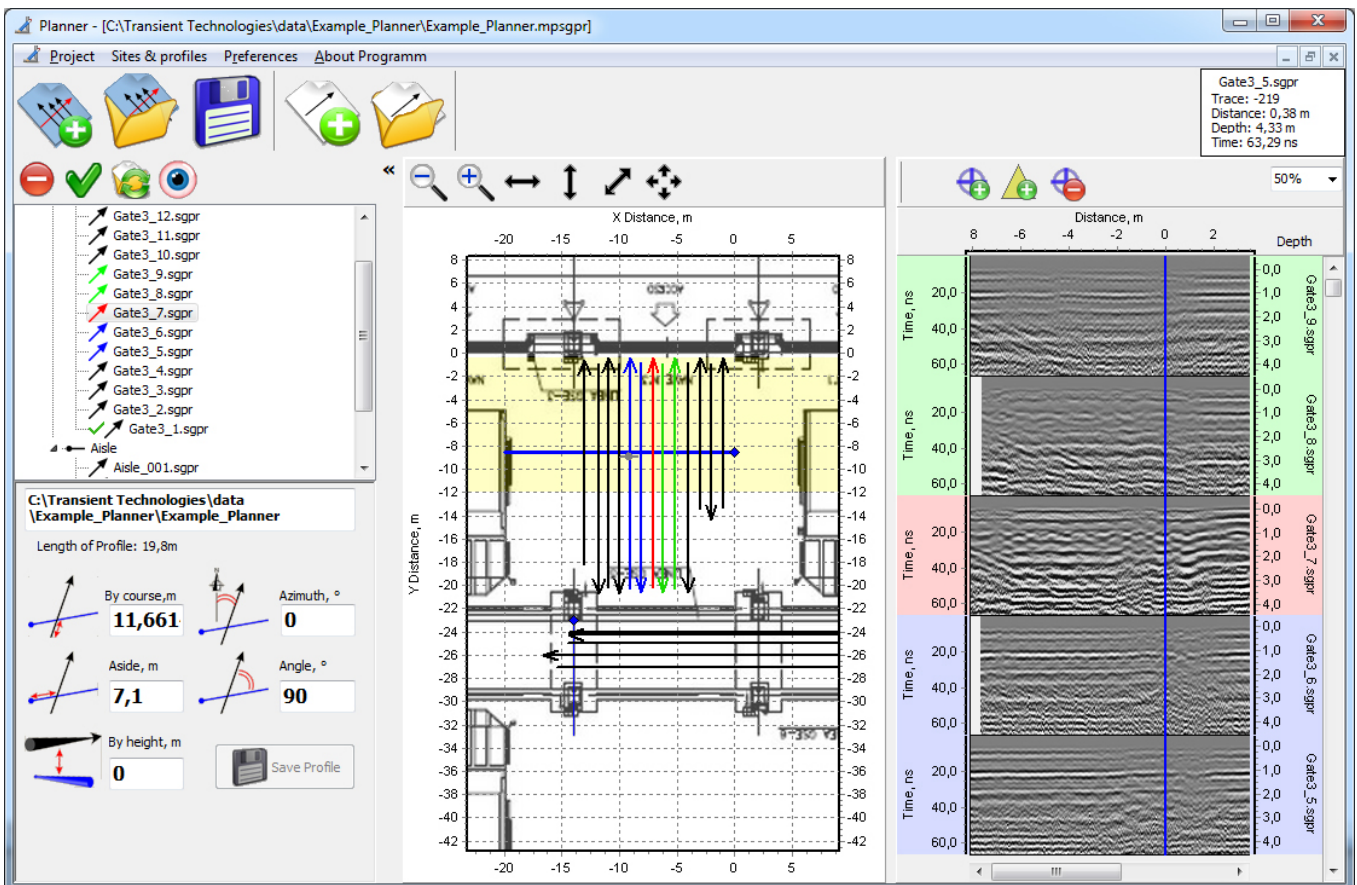


VIY[®]3

Ground Penetrating Radar



Planner ver 3.9.1.24 User Manual

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All pictures in this User Manual are given for reference purpose only, and may differ from actual product appearance.

Product design and specification may be changed by manufacturer without notification.

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General Information

Idea of Planner program

Planner program is designed to map GPR data and detected underground objects on a plan or a map. This program helps users to manage sounding process with VIY®3 GPR on some a territory.

VIY3 program package

Planner program is included in VIY3 software package as a mapping tool. Another program of this package (Synchro3) is served for managing of a sounding process and for GPR data processing.

Computer Requirements

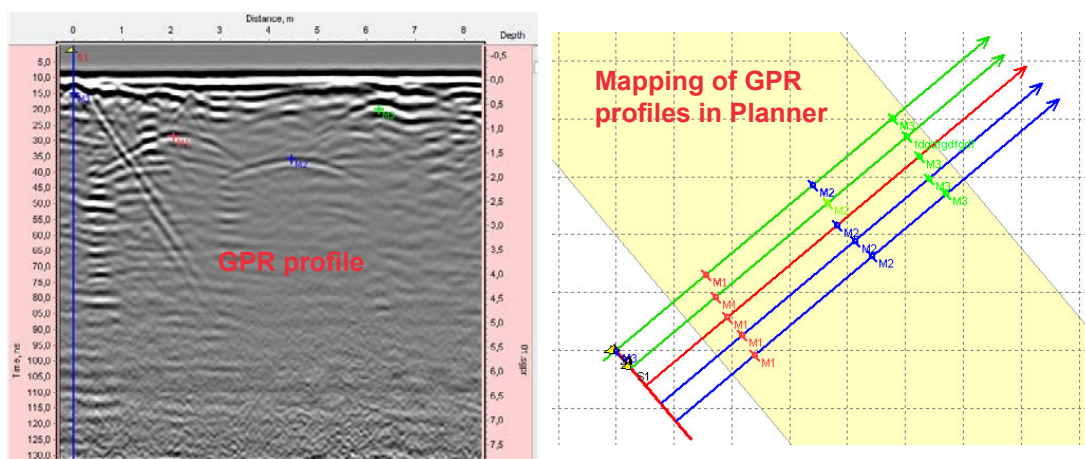
The system requirements for the Synchro3 software are:

- Computer (laptop) operated by Windows XP, Windows 7, Windows 8, Windows 10
- Intel® Pentium® M, CPU frequency higher than 1500 MHz
- Memory at least 512 MB
- Port USB2.0
- At least 100MB free space on hard drive

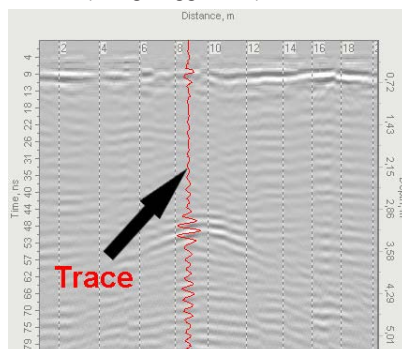
Terms and Definitions

This User Manual uses the following terms and definitions.

GPR profile (or profile) – is a two-dimensional image in the coordinates of depth (vertical) and traveled distance (horizontal). Profile consists of a set of traces. Amplitude of the traces of the profile is displayed by color. The amplitude-color dependence is determined by color palette. For example, in the case of palette by default (gray-scale), minimum value corresponds to black, maximum to white, and zero level to gray color. The profiles are represented by vectors (a line with an arrow) on a map.



Trace – is a set of samples that make up result of sounding in one point of profile. Profile is displayed by one-column pixels of different colors or curve (using Wiggle tool).

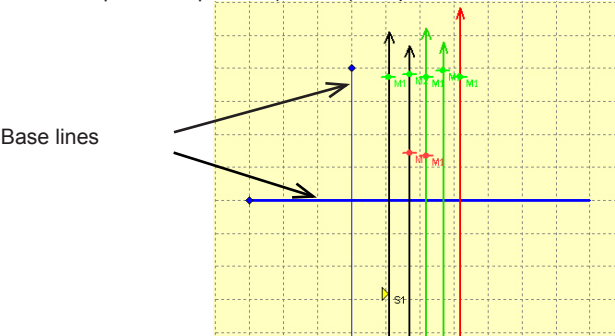


Sample – is an elementary part that composes the trace. This is a single point on the profile.

Marker – a mark on a profile that is set by GPR operator.

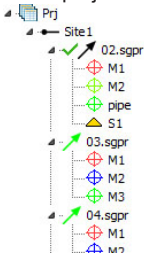
Markers are displayed on GPR profile and on a corresponding profile vector on the plan.

Base line – is a line on a plan. The profiles (vectors) are placed in relation to it.



Site – a complex of data, including: base line, profiles (vectors) and markers. One site may content unlimited quantity of profiles and only one base line.

Object tree – a tree-structured list of all objects of a project: sites and markers.

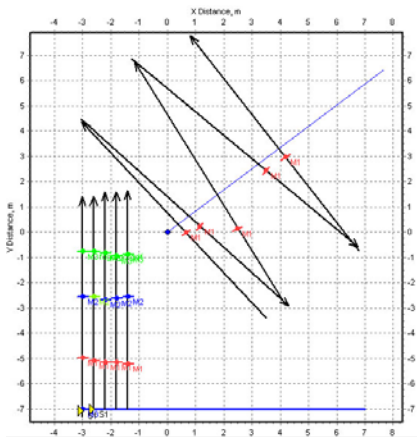


Etalon profile – a selected (etalon) GPR profile of each site. In Object tree the etalon profile is marked by check mark 02.sgpr .

Planner program can display profiles that were acquired by different GPR antennas with different settings of GPR and of odometer. The program uses one of the profiles that is selected as etalon, to display all the profiles with the equal settings, filters that were applied, and on an equal scale.

In the new site the first added profile will be set by default as the etalon profile.

Project – consists of one or more sites.



Program description

Main menu

Planner program has Multiple document interface (MDI), that allows user to open many projects at the same time. The Main menu contains Menu and the field with tools and buttons.

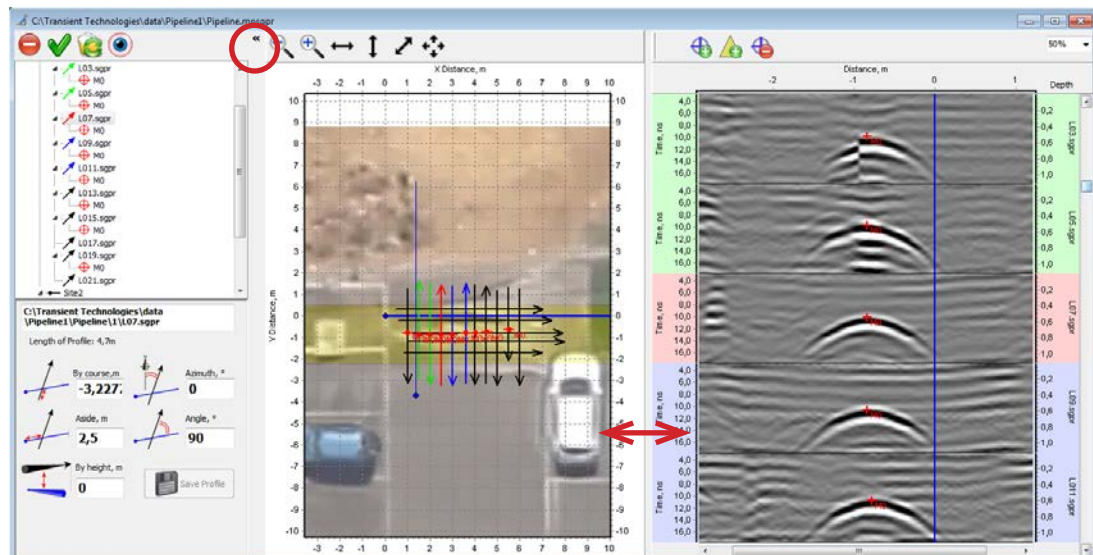


Project window

Each project is displayed in its own window.

The Project window is split to 3 parts (see in picture from left to right):

- Objects Tree with objects properties;
- Project Plan;
- Displayed GPR profiles.



Each part has its own tools panel with control buttons.

By moving (left-right) the separator between the Project Plan part and Displayed GPR profiles part you can change the dimensions of the parts (showed by bidirectional arrows on the picture above).

