

ArmScan v 1.2 Operator Manual.

Short list of actions to obtain a 3D model with fittings:

1. Add radarogramma files to the software
2. Press AUTO PROCESSING button in the Processing tab
3. In the point search tab, select the search algorithm and press AUTOSEARCH (if the EpsilonBase algorithm is selected, skip step 2).
4. In the 3D MODEL tab, press BUILD 3D MODEL

For more details, see below.

Open File/Project.....	1
Working with Radarogramma Files (Profiles).....	2
Search of Objects.....	4
Block 3D Model.	6

Open File/Project.

Starting with ver. 1.1, the software allows storing of processed radarogrammas and found points. All software content is a project. After starting the software, the working area is a new empty project in which radarogramma files (profiles) can be added. Two buttons are available: OPEN FILES and OPEN PROJECT

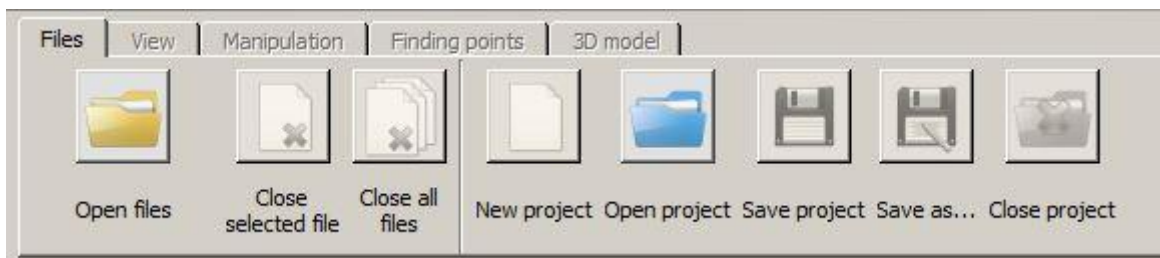


Figure 1

OPEN FILES. If you plan to start working with new radarogramma files, you should add them to the software by using OPEN FILES button. As soon as at least one radarogramma file (profile) is added to the software, the OPEN FILES button will change to ADD FILES. The files to be opened must have the following name format: 00004_h00.GPR, where 00004 is a sequential number of the survey made (it will be identical in all files of this survey), _h - file orientation (h - horizontal, or v - vertical), 00 - sequential number of the surveyed profile for the current survey of the current orientation data. Opened files are sorted by horizontal and vertical and are placed in respective tabs.

OPEN PROJECT is used to open a previously saved work. A project file (gprx extension) will have any name. A project may contain several radarogrammas, their settings, points and other information and files. A gprx file is a zip-archive.



Figure 1.1. Buttons to handle projects.

Working with Radarogramma Files (Profiles).

Select file. To select a file, left click on the opened profile. When selecting a file, a point will be placed to the left from the displayed name to indicate that the file is selected.

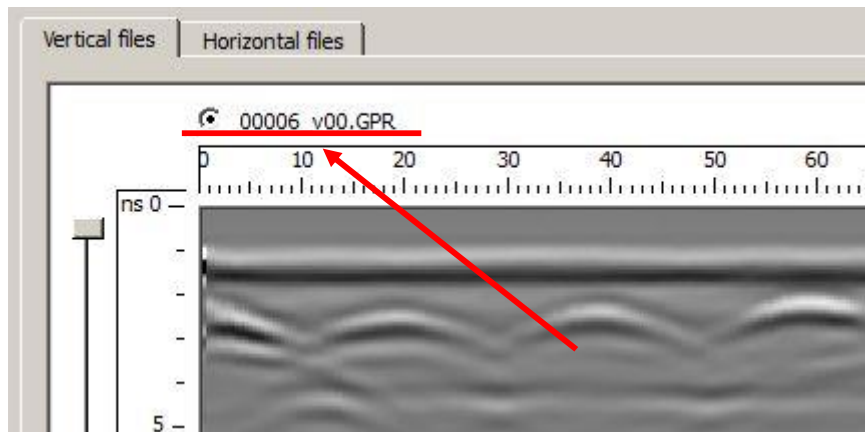


Figure 2

Close Profiles in Software. You may close one or all opened profiles. To close a single profile, press CLOSE SELECTED FILE button in FILES menu. To close all profiles, go to the FILES tab and press CLOSE ALL FILES button, in which case a confirmation request will appear.

