TechnoKom

AutoGRAPH.NET

DISPATCH SOFTWARE

USER MANUAL

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INTRODUCTION

This User Manual applies to the AutoGRAPH.NET Dispatch Software version 2015.3.3 (release 90), developed by TechnoKom Ltd.

The User Manual is intended for standard users who are aware of the operating principles of vehicle and personal tracking systems as a whole. For information on the software configuration and administration see the User manual for advanced users.

AutoGRAPH.NET is a multifunctional dispatch software based on multiple modules which can be connected together to make single system intended to monitor asset location in real-time, to monitor history of movements and state of asset's parameters, generate reports, notify the user about different events, etc.

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GLOSSARY

ASSET is a vehicle or a person equipped with a tracking device.

GEOFENCE is any virtual enclosed area on a map which is used to generate a notification or trigger a preset event when an asset enters or exits this area.

CP – control point. The control point is a circular geofence.

PC – personal computer.

SYSTEM REQUIREMENTS

Parameters	Minimum system requirements	Recommended system requirements
Operating system	Microsoft Windows XP SP3	Microsoft Windows 7
Processor	Intel Core i3 2 GHz	Intel Core i5 2 GHz and higher
RAM	2 GB	4 GB
Hard disk space	150–200MB free disk space (not including the space for data)	
Screen resolution	1680x1050 dpi	1920x1080 dpi
Internet connection	required to load internet maps and download data from dataserver.	
Software requirements	.NET Framework 4.0.	

SOFTWARE INSTALLATION

Before installation, be sure that your PC meets the system requirements.

To install the software, download the installation file from the official web-site or official forum (if beta version of software is required) of Technokom. Then:

1. Run the AutoGRAPH.NET_Setup.exe file and select the language to launch the installation wizard. You will be prompted to accept the AutoGRAPH.NET License Agreement. Read the agreement carefully. If you agree with the license terms, accept the agreement and go to the next step of installation, otherwise cancel the installation procedure.
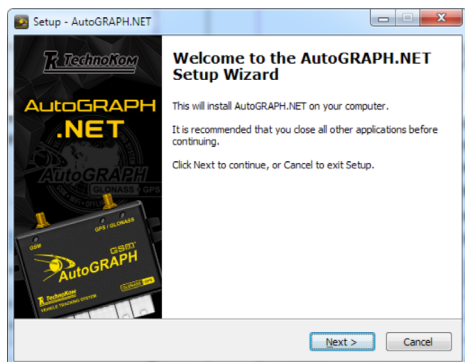
2. Browse to the installation directory.

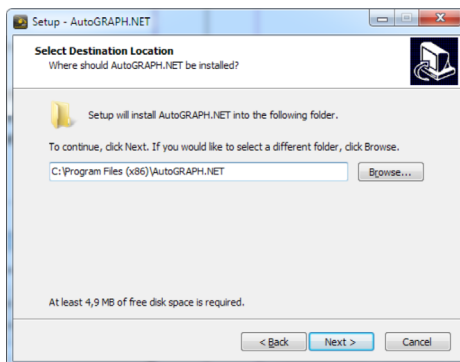**Fig.1. Running installation.**

Fig.2. Selecting installation directory.

3. Select which components to install. Demo configuration is a pre-configured scheme intended to try new features of the software. Demo data is a sample data for the demo configuration.

4. Continue installation. Please wait until it is completely finished.

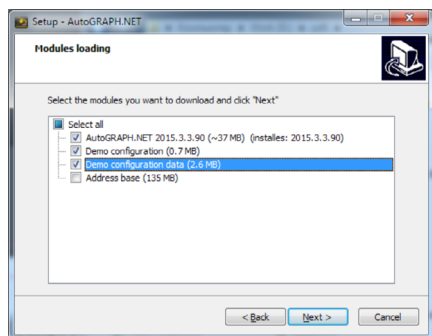**5.** After finishing, you will be prompted to run the AutoGRAPH.NET Software.

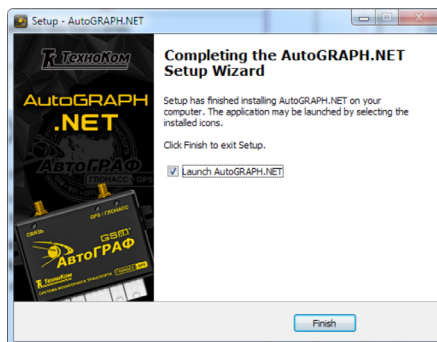**Fig.3. Selecting additional modules.**

Fig.4. Completing installation.

GETTING STARTED

LOGGING ON

Before starting, a user must log into the system.

When running the software, the "Log on Server" screen requires the user to enter valid user name and password to gain access to the data and the software functions. Logging onto the server also provides access to the user schemes and files on server, which can be downloaded to a local folder, if necessary.

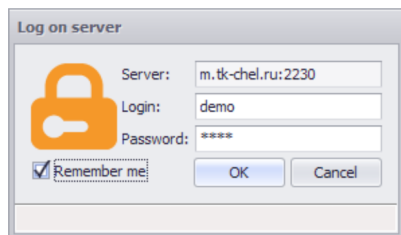Contact your dealer to obtain personal login and password to access AutoGRAPH.NET.

Fig.5. Logging on.

The «Remember Me» option will save the current user credentials so that they don't have to be entered every time the software is launched.
To get familiar with the basic features of the software you can use a demo version with demo configuration and data. To log in to the demo version use "demo" login and "demo" password.

LOADING SCHEMES

1. Run the AutoGRAPH.NET software on your PC.

2. The software will launch with the scheme that was used during the previous session. When running the software for the first time after installation, it will launch the demonstration scheme (if installed) by default.

3. If no scheme is found to launch (scheme has been deleted, moved or has not been installed), the software will launch a blank scheme template. In this case, it is recommended to load the required scheme manually. To open the scheme, follow *Main menu - Scheme Menu - Open* and select the required scheme in the drop-down list. This list contains schemes stored in *\ProgramData\ AutoGRAPH Shell\Schemes* directory on system hard drive.
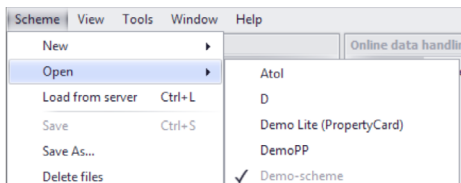

Fig.6. Opening the scheme.

4. Available schemes can be downloaded from the server. To do this:

• follow *Main menu - Scheme Menu - Load* from server to run "Load files from server" menu (Fig.7). This menu is intended to downloaded schemes, maps, modules and report templates available to the user.

• specify server settings and enter valid user registration data.

• press the "Connect" button to connect to the server. If valid registration data has been entered, the list of available files will be downloaded.

• go to the "Scheme" tab and select the required schemes by checking boxes.

• go to other tabs and select necessary files to download.