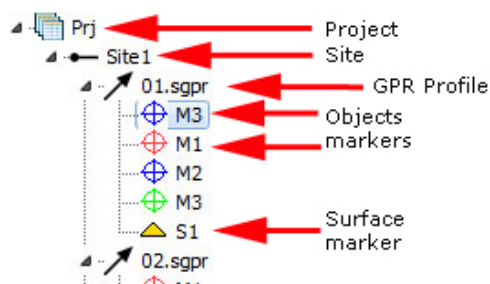
If necessary, you can hide the part of Objects Tree, by clicking on the border between Project Plan and Objects Tree (marked by a red circle on the picture above).

Program description

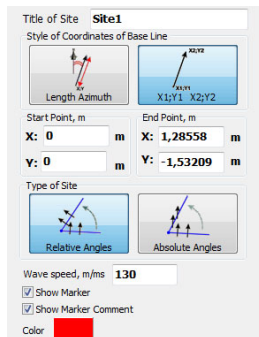
Objects Tree

The Objects Tree consists of 4 levels:

- Project
- Sites
- GPR profiles
- Markers



Under the Tree you will see the window with properties of the selected object.



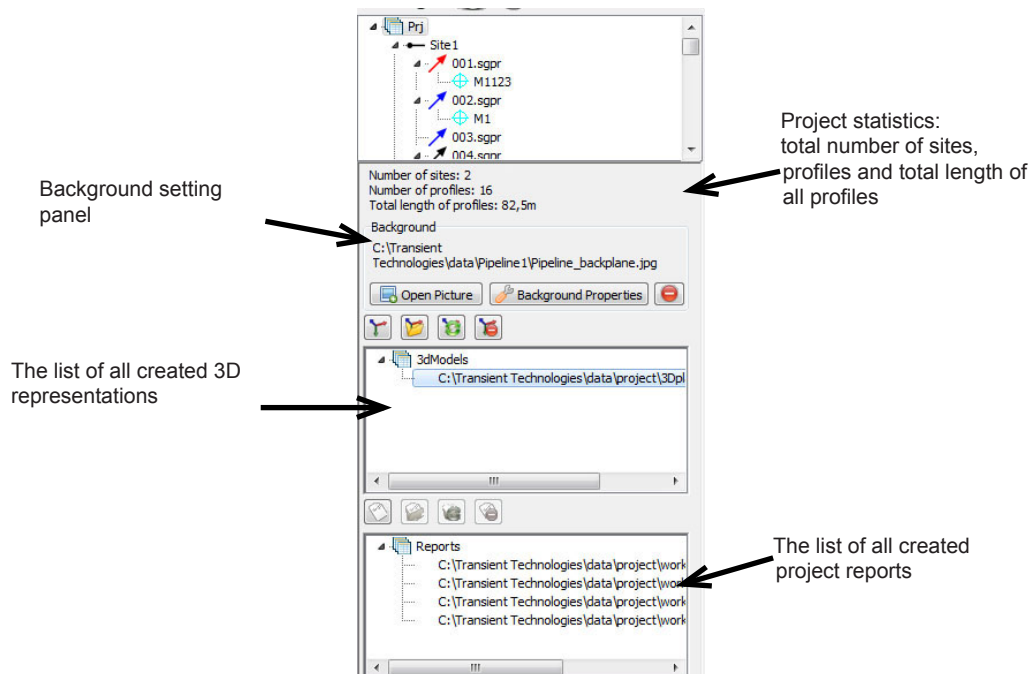
Control items of the Objects Tree

The Objects Tree contains 4 control items:

- Delete** button: deleting of an object from the selected site or project.
- Set as etalon** button: the selected profile becomes etalon.
- Reload profile** button: re-opening of the GPR profile. Please consider that all the changes may be lost.
- Open in Synchro** button: the selected profile will be opened in Synchro3 program.

Project properties

When you click on Project name in the Objects Tree, a Project properties panel will appear under the Project Tree:



Site properties

Each new created site by default has the name of Site1, Site2 and so on.

When you click on Site name in the Objects Tree, a Site properties panel will appear under the Project Tree.

In the upper part of the panel you can find a statistics about total number of the profiles and total length of all site profiles:

Title of Site **Site1**

Number of profiles: 11
Total length of profiles: 49,1m

Below you will see a panel of the site's Base Line properties.

You can define the style of Base Line coordinates in two ways:

- By defining the coordinates of the Start and Finish points of the Base Line:

Style of Coordinates of Base Line

Length Azimuth

X1:Y1 X2:Y2

Start Point, m

X: 0 m

Y: 0 m

End Point, m

X: 10 m

Y: 0 m

- By defining the Start point, length and an azimuth of the Base Line.

Style of Coordinates of Base Line

Length Azimuth

X1:Y1 X2:Y2

Start Point, m

X: 0 m

Y: 0 m

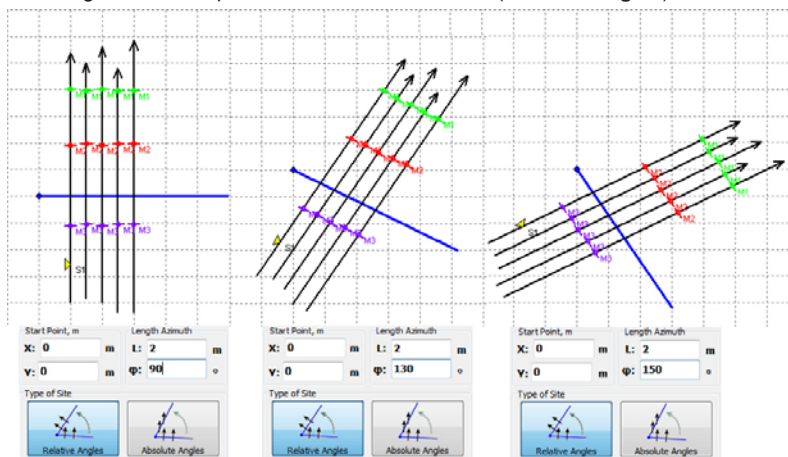
Length Azimuth

L: 10 m

φ: 90 °

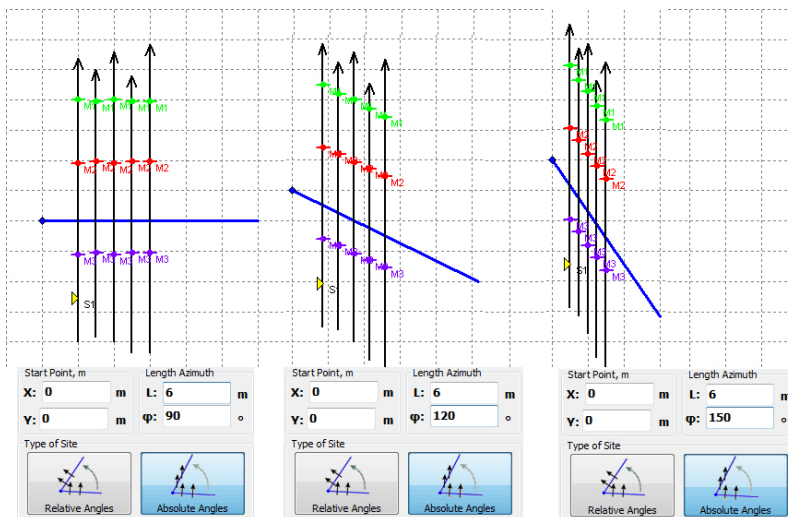
On the Site properties panel you can also set the way of defining the profiles coordinates:

- You can set the angle where the profile crosses the Base Line (**Relative Angles**),



Program description

- Or you can set the azimuth of the profile (**Absolute Angles**).



You can change Wave speed in the Site properties.

Wave speed, m/μs Color

You can select the color for the by clicking on **Color** button Base Line.

- ✓ When you add profiles to the site, this parameter will be defined by the wave speed of the etalon profile. Therefore, the wave speed of the site and of all profiles will be equal to the wave speed of etalon profile. If you change the wave speed of the site, the wave speeds of all the site's profiles will be changed equally.
- ✓ All numerical parameters in the program you can enter in two ways: by inputting numbers from a keyboard or with arrows on a keyboard **Up** and **Down** ↑ or ↓. Is the last way is selected, a single click on ↑ or ↓ increases/decreases the number by 1. With **Shift** button held, the pressing of ↑ or ↓ button leads to increasing/decreasing of parameter by 10. When you enter a new number from the keyboard, the number cell will change its color for yellow. After pressing **Enter** the color of the cell will change for white and the parameter will be set.

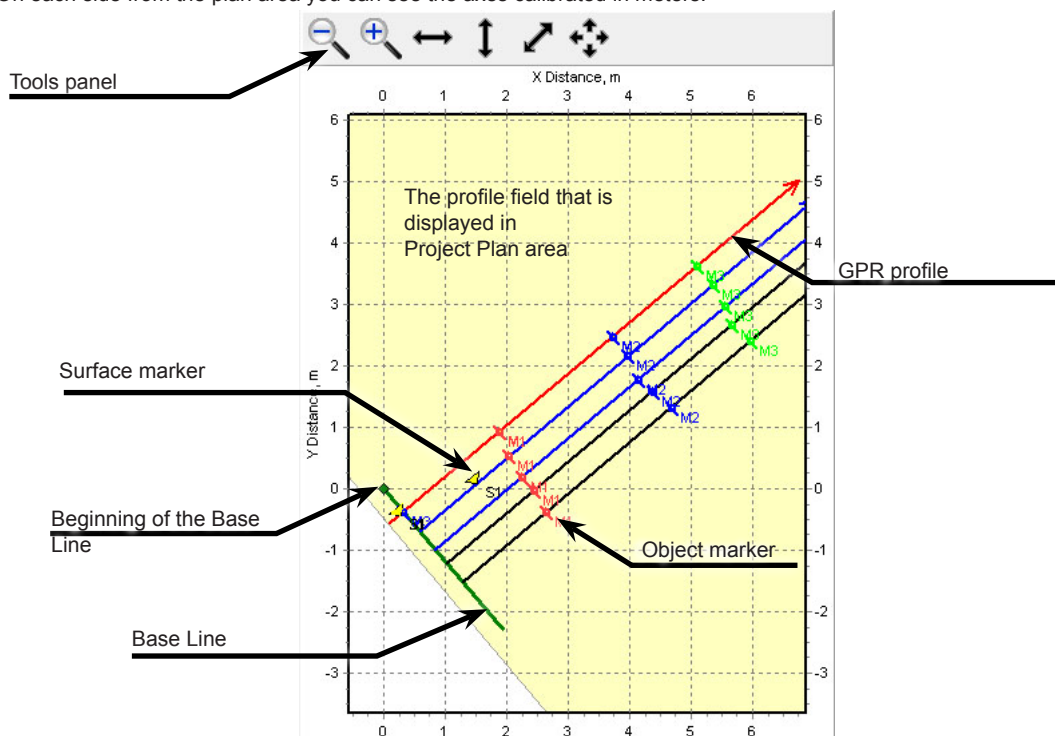
In the **Show** panel you can find the control flags to show or hide visual parameters on the plan and on GPR profiles:

Show

- ☒ Profiles
- ☒ Marker
- ☒ Marker Comment
- ☒ Surface Marker
- ☒ Surface Marker Comment

Project Plan

The Project Plan serves for displaying of mutual alignment of GPR profiles on the plan relative to each other. The Project Plan contains tools panel with buttons for scale changing, and control items for display mode changing. On each side from the plan area you can see the axes calibrated in meters.



Items that are displayed on the Project Plan:

- Base Lines of the sites
- GPR profiles in the shape of vectors
- Surface markers and object markers
- ✓ Surface markers are always displayed in the shape of a yellow triangle.
Both the color of the object markers and of their comments correspond to the chosen color of the marker.
- Optionally, you can add location plan or map as a background.

Changing the plan background picture

All the objects from all the sites are present on the Project Plan with taking into account their relative position toward each other. You can change zoom or move the vision field area with the help of the mouse or/and control buttons on the Project Plan panel.

Changing the plan zoom

You can zoom in/out with the buttons:

button: zoom-in.

button: zoom-out.

button: changes zoom of the project by width of the plan area.

button: changes zoom of the project area according to the height of the plan.

button: changes zoom of the project area by width and makes it equal to the plan height.

button: changes zoom in such a way, that the selected profile is seen in the Project Plan area.

