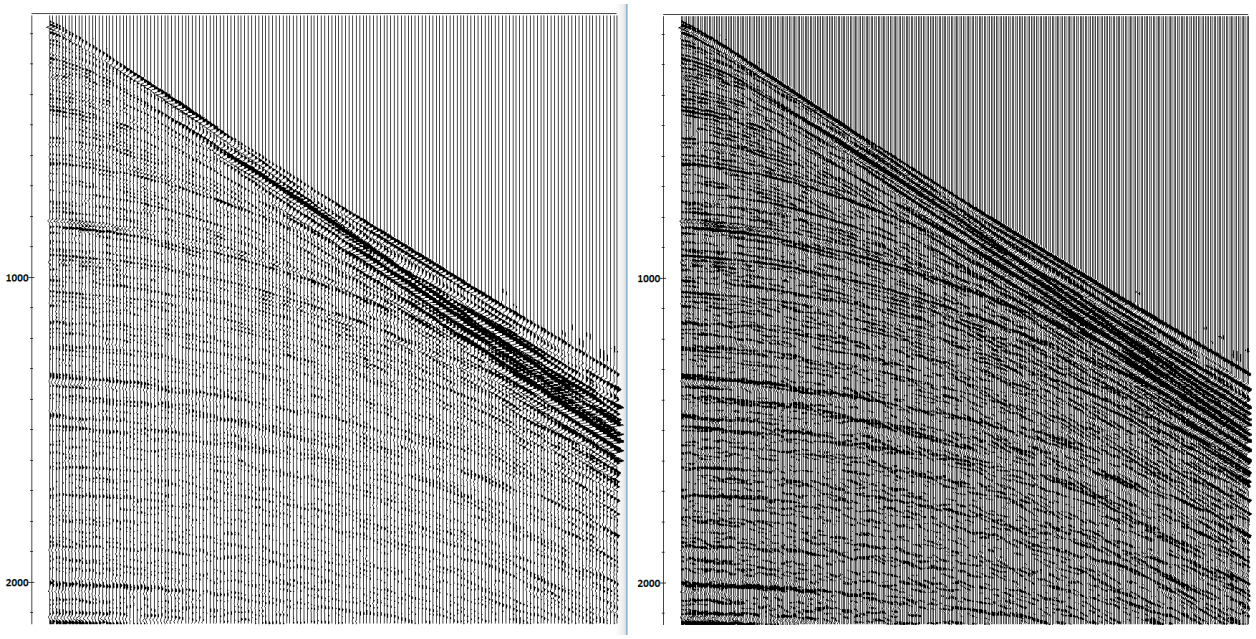
It shall be noted that impedance in the first layer was fixed at 1500 (was supposed to represent water column) and below a constant impedance trend of 2000 was used as a constraint for the inversion.

- Two brand-new modules for regular noise suppression: **Sparse F-K Filter** and **Sparse Radon Filter** both can be applied to both 2D and 3D data with irregular offsets. They can also tackle partially spatially aliased data.



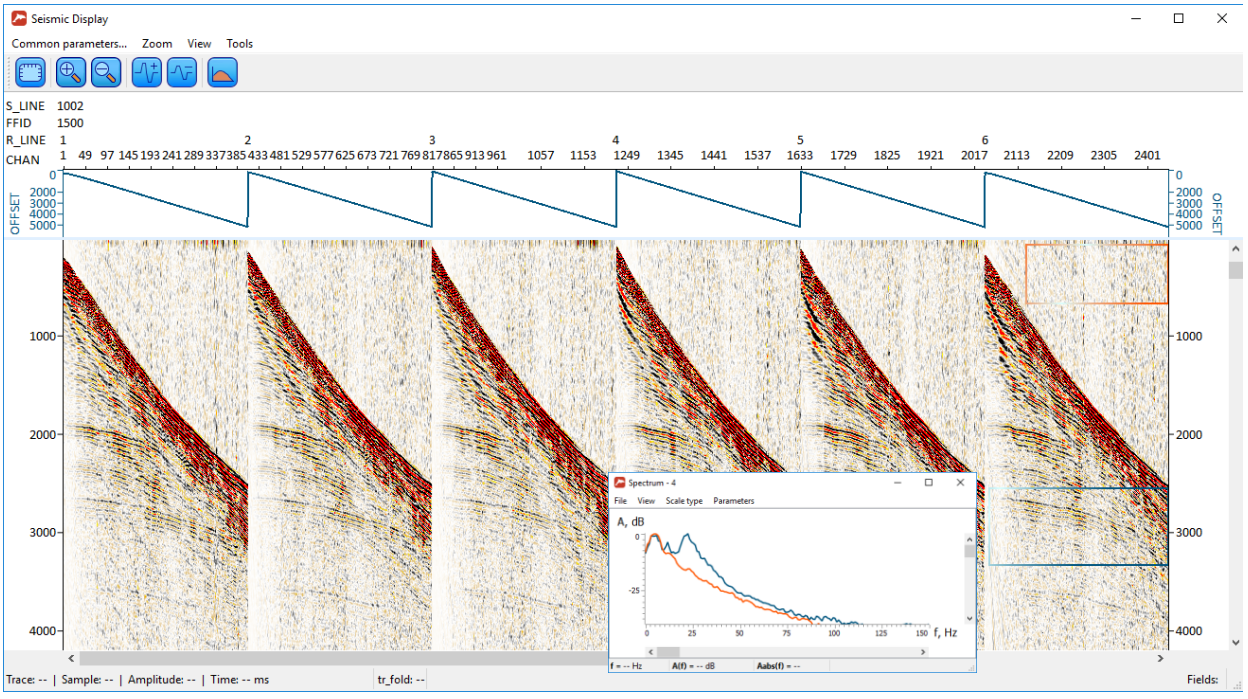
Sparse F-K Filtering, from left to right: before, after, and the difference