Scaling Radar Data. The data scaling is configured by using the buttons located in the left part of the VIEW menu. Changes are applied to all profiles of the same orientation.

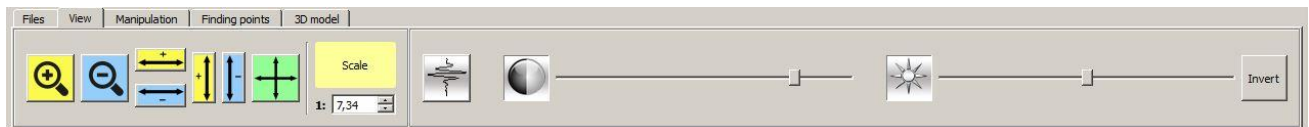


Figure 3. VIEW tab

You can also manually configure scaling. If the monitor is not calibrated, the yellow SCALE item (Figure 3) and the scale may be displayed incorrectly.

To calibrate the monitor, double click the SCALE item. A window will appear (Figure 3.1), which dimensions can be changed. Then measure the rectangle size with a ruler, specify the value in mm and press Ok. The SCALE item will then become green.

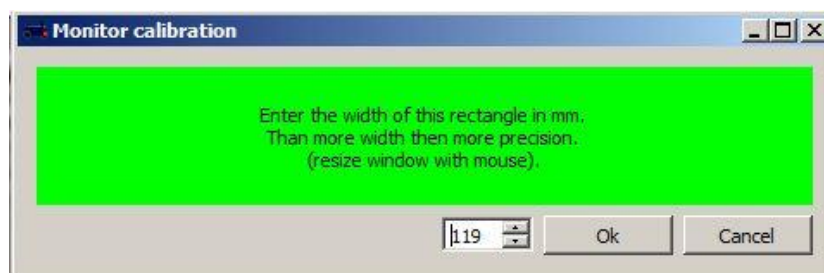



Figure 3.1. Monitor calibration window.

Important! If you change the screen resolution or replace the monitor, calibration should be repeated.

Configure Radar Data Display.

Gain change: after pressing , GAIN PROFILE window will appear (Figure 3.2). The gain can be changed by moving the slider left or right. If you select USER PROFILE, you can add sliders and configure radarogram gain within the required range.

Contrast and brightness can be configured by using sliders where the leftmost position is the minimal one, and the rightmost if the maximum one. Changes are applied to all profiles.