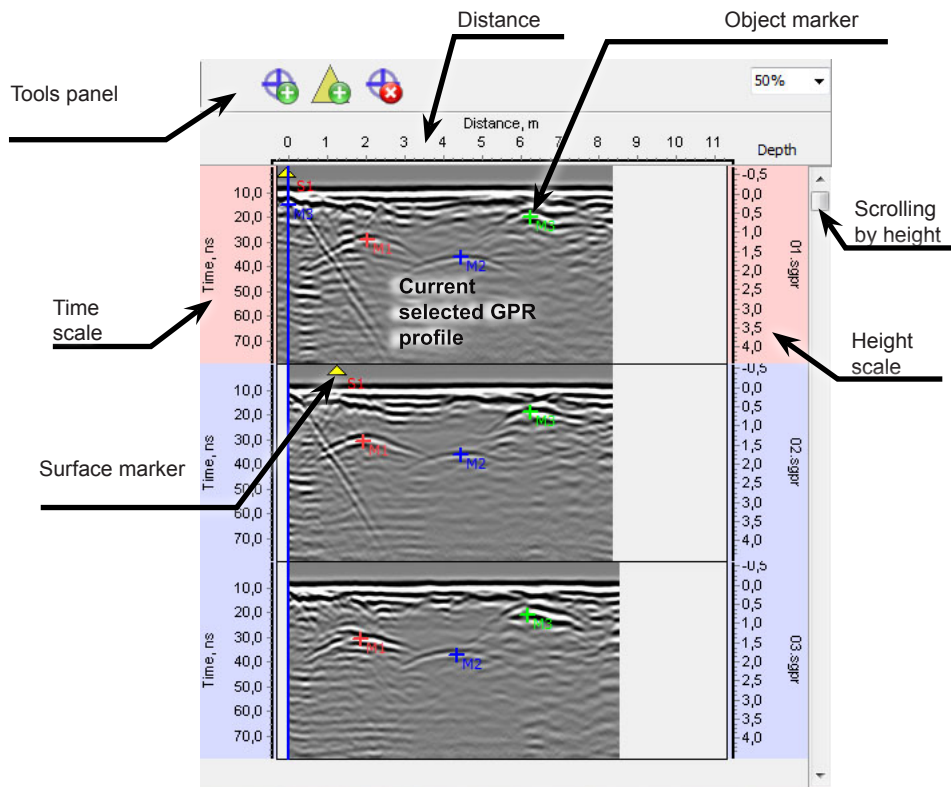
Shift of the viewing area

To shift the viewing area press and hold right mouse button, and move the cursor with the viewing area to a new place.

Area of Displayed GPR profiles

The area of Displayed GPR profiles shows profiles that were acquired by Synchro3 program. The profiles are displayed in that area if one of profile or marker is selected in the Objects Tree.

If the project name or site name is selected in the Objects Tree, this area will be empty.



Control tools of the Area of Displayed GPR profiles

push-to-lock button: turn on the mode of **object** markers adding. When you turn it on, drop-out list will appear next to that button. You can choose the color of the marker from it. Turn the button off when you finish **object** markers editing.

push-to-lock button: turn on the mode of **surface** markers adding. Turn the button off when you finish **surface** markers editing.

push-to-lock button: turn on the mode of **surface** and **object** markers deleting. Turn the button off when you finish markers deleting.

In the upper right angle of the Area of Displayed GPR profiles you will find drop-out list , that serves for profiles zoom adjusting.

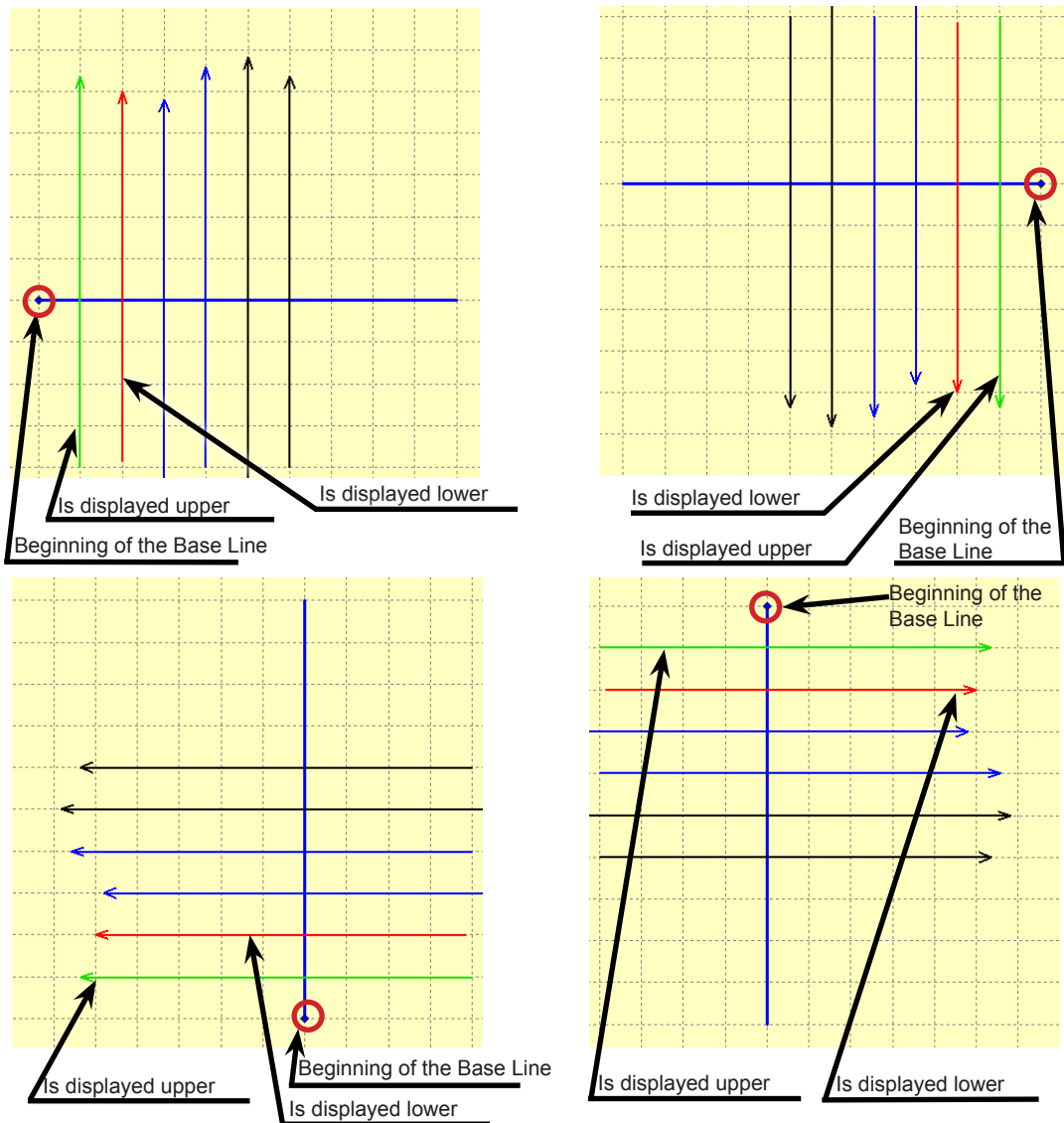
By default all the profiles are displayed with zoom of 50%.

The order of profiles displaying

The vertical position of each GPR profile in the Objects Tree is defined by the distance from the beginning of the Base Line till its intersection with GPR profile. This parameter is called **Aside** in the profile properties. All GPR profiles are sorted out in order of increase of that parameter.

On the picture below you can see some examples of profiles placement on the plan relative to the Base Line. The profiles that are placed **closer** to the beginning of the Base Line, will be showed in the **upper position** against the others at the Area of Displayed GPR profiles.

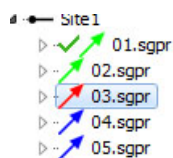
The profiles that are placed **farther** from the beginning of the Base Line, will be showed in the **lower position** against the others at the Area of Displayed GPR profiles.



Profiles selecting by color

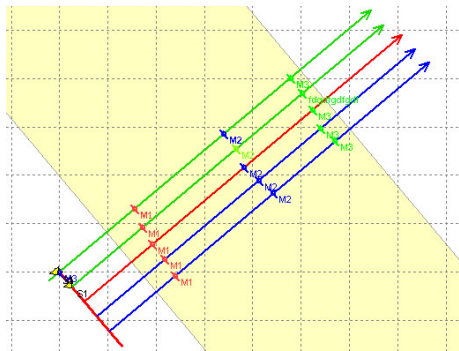
When you choose some profile on a plan or in the Objects Tree, that profile and two adjacent profiles from each part, will change their color on the Area of Displayed GPR profiles. The identical color changing will happen at Objects Tree and on the plan area.

In Object Tree the icon of the selected profile is displayed by **Red**, the profiles located above - by **Green**, the ones located below - by **Blue** color.

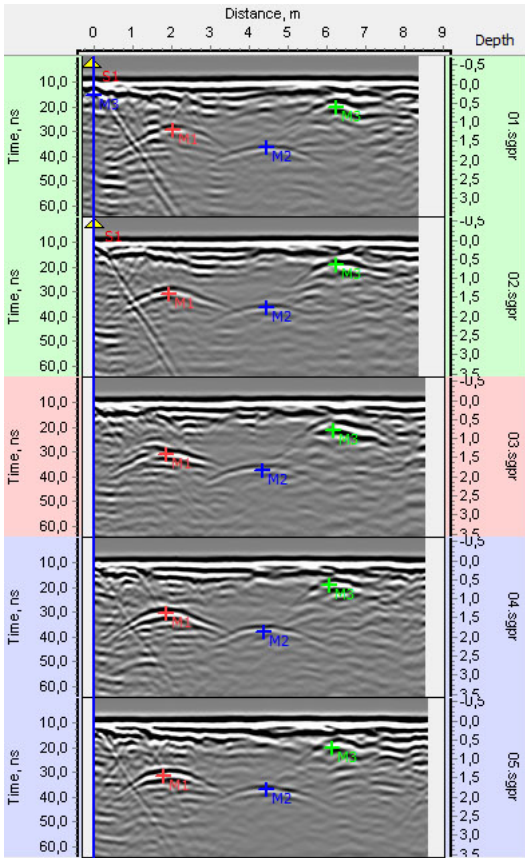


Program description

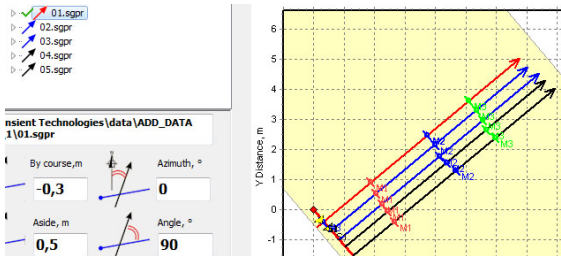
On the plan area the profiles will be displayed with the same colors.



The same changing has place in the Area of Displayed GPR profiles.
The right and left side panels of the profiles have corresponding colors.



The Area of Displayed GPR profiles can contain up to 5 profiles.
The icons of the profiles that are not displayed in the Area of Displayed GPR profiles, will be displayed as **Black** on the plan and in the Objects Tree.



Getting started

Software installation

Planner program is included in VIY3 software package and is been installed during the software installation. The installation process is described in [Synchro. User Manual](#).

Before sounding process

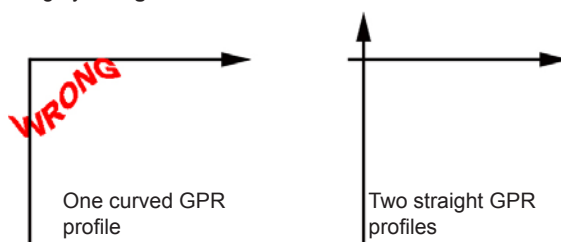
Before sounding process you should:

- Clean the location place from big objects that may hinder the sounding process
- Make the plan of sounding taking into account any features of the location (trees, holes etc.)

If you have plan (or map) of the location, you can use in as a background for the Planner project.

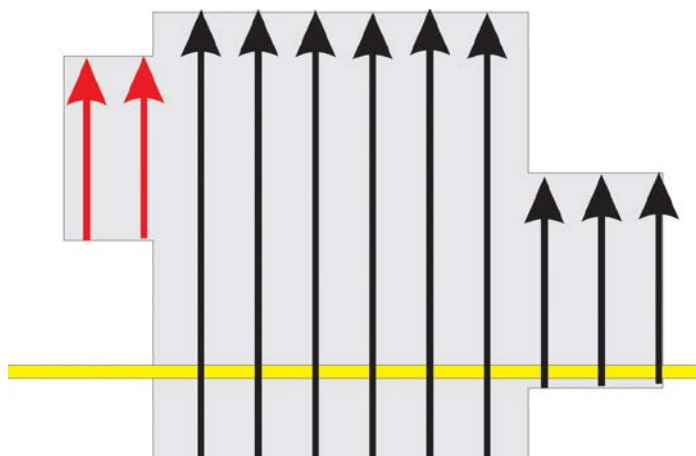
Base Line and profiles arrangement

You should perform the sounding by **straight** movement of the antenna unit on the surface.