• press the OK button to start downloading. Selected schemes will be downloaded into *\ ProgramData\AutoGRAPH Shell\Schemes* folder and become available to select in the "Open" menu (Fig.6). After downloading, the "Load files from server" menu will be automatically closed.
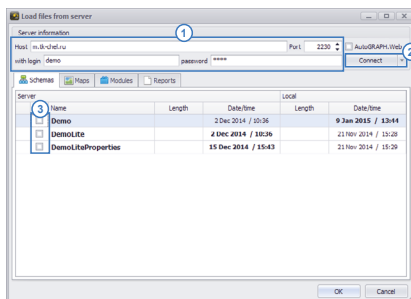

Fig.7. Load files from server.

OVERVIEW

After successful login, the software functions become available. Listed below is a short description of general menus and functions of the AutoGRAPH.NET. The interface can vary depending on the scheme and desktop settings.
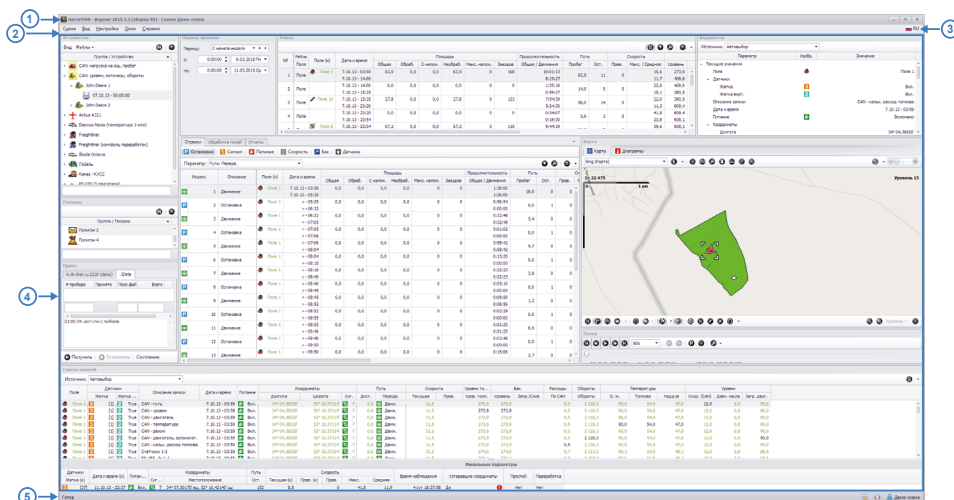

Fig.8. Overview.

(1) **Title** consists of a software version and description of the open scheme.

(2) **Main menu.** General operations of the software are available in main menu. Some operations are available via keyboard shortcuts.

(3) **Language.** Clicking the icon displays the list of available languages. After selecting the language, the software will be restarted.

(4) **Desktop.** It is the working area of the application that displays the modules. The application has the default desktop (Desktop 1), however users can customize the desktop, if necessary. To set the default desktop, follow *View Menu - Desktops - Desktop 1*.

(5) **Status bar**. The bar may be hidden when needed. To hide the bar uncheck the "Show status bar" box in "Panels Settings" of the "Window" menu.
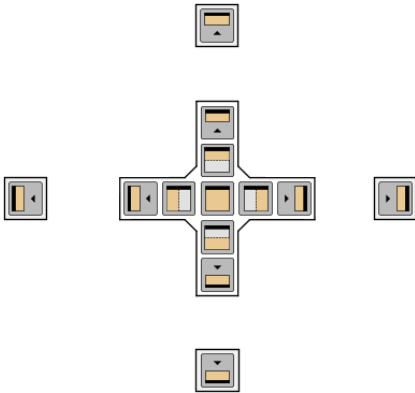
The Navigation tool integrated in the software allows users to arrange windows freely. When moving a window the tool shows different window arrangement.

Fig.9. Navigation tool.

DATA VIEWING

This section covers description of procedures of data viewing, reporting and charts creation in AutoGRAPH.NET.

To view data:
• select data to view in Device selector;
• select a trip in Trips selector, if sharing to trips is enabled;
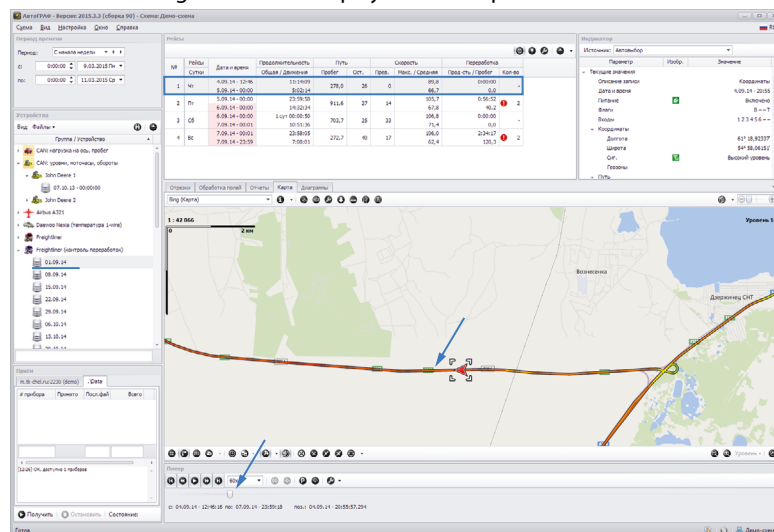• selected tracking data will be displayed on a map.

Fig.10. Sample of track displayed on map.

Detailed information on sharing data to trips, viewing current position of assets and history of their movement is also given in the sections below.

DATE / TIME SELECTION

By default the Device selector groups the data from each vehicle into separate files on a weekly basis (Fig.11). Each file is dated by week start date. When selecting any file, the user will review data for a whole week.

The Device Selector enables data viewing fro a custom time period (Fig.12).

To view data for a custom period:
• select the Time span mode in "View" menu of the Device selector.
• specify custom start and end values or select one of the preset intervals in Time span selector (Fig.13).
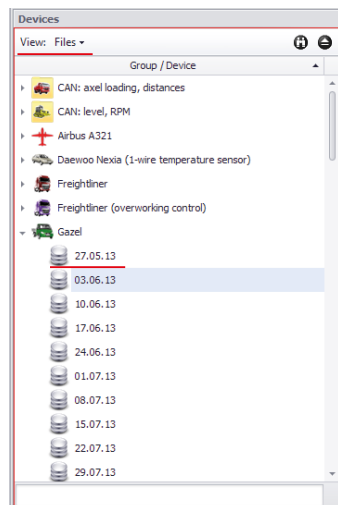• data from the selected period will be displayed in AutoGRAPH.NET.

Fig.11. File view.
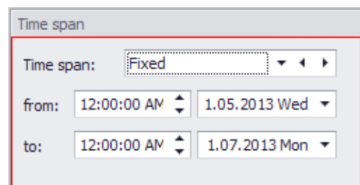

Fig.12. Time span view.