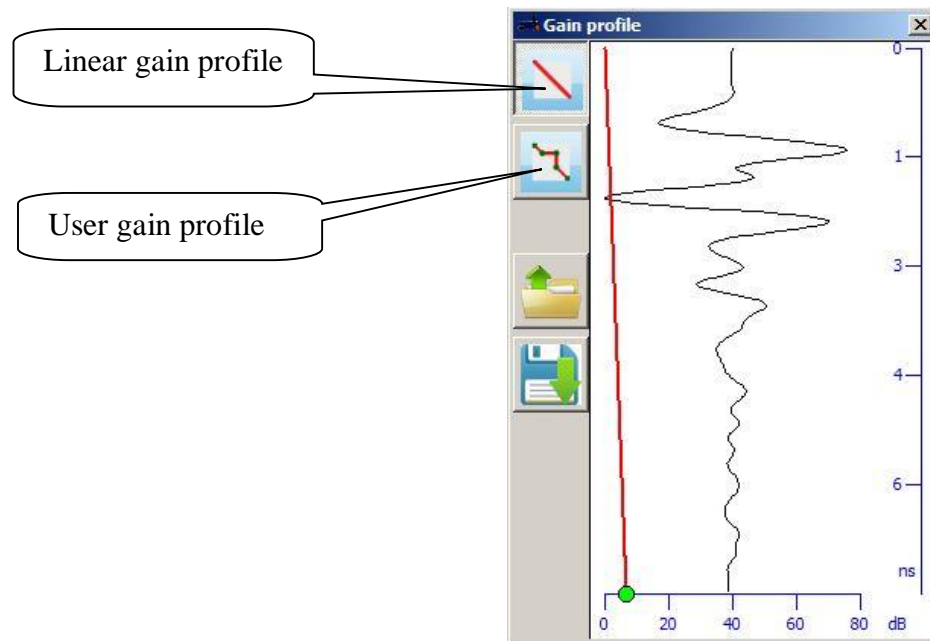


Figure 3.2. Gain profile

Filtration. PROCESSING menu allows for HIGHLIGHTING ENVELOPE LINE, DEDUCT AVERAGE and MIGRATION. This is possible for a single file or for all opened files of the same direction (item 2 in Figure 4). For some algorithms, processing is not required or may even cause interruption.

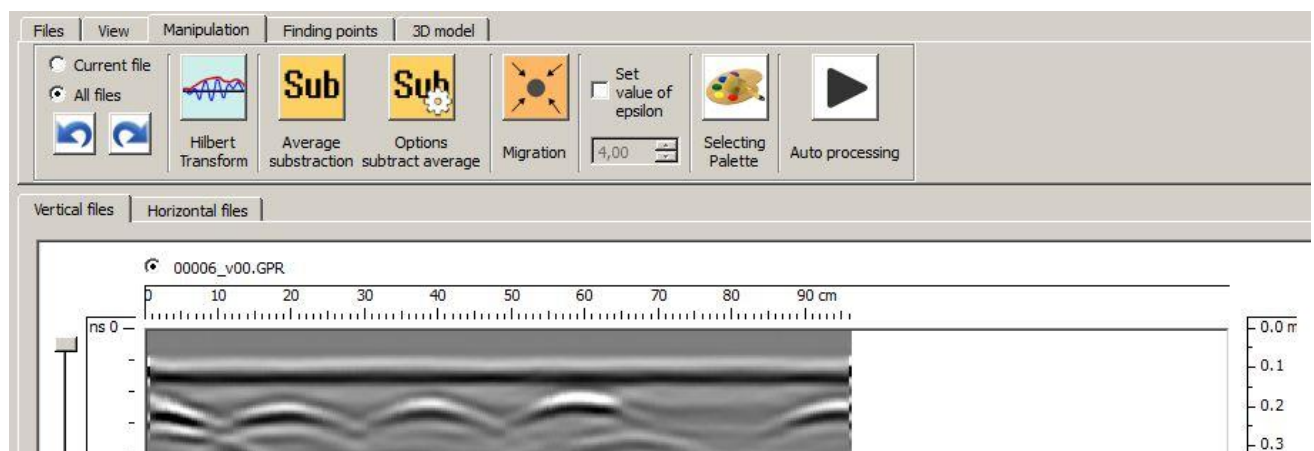


Figure 4

You can select a palette (item 4 in Figure 4) in the processing block, according to which the data will be displayed. The GREY SHADES palette is set on default.

When applying filters, the software memorizes the data status and allows canceling any actions undertaken (item 1 in Figure 4). The maximum number of memorized actions is 10. Canceling can be done for all files or for each file separately. You can manually set epsilon values; this is used in some point search algorithms.

AUTO PROCESSING button sequentially performs the following operations: deduct average, migration and hightailing envelope line.

Search of Objects.

Objects are searched in the POINTS SEARCH menu by highlighting hyperbola vertexes shown on the radarogramma. Points can be searched for in all files or in each file separately.

There are three search algorithms available: SFBS, BitmapBase, and EpsilonBase. To search in a single file, specify it and press FIND POINTS

To search in all files, press FIND POINTS IN ALL FILES

After setting points, press BUILD OBJECTS to merge them into objects and display in 3D (item 4 in Figure 5).

SFBS Algorithm. You can specify the point search limits by using sliders (item 12 in Figure 5). When searching in a single file, you can also highlight a search area (item 11 in Figure 5).