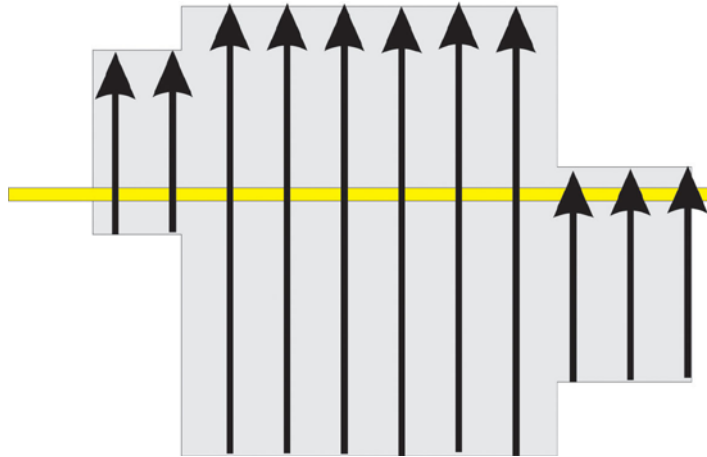


There is constant contact of GPR with the ground demanded during whole sounding process.

Place the tape-measure on the test-ground so that all the further profiles cross the tape-measure line. The tape-measure line will be the Base Line for the current site.



Wrong tape-measure placement (yellow line). The red profiles on that example don't cross the Base Line.



Correct placement of the tape-measure. All the profiles cross the Base Line.

Creating the project

Launch Planner program. In the program menu choose **Project > Create Project** or just click button **Create Project** on the tools panel.



New project window will appear. The project will have one site with the name of Site1.

The Base Line of the site will be placed in the zero point of coordinates.

Its length by default - 10 m. Azimuth - 90 degree.

Change Base Line coordinates to necessary.

By default the measurements will be taken in relative coordinates.

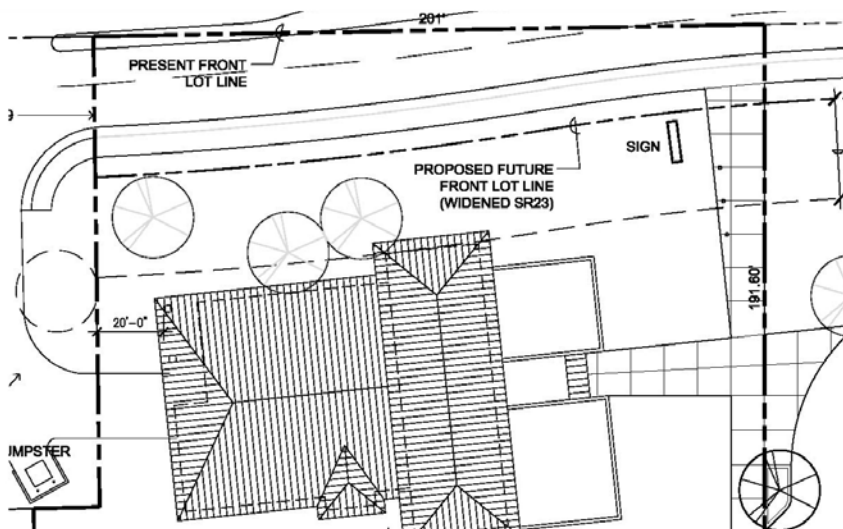
Set the initial point of the Base Line : Start Point X=0, Y=0;

And the final point: End Point X= (length of the tape-measure line), Y=0.

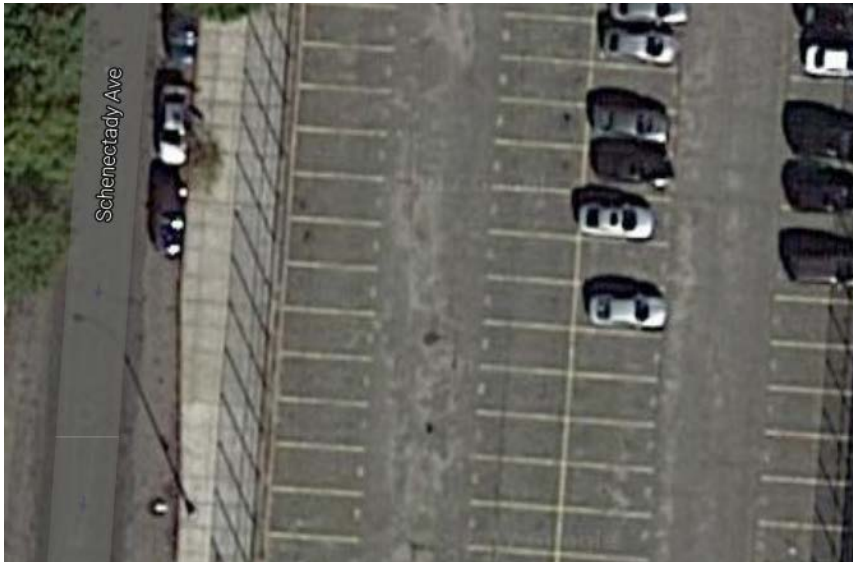
- ✓ Afterwards, you can export project data to AutoCad, having set the absolute coordinates of the initial and final points of the Base Line of the first site. The coordinates of all objects exported within project in AutoCad will be absolute too.

Adding plan/map of the location to project

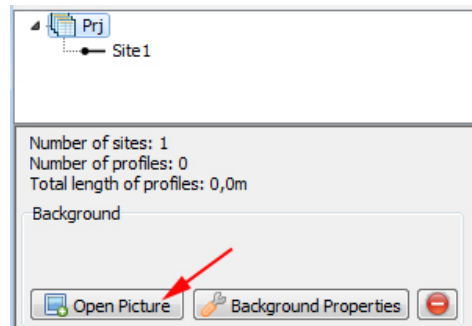
To add a plan/map to the project please make sure that plan/map file is in graphic format(*.jpg or *.bmp).



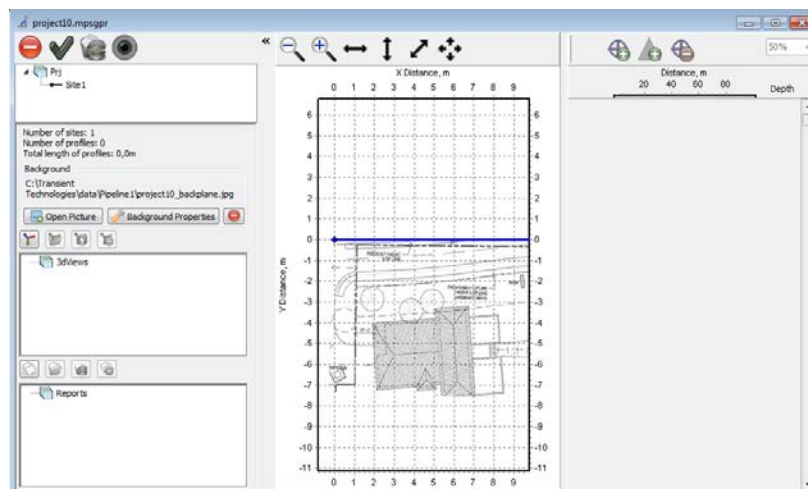
You can use a fragment of Google maps as a background for the project:



In order to add a picture of the plan/map, select the name of the project in the Objects Tree and click Open button, that is located at Background panel:



Then select the necessary file and click **Open**.
The location plan/map will appear in the plan area:

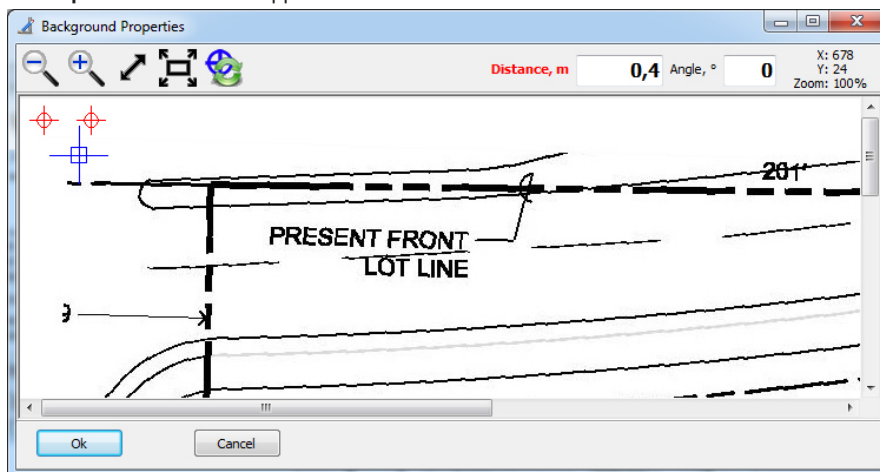


Getting started

Before beginning of the sounding process you should calibrate plan/map scale:

- Click  **Background Properties** button that is located on **Background** panel.

Background Properties window will appear:



Background Properties window contains the following control elements:



Zoom-out



Zoom-in



Zoom at screen. Fits the background picture in the **Background Properties** window.



Zoom of 100%. Displays the picture with in the real size.





Reset of the measure points. All the scale markers and a referencing marker return to their initial position.

In the upper right corner you can see **Distance** and **Angle** boxes.

In the **Angle** box you can enter a value of the angle that you want to turn the background picture on.

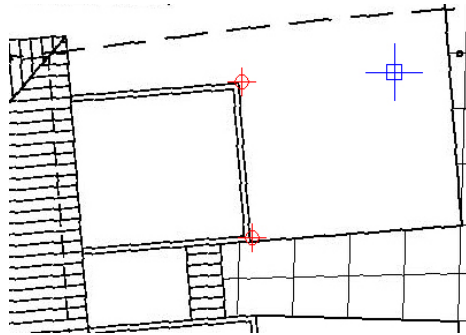
Distance box serves for background scale adjusting.

Adjusting the scale of background picture

In the left corner of the window you can find a referencing marker  and also two scale markers .

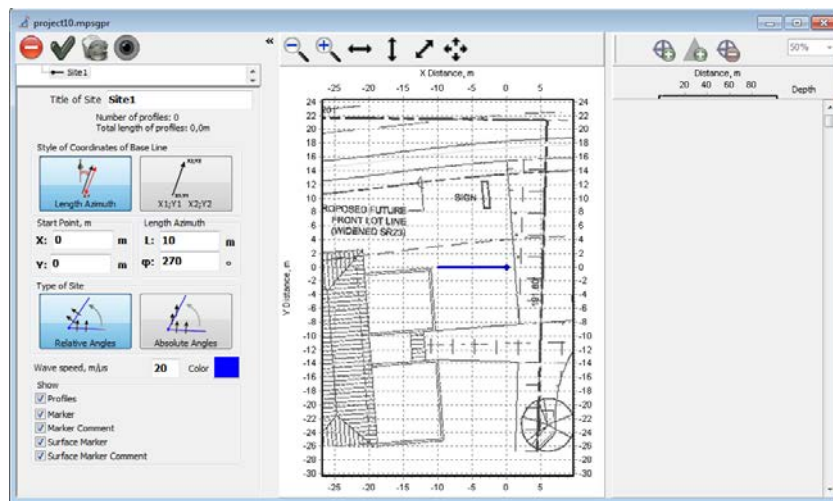
- Place the referencing marker to the selected reference point on the plan/map.
 - ✓ For the first site, this point will correspond to the Base Line's reference point (with zero coordinates).
The reference points of all the others sites will be counted from this same point.
- Find some object on the plan/map that you can easily identify on the place. The object should be chosen so that you could measure with a tape-measure one of its dimension. The chosen object might be: street width, the distance between buildings, a width of a building wall etc.
Accurately measure this distance with the tape-measure.

- In the **Background Properties** window place two scale markers to the selected points that correspond to the ones on the place.




- Enter the value of measured distance (in meters) into the **Distance** box.
- Click **Ok**.

The plan/map background scale has been calibrated.




- ✓ The same calibration procedure you can do with Google maps screenshot.

Adding a new profile

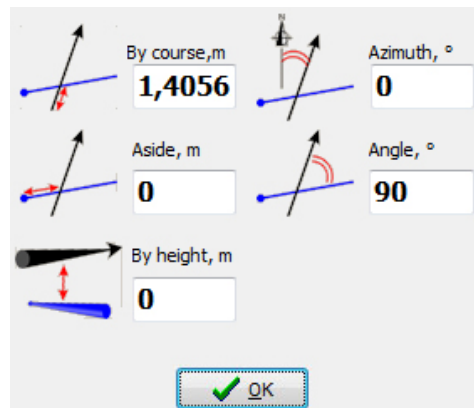
Choose in the menu **Sites&profiles > Create Profile** or just click the button **Create New Profile**  on the tools panel.