Fig.13. Time span selector.

SHARING TRACK TO TRIPS

Trip selector divides data covered by selected interval into trips according to trip settings. Sharing track to trips enables data viewing and calculation of asset parameters for separate trips.

No	Trips / Days	Date and time	Duration Total / Move	Way Distance	Way Parks	Way Over	Speed Maximal / Mean	Tank Level	Tank FUV (d)	Tank UpC	Engine Cons. / l/100 km
3	Thu	23.10.14 - 00:00	23:59:46	96.9	65	0	88.0	19.4	20.9	1	21.4
		24.10.14 - 00:00	4:20:08				41.2	18.8			22.1
4	Fri	24.10.14 - 00:00	23:59:56	50.3	88	0	80.7	18.8	0.0	0	11.3
		25.10.14 - 00:00	3:57:06				34.4	7.6			22.4
5	Sat	25.10.14 - 00:00	1 d 00:00:14	56.0	76	0	77.3	7.6	18.8	1	10.6
		26.10.14 - 00:00	3:14:35				38.4	15.7			19.0
6	Sun	26.10.14 - 00:00	1 d 00:59:53	107.3	58	0	86.3	15.7	22.4	1	22.4
		27.10.14 - 00:00	4:38:49				38.9	15.7			20.9
7	Mon	27.10.14 - 00:00	23:59:59	79.5	50	0	83.0	15.7	22.1	1	14.9
		28.10.14 - 00:00	3:33:27				40.1	22.9			18.8
31		21.10.14 - 00:00	30 d 17:29:00	1,817.1	1 589.5	8	116.0	10.4	338.3	16	337.7
		20.11.14 - 16:29	3 d 23:08:39					11.0			

Fig.14. Trip selector.

Pressing the "Share trips" button 🖨 shares the selected track to trips. A second press on the button disables the sharing. Each trip is displayed on a single row, which consists of information on the trip duration, vehicle distance per trip, maximum and average speeds per trip, etc. Columns of the table are fully configurable. The user can select default columns or a user-defined set. The "Fixed-column" button ⊕ allows display of user-defined columns. A second press sets the default view.

The weekend trips are highlighted in red in the Trip selector. Selecting trip displays vehicle track for this trip on a map.

Total row consists of total parameters of vehicle per selected time span.

Pressing the button ▼ opens a drop-down menu in the Trip Selector. Functions of menu are described below:

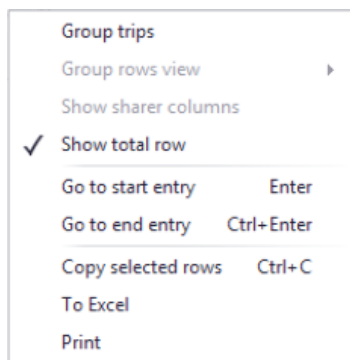**Group trips** - sorts the trip into groups and subgroups depending on the trip sharers.

Group trips	
Group rows view	▶
Show sharer columns	
✓ Show total row	
Go to start entry	Enter
Go to end entry	Ctrl+Enter
Copy selected rows	Ctrl+C
To Excel	
Print	

Fig.15. Menu of Trip selector.

Group rows view - is used to configure the view of group titles when trips are grouped: short, normal or detailed.
Show sharer columns - displays columns with the sharers' description.
Show total row - displays total parameters for all trips. Total row is displayed in the bottom of the trip list.
Go to start entry - highlights the first entry of the selected trip in the Data viewer. You can go to the start entry by pressing Enter key.
Go to end entry - highlights the last entry of the selected trip in the Data viewer. You can go to the end entry by pressing Ctrl+Enter keys.
Copy selected rows - copies selected entries to the clipboard.
To Excel - exports the list of trips to an MS Excel file.
Print - prints the list of trips out.

VIEWING THE TRACK

Maps viewer allows the user to monitor vehicle position in real-time, as well as to view history of all vehicle movements. When selecting data and trip to view, the Map viewer displays vehicle track from selected file. A special cursor shows vehicle position at the selected time. The user can select a point on the track to view. Double clicking on the track moves the cursor to the selected point and highlights the entries on Trip selector and Stages viewer which the selected point refers to.

Viewing online data

To view the current position of a vehicle, select a vehicle or a group of vehicles to view in the Device selector.
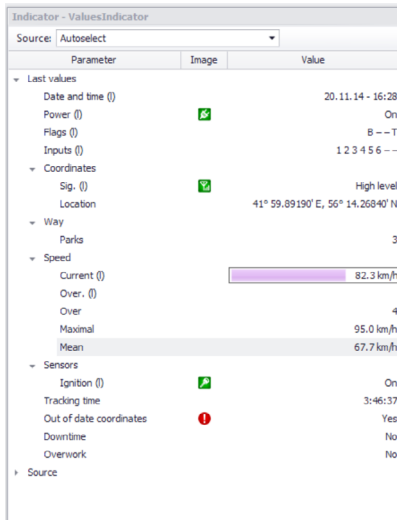
Mode of view of online data allows the user to select online data to view. To change this, press button 🌐 in the tool bar of Map viewer and select necessary mode in the drop-down list.

• **Current group** displays the online data of the selected group only. When selecting a device, online data of all vehicles of the Device selector will be displayed on map.

- **Current group and inside** displays online data of the selected group of vehicles and vehicles of the nested groups. When selecting a device, online data of all vehicles of the Device selector will be displayed on the map.
- **All vehicles** displays last known position of all vehicles.

When viewing online data, the Maps viewer shows the positions of vehicles out of the working area of the map with arrow.

When selecting a vehicle to view, the Values indicator displays online data: last known position of the vehicle, state of inputs, outputs and sensors of on-board tracker, installed on this vehicle.

Fig. 16. Values indicator.

History of vehicle movement

To view history of vehicle movement:
- select data to view in the Device selector.
- if the Time Span mode is enabled, specify period in the Time Span selector.
- select a trip to view, if the track sharing to trips is enabled in the Trip selector.
- the Map viewer will show the track from the selected file, if the File mode of view is enabled; or the track in a specified period, if the Time Span mode is enabled.

The user can set parameters of the track displaying using buttons on the tool bar of the Maps viewer.

 Vehicle always center of map. If the button is pressed, the vehicle cursor always will be in the center of the map when playing the track. For detailed information on track playing see "Playing the track" section.

 Hide track. Press the button to hide the track. Second press displays the track again.

Show track point. Press the button to show points on the track. Clicking on a track point displays a hint with information about this point.

Show direction track. Press the button to show direction of travel.

Segments track. Press the button to show stages on the track. In the button's drop-down menu, user can optionally display or hide different stages on the track.

Pressing the stage icon on the track displays a hint with information on this stage.
An index under the stage icon allows the user to find associated items in the Stages viewer.

