TechnoKom

GLONASS GPS


DOCUMENT VERSION 2.1

GLONASS GPS

# AutoGRAPH NAVIGATOR

## DRIVER ASSISTANT, TASK MANAGEMENT AND NAVIGATION SYSTEM

## USER MANUAL

SMS

# Table of content

# Introduction

This User Manual applies to AutoGRAPH-NAVIGATOR devices of revision 2.0 (hereafter – device) produced by TechnoKom Ltd. The User Manual contains installation and connection procedures of this device, as well as its function and control. This Manual constitutes the Operating Rules to be observed to ensure successful operation of the device and its compliance to warranty provisions.

For proper operation of the AutoGRAPH-NAVIGATOR device, a user should be aware of operating principles of the vehicle tracking system as a whole, as well as understand functions of its individual components. Therefore, it is highly recommended to study the fundamentals of operation of GPS navigation, GSM communication, peculiarities of short message service (SMS), GPRS and the Internet before starting.

IMPORTANT

*Some functions of AutoGRAPH-NAVIGATOR devices depend on capacities and configuration of the existing mobile network operator (MNO). Furthermore, some functions may be disabled by the operator, or their operating range may be limited due to the settings of the network. To check availability of a certain function, contact your mobile network operator.*

IMPORTANT

*All information on functions, functional capabilities and other specifications related to AutoGRAPH-NAVIGATOR devices, as well as all information contained in this User Manual is based on current data (at time of writing) and is deemed to be valid as of the date of publication. Technokom reserves the right to modify the information or specifications without prior notice or commitment.*

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# Product Overview

AutoGRAPH-NAVIGATOR is a driver assistant, task management and navigation system which provides following features:

- vehicle tracking and navigation;
- control of movement parameters and vehicle operation;
- task management;
- auto routing and route control;
- messaging;
- voice communication;
- sending vehicle operating status to dispatcher.

# Technical Specifications

## Technical specifications

| Description | Value |
|---|---|
| GNSS receiver | uBlox MAX-M8Q |
| Supported GNSS | GLONASS+GPS / GALILEO / Beidou |
| Channels | 72 |
| Time to first start[1], s | 26 |
| Position accuracy[1], m | 2.0 |
| Processor | ARM Cortex A8 Core AM3354, 1GHz |
| RAM, Mb | 512 |
| External memory | microSDHC<br>up to 32 Gb |
| Display | 7'', 800 x 480 |
| Display type | TFT, touchscreen |
| OS | Microsoft Windows<br>Embedded Compact 7.0 |
| GSM modem | Yes |
| Communication | 3G UMTS[2] / GSM (GPRS / SMS) 850 / 900 / 1800 / 1900 MHz |
| SIM holders | 2 |
| Antenna (GPS / GLONASS, GSM) | Internal |
| Connection to PC | USB 2.0 |
| Built-in accelerometer / motion sensor | Yes |
| Audio interface (GSM) / Loudspeaker amplifier | Yes |
| Built-in microphone | Yes |
| Operating voltage, V | 10...60 |
| Power consumption at 12 VDC, mA | 700 |
| Type of internal backup battery | Li-Polymer |
| Battery capacity, mAh | 1500-4500 |
| Battery life, hours | ~ 1 |
| Built-in battery Charger | Yes |
| Operating temperature[3],°C | -40...+85 |

[1] With nominal navigation signals level -130dBm.

[2] Optional.

[3] Does not apply to the device battery.

| Description | Value |
|---|---|
| Weight, g | 500 |
| Dimensions, mm | 205 x 115 x 15 |
| Average life time, years | 7 |

## Functional specifications

Specification given below is applicable to AutoGRAPH-NAVIGATOR firmware of version 2.0.0.15.

- *Message handling via data server.*
- *Loading files from server.*
- *Voice communication.*
- *Task management.*
- *Routing.*
- *Route tracking.*
- *Autoinformer mode, intended for an announcement of public transport stops and other information in public transport.*
- *Vehicle operation indication.*
- *Vector, internet and raster map support.*
- *Voice reporting about battery discharge and other events.*
- *Searching for an address in address base.*
-

# Scope of supply

| № | Description | Qty |
|---|---|---|
| 1 | AutoGRAPH-NAVIGATOR device | 1 |
| 2 | Power supply cable | 1 |
| 3 | Power adapter-bracket | 1 |
| 4 | 3A fuse with a holder | 1 |
| 5 | SD-card, 4 Gb | 1 |
| 6 | Windscreen mount holder | 1 |
| 7 | Warranty certificate | 1 |


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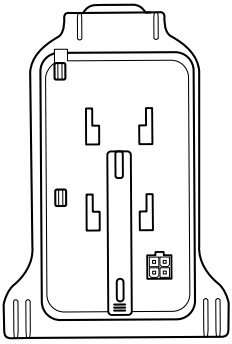

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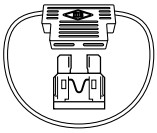

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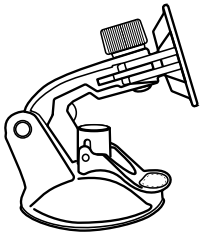

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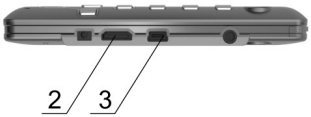
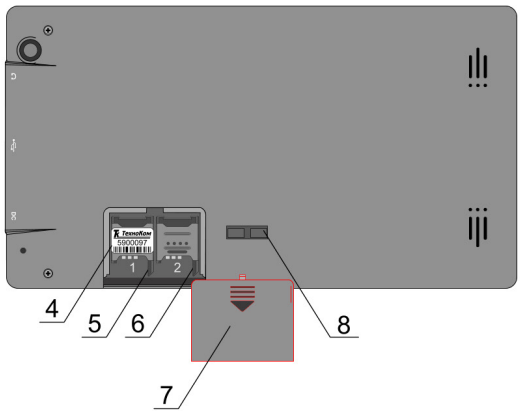
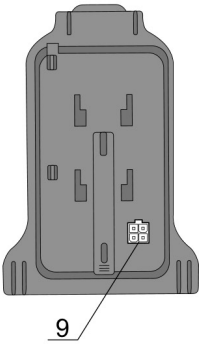
# Components of AutoGRAPH-NAVIGATOR