As a result, Synchro3 program will launch. A new profile will be created in it. Connect GPR to the laptop and make all necessary settings (please refer to [Synchro. User Manual](#) to have more detailed information about all antenna settings and sounding process).

Start sounding, moving antenna unit along a straight line till its crossing with the tape-measure line (Base Line).

When the center of the antenna unit crosses the Base Line, click the button  in Synchro program (or just press **Insert** on the laptop keyboard).

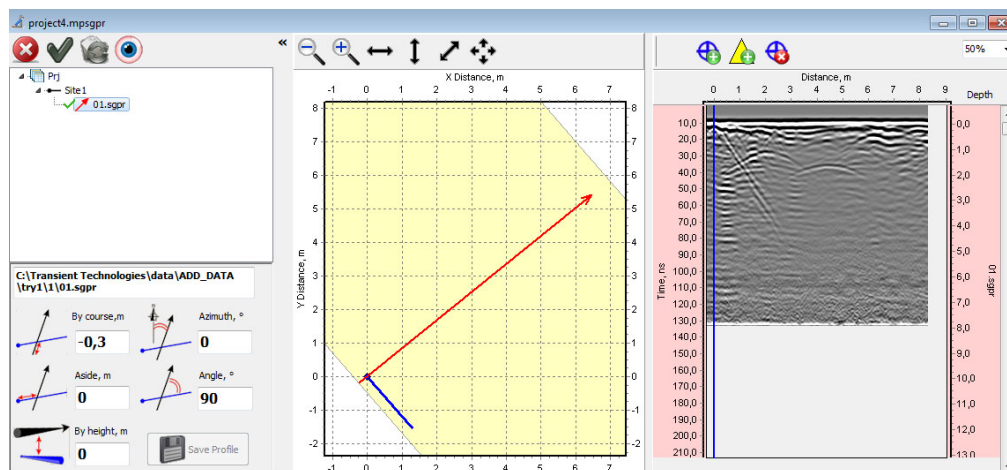
The following dialogue window will appear:



- The distance **"By course"** will be measured automatically by odometer.
- You should enter the number (in meters) in **"Aside"** box. Check the distance on the tape-measure, on which the center of the antenna unit crossed the tape-measure.
- Enter into the **"Angle"** box an angle at which antenna unit crossed the tape-measure (by default it is 90°)
- Or enter into the **"Azimuth"** box an absolute azimuth relative to North direction.
- Click **OK** and continue moving the antenna unit.


* **"By height"**. This is an optional parameter. You can enter the height of the profile relative to a base line plane.

Having finished the sounding, save the profile on the hard drive of your laptop. The profile will be added to the current Site of your Planner project. The crossing point of the profile with the Base Line corresponds to **"By course"** and **"Aside"** parameters, and the crossing angle to **"Angle"** value.




Place the antenna unit to a new point, according to your sounding plan, and repeat the same process with a new profile.

Adding the saved profile to the project


Choose in menu **Sites&profiles> Open Profile** or just click button  on the tools panel. As a result, the Open SGPR Files dialogue will appear. Select on or several profile files to be added.

Deleting profile from the site

Choose necessary profile in the Objects Tree, click Delete button  on the tools panel that is placed above the Objects Tree. The profile will be deleted from the site and project.


- ✓ After deleting the profile from the project, the profile file will remain on the laptop's hard drive.
- ✓ If the selected profile is set as etalon, Planner program does not let it to be deleted.
Before deleting such a profile, set another profile as an etalon one.

Assigning another profile as etalon

Select necessary profile in the Objects Tree and click the button  in the project tools panel. The etalon profile will be re-assigned.


Re-opening of the profile

If GPR profile that is included in the current project has been changed by other program, you can restore it.

Select the profile in the Objects Tree and click the button  in the project tools panel. The selected profile will be re-opened anew.

Modifying the profile in Synchro3

In Planner program you can edit the arrangement of the profile on the plan, and modify all the markers. To be able to modify more profile parameters, including profile processing, you should open the profile in Synchro3 program.

To do that, select the profile in the Objects Tree or on the plan and click the button **Open in Synchro**  on the tools panel. Synchro3 program will open this profile. Do all the necessary modifications of the profile and then save it in Synchro3. After saving the profile file, the updated profile will appear in Planner program.

Batch processing of GPR profiles

If you want to modify different all profiles at the same time, first you should do all needed modifications of the selected profile with Synchro3 program (please read previous section).

Then in the Objects Tree of the Planner program select this profile and right click on it.

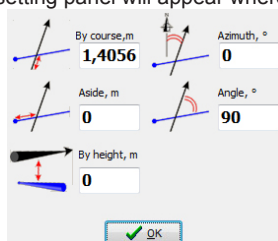
In a drop-out list select **Batch processing, all as selected**.

After that all the profiles from the current site will be processed identically.

Modifying the profile position

If necessary, you can modify the position of the profile after it was added in the project. Select the profile in the Objects Tree.

Under the Objects Tree the setting panel will appear where you can change all the profile position data.



The image shows a settings panel for profile position. It contains five input fields with corresponding diagrams:

- By course, m:** 1,4056 (Diagram: A line segment on a coordinate system).
- Aside, m:** 0 (Diagram: A line segment perpendicular to the course line).
- By height, m:** 0 (Diagram: A vertical line segment).
- Azimuth, °:** 0 (Diagram: An angle measured from a horizontal reference line).
- Angle, °:** 90 (Diagram: An angle between two lines).

 At the bottom is an **OK** button with a green checkmark icon.



You can enter the value of demanded parameter from the keyboard or increase/decrease it with keyboard keys Up or Down (↑ or ↓).

- ✓ All the profiles in the Objects Tree are sorted out by increment of **Aside** parameter (the distance on the tape-measure from the beginning of the Base Line till the crossing point of the profile with the Base Line). Therefore, changing Aside parameter will lead to re-sorting of the profiles in the Object Tree.


Markers of underground objects

Now that all the profiles were added and properly arranged in the site, you may mark on the profiles underground objects that have been found.

Adding underground object marker



Click the button  on the tools panel of the area of Displaying of GPR profiles. Next to this button a drop-out list of the marker color will appear . Select the color of the new marker and add it into the profile. New mark of selected color will appear on the profile (area of Displayed GPR profiles). The same marker will appear in the Objects Tree and on the plan.



Adding surface markers

To add a surface marker click the button  and put the marker in the needed point of the profile. A new surface marker will appear on the profile - yellow triangle. The same marker will appear on the plan and in the Objects Tree.

✓ The surface markers differ from the object markers because they are always visible on the upper part of GPR profile, not depending on vertical scrolling of the profile.

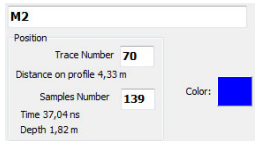
Deleting markers

You can delete markers either from the Objects Tree or directly on the profile. Choose the marker on the Objects Tree and click the **Delete** button  on the tools panel. Or choose the profile in the area of Displayed GPR profiles, click **Delete Marker** button  on the tools panel, then move the cursor to the requested marker and click on it. The marker will be deleted.

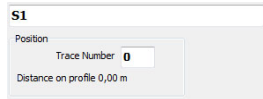
When you move the cursor over the marker, the cursor icon will change from  to .

Modifying markers parameters

When you select marker in the Objects Tree, Marker settings panel will appear in the project window:



Object markers settings panel



Surface markers settings panel

All parameters you can enter in two ways: by inputting numbers from a keyboard or with arrows keys on a keyboard Up and Down ↑ or ↓. When you change one of them, the marker will move in area of Displayed GPR profiles and on the plan at the same time.

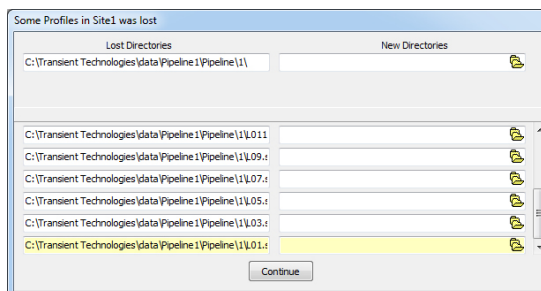
Data transfer


When you save the project, a project file with extension .mpsgpr will be saved on a hard drive of your laptop. This file contains the links to all the GPR profiles files from the project. Planner program allows you to use GPR profiles that are located in different places, including ones located in the network. This is why there is not enough just to copy .mpsgpr file for transferring to another computer.

To transfer project data you should copy the project. Choose in the program menu **Project > Copy Project**. In the windows that appeared choose the way where you want to save the project files and create a name of project file. As a result, the program will copy the main project file to the indicated location, and also all the other necessary files to the folder with the same name as a project file's.

Errors occurring during data transfer

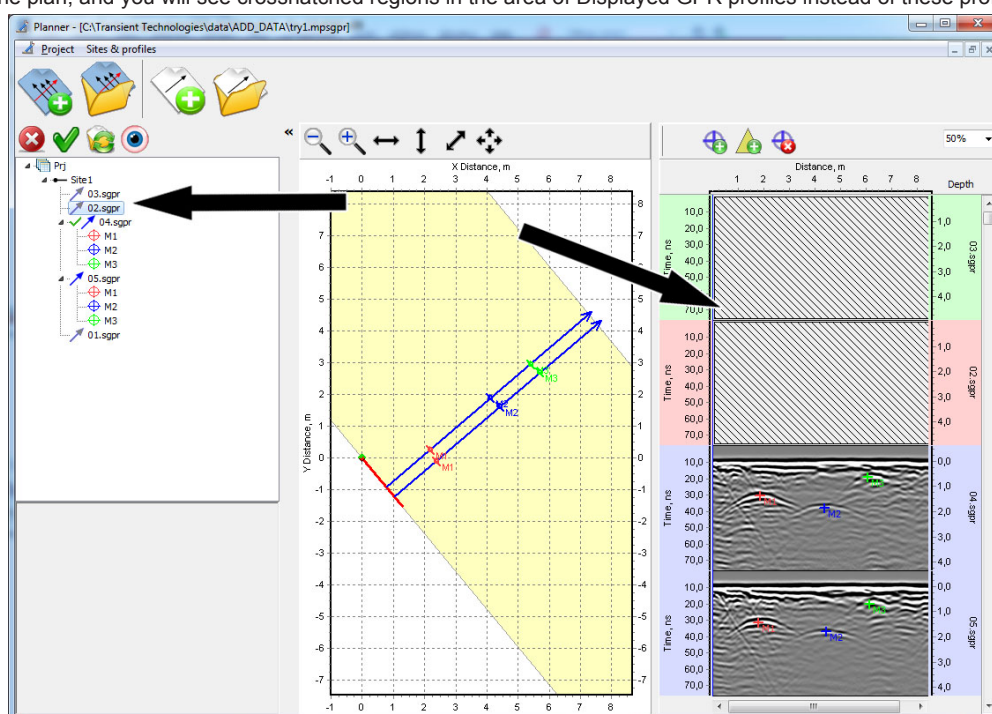
If you copied a project .mpsgpr file and all the files of GPR profiles to a new location on your computer or to another computer with the help of file manager, you will see the following dialogue window when you open the project file from the new location:




Here you can either enter a new files path or just click the button  on the right to select necessary files or folder. Etalon file is selected by yellow in this dialogue window.

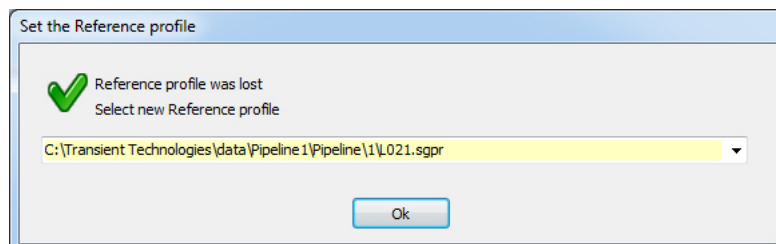
When new files paths are entered, click **Continue**.

If paths of some files are wrong, these profiles will be marked by Grey color in the Objects Tree, they will be absent on the plan, and you will see crosshatched regions in the area of Displayed GPR profiles instead of these profiles.



To restore the link to 'lost' profile, select it in the Objects Tree and click button Reload Profile . Then select the right path to that file and click Open.