Playing the track

Using the Player integrated in the scheme, the user can a play selected track. When playing, the cursor moves along the track from the start track point to the end track point of the selected time period. Before playing, it is recommended to select playback speed and set another parameters of the Player.
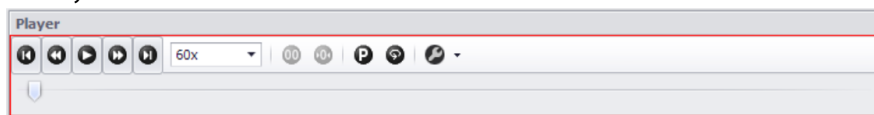

Fig.17. Player.

Set zero
Sets the current track point as the zero point .

Go to zero
Goes to the zero point.

Skip parking
Skips times when vehicle is parked, when playing the track.

Autorepeat
Repeats the playback for selected time span.

Settings
Change playback settings in a drop-down menu.

Player range - select data range to play, if the track is shared by trips:
• Whole calculated time span - to play the track per selected time period.
• Current trip time span only - to play only the track per selected trip.

Multiple trip selectors - allows setup of playback, if several Trip selectors are installed in the scheme.
• Time spans overlap with alignment on start - data of different Trip selectors is played simultaneously and start points of those intervals are aligned.
• Single time span - all selected intervals are played one by one in chronological order.

Use player buttons to play the track.

Start
Goes to the start point of the selected time span.

Rewind
Press and hold this button to rewind.

Play
Runs the player.

Fast forward
Press and hold this button to fast forward.

Finish
Goes to the end point of the selected time span.

When playing the track, the player displays duration of selected time period and date and time of the point, which is currently playing.

Move the player slider to select section to play.

When playing, vehicle cursor moves along the track, passing track points in chronological order. During playback the modules synchronised with the Player are highlighting entries (or stages) associated with the point which is currently playing.

SETTINGS OF THE MAP VIEWER

Loading the required map

The AutoGRAPH.NET Software supports internet, vector and raster maps.

Maps viewer selects the most appropriate map from the list of available maps to display the track. If there is no suitable map in the list, the track will be displayed on a template of a geographical map, which is the cylindrical projection of an area occupied by the selected track. The segment of a map with the track can be filled partially. Maps can partially overlap each other or nest within each other. For example, when the district map is overlapped by the more detailed maps of its settlement.

Fig.18. Tool bar of the Map viewer.

In the drop down list of available maps (Fig.18, i.1) on a tool bar of the Map viewer, the user can select the necessary map. The list contains all vector, raster, and Internet maps added to the application. Advanced users can add new maps to this list. The list contains the name and type of each map. If the vector or raster map has not been loaded in the Maps Viewer, "Map type" field will display "is not open" message. Maps which are not open, aren't used to display the track. To open them manually, the user should select these maps from the list.

To view additional information about selected map, press the "Map information" button (Fig.18, i.2). In the drop-down menu of the button, user can set parameters of internet maps.
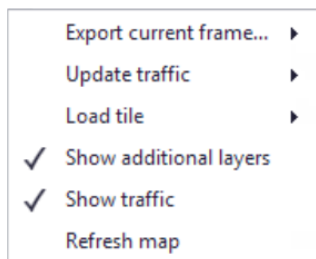
Export current frame to - copies the current frame of a map to the clipboard or saves it as an image file.
Update traffic - updates the traffic information.
Load tile - enables loading of tiles via the Internet, using cache files or simultaneously from the cache files and via the Internet.
Show additional layers - shows reference map layers.
Shows traffic - shows traffic information.
Refresh map - forces the Map viewer to refresh the map.

Fig.19. Map settings.

In the map selection, there is an option to automatically select the most appropriate map for different levels of detail. To enable this function, press "On/Off selection of maps on detail levels" (Fig.18, i.8) in the tool bar. A second press disables the auto-selection. In the context menu of this button, the user can select the types of the maps available for auto-selection. To change the level of detail, use the slider (Fig.18, i.9).

There are vector maps on the server, which are available to download. To download, press the "Download map" button (Fig.18, i.4) on the tool bar and select maps in the menu.

To add a map to the list of available maps, go to the common settings of the Map Viewer. By pressing the " Settings" button on the tool bar (Fig.18, i.3). The user can add vector and raster maps and select internet map in the menu. To add a vector or raster maps, go to the "Raster & vector maps" tab (Fig.20). The AutoGRAPH.NET supports raster and vector map of the .mp and .agv formats.
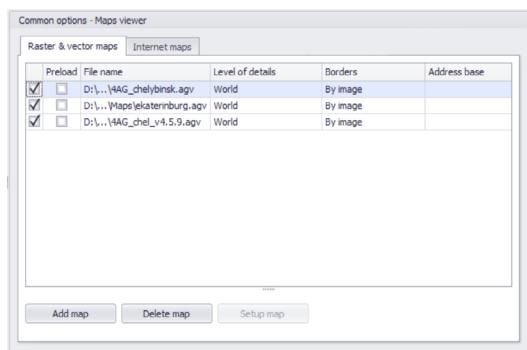

Fig.20. Raster & vector map settings.

To load a new map:
- press "Add map" button and select the required map. A new map will be added to the list on the "Raster & vector maps" tab;
- check the box beside the map to add it to the Maps viewer to view the track.
- check "Preload" box to allow the map loading when running the application. This option speeds up the map loading when selecting it in the Map Viewer.

- specify the level of detail in the "Level of details" field. This option allows the user to specify map selection to view the track in auto-selection mode.
- select the method of the identification of the map borders:
- *by image* - to identify map borders by the edges of the map images.
- *by data points* - to identify the borders by the limiting reference coordinates. It is recommended to use this method for raster maps.
- *by borders* - to identify borders according to the reference file. Use of this method prevents the track appearing on blank, informational, or branded areas of the map. The border file can be specified manually in Mapborder (OziExplorer plug-in) for raster maps or using the relevant polygon type for vector maps.

To delete a map from the list, select the map and press the "Delete map" button.
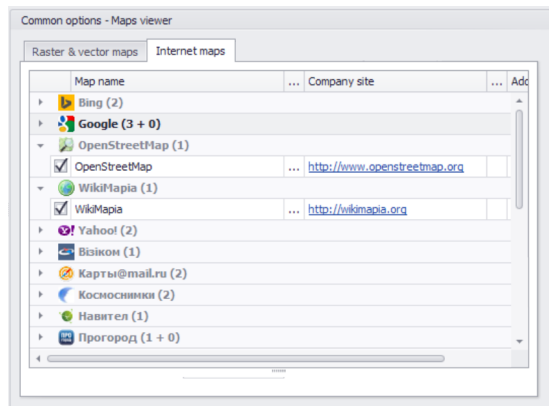
To add internet maps go to the "Internet maps" tab. The list on this tab consists of all internet maps supported with the AutoGRAPH.NET.

To add a map in the Maps viewer, check the box of the required map. The selected map becomes available to display the track in the Maps viewer.

Fig.21. Internet map settings.