## Basic

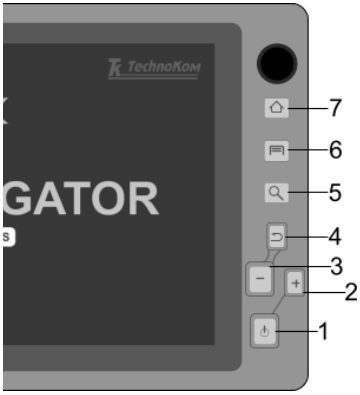




1. **Control buttons.**
2. **MicroSD card hole.**
3. **Mini USB connector.**
4. **Label with serial number[1].**
5. **Main SIM holder[1].**
6. **Backup SIM holder[1].**
7. **Removable panel.**
8. **Power contacts.**
9. **Power connector.**

[1] To access component, the removable panel must be removed.

## Control buttons




**1. Switch On/Off button**
Short press turns on / off the display backlight. Long press (longer than 3 seconds) turns on/ off the device.

**2. Zoom in button in Navigation menu.**

**3. Zoom out button in Navigation menu.**

**4. Back**
Returns to previous menu.

**5. Searching**
Opens address searching menu in the Navigation menu.

**6. Main menu**
Goes to the main menu.

**7. Alert button**
Long press (longer than 3 seconds) sends alert message to server.

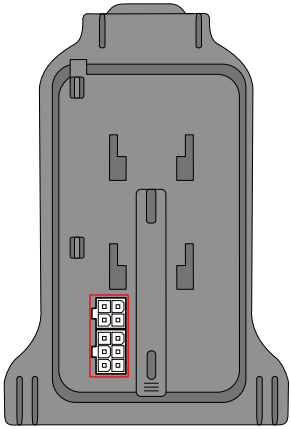
NOTE

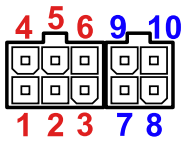
*To avoid an accidental pressing, it is required the delay between sequent presses a button must be at least 3 seconds. Otherwise presses aren't processed.*

# Interface connectors

### Power connector

The device power connector is arranged on the power adapter-bracket, supplied with the device.






| № | Colour of a wire in a cable | Assignment |
|---|---|---|
| 1 | Black | -Vin |
| 2 | Green with a white strip | CAN (H)* |
| 3 | Brown with a white stripe | RS-485 (B)* |
| 4 | Red | +Vin |
| 5 | Yellow with a white stripe | CAN (L)* |
| 6 | Orange with a white stripe | RS-485 (A)* |

| № | Colour of a wire in a cable | Assignment |
|---|---|---|
| 7 | Orange with a green stripe | RS-232 RxD* |
| 8 | Reserved | --- |
| 9 | Brown with a blue stripe | RS-232 TxD* |
| 10 | Pink | 1-Wire* |

* Not available in the current version of AutoGRAPH-NAVIGATOR.

# Getting started

Before starting the operation, ensure that the AutoGRAPH-NAVIGATOR device is configured, SIM and SD cards are installed.
All necessary information on the device configuration, SIM and memory card installation is given below. It is highly recommended to study this information before starting the device installation procedure.

## SIM installation

AutoGRAPH-NAVIGATOR is equipped with a holder for two SIM cards. For proper operation, it is quite sufficient to insert the main SIM card into the device. But the backup card provides the appropriate operation of the device even if the main SIM card is damaged.

**To insert SIM cards:**

- Ensure that the AutoGRAPH-NAVIGATOR device is turned off.
- Remove the removable panel of the device back cover.
- Insert a SIM card in the holder intended for the main SIM card (number 1). SIM holder are marked with numbers on the PCB. To open the holder cover, shift it from the edge of the PCB and open (Fig.1, i.1). Be sure that the SIM card is inserted into the retaining slot with its cut angle facing the edge of the printed circuit board (Fig.1, i.2).

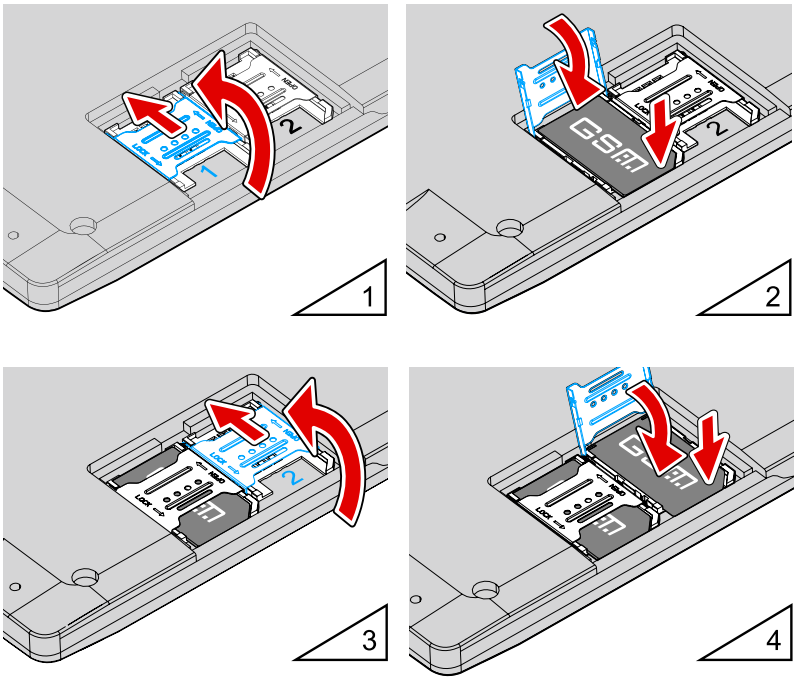



**Fig.1. SIM cards installation.**

- If necessary, insert a second SIM card in the holder intended for the backup SIM card (Fig.1, i.3). Be sure that the SIM card is inserted into the retaining slot with its cut angle facing the edge of the printed circuit board (Fig.1, i.4).
- When the SIM cards are connected, place the removable panel back.