- Brand-new **Sparse F-K Interpolation** spatially interpolates 2D or 3D data in F-K (or F-Kx-Ky) domain, can tackle partially aliased data.

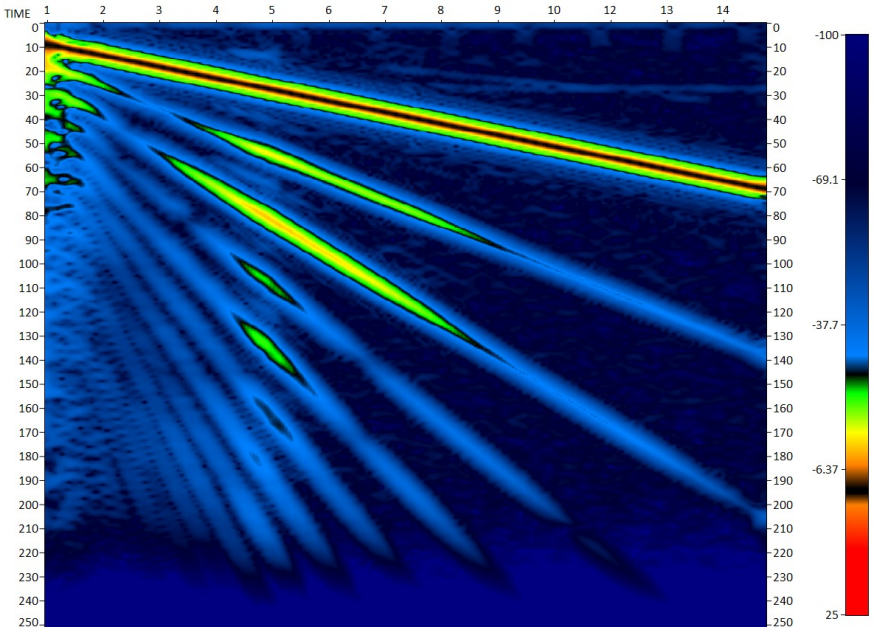


Original shot gather (left) and interpolation result (right)