> *Since the Internet map providers (vendors) change and revise the terms of their license agreements from time to time, responsibility for using Internet maps shall be borne by the software user at all times. If you have discovered that the current edition of the license agreement of Internet map provider forbids the use of this map, disable this Internet map and do not use it.*

Measuring distances on a map

This function allows measuring of distances between two or more points on a map. To enable measuring mode, press the "Measure distances on a map" button (Fig.18, i.5) on the tool bar. Left click selects points on a map to measure distance between them. The total distance from the first point to the last one is indicated on the tool bar on the right of the "Measure distances on a map" button. A second press on the button disables the measuring mode.

Routing

The AutoGRAPH.NET Software supports automatic routing between two selected points on a map.
To calculate a route:
• press "Route" button (Fig.18, i.6) on the tool bar of the Map viewer.
• select a routing method in the drop-down list. There are two routing methods intended for internet maps (Google and Progorod) and one for routing on vector maps (Vector routing). Vector routing is available only for vector maps with the graph file.
• left click to select a start point on a map.
• then select midpoints of the route. When selecting points, the software automatically calculates the route between them. The route distance is indicated on the right of the "Route" button on the tool bar.
• to add a midpoint between two points of the route, move the route section connecting these points, to the required area on the map. Use the left click to move the section.

• after setting all points, enable the context menu by right clicking on the route. In this menu, the user can set parameters of the route and convert it to a geofence:
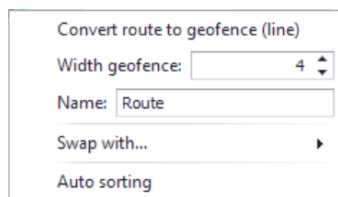
Convert route to geofence (line)	
Width geofence:	4
Name:	Route
Swap with...	▶
Auto sorting	

Fig.22. Route settings.

Convert route to geofence (line) - converts the route to a geofence of the line type.

Width geofence - is a width of the line, created from the route

Name - is a geofence's name.

Swap with - changes the position of selected net and recalculate the route according a new sequential number of the net.

Auto sorting - sorts the route points to shorten stretch of the route. Auto sorting is available for routes with total number of nets not exceeding 10.

Searching address

The AutoGRAPH.NET supports operation with address databases and provides searching of necessary address on an internet map.

To find an address:

• enable address searching by pressing the "Address" button (Fig.18, i.7) on the tool bar.

• select required address database in a drop-down menu of the button.

• enter an address in the field on the right of the "Address" button.

• press Enter to start searching.

• if the address has been found, it will be shown on the map.

Options described below allows the user to setup the map display.

Grid (show/hide)
Grid is available only for Internet and vector maps.

Ruler (show/hide)

Hide POI
This option is available only for vector maps.

3D mode
This option is available only for vector maps.
Use the context menu of this button to select how to display objects on a map:
• Isometric projection - shows isometric projection of objects.
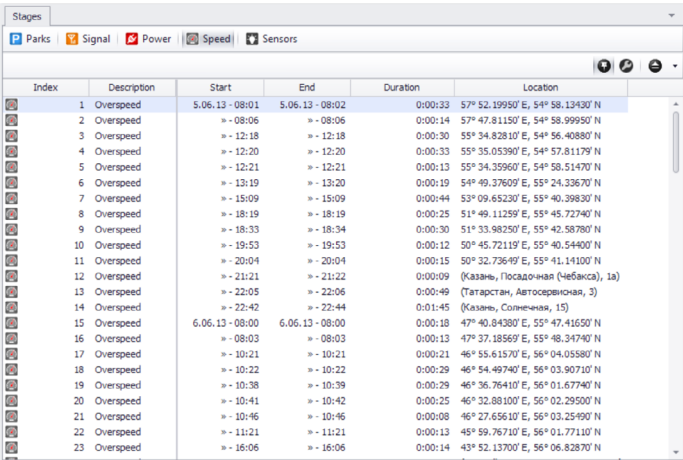• Perspective projection- shoes perspective projections.

Elapsed time
Shows the time elapsed from the moment when the last data has been received. This button is active when a vehicle group or a vehicle is selected in the Device selector.

STAGES

Stages viewer allows the user to divide the track into segments according to any condition. Conditions may be entering a geofence, power supply state, navigation signal, parking, motion, speeding etc.

Depending on settings, the Stages viewer can has several tabs with list of different segments on each of them. Columns on the tabs are configurable. The user can set default view which displays all available data on stages or displays preset columns by pressing the "Fixed columns" button 🔧.

Fig.23. Stages Viewer.

> **NOTE** For detailed information about setting columns see extended version of the User Manual intended for advanced users.

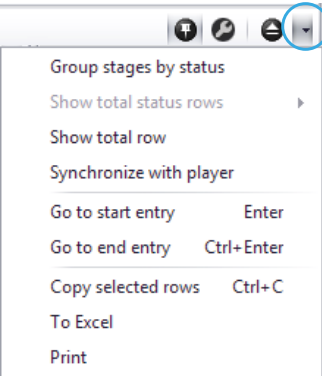In the context menu of the Stages viewer, additional options are available.

Fig.24. Context menu of Stages viewer.

Group stages by status - groups stages with similar parameter states.

Show total status rows - enables displaying of total statuses when stages are grouped: none, expanded or all.

Show total row - shows total values of parameters for the selected time period.

Synchronize with player - enables following the player when playing the track. The stage associated with the currently playing track point will be highlighted.

Go to start entry - goes to the first entry or point of the selected stage within the Data and Maps viewers.

Go to end entry - goes to the end entry or point of the selected stage within the Data and Maps viewers.

Copy selected rows - copies selected entries to the clipboard.
To Excel - exports list of stages to a MS Excel file.
Print - prints the list of stages out.

The context menu can be opened by right click on a stage.

Stages viewer is synchronized with Map viewer, Data viewer and Diagram viewer. This means that when you select the stage in the Stages viewer (with double click), synchronized modules will display the information related to the selected stage - initial entry or point. For example, Data viewer will highlight the first entry associated with the selected stage.

Double click on a stage moves vehicle cursor to beginning of the stage. The start point of stage is denoted by a stage icon on vehicle track. Clicking on the icon displays additional data on the point.
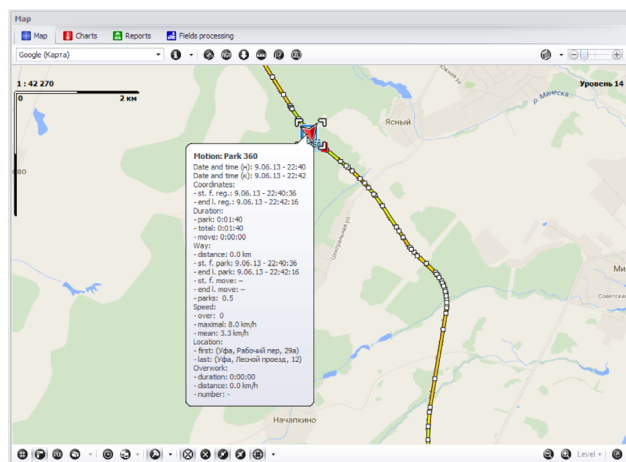

Fig.25. Click on the stage icon enables the hint.