IMPORTANT

*Specify PIN code of all device SIM cards in the device settings before you turn on the device. Use the configuration application «AGNavConfig» to configure the device (for detailed information see section «Device configuration» of this User Manual).*

IMPORTANT

*Do a test of a new SIM card in a cell phone before you install it into the device. This ensures that GPRS / SMS / USSD services are enabled and operate properly, the PIN code matches the code preset in the device (in order to prevent locking), and a personal account associated with the SIM card has the sufficient balance for successful operation of the services.*

NOTE

*AutoGRAPH-NAVIGATOR starts operation with the main SIM card. If the main SIM card is unavailable (disabled, damaged or not inserted), the device will switch to the backup SIM card.*

## MicroSD card installation

AutoGRAPH-NAVIGATOR supports connection of a microSD card with capacity up to 32Gb. The device external memory is used to store firmware files, maps, task files and etc. AutoGRAPH-NAVIGATOR is supplied with 4Gb microSD card.

### BEFORE THE INSTALLATION

The SD-card, supplied with the device, contains all files required for the proper operation of the AutoGRAPH-NAVIGATOR device.

Load all necessary maps in the device SD-card. All maps must be located in the folder \AGMap of the SD-card.

### SD-CARD INSTALLATION

MicroSD card slot is located on the device right side panel.

**To install SD card in the device:**

- Ensure that the AutoGRAPH-NAVIGATOR device is turned off.
- Insert a microSD-card in the slot with the card's contacts upward (Fig.2).

To remove the microSD card, gently push the card's external edge and release it. Then remove the card.

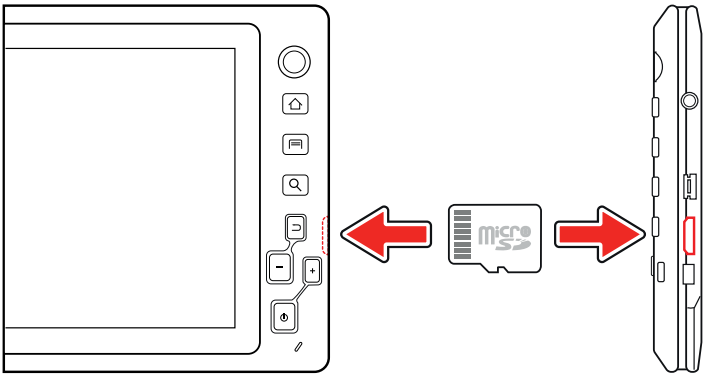



**Fig.2. SD-card installation.**

## External power connection

The AutoGRAPH-NAVIGATOR device is connected to the power supply source through the interface cable supplied with the device. Also the device is supplied with power adapter-bracket intended to connect the device to power source using the interface cable. The power adapter-bracket is also used to mount the device on the windscreen holder.

**To connect external power to the device:**

- Mount the power adapter-bracket on the back side of the device. Ensure that the contacts on the inside of the power adapter-bracket match the power contacts on the device.
- Connect the interface cable supplied with the device, to the vehicle power source. When making connections, pay special attention to the safety rules stipulated by the regulations for motor vehicle repair procedures. All connections should be properly isolated and securely connected.
- Connect the interface cable to the interface connector of the power adapter-bracket.
- The AutoGRAPH-NAVIGATOR device starts operation immediately after the power connection. The device start-up window is given on Fig.3.


**Fig.3. Start-up window.**

**To turn on the device when external power is disconnected:**

- Press and hold Switch On/Off button located on the device front panel, for 3 seconds. The device will start loading.
- When external power is disconnected, the device is powered by internal backup battery. An approximate battery life time is 1 hour.


*Before turning on the device, when it is powered by internal battery, ensure that the battery is charged. Otherwise, the device doesn't turn on.*

When the device system have been loaded, the device runs the work screen – Navigation menu. This menu is intended to navigate and track an asset, and calculate route to the selected destination.

To go to the main menu, press the Menu button on the lower right of work screen (Fig.8). Main menu provides quick access to the device main options.

## Device turning off

- To turn off the device using the Switch On/Off button, press and hold it for 3 seconds. The device will prompt the user to confirm its turning off (Fig.4). Press Yes to turn off the device or press No to cancel turning off and continue operation.
- The device can be turned off by virtual button. To do it, go to the Settings menu and press the TURN OFF button (Fig.9).

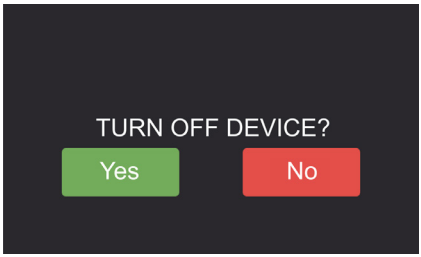



**Fig.4. Turn off confirmation.**

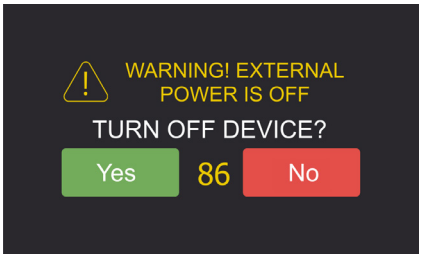



**Fig.5. Notification of external power turn off.**

To prevent over-discharging of the internal battery, automatic device turning off is provided when the external power is disconnected. When the external power turns off, the device notifies the user about it using voice and text notifications and prompts the user to turn off the device (Fig.5).