If the path to the etalon file is lost during data transfer, the following window will appear when you open the project:



Drop-out list will contain all available profiles files of the site of current project. You should appoint a new etalon file instead the old one.

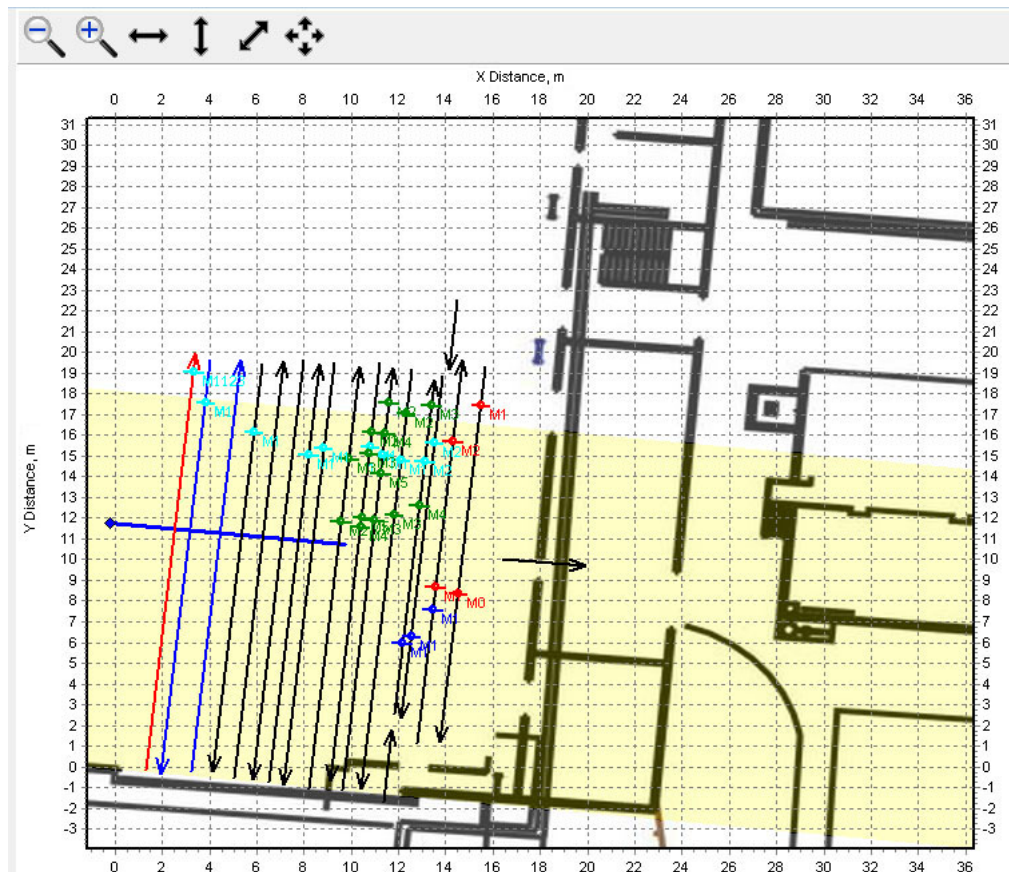
3D View

One of the features of Planner program is creating of 3D View of GPR data.

Project preparation for 3D View

Select on the plan a region that you want it to be represented in 3D. Place the selected profiles in center of the plan area. To do that, change the plan window size or its scale, move the plan to fit a necessary area into the plan window.

- ✓ Please take into account that only the part of the project that is visible on the plan will get to 3D View.



Creating 3D View

When the project preparation is done, select **Sites&profiles> 3D View > New** in the main Planner menu.

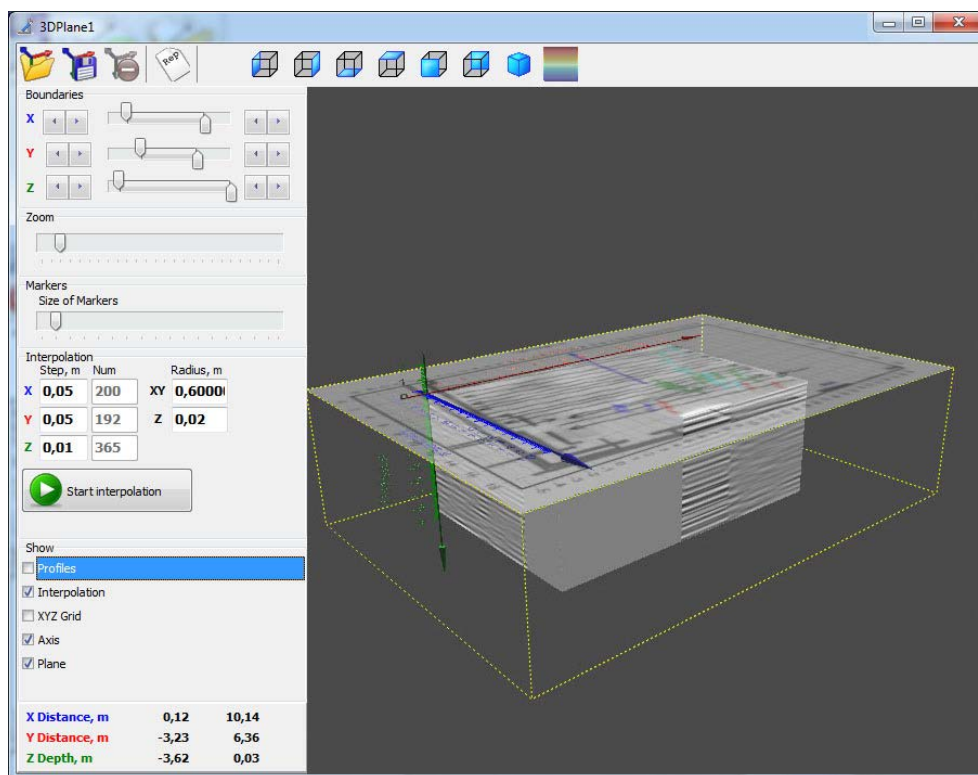
Or just select the name of the project in the Objects Tree - project properties panel will appear below. Find **New 3D**

View button  in that panel.

As a result, a new window of 3D View will appear.

3D View window

The window of 3D View contains Tools panel with different control items and 3D View area.



Upper control panel contains the following buttons:



- Open saved 3D View



- Save current 3D View



- Delete saved 3D View. This 3D will be deleted from the project. The corresponding file .mp3dmodel also will be deleted.



- Create a report



- Group of buttons that represent the 3D picture from different sides. Six positions for different six planes, and an isometric view.



- Palette dialogue window will appear

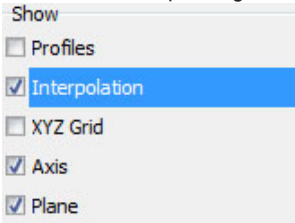
Working with 3D View

After creating a new 3D View, the selected part of the project will appear in 3D area, that contains followings items:

- GPR profiles in the form of rectangular planes
- Coordinate axes
- Surface plane with translucent plan of selected project site
- All markers on the profiles

3D View

You can turn on/off different items in 3D area. Set corresponding marks in the set-boxes on the panel **Show**:



Profiles - Turn on/off all profiles on 3D view

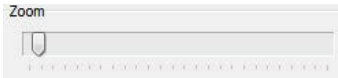
Interpolation - Turn on/off an interpolation result (if it has been created)

XYZ Grid - Turn on/off the grids on all six planes

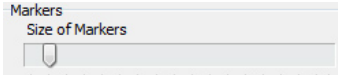
Axis - Turn on/off 3D axes

Plan - Turn on/off translucent plan as a background

If necessary, you can change zoom of 3D view with **View zoom** slider in the Zoom panel:



In 3D View the markers are showed as spheres of appropriate color.
To change dimension of the markers use **Size of Markers** slider:



To turn marker off, decrease its size to zero.

To rotate 3D view to any position, use any mouse button.

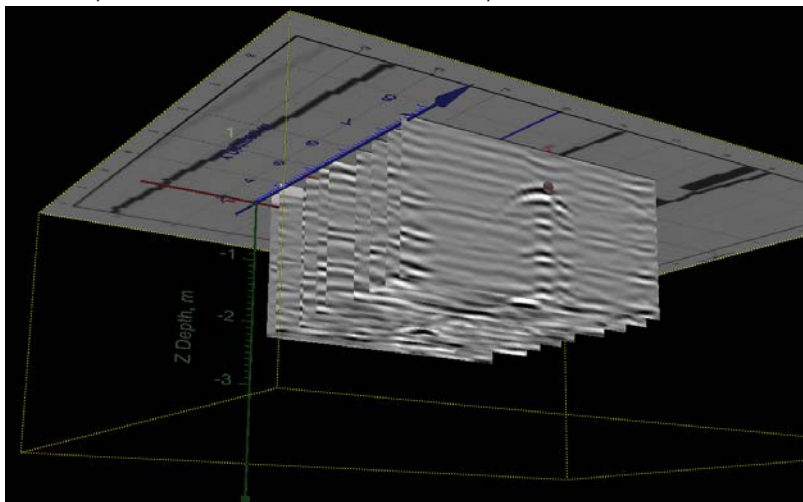
You can always turn 3D view to any of six planes, or return it to default position with group of keys on the upper tools panel:



The rotation of 3D view in different planes allows user to see clearly mutual alignment of different elements of the project.

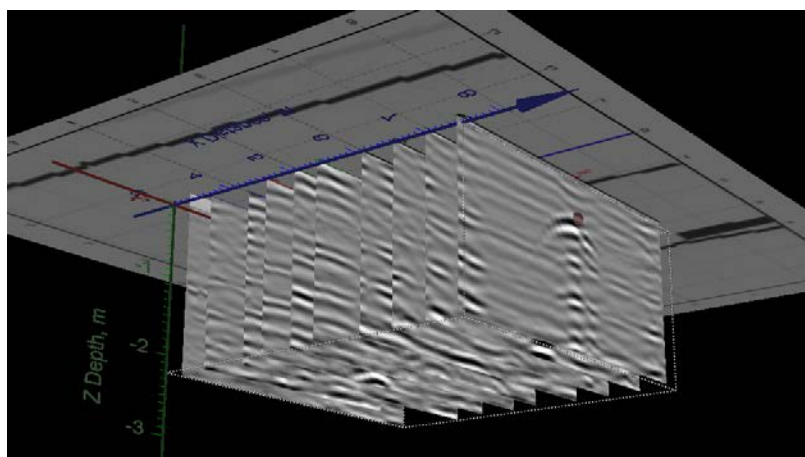
The limits of interpolation area

After creating/opening 3D View, its visible region is limited by yellow lines. These limits correspond to the selected area borders on the plan.



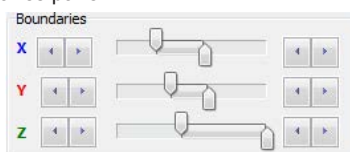
The area where data interpolation will be built, can differ from 3D View area. By default, the program defines the interpolation area automatically. The interpolation area includes the space only that contains initial data: GPR profiles.

To turn on/off showing of the interpolation area, press **Shift+C**.



The interpolation area is bordered in the screen by thin white lines. Rotation and scaling of 3D view takes place around the center of the interpolation area.

You can change manually the boundaries of the interpolation area. To do that, use sliders from Boundaries panel:



When interpolation is created, the sliders from Boundaries panel allows user to change positions of cross sections of resulting 3D object. The sliders movement is permitted inside the limits of interpolation area only. If you want to create a new interpolation, having changed the existing boundaries, take off the flag of **Interpolation** check-box in **Show** panel, and then move the boundaries to necessary positions.

The interpolation parameters

To be able to analyze 3D data, you should perform GPR data interpolation. As a result of interpolation, you will get 3D data area with the even grid. Cutting this area by cross-sections you can make different zones of it open to view. For example, if you make a horizontal cross-section on demanded depth, you will get so-called **C-scan**.

You can change interpolation parameters in Interpolation panel.

Interpolation		Radius, m	
Step, m	Num		
X 0,05	90	XY 0,6999	
Y 0,05	95	Z 0,02	
Z 0,01	222		

Start interpolation

By default, Planner program sets all the interpolation parameters automatically. But is necessary, you can change these parameters.

Step,m (by axes X, Y and Z) : sets the grid step (in meters) for each coordinate. On the right from each box you can see **Num** box, where steps number is displayed, according to the chosen grid step.

The increase of grid step leads to decrease of the volume of computed data and to interpolation time reduction. At the same time, the increase of grid step leads to the worsening of the resolution in 3D View.