CHARTS

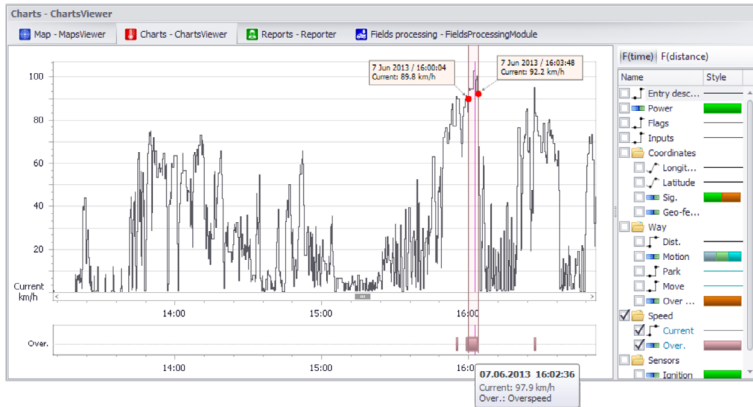Charts viewer constructs charts of different vehicle parameters related to time or distance.

Fig.26. Charts viewer.

To build a chart:

• select data to view in the Device selector;

• select a trip to view if the track sharing to trips is enabled;

• select a parameter in the Charts viewer to construct the chart. List of parameters of the module consists of all vehicle parameters available in the scheme. Chart viewer automatically recognises a type of selected parameter and constructs a diagram, if the parameter is a switch, or a chart for other types. The diagram displays intervals when the switch was enabled and disabled. The chart is a time-parameter or distance-parameter curve. Type of relation can be selected using F(time) and F(distance) options on the top of the list of charts.

• the user can select several parameters. When constructing, charts will overlay each other and diagrams will be stacked.

• when pointing the mouse at the chart, the hint displays date and time of the point and the parameter value.

• when pointing the mouse at a diagram, time span covered by the selected segment of the diagram will be highlighted (Fig.26).

REPORTS

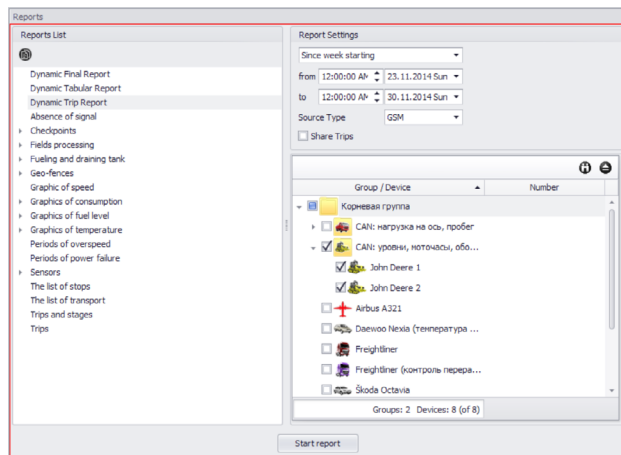The AutoGRAPH.NET has a built-in Reporter intended to generate various reports.

Fig.27. Reporter.

The window consists of several panels (Fig.27):

• Reports List is a list of supported reports. There are two general types: dynamic and pattern reports. Dynamic report is a report without a defined pattern, which consists of all available data on vehicle. Pattern report has a defined pattern and consists of only data sets specified by the pattern.

• Report settings allows to specify time span and another settings of reports.

• Device selector is a list of devices intended to select devices to generate reports for them. This list is a copy of the main Device selector.

To run a report:

• select a type of report;

• select vehicles for reporting by checking boxes;

• specify settings:

• *specify time span for reporting;*

• *select source of data. If data was downloaded from the server, select GSM type. If data was read via USB, select USB type.*

• *enable "Share Trips" option to report information about trips.*

• press the "Start report" button to generate report of selected type.

• after completing, the report can be printed out or saved as external file.

GEOFENCES

A geofence is a virtual area on a map, which will generate a notification, if an asset crosses the area. The AutoGRAPH.NET has a built-in Editor of checkpoints and polygons which allow to create and edit geofences.

The settings of geofences can be specified in the Geo-fences menu. To open the menu, follow *Main menu - "Tools" menu - Geo-fences*.
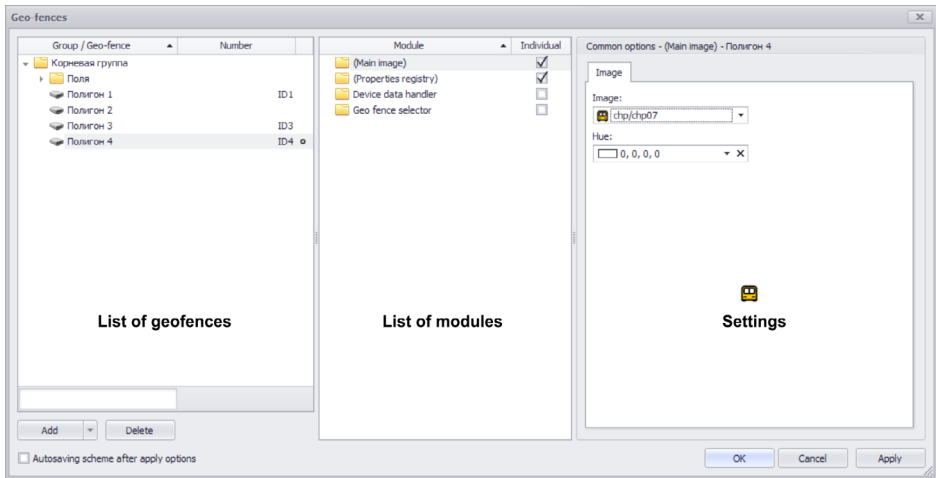

Fig.28. Geo-fences Menu.

SETTINGS

The list of geofences can have several layers of nesting. Every geofence can have individual settings or take its settings from the parent group.

To set individual settings:
• select a geofence;
• check "Individual" boxes of required modules in the list of modules;
• specify settings of selected modules.

To set settings on a group:
• select a group of geofences;
• check "Individual" boxes of required modules for selected group and uncheck "Individual" boxes for geofences in this group which must take group settings;
• specify settings of selected modules.