## Interface language

It is recommended to select the necessary interface language when device turns on. To select a language, select the Settings menu in the Main menu, then select *Preferences/Common* and set up the necessary language (Fig.6).

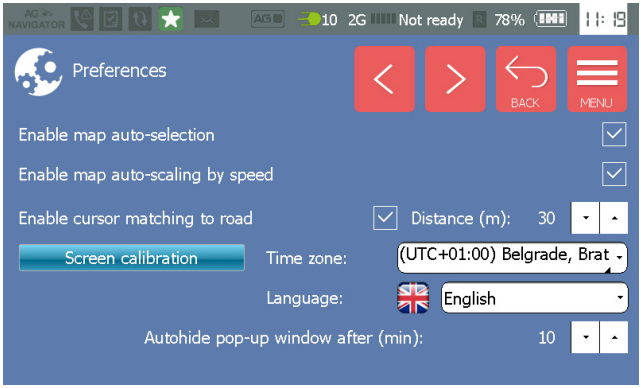



**Fig.6. Language selection.**

When the language is selected, restart the device to apply changes. To turn off and turn on the device, follow instructions given in previous sections.

# Alert signal

In an emergency, you can send an alert signal – SMS message to data server. To do it, press and hold for at least 3 seconds the Alert button on the device front panel.


**Fig.7. Alert button.**

# Main menu

When the device has turned on, press the Menu button in the Navigation menu to go to the Main menu.

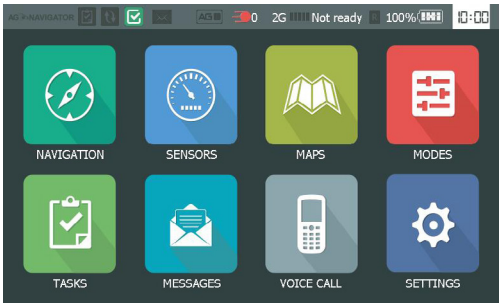



**Fig.8. Main menu.**

Main menu provides quick access to the device other menus. Described below is the Main menu options:

- **Navigation** – allows the vehicle navigation and tracking.
- **Sensors** – provides indication of the vehicle operation parameters. The menu is not available in the current version of firmware.
- **Maps** – provides list of available maps.
- **Modes** – allows selection of the device operation mode.
- **Tasks** – provides list of driver tasks.
- **Messages** – provides messaging function: message transmission and reception.
- **Voice call** – provides voice calls.
- **Settings** – provides access to the device settings.

# Settings menu

At first start, it is recommended to set up the device. To do it, go to the Settings menu by selecting the SETTINGS option in the Main menu.

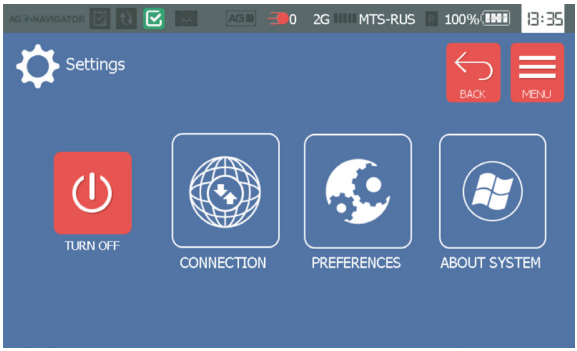



**Fig.9. Setting menu.**

Described below is options available in the Settings menu**:**

- **TURN OFF button** – turns off the device.
- **Connection** – opens the Connection menu intended to indicate operation of GNSS and GSM modules of the device.
- **Preferences** – opens the device settings menu.
- **About system** – provides information about the device.

To return to the Main menu, press the Menu button. To go to the previous menu, press the Back button.

Detailed information on options available in each menu is given in sections below.

## Preferences

Select the Preferences option in the Settings menu to go to access the device settings.
The Preferences menu consists of two sections: Common and Sound.
To set up the device general settings, such as time zone, language, maps auto selection and etc., go to the Common menu. To set up the device sound settings, go to the Sound menu.

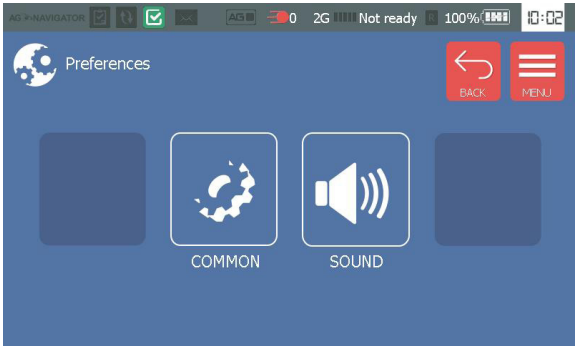



**Fig.10. Preferences menu.**

To go to the next page in the Common and Sound menus, use button >. To go to the previous page in the Common and Sound menus, use button <.