Radius,m: changes the interpolation radius. Please notice that radius for X and Y axes differs from the radius of Z axis. This is concerned with the difference in discrete step along each axis.

When all the parameters are set, click **Start Interpolation** button. The button inscription will change for **Stop Interpolation**. The progress indicator will appear below.

You can stop at any moment the interpolation process by clicking **Stop Interpolation** button.

Cross-sections of interpolation area

When the interpolation process is finished, you will see the result of the process on display as a parallelepiped, filled with GPR data. The data step is equal to the chosen grid step.

Now you can perform a cross-section of interpolation area by using sliders from the Boundaries panel.

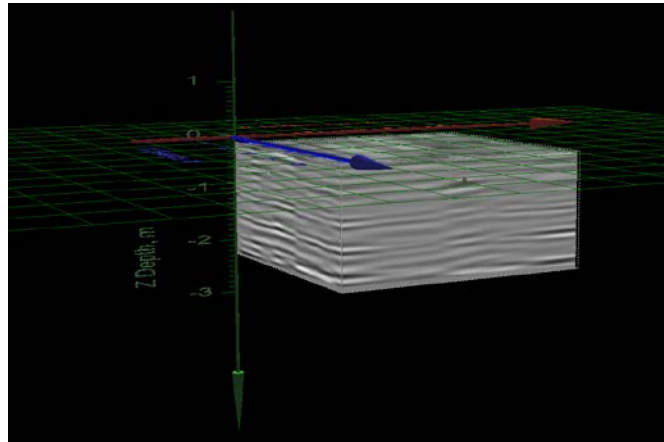
Boundaries

X Y Z

Or you can use a keyboard:

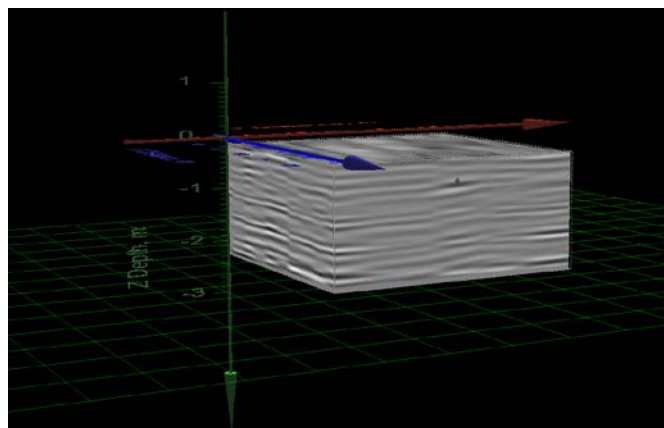
- Cross section that is orthogonal to **Z** axis: to move this cross-section along Z axis, use keys combinations Z+↑ or Z+↓. The cross-section plane will move according to the selected grid step of the interpolation.
To select upper/lower plane: Z+→ or Z+←.
Cross-section moving with enlarged step: Shift+Z+↑ or Shift+Z+↓.
- Cross section that is orthogonal to **Y** axis: to move this cross-section along Y axis, use keys combinations Y+↑ or Y+↓. The cross-section plane will move according to the selected grid step of the interpolation.
To select upper/lower plane: Y+→ or Y+←.
Cross-section moving with enlarged step: Shift+Y+↑ or Shift+Y+↓.
- Cross section that is orthogonal to **X** axis: to move this cross-section along X axis, use keys combinations X+↑ or X+↓. The cross-section plane will move according to the selected grid step of the interpolation.
To select upper/lower plane: X+→ or X+←.
Cross-section moving with enlarged step: Shift+X+↑ or Shift+X+↓.

Examples of cross-sections

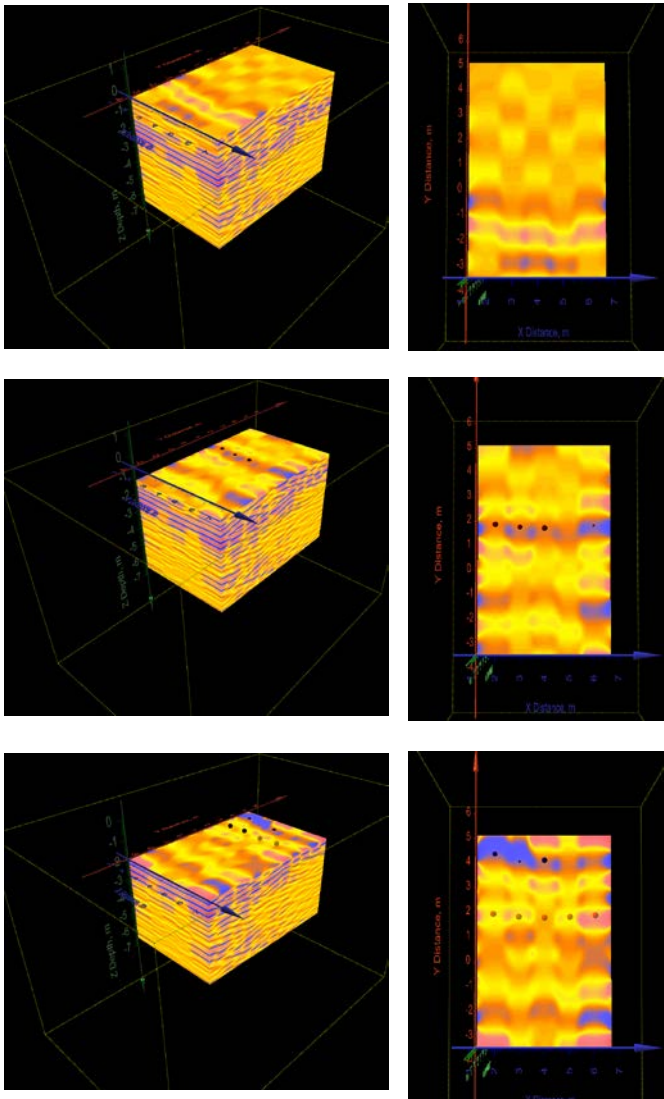


On the example above upper Z plane is selected.

Below you can see: lower Z plane is selected. Key combination (Z+→) was pressed:



The cross-section moving along Z axis (used key combination Z+↓):




You can find out the current position coordinates of the cross-section plane by 3D View scale, or from data on coordinates panel located in the left lower corner of the program window:

X Distance, m	1,23	6,68
Y Distance, m	-3,45	5,21
Z Depth, m	-6,53	-1,97

On the example above the upper Z plane is located on the depth of 1.97m, and the lower one - on 6.53m.

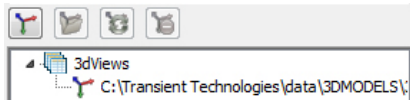
Saving 3D View


Planner program has a possibility of saving 3D View for using its results further.

To save it, click **Save 3D View** button  in the upper tools panel.

Open saved 3D View

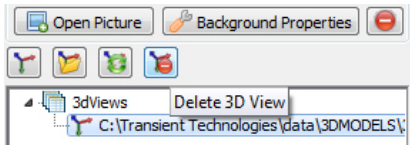
You can open previously saved 3D View from the project window (3D view panel or **Sites&profiles > 3D View**).




Or you can open saved 3D View directly from 3D View window, clicking **Open 3D View**  on the tools panel.

Deleting 3D View

You can open previously saved 3D View from the project window.



Or you can delete saved 3D View directly from 3D View window, clicking **Delete 3D View**  on the tools pa

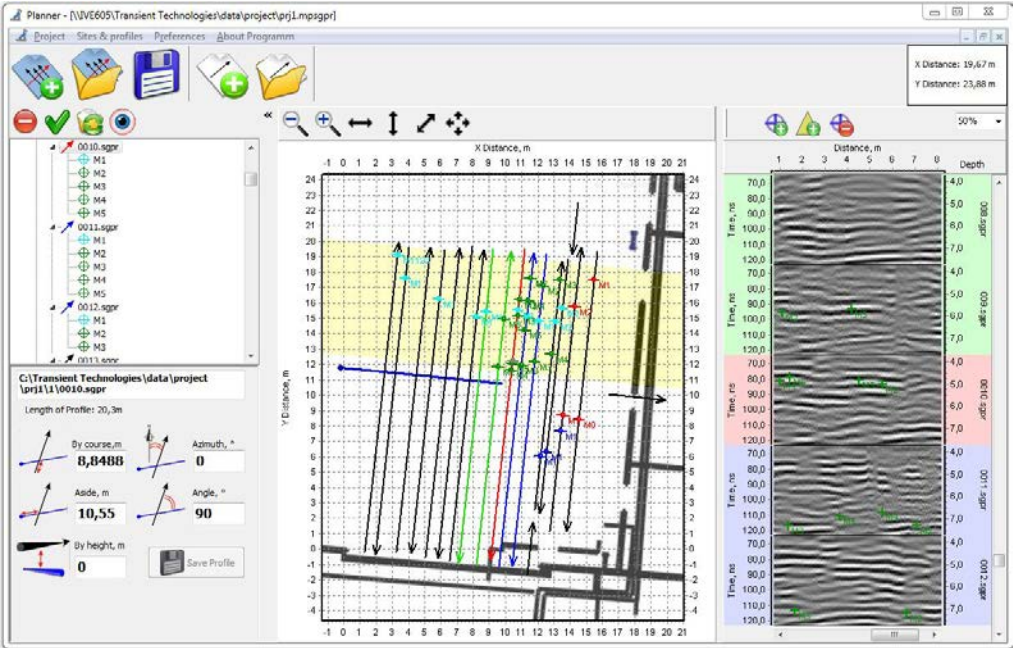
After that the current 3D View will be deleted from the project and the corresponding file with .mp3dmodel extension will also be deleted from the computer's hard disk.

Reports

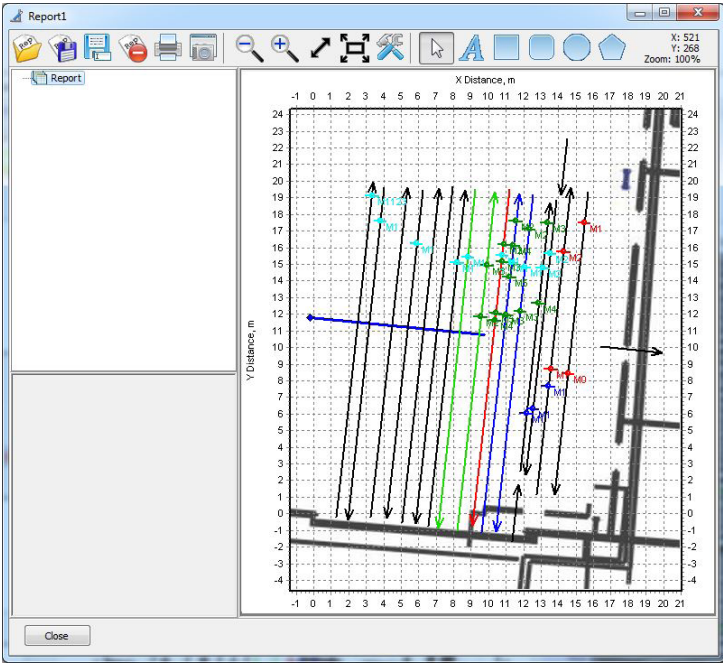
Planner program has means of report creating. The report represents a fragment of the plan or 3D view with marked graphical elements and captions. The reports are saved as separate files on a hard disc of your computer ,each project can have unlimited number of reports. When you finish editing the report, you can save it as an image for further use in other documents.

Creating a report from the plan area

In the project window, changing the horizontal dimension of plan area and its scale, attain the best position and size of your further report window.