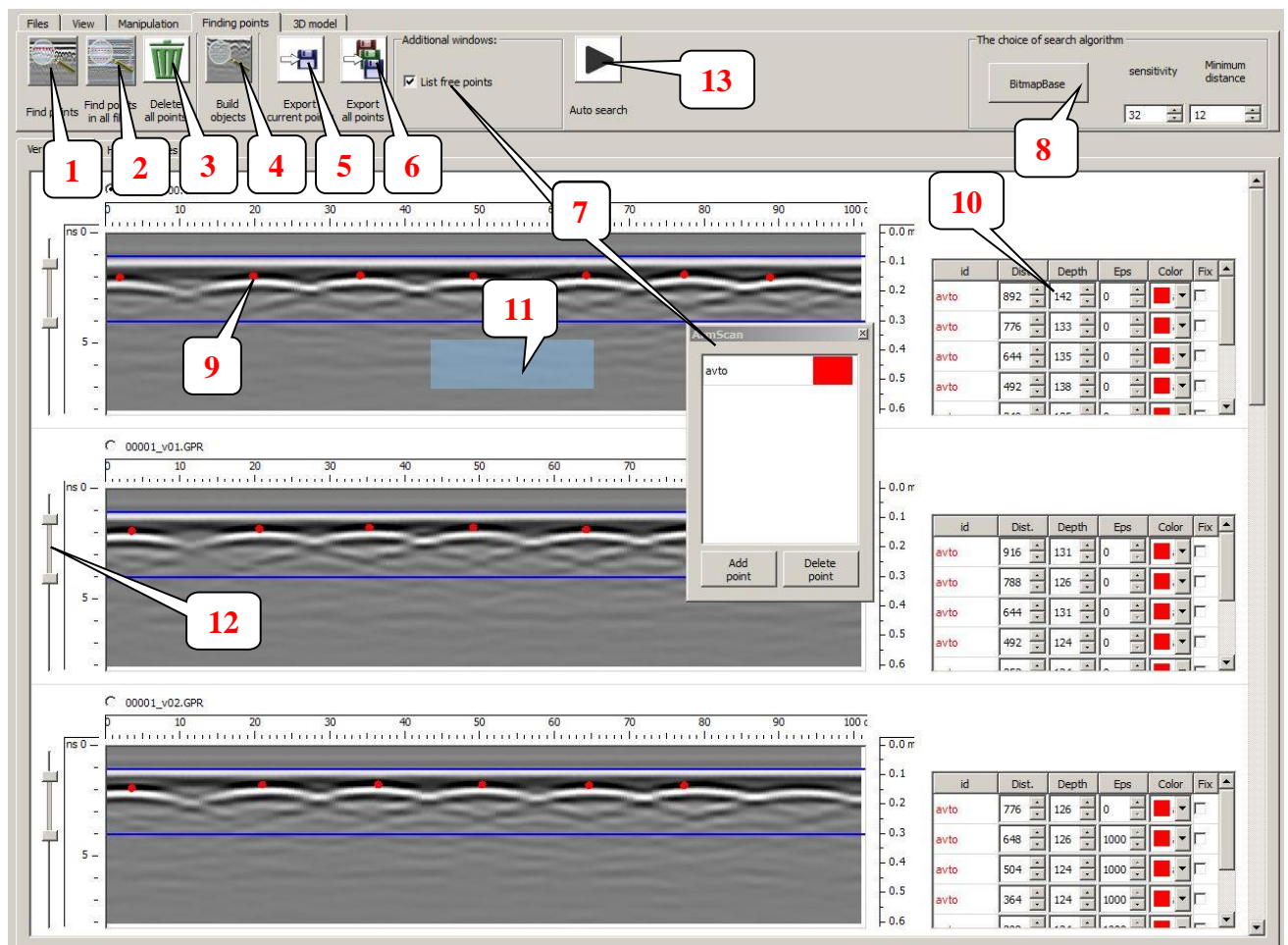


Figure 5

If you set sliders to the zero position (upper), the start and end points will be set from the configuration menu (item 8 in Figure 5).