## Common settings

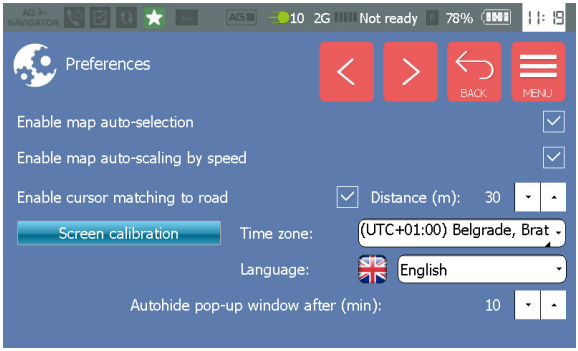
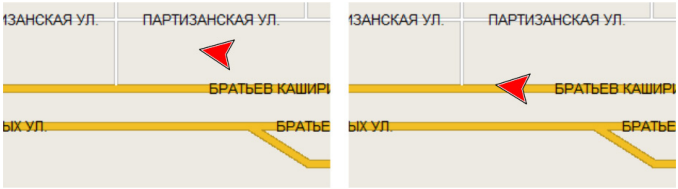



**Fig.11. Common menu.**

Settings available in the Common menu is described below:

- **Enable map auto-selection** – enables automatic selection of a map from the list of available maps to display the vehicle position if the selected map does not cover vehicle location area. List of available maps is given in the Maps menu. Also the Maps menu allows the user to select other map to view vehicle position.
- **Enable map auto-scaling by speed** – enables automatic adjustment of map scale relating to vehicle speed providing the smaller scale for the higher speed.
- **Enable cursor matching to road** – enable matching of vehicle cursor to road if vehicle is not far from the road than the specified distance. The distance must be specified in meters. This option allows vehicle position correction.

Sample tracks when the option are enabled and disabled is given on Fig.12:




1 – option is disabled. 2 – option is enabled.

**Fig.12. Application of "Enable cursor matching to road" option.**

- **Screen calibration button** – starts touchscreen calibration procedure. To calibrate the device touchscreen, it is necessary to set and hold cursor in the center of the target on the screen. Complete all calibration steps following the instruction at the top of display. The touchscreen calibration is intended to adjust the sensor response to user touches. If incorrect sensor response occurs, it is recommended to make touchscreen calibration.
- **Time zone** – select the necessary time zone in the drop-down menu.
- **Language** – select the necessary language of the device interface. The devices restart is required to apply language settings.
- Auto hide pop-up window after (min) – specify an interval of auto hiding of pop-up windows.

## Sound settings

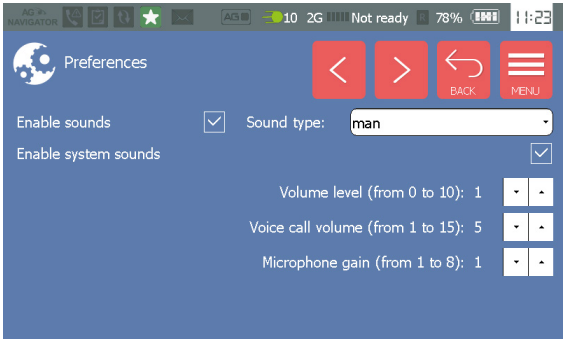



**Fig.13. Sound menu.**

- **Enable sounds** – turns on sound notification of different events, e.g. geofence entrance.
- **Sound type** – select voice type of sounds in the drop-down menu.
- **Enable system sounds** – turns on sound notification of system events, e.g. external power shutdown.
- **Volume level (from 0 to 10)** – set sounds volume using Up and Down buttons. Volume level ranges from 0 to 10: minimum value is 0, maximum value is 10.
- **Voice call volume (from 1 to 14)** – set voice call volume using Up and Down buttons. Voice call volume level ranges from 1 to 14: minimum value is 2, maximum value is 14.
- **Microphone gain (from 1 to 8)** – set device microphone gain using Up and Down buttons. Minimum gain is 1, maximum value is 8.

## Connection

Connection menu is intended to indicate operation of GLONASS/GPS receiver and GSM modem of the AutoGRAPH-NAVIGATOR device.

The menu consists of two sections:

- **GSM** – provides indication of GSM modem operation.
- **GPS** – provides indication of GLONASS/GPS receiver operation.

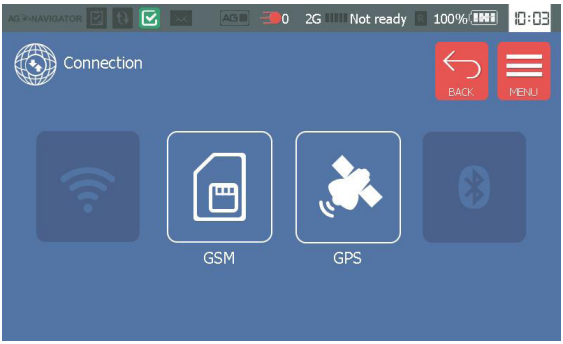



**Fig.14. Connection menu.**

### GSM menu

In this menu, the user can check GSM modem operation, including state of file loading, data transmission, and etc.
Information available in this menu is described below:

1. **Serial number** – AutoGRAPH-NAVIGATOR serial number.
2. **GSM signal level in dBm.**
3. **Active SIM** – SIM number currently used by the device: 1 – main SIM, 2 – backup SIM.
4. **Modem status** – GSM modem current status. If GSM modem is ready, its IMEI is displayed. Also data transmission state is indicated in this field. The device collects coordinate data and driver statuses, and sends them to data server. If there is no data to be transferred, the messages “No data” is displayed. The modem last operation and time of the operation are displayed in the next string, e.g “Modem was restarted: 1-10:03:37”, where 1 – time spent for the operation (in ms), 10:03:37 – time of operation.
5. **File loading state** – indicates state of loading the file from data server.