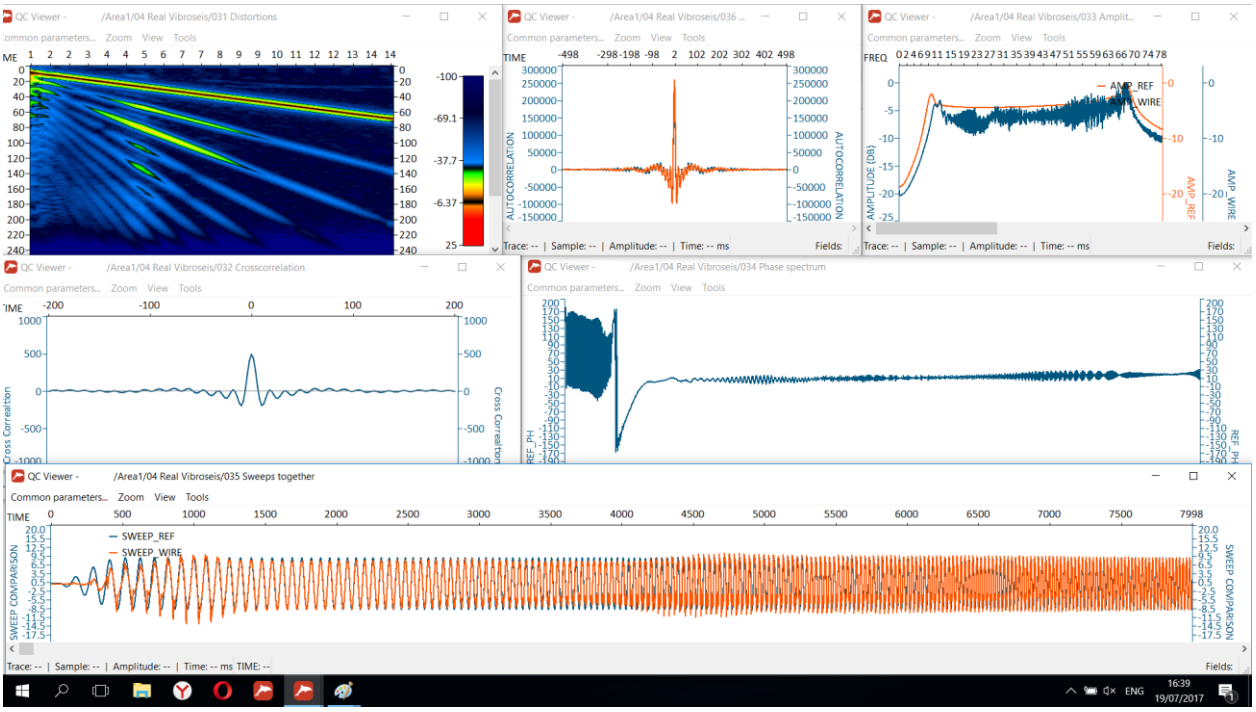
- **Seismic Display** module – a powerful brand new tool for display of seismic data together with header plots, with a modern look and a lot of flexibility. In the future, it is aimed that it will replace Screen Display.



- **Time-Frequency Representation** module converts a seismic trace into TF domain. It can be used for analysis of harmonic distortions of a vibroseis FM-sweep:

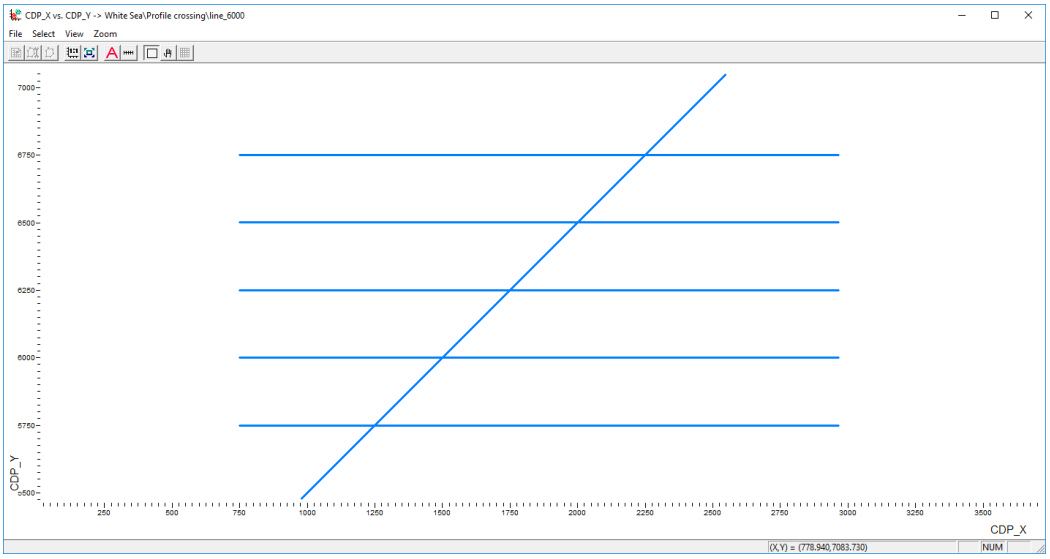


- **Trace->Header** module converts trace sample values to a specified trace header. This technical module allows display of a trace as a plot in the **Seismic Display**. For example, being used together with **Time-Frequency Representation** and **Trace Math Transforms** it allows full-scale QC of vibroseis sweeps:

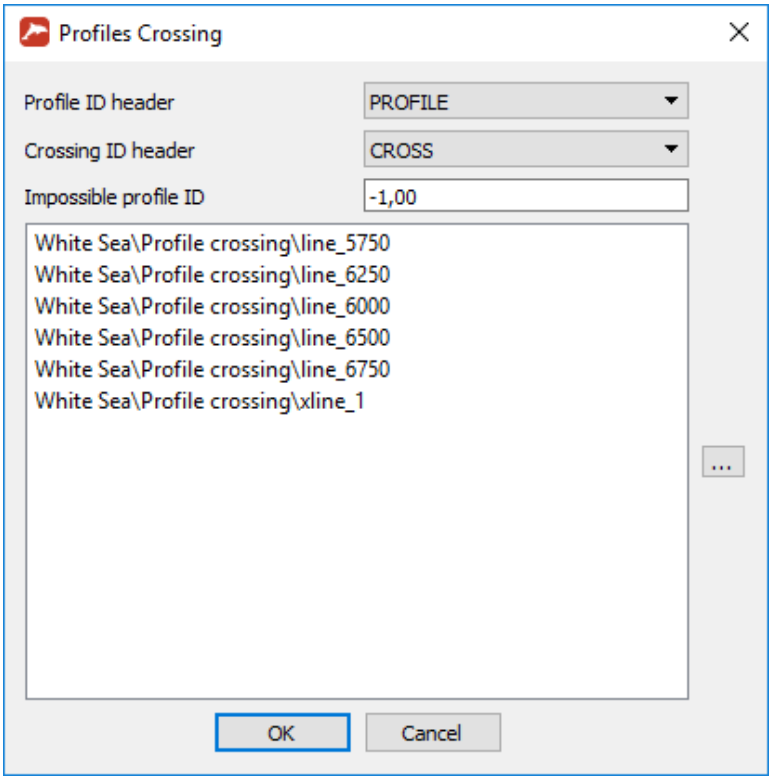


Sweep QC example, from left to right and downwards: harmonic distortion analysis, auto-correlations of a pilot and a measured sweeps, comparison of amplitude spectra of a pilot and a measured sweeps, sweep cross-correlation, sweep phase spectrum, comparison of a pilot and a measured sweep signals.

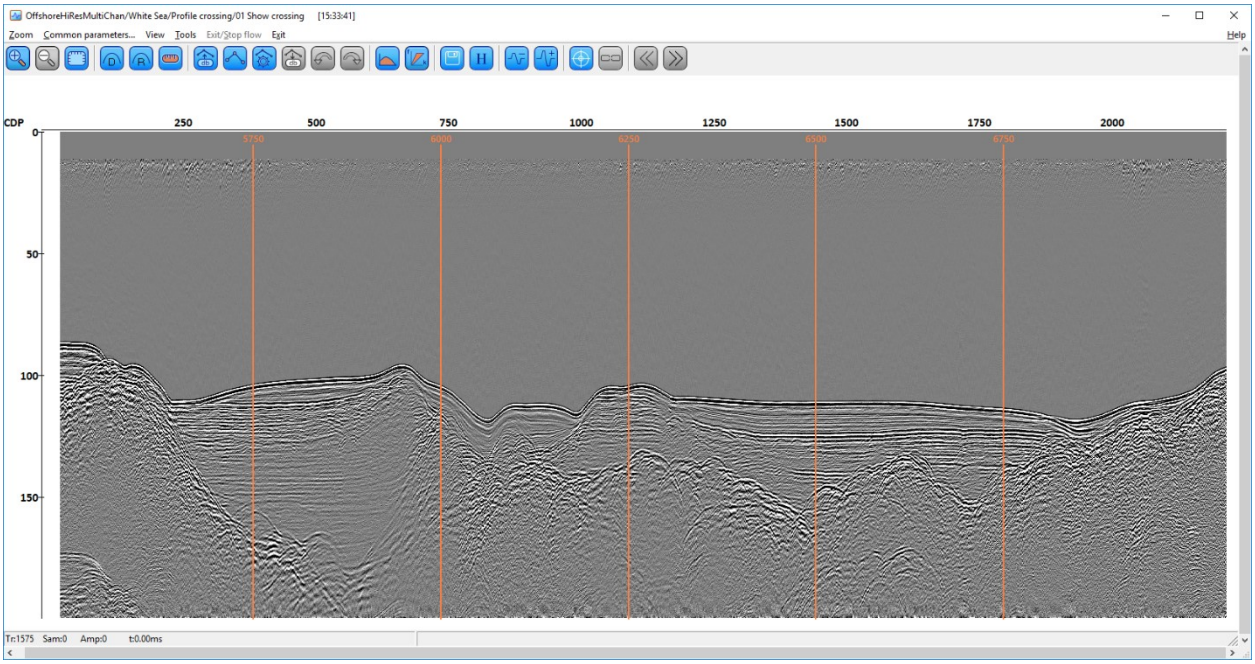
- **Profile Crossing*** -- this brand new stand-alone module finds all crossing points of a specified set of datasets basing on their CDP_X/CDP_Y coordinates. The cross points found are stored is a specified header and can be displayed in **Screen Display** or printed out using **Plotting** as header marks. The pictures below illustrate how it works:



A set of 2D seismic lines, one of them crossing the others

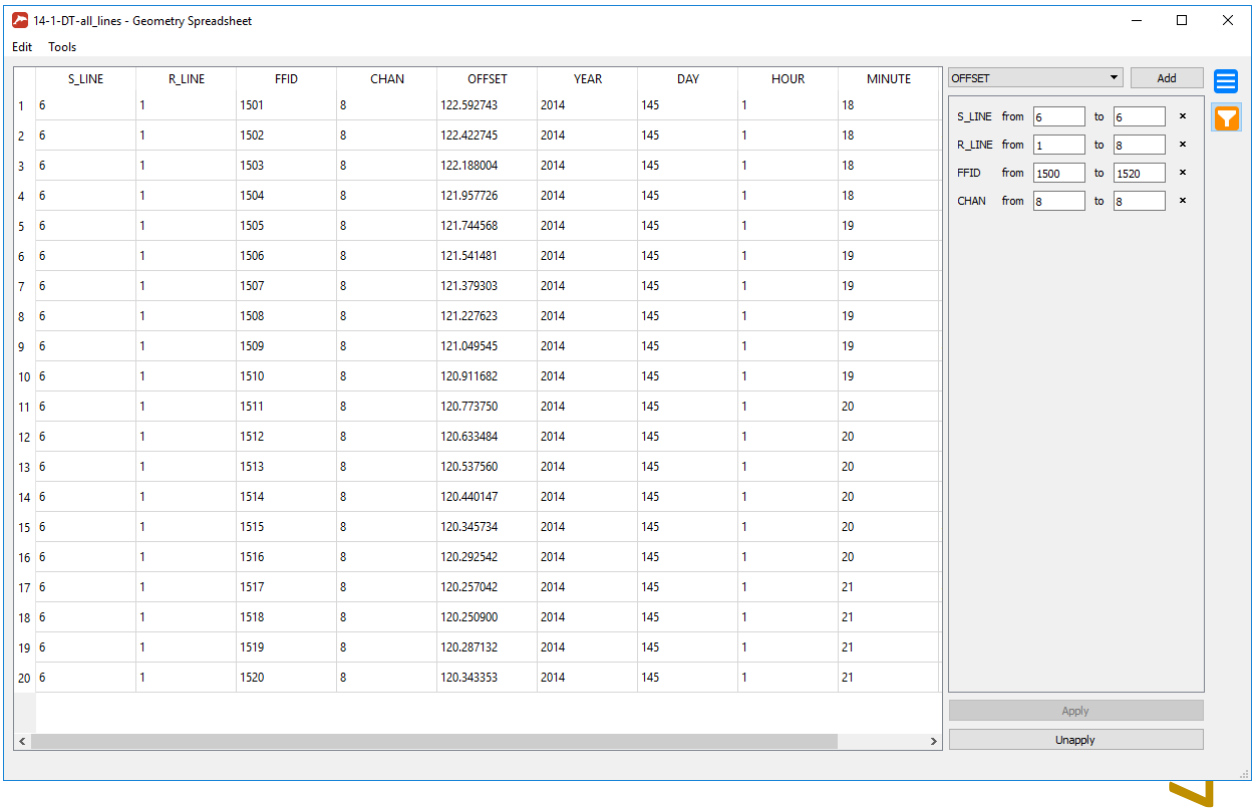


Profile Crossing *module parameters*



A dataset along the crossing line as displayed in Screen Display with all cross-points parked. The marks are labelled with profile ID's of the crossing lines.

- Improved **Geometry Spreadsheet** – brand new filters on header values can show the data you want and hide the rest. Filtered data displays only the traces that meet criteria that you specify and hides all other traces. You can filter by more than one header: each additional header filter further reduces the subset of data to display.



	S_LINE	R_LINE	FFID	CHAN	OFFSET	YEAR	DAY	HOUR	MINUTE
1	6	1	1501	8	122.592743	2014	145	1	18
2	6	1	1502	8	122.422745	2014	145	1	18
3	6	1	1503	8	122.188004	2014	145	1	18
4	6	1	1504	8	121.957726	2014	145	1	18
5	6	1	1505	8	121.744568	2014	145	1	19
6	6	1	1506	8	121.541481	2014	145	1	19
7	6	1	1507	8	121.379303	2014	145	1	19
8	6	1	1508	8	121.227623	2014	145	1	19
9	6	1	1509	8	121.049545	2014	145	1	19
10	6	1	1510	8	120.911682	2014	145	1	19
11	6	1	1511	8	120.773750	2014	145	1	20
12	6	1	1512	8	120.633484	2014	145	1	20
13	6	1	1513	8	120.537560	2014	145	1	20
14	6	1	1514	8	120.440147	2014	145	1	20
15	6	1	1515	8	120.345734	2014	145	1	20
16	6	1	1516	8	120.292542	2014	145	1	20
17	6	1	1517	8	120.257042	2014	145	1	21
18	6	1	1518	8	120.250900	2014	145	1	21
19	6	1	1519	8	120.287132	2014	145	1	21
20	6	1	1520	8	120.343353	2014	145	1	21