BitmapBase Algorithm. Points are searched based on trace values and using two parameters: sensitivity and minimal distance between points. When searching in all files, the search limits are not taken into account. When searching in a single file, the search limits can be set by highlighting a specific area.

EpsilonBase Algorithm. Points are searched based on trace values and using two parameters: threshold and epsilon. If an epsilon value is set in the PROCESSING tab, this value will be used, otherwise epsilon is taken from the first loaded trace. The epsilon value will be equal for all traces.

The threshold is selected of thumb. 100 is a default value. It serves to sieve any points found by mistake.

During the search, search limits are nor taken into account and no highlighting should be on the traces. The algorithm searches for hyperbolas. If the traces are processed and no hyperbolas found, this search algorithm is unsuitable.

Algorithm Result.

When detecting hyperbola vertexes by the algorithm, avto points will be set in these spots on the radarogramma taken from the list of available points (item 7 in Figure 5). A list of detected points from each of the radarogrammas (item 10 in Figure 5) will be shown in the bottom (for horizontal files) or to the right (for vertical files) in an additional window.

Edit Points.

You can edit points: moving, changing tags, deleting, and adding new points. You can change the point position both on the radarogramma and through respective items in the list of found points. To prohibit any changes of the point, you can fix it by right-clicking the point and selecting FIX POINT («») in the appeared window or by placing a tick opposite to the point to be fixed in the list of detected points in the Fix item.

You can change the tag (point color) in the window containing a list of tags or by clicking the point and selecting a new one.

You can delete a point by right-clicking it and selecting DELETE POINT in the appeared window. To delete all highlighted points, double-click the point. You can delete points by highlighting them on the radarogramma and pressing Delete. You can delete all points by pressing DELETE ALL POINTS (item 3 in Figure 5).

To manually add a new point on the radarogramma, at least one point must be created in the list of available points (item 7 in Figure 5). To add a point, right-click the radarogramma in the spot where a new point must be placed and select a tag in the appeared menu.

AUTO-SEARCH button activates FIND POINTS IN ALL FILES and then BUILD OBJECTS buttons (item 13 in Figure 5).

Save List of Points.

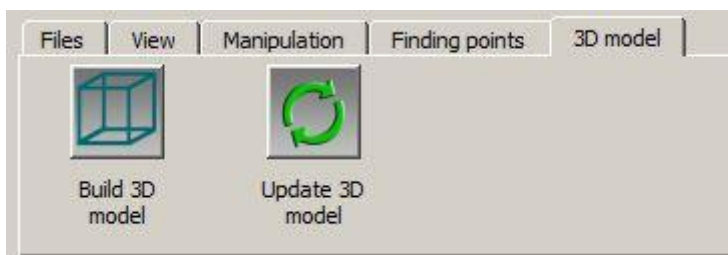
Radarogramma parameters with the list of points can be saved in a csv file that represents a textual document with a delimiter (semicolon). To save, press SAVE CURRENT POINTS or SAVE ALL POINTS (items 5 and 6 in Figure 5). The files with point lists will be saved in the software home folder («My Documents\ArmScan»). After saving, a message will appear containing OK and SHOW buttons. SHOW button is used to open a folder with files.

Merging into Objects

After setting points, press BUILD OBJECTS to merge them into objects and display in 3D (item 4 in Figure 5). A list of points is then generated, located on successive profiles with a small deviation (± 5 counts by trace and ± 5 points by depth). Detected objects will be displayed along with the 3D model.

Block 3D Model.

There is a button in the 3D Model tab that starts visualization of radar data in 3D mode.



If you don't see red lines of fittings, it means that after searching for points, the BUILD OBJECTS button (item 4 in Figure 5) was not pressed or the SPECIAL FIGURES tick was removed in the DISPLAY tab in the settings window.