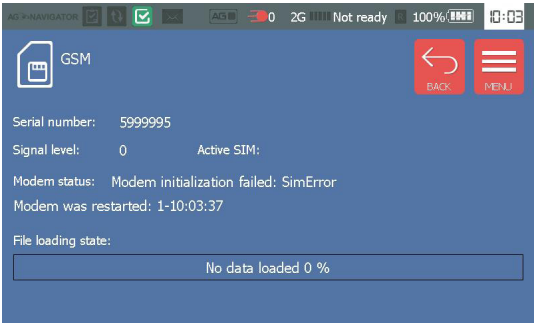



**Fig.15. GSM modem status.**

## GPS menu

The GPS menu provides indication of GLONASS/GPS receiver operation.
The receiver mode is displayed in the Mode field. The device receiver supports hybrid navigation system, e.g. GLONASS+GPS.
When GNSS signal is pure, the warning about loss of accuracy is shown. Current position accuracy is displayed on the right of the warning sign.


**Fig.16. GPS menu.**

To enable additional menu providing detailed information on GNSS signal and satellites location, press button (Fig.16).

This menu contains the receiver logs, GNSS signal digram and satellites position map (Fig.17):

1. **Receiver logs** contain service information on the receiver operation.
2. **Horizon visibility diagram** displays location of GLONASS and GPS satellites relative to the device, which the device is connected to. GPS satellites are denoted with label , GLONASS satellites are denoted with label .
3. **Number of visible GLONASS (GLS) and GPS satellites.**
4. **Signal to noise diagram for GPS satellites** which the device is connected to. X-axis contains number of GPS satellites providing the device location. Y-axis displays signal to noise value (in dB) of a satellite.
5. **Signal to noise diagram for GLONASS satellites.** The diagram is generated similar to the GPS satellites diagram.


**Fig.17. GLONASS/GPS state.**

## About system

To view information about system, select the About system option in the Settings menu (Fig.9). In addition to information about the device system, this menu allows the user to update the device firmware.

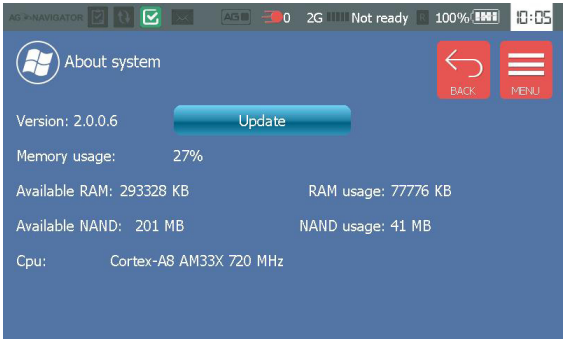



**Fig.18. About system.**

**To update the device firmware:**

1. Remove SD-card from AutoGRAPH-NAVIGATOR.
1. Connect the SD-card to a PC.
2. Create a new folder in the SD-card (in root directory).
3. Rename new folder by “newversion”.
4. Copy an update file in the *\newversion* folder. The update file has the next format – AGNV-2.0.0.1.eraw, where 2.0.0.1 is a firmware version.
5. Insert the SD-card with the required update file into AutoGRAPH-NAVIGATOR, then turn on the device.
6. When the device system has been loaded, go to the About system menu.
7. Press the Update button in this menu and wait for the updating finishing.
8. It is not available to install the updates which have been installed already. So, when trying to load already installed update, the updating procedure won’t start.

# Navigation

The AutoGRAPH-NAVIGATOR device provides real-time vehicle tracking and navigation. To start vehicle navigation, go to the Navigation menu.

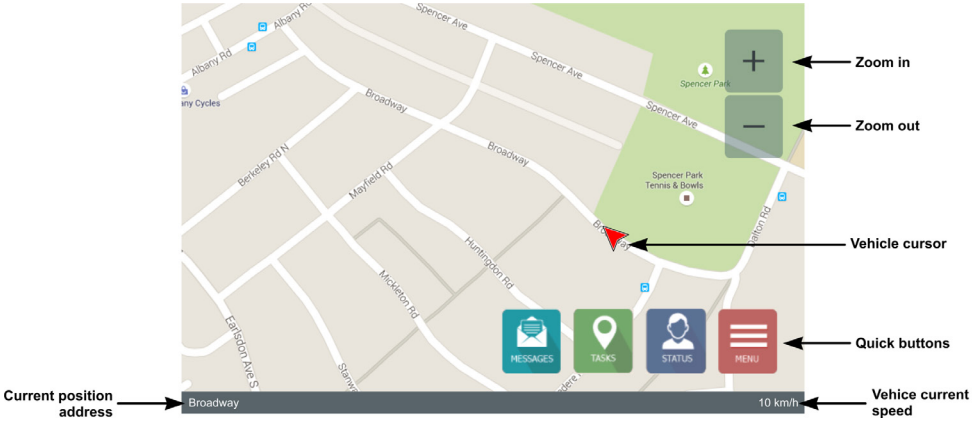



**Fig.19. Navigation menu.**

On the Navigation menu, the vehicle current position is displayed on a map using a vehicle cursor (Fig.19). The cursor moves along the vehicle and displays direction of movement. The vehicle current speed is indicated on the lower right of the screen. The street where the vehicle is in, is displayed on the lower left of the screen.

To adjust map scale, use on-screen buttons + and −. Also there are Zoom in and Zoom out buttons on the front panel of the device.

Quick buttons (Fig.19) provide easy access to the device other menus.


Goes the Inbox menu providing a list of incoming messages. A number of new incoming messages are displayed on the Status bar.


Goes to the Task menu to view new tasks received by the device. When the device receives a new task, the New task indicator on the Status bar turns on.


Goes to the Status menu allowing selection of a driver status. The driver current status is displayed on the Status bar. Information on driver statuses is sent to the server along with other data providing real-time driver status monitoring in the Dispatch software.


Goes to the Main menu.

## Map selection

The user can select any map of supported formats for the Navigation menu. AutoGRAPH-NAVIGATOR supports vector, raster and online maps.