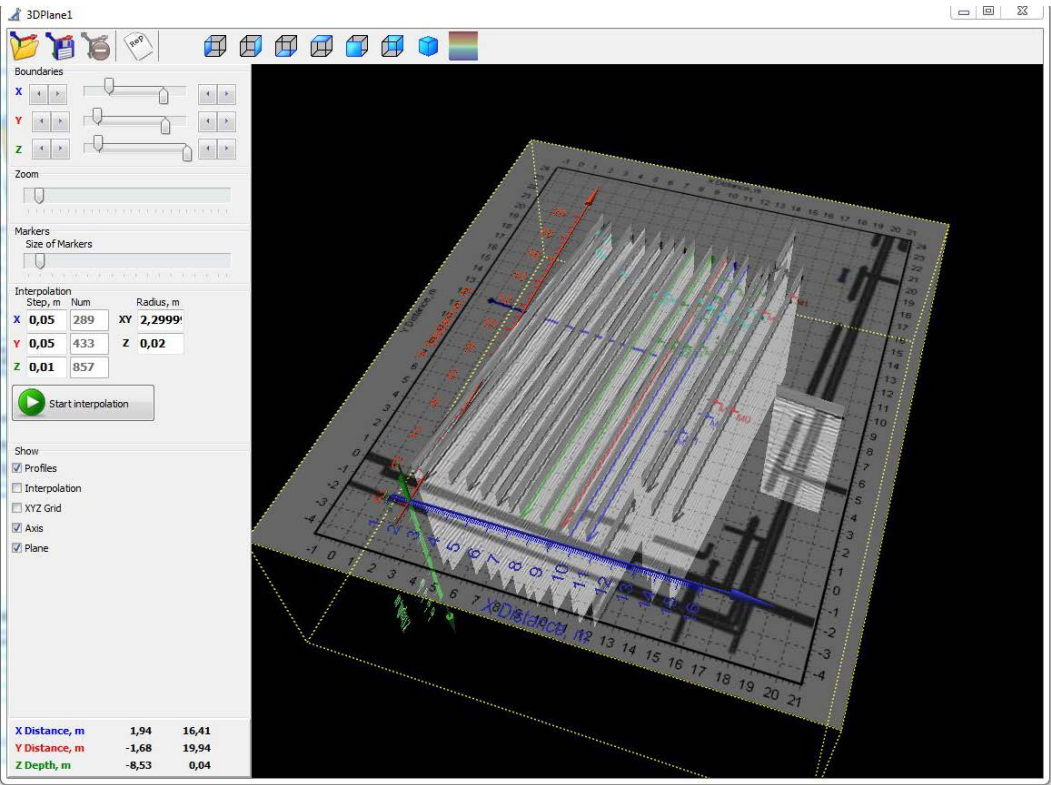


In the Planner main menu choose **Sites&profiles> Reports> New**. New report window with selected plan fragment will appear.

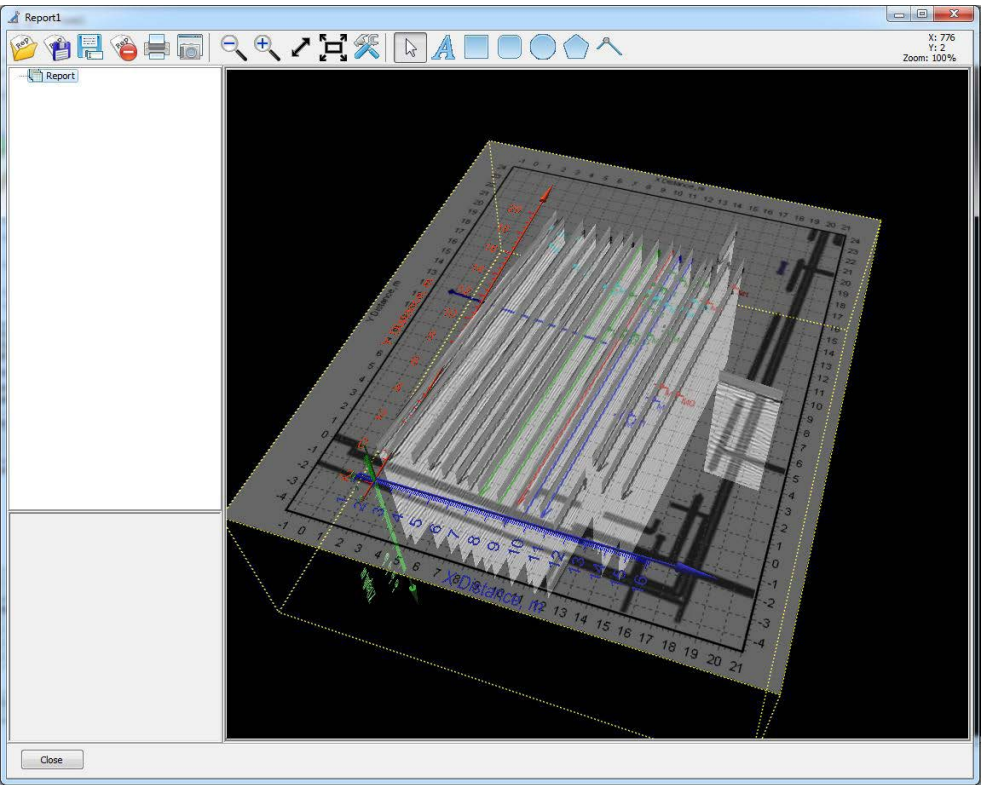


Report creating from the 3D View window

In 3D View window change the window size, its scale and objects orientation.

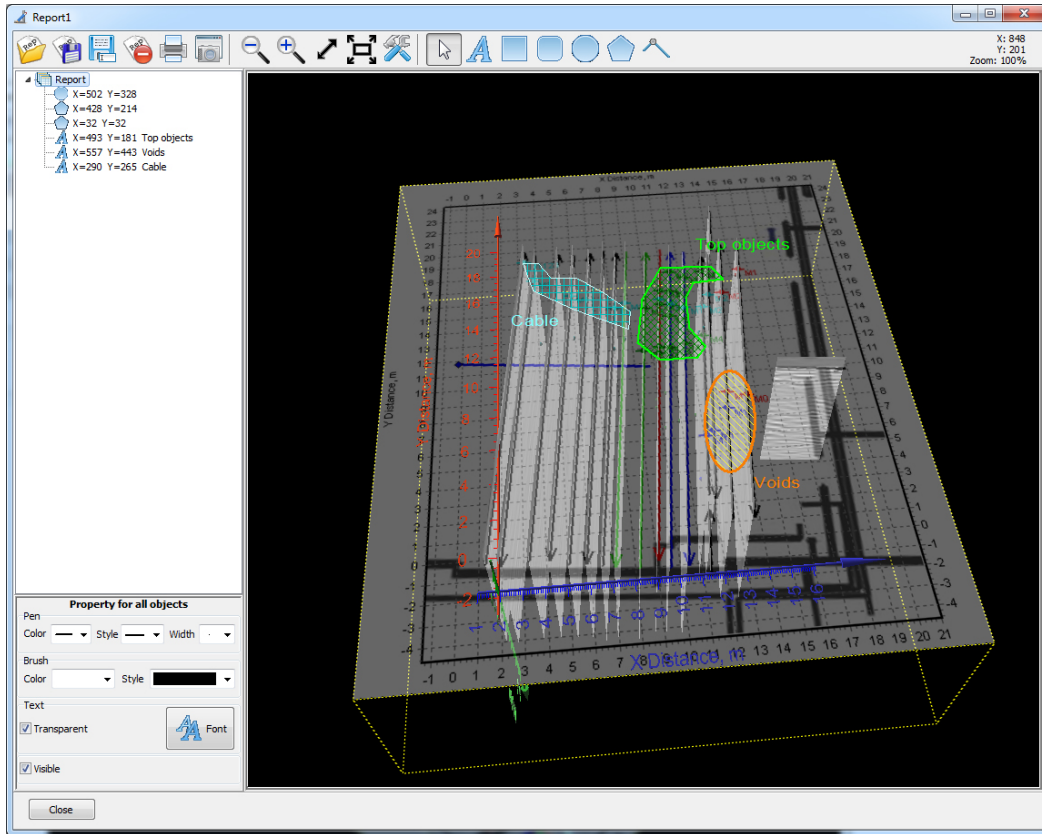


Then click the **Create Project** button  on the tools panel of 3D view window.









Editing of the report objects

Report may contain different graphical objects: text, rectangles, rounded rectangles, ellipses, polygons and polylines.

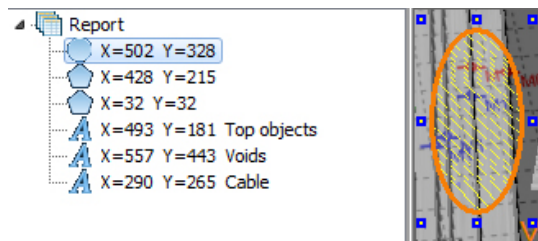


To add a new object click on corresponding button on the tools panel and then click on the report image.

-  - Add text
-  - Add rectangle
-  - Add rounded rectangle
-  - Add ellipse
-  - Add polygon
-  - Add polyline

Selecting objects to edit

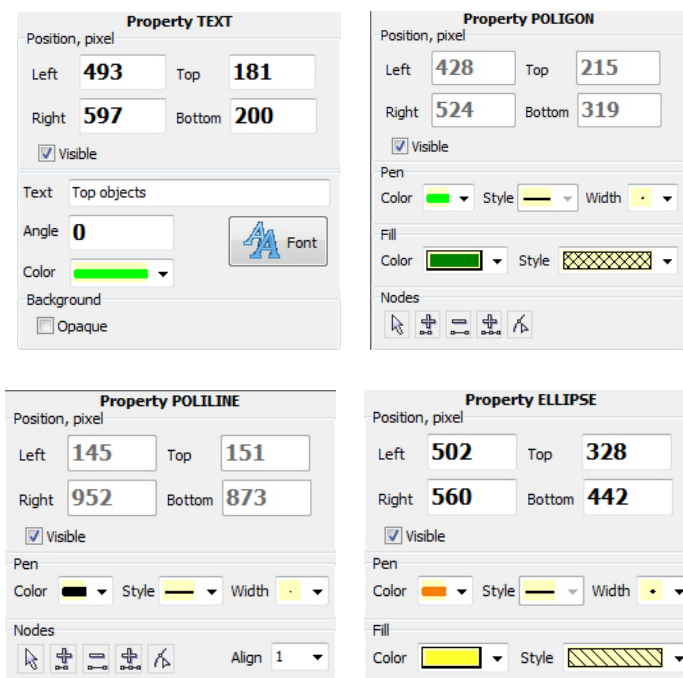
You can select the object for editing, by clicking on it on the report image or just select the object in the Objects Tree.





When the object is selected, its line in the Objects Tree will be marked, and in the report image you will see small blue rectangles around the object .

Changing parameters of the selected object

When some object is selected, you will see a object edit panel in the lower corner of the window. There you can change necessary parameters:




Report saving

To save a report click the **Save Report** button  on the report tools panel or **Save Report as** button .

In the appeared window enter file name and click Save.

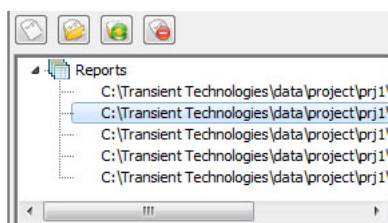
Report opening


If you need to open another project during current project editing, just click Open Report  button on the report tools panel.

You can also open report from the project window: in the main menu choose **Sites&profiles> Reports>** (select necessary report line).


There is third way of report opening exists: in the Objects Tree of the project window select the line with the name of project: **Prj**.

The project settings panel will appear in the lower part of the Objects Tree. There you will see the list of all reports related to the current project, and the reports tools panel.



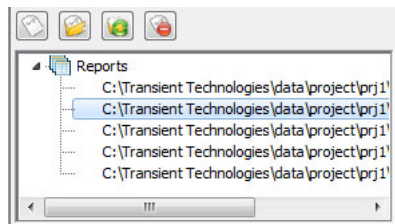
Select the necessary report line and click **Open Report** button .

Report deleting

You can delete the report directly from the report window, clicking **Delete Report**  button on the report tools panel.

Another way to delete the report: select the project name Prj line in the Objects Tree of he project window.

The project settings panel will appear in the lower part of the Objects Tree. .

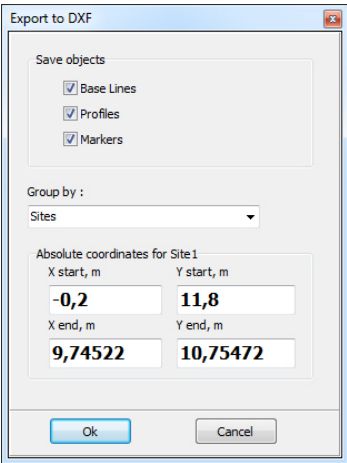


Select the necessary project line and click **Delete report**  button.

- ✓ When deleted in program, the report will be deleted from the project, and the report file will be deleted from the hard drive of your computer.

Data export to AutoCad

To export project data to AutoCad select in the main menu **Project> Export to DXF**.
In the appeared dialogue window select the objects to be exported and their grouping way.



In DXF file the position of all the objects will be given in relative coordinates.
To have the absolute coordinates of the exported objects you need to enter the absolute coordinates of the beginning and the end of the Base Line in Site1.