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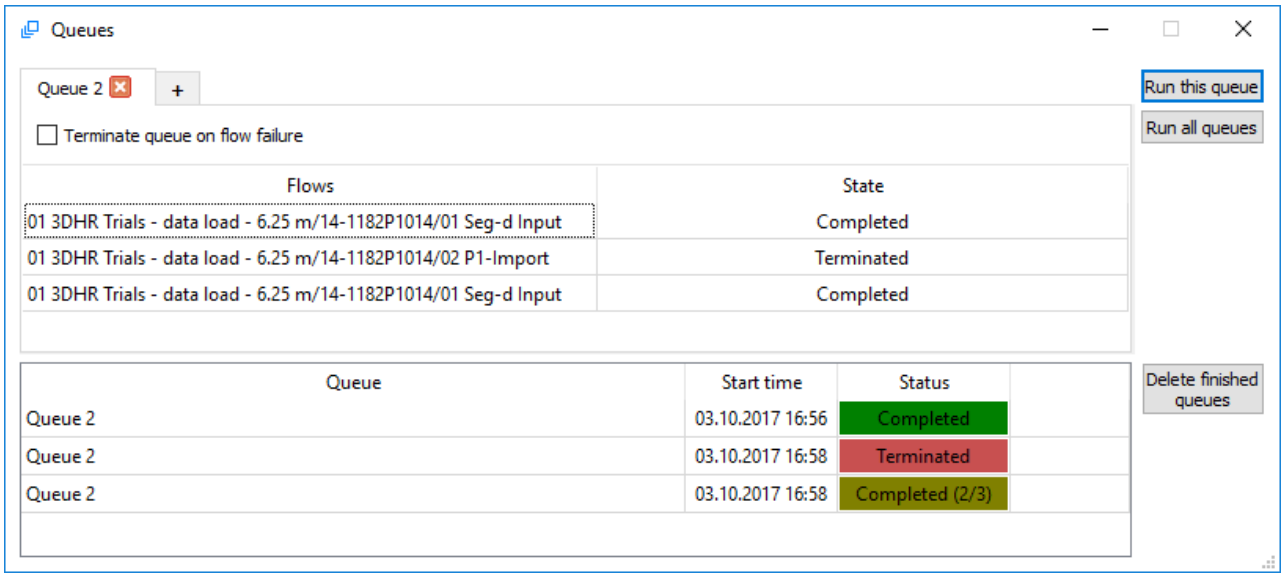
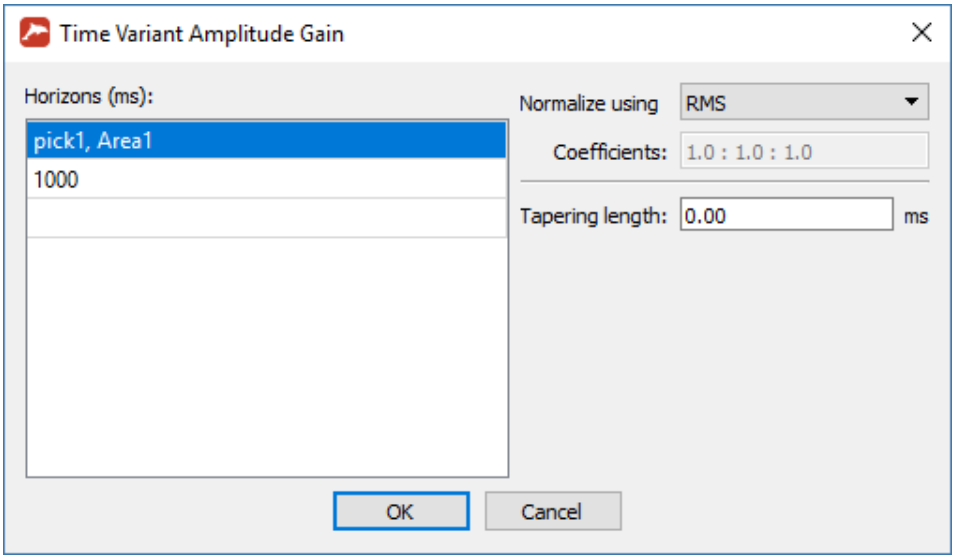
- Working with **Queues** became even more convenient – now, if you switch off 'Terminate queue on flow failure' check box and run the queue, the queue continues even though some of the flows terminates abnormally. For this reason, the queues now can display new statuses:
  - Completed – all flows of the queue we completed successfully;
  - Terminated – the queue was terminated due to a flow failure;
  - Completed (2/3) – the queue was completed, though only 2 flows of the 3 completed successfully:



- Brand new **Time-Variant Amplitude Gain** module normalizes average amplitudes of specified time windows. The windows are defined by horizon that can be constant, or variable if loaded from database picks or trace headers. (One horizon defines 2 windows – above and below it).