### Loading a new map in the device

All necessary maps should be stored in the *\AGMap* folder in the SD-card root directory.

- The device supports vector maps of .agv format. Vector maps of other formats are required to be converted to .agv format before loading in the device.
- Prepared vector map should be stored in the *\AGMap* folder in the SD-card root directory.
- To load a raster map in the device, all files of the map – 1 file of .bmp format and 1 file of .map format, must be stored in the *\AGMap* folder in the SD-card root directory.
- To load an internal map in the device, its cache files must be saved in the *\AGMap* folder in the SD-card root directory.

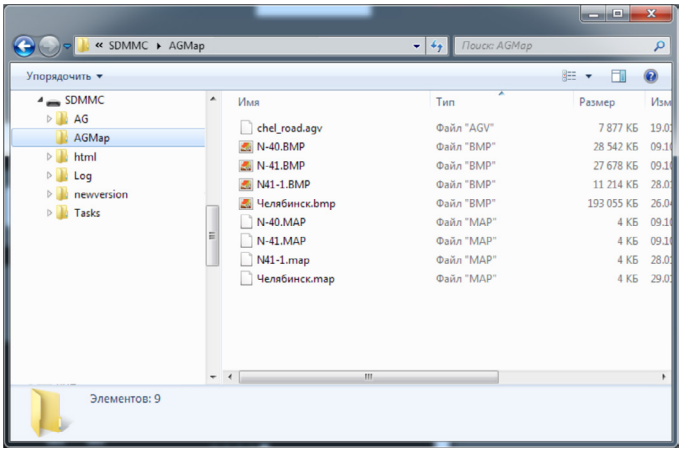



**Fig.20. AGMap folder.**


*To convert a vector map to .agv format, use Vector map converter supplied with the AutoGRAPH.NET Dispatch software. The AutoGRAPH.NET Dispatch software can be downloaded for free from TechnoKom official web-site.*

## Map selection

To select the necessary map, go to the Maps menu (Fig.21). To do it, select the Maps option in the Main menu.

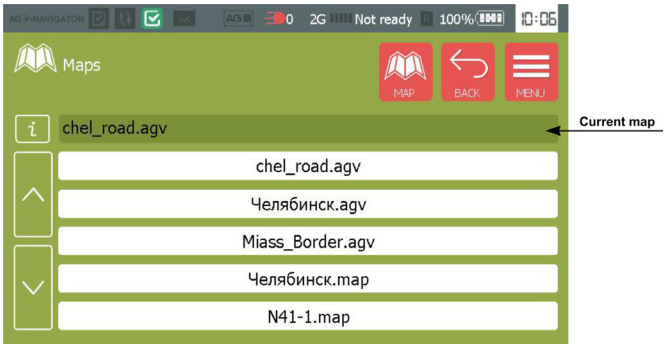



**Fig.21. Maps menu.**

- All maps of the supported formats, loaded in the */AGMap* folder on the device SD-card, are available in the Maps menu.
- To open a map, click the map. The map loading will be started. A map loading time depends on the map size.
- The current selected map is displayed at the top of list, e.g. chel_road.agv map on Fig.21.
- To view information about selected map and set up its level of detail, press the button i.
- To scroll the list of maps, use Up and Down buttons on the left of the screen.

To go to the Navigation menu, press the Map button at the top.
To return to the Main menu, press the Menu button.

# Status bar

Status bat at the top of the device screen provides indication of important events and the device operation. The status bar is always on top. Description of status bar indicators is given below.


**Fig.22. Status bar.**

**MISSED CALL**

The indicator notifies the user about missed incoming call. To view details of the missed call, go to the Voice call menu.

Missed call.

No missed calls.

**NEW TASK RECEIVED**

The indicator notifies the user about receiving a new task. To view the received task, go to the Task menu.

New tack is received.

No tasks.

**DATA COMMUNICATION**

The indicator indicates state of data communication: data loading from server or data transmission to server.

Data communication is in progress.

No data is being sent or received.

**DRIVER STATUS**

The indicator displays the driver current status. The indicator changes depending on the selected status. To set other status, go to the Status menu by pressing the Status button in the Navigation menu.

Driver status is Ready.

**INCOMING MESSAGE**

The indicator notifies the user about a new incoming message. A numbered badge on the right of the indicator displays a number of new incoming messages. To read incoming messages, go to the Messages menu. Quick access to the list of incoming messages is provided by the Messages button on the Navigation menu.


12 incoming messages.

No message.

**CONNECTION TO AutoGRAPH ON-BOARD CONTROLLER**

The indicator indicates connection to the AutoGRAPH on-board controller. AutoGRAPH-NAVIGATOR devices, equipped with RS-232 bus, support connection to the AutoGRAPH controller to exchange data.


Connected to AutoGRAPH.


Do not connected to AutoGRAPH.

**GNSS SIGNAL STATE**

The indicator displays position acquisition state and a number of visible satellites.


Position is determined. Number of visible satellites – 10.


Position is not determined. Number of visible satellites – 0.

**COMMUNICATION STANDARD**

The indicator displays communication standard currently used: 2G, 3G, 4G, and etc.


The device is connected to 3G network.


The device is connected to 2G network.

**GSM SIGNAL LEVEL AND MOBILE OPERATOR**

The indicator indicates GSM signal level. A badge on the right of the indicator displays mobile network operator.


Connected to GSM network provided by Rostelecom mobile operator.

GSM signal is not available.

**ROAMING**

The indicator notify the user about connection to roaming network.


Connected to roaming network.


Connected to home network.

**INTERNAL BATTERY LEVEL**

The indicator displays remaining battery level in % and as a diagram.


Battery is charged.


50% remaining.


Low battery level. It is recommended to connect the device to external power.


Battery is discharged. It is highly recommended to connect the device to external power to avoid the device switch off and battery over-discharging.