Main image

The options on this tab allows the user to select an image for the geofence, which will denote a geofence on map and in the Geo-fences selector. To specify the image select image and specify its hue.
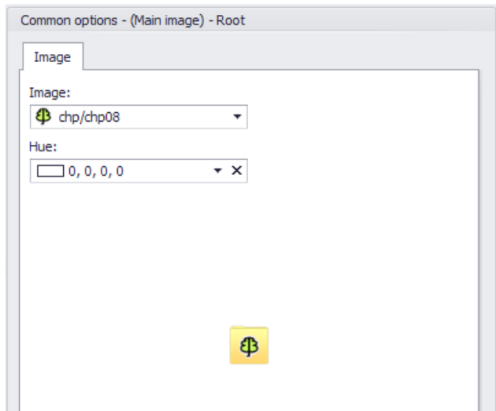
Fig.29. Main image of geofence.

Properties registry / Property card

The Properties registry is the registry which unites properties of a geofence. Registry of properties can be used to export data to external applications or to exchange data between modules within the AutoGRAPH.NET application. New property can be added to the registry manually or imported from geofences file.

A Property card is a card of properties, intended to add user-defined properties of geofences in the software. Depending on the scheme configuration, the Property card can be uninstalled.
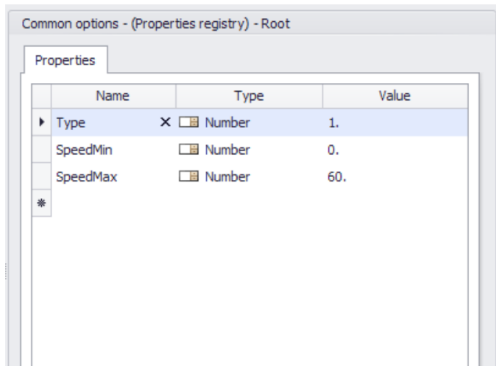
Fig.30. Properties registry of geofence.

Device data handler

Options of this module allows setup of parameters of geofence processing.

- **Check day of week** - days of the week when the application will check whether geofences are crossed. To check or uncheck all items quickly, use "Check / uncheck" button.
- **Fixation time** - is minimum time during which the vehicle must be in / or out of the geofence to fix entering / or exit from the geofence. Specify the fixation time in seconds.

Fig.31. Device data handler of geofence.
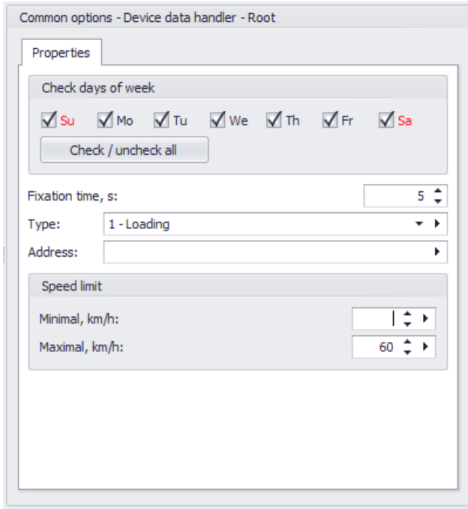
- **Type** is the type of the geofence. The type can be used for sorting geofences.
- **Address** is the address of the geofence. If the address is not specified, it will be identified using the installed address database.
- **Speed limit** - minimum and maximum values of vehicle speed in the geofence.

GEO-FENCE SELECTOR

Geofence selector is a module that stores list of geofences available in the scheme.
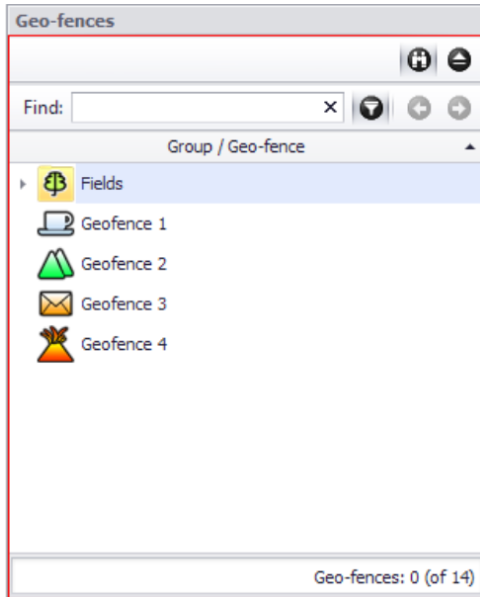
Fig.32. Geofence selector.
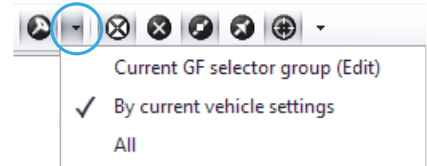
Fig.33. Checkpoints and geofences view.

Left click on the geofence shows its position on a map.

In the Map viewer the user can setup mode of geofence view (Fig.33).

- **Current GF selector group** - shows geofences of selected group.
- **By current vehicle settings** - shows geofences of selected vehicle.
- **All** - shows all geofences of Geo-fences selector.

"Checkpoints and geofences" button (⊘) enables / or disables geofences displaying on a map at all.

The user can monitor passing the geofenced area by a vehicle using the Stages viewer on the "Geo-fences" tab. This tab must be enabled by the system administrator.

Fig.34. Stages viewer. Geofences.

Index	Description	Date and time	Duration Total / Move	Way Distance	Way Parks	Way Over	Speed Maximal / Mean	Level
1	Geofence 1	1.06.13 - 05:00 / 2.06.13 - 08:19	1 d 03:18:42 / 0:35:57	1.2	39.5	0	44.9 / 14.2	25.9 / 24.2
1 - 2	–	2.06.13 - 08:19 / » - 08:25	0:06:26 / 0:06:26	4.1	0	0	64.0 / 46.4	24.2 / 23.5
2	Geofence 2	» - 08:25 / » - 08:26	0:01:03 / 0:01:03	0.4	0	0	42.1 / 34.0	23.5 / 23.5
2 - 3	–	» - 08:26 / » - 08:37	0:10:40 / 0:08:33	3.9	2	0	61.2 / 41.3	23.5 / 22.8
3	Geofence 4	» - 08:37 / » - 08:40	0:03:07 / 0:03:07	1.0	0	0	53.4 / 34.8	22.8 / 22.4
3 - 4	–	» - 08:40 / » - 08:43	0:03:30 / 0:03:30	0.8	0	0	37.1 / 17.7	22.4 / 22.2
4	Geofence 4	» - 08:43 / » - 08:44	0:00:23 / 0:00:23	0.0	0	0	13.4 / 7.7	22.2 / 22.2
4 - 5	–	» - 08:44 / » - 09:11	0:27:34 / 0:05:48	1.0	3	0	32.9 / 18.4	22.2 / 21.4
5	Geofence 4	» - 09:11 / » - 09:14	0:02:46 / 0:02:46	0.9	0	0	44.5 / 31.1	21.4 / 21.1
5 - 6	–	» - 09:14 / » - 09:44	0:30:02 / 0:12:51	2.3	7	0	50.3 / 27.8	21.1 / 21.3
6	Geofence 4	» - 09:44 / » - 09:51	0:06:47 / 0:05:37	1.7	1	0	59.1 / 32.6	21.3 / 20.3
125		1.06.13 - 05:00 / 9.06.13 - 22:59	8 d 17:59:22 / 1 d 00:17:24	549.9	514	5	93.2	25.9 / 26.6

The Stages viewer shows vehicle parameters into geofence and out of it. Double clicking on an item moves the vehicle cursor to the point associated with the first entry in the geofences and highlights this entry in the Data viewer.