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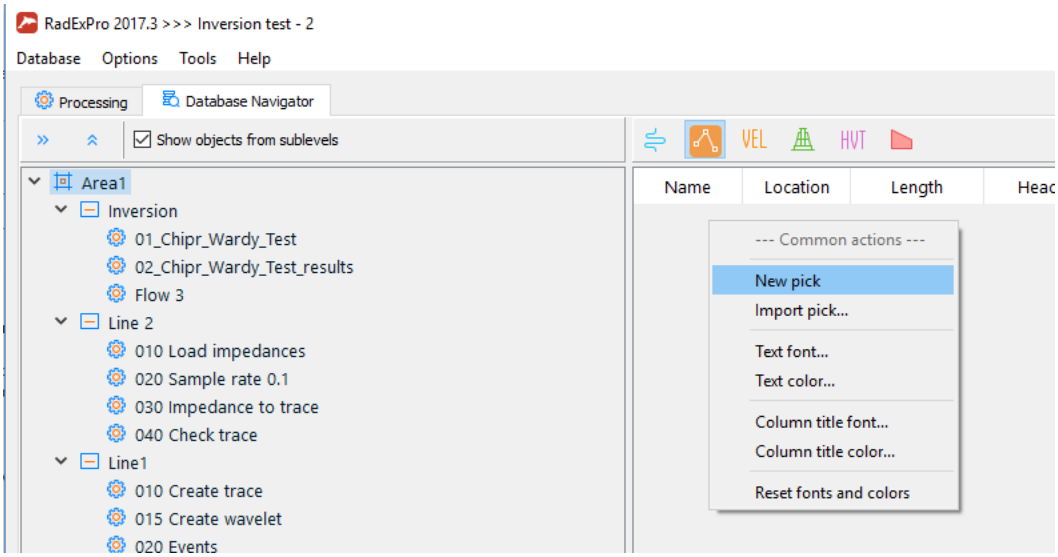
- Now you can **create a new empty pick** through the pop-up menu of the Database Navigator:

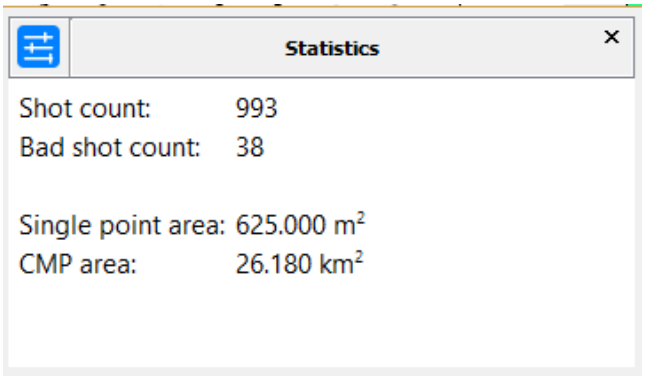


After the new pick was created, you can edit it to add values manually.

- Improved **Predictive Deconvolution** module can now output deconvolution operator for each trace, instead of deconvolved traces.

- Improved **MASW** module can now load a pre-saved scheme as a set of default parameters. Now, when working with multiple lines you don't need to re-define all internal parameters (e.g. those of dispersion image calculation) manually -- instead just load them from one and the same previously saved scheme.