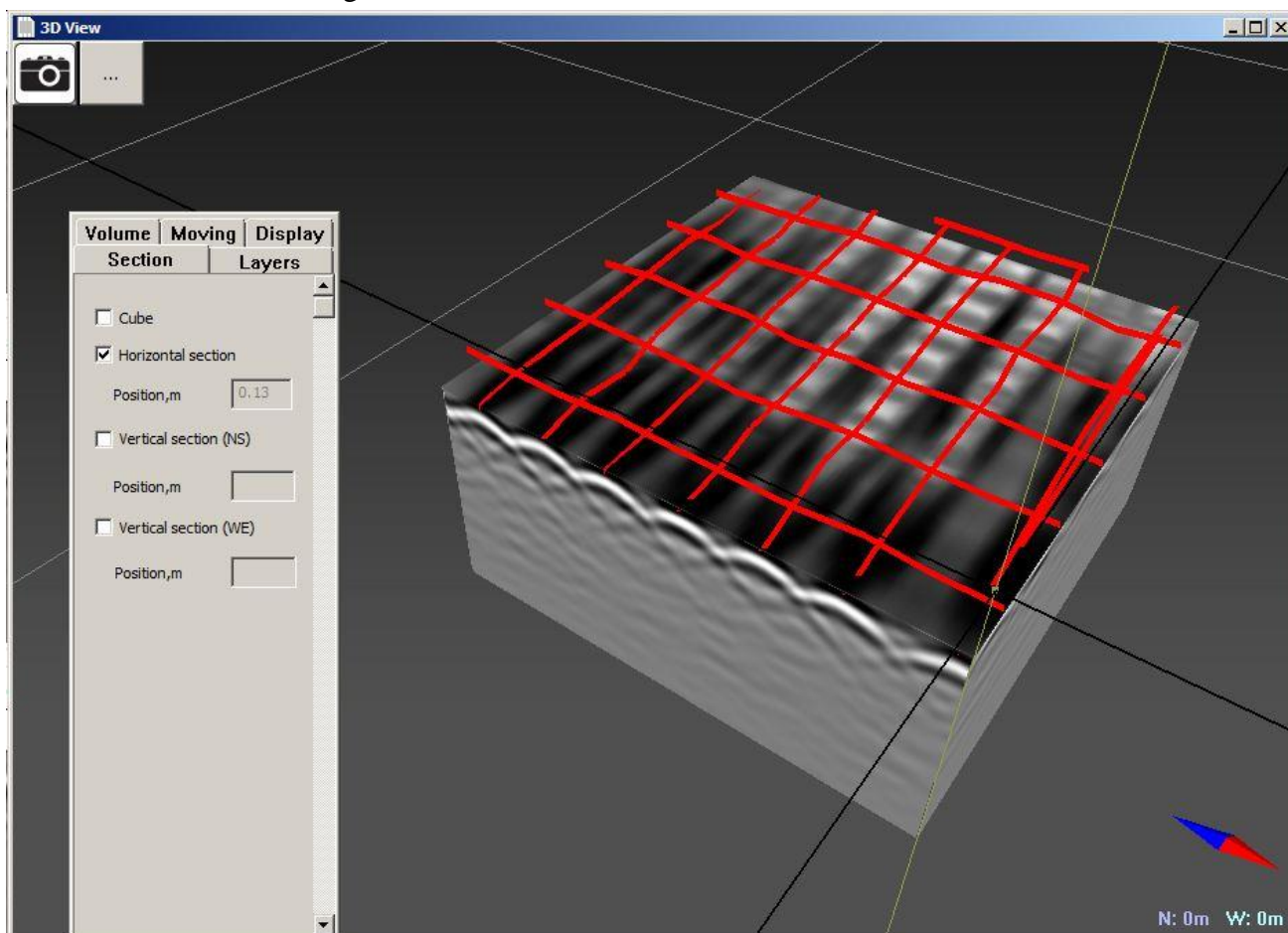


Figure 6

Scaling can be changed by mouse scrolling.

Cube rotation right mouse button
 Cube relocation middle mouse button

To move the settings window, go to the RELOCATION tab

Two buttons appear in the left top corner:



saves a window screenshot in the software home folder («My Documents\ArmScan») in png format



Opens the software home folder