CREATING GEOFENCES

The AutoGRAPH.NET Software has an integrated geofence editor intended to create, edit and delete checkpoints and polygons. To run the Editor, press the "Editor of checkpoints and polygons" button on the tool bar of the Map viewer.
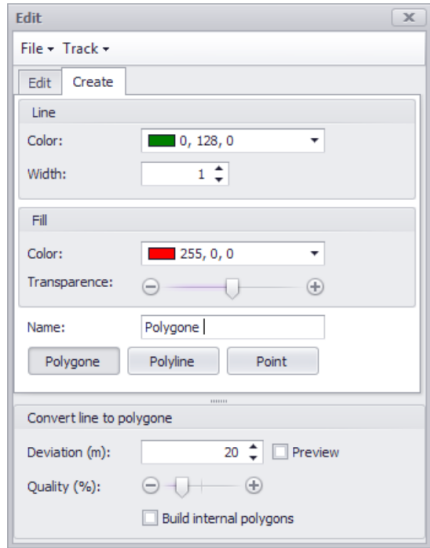
Editor window has two tabs - "Edit" and "Create". The "Create" tab is used to create a new geofence. The "Edit" tab is used to edit features of the created geofences. Both of the tabs have similar options. It is possible to configure the colour and thickness of the contour lines of the geofence, select the fill colour and specify transparency. The software supports following types of points: circle (Point), polygon and line (Polyline).

Fig.35. Editor of checkpoints and polygons.

To create a point:

• go to the "Create" tab.
• specify parameters of a new point: set the colour and thickness of lines, fill colour and transparency.
• enter the name for the new point in the "Name" field.
• select the type of the new point.
• use left mouse button to draw a new point on a map.

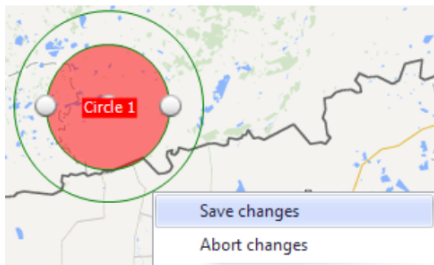The instruction below describes how to draw each type of geofence.
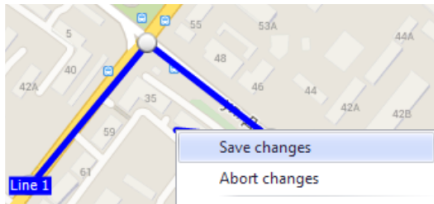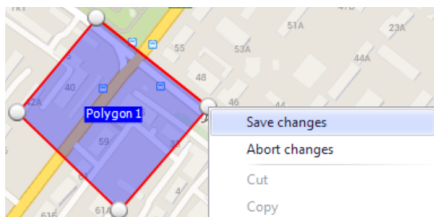

Fig.36. Creating a point.

Point

1. Place the central point on a map;

2. Configure the radius by moving the mouse pointer;

3. Right click to open the geofence context menu and select "Save changes" option in this menu.

Fig.37. Creating a line.

Polyline

1. Use left click to set nets of the polyline on a map. When drawing, the nearby points are automatically joined.

2. Before saving, it is available to move polyline's vertices. Use left click to move them.

3. Right click to open the geofence context menu and select "Save changes" option in this menu.

Fig.38. Creating a polygon.

Polygon

1. Select vertex of a polygon using the left click. The Editor will loop nearby points automatically to make a polygon.

2. Before saving, it is available to move polygon's vertices. Use left click to move them.

3. Right click to open the geofence context menu and select "Save changes" option in this menu.

It is possible to apply changes by pressing the Enter key. Pressing Ctrl+Z combination aborts changes.

To edit the geofence:
• go to the "Edit" tab;
• specify the geofence parameter on the tab;
• left clicking on the geofence opens the geofence context menu. The options of this menu are described below:
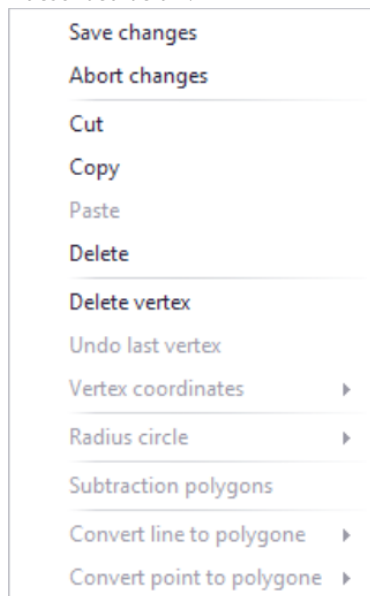
Menu
Save changes
Abort changes
Cut
Copy
Paste
Delete
Delete vertex
Undo last vertex
Vertex coordinates ▶
Radius circle ▶
Subtraction polygons
Convert line to polygone ▶
Convert point to polygone ▶

Fig.39. Geofence context menu.

Save changes - saves changes.
Abort changes - aborts last changes.
Cut - cuts selected geofences.
Copy - copies selected geofences to the clipboard.
Paste - pastes the geofence from the clipboard.
Delete - deletes selected geofences.
Delete vertex - deletes selected vertex of the polyline or polygon. Use the right mouse button to select the necessary area on the map.
Undo last vertex - deletes the last added vertex.
Vertex coordinates - allows changing of the coordinates of the selected vertex or point.
Radius circle - allows changing of circle radius.
Subtraction polygons - subtracts internal polygon from external one. To make the subtraction:
• place smaller polygon in the bigger;
• select bigger polygon;
• then select smaller polygon;
• use left click to select a geofence. Press and hold Ctrl key to select several geofences.
• open the geofence context menu and select "Subtraction polygons" option.

Convert line to polygon - converts the selected line to a polygon. Specify conversion parameters in the Editor window:
   Deviation - this option specifies the permissible width from the line to the polygon borders.
   Quality (%) - this option determines how accurate the polygon should be made. The higher the quality, the more system resources are required to make a polygon.
   Build internal polygons - this option allows areas inside the polygons to be made.
   Preview - preview of the polygon prior to building.

Convert point to polygon - converts the selected point to a polygon. Prior to conversion, specify the name for a new polygon and the number of its vertices. The circle will be converted to a regular polygon with the selected number of vertices. Polygon will be created as the same dimensions as the circle. You can change the layout of the vertices of the created polygon in the "Edit" tab. Select this polygon with a right-click and drag its vertices with a left-click.

AutoGRAPH.NET