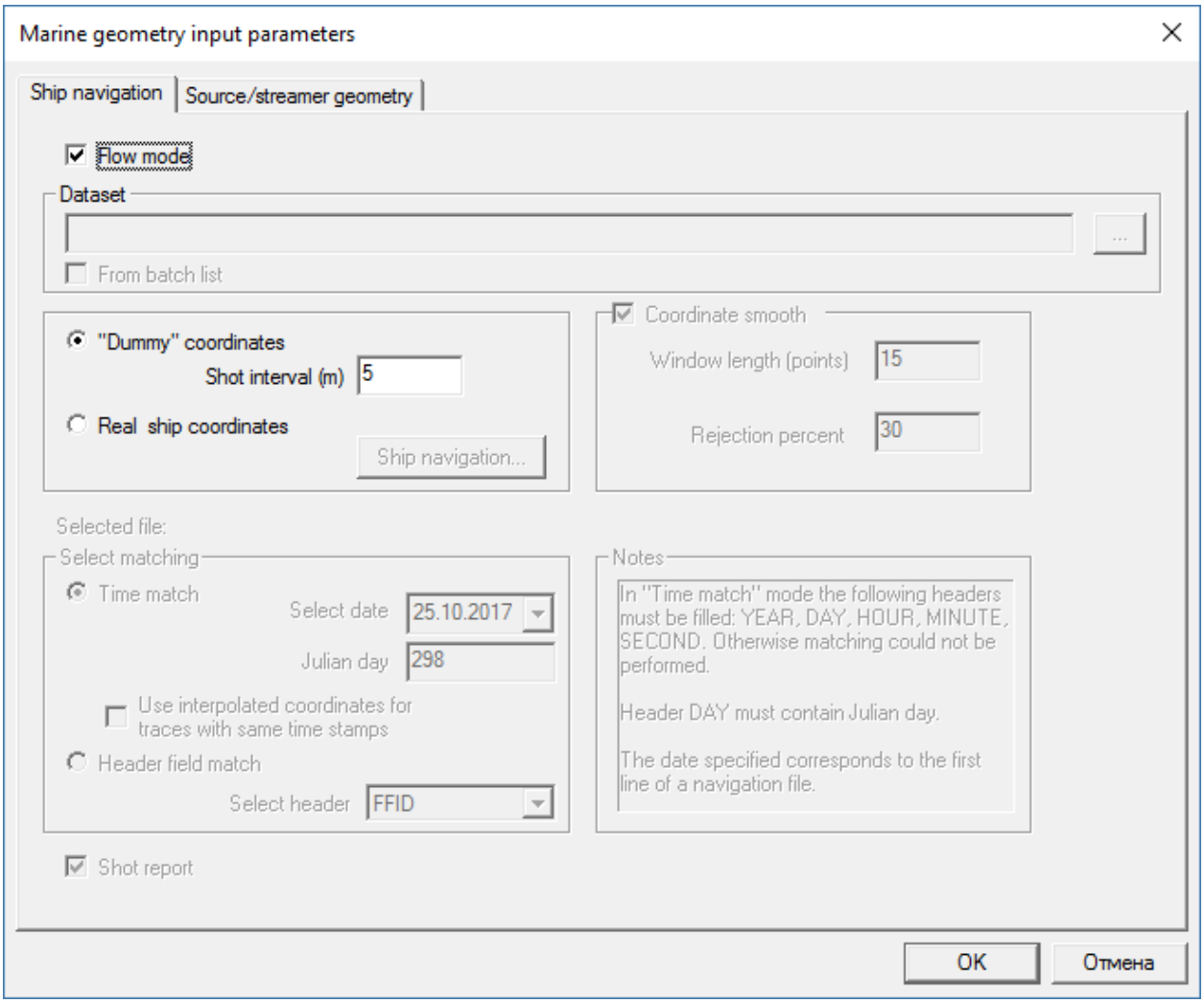
- Improved **Interactive QC** module – a new window with survey statistics has been added:



Additionally, we have transferred map rendering to OpenGL that makes their redrawing way faster.

- Improved **Trace Math Transforms** can now recalculate input trace amplitudes to dB (normalized to trace maximum).

- Improved **Marine Geometry Input**. When working in Flow mode with “Dummy” coordinates it will correctly assign CDP numbers for both incrementing or decrementing profiles (with incrementing or decrementing FFIDs).



- Improved **SEG-D Input** – we have added limited support of Q-Marine flavor of SEG-D. When station type is selected to be Q-Marine, it will read the following vendor-defined headers: pressure spencer’s measurements, GunMask, WaterDepth, ShotIncrement.

- The following bugs were fixed:
  - Variable File Open dialogs opened in SEG-Y Input module **– FIXED!**;
  - Occasionally, after a flow runs, its status window did not open **– FIXED!**;;
  - ‘Log’ button of as just created flow did not get active unless you get out of the flow and re-open it **– FIXED!**;
  - 3D CDP Binning occasionally crashed **– FIXED!**;
  - 3D Volume Viewer crashed when a dataset contained huge amplitudes **– FIXED!**;
  - Queue status disappeared after the queue completed **– FIXED!**;

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- Interactive Velocity Analysis did not always assign coordinated to exported velocity functions **– FIXED!**;
- Text Output used to truncate the output numbers – now it outputs allsignificant deciamals **– FIXED!**;
- NMO/NMI module occasionally crashed due to memory access problems **– FIXED!**;
- Velocity Curve Editor did not work on Windows 8/8.1/10 **– FIXED!** ;

As usual, if you are on maintenance, please contact us at support@radexpro.ru and get your update for free.