**CURRENT TIME**

24-hour format is used to display current time.


Current time – 12:00.

# Address searching

To search for an address on the map, go to the Navigation menu and press the Searching button on the device front panel.


**Fig.23. Searching button.**

Alternatively you can open this menu as follows:
- in the Navigation menu, click a map and hold until the Route menu appears;
- in the Route menu, press “Select address”.

In the Select address menu (Fig.24), first you need to enter a city to search. The device will show a list of items found in the installed address base. Next you need to select an appropriate item in the list of available variants. In a similar way you need to select street and house number for searching.

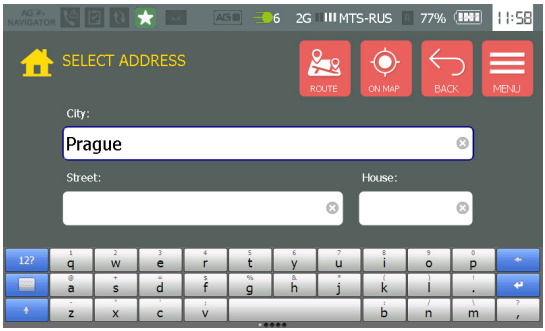



**Fig.24. Select address menu.**

As an address is selected you can find it on map pressing the button “ON MAP” on the upper right of the main screen.
To calculate a route to the selected address, press the “ROUTE” button.

### Address base installation

AutoGRAPH-NAVIGATOR uses default address base, loaded in the device SD card. If you need to use other address base, you may copy the necessary address base file in the \AddressBase directory on the device SD card. Only one address base file can be stored in this directory. All address base files which are not used must be removed from the \AddressBase directory

AutoGRAPH-NAVIGATOR supports address base of the .aga2 format. This is a format used in the AutoGRAPH 5 Dispatch Software.

# Auto routing

AutoGRAPH-NAVIGATOR provides calculation of optimal route to the selected destination.

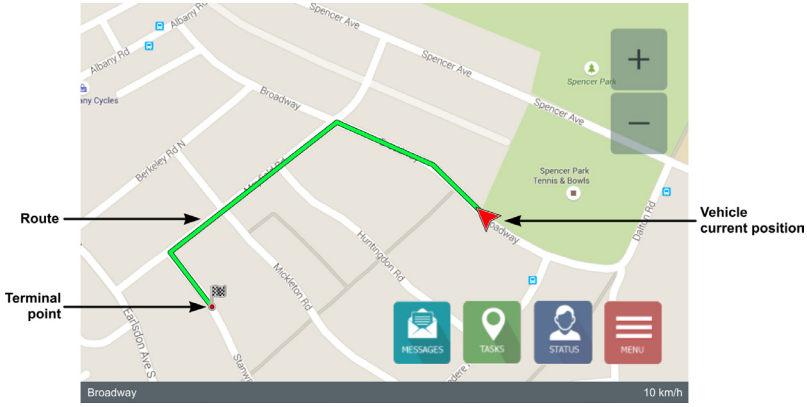



**Fig.25. Following a route.**

Also the device provides route tracking:

- when a vehicle follows a route, its current position and movement direction are indicated on screen;
- when a vehicle departures the route, the device notifies of it using voice notification;
- when a vehicle achieves the destination, the device notifies of it using voice notification.

Before routing, ensure that the map used for routing is equipped with graph.

**IMPORTANT**

*Routing is available only on maps equipped with special graph.*

**To check a map:**

- Load the map in AutoGRAPH-NAVIGATOR.
- Turn on the device and go to the Maps menu by selecting Maps option in the Main menu.
- Select this map in the maps list to open it.
- Open information about selected map by pressing button i in the Maps menu, and ensure that the loaded map is equipped with graph.

**To calculate route:**

• turn on AutoGRAPH-NAVIGATOR and wait until the device acquires position. State of positioning is indicated on the Status bar;

• open the required map with graph which will be used for route calculation;

• go to the Navigation menu of the device. To do it, select the Navigation option in the Main menu;

• select a destination point on the map – tap the required point and hold until the routing menu runs (Fig.26);

• set the selected point as terminal point of the route. To do it, press the Terminal point option in the routing menu;

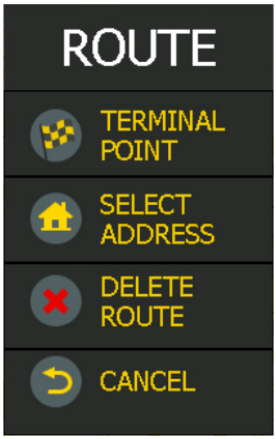



**Fig.26. Routing menu.**

• the device will start calculation of optimal route from the device current position to the selected point. The route terminal point is designated with an icon (see Fig.25);

• when the route is calculated, AutoGRAPH-NAVIGATOR starts the route tracking;

• when vehicle achieves the destination point, the device finishes tracking;

• to finish the tracking manually and delete current route, open the routing menu and select the Delete route option. The device will finish the route tracking;

• to close the routing menu, press Cancel.

• Alternatively you can select a terminal point by a certain address. AutoGRAPH-NAVIGATOR supports searching for an address in internal address base. To select terminal point in the address base, press Select address in the Route menu (Fig.26). It will open the Select address menu intended to find required address in address base. Detailed information on how to search for the required address and calculate route to it is given in the “Address searching” section of this User manual.


*To be able to calculate a route till an address, the address base of .aga2 format is required. Detailed information on address base installation see in the “Address searching” section of this User manual.*

# Auto informer

The Auto informer mode is intended to customize AutoGRAPH-NAVIGATOR for the operation in public transport. This mode provides automatic announcement of public stops and advertisements.

**Route preparation for the Auto informer mode**
Route file is created in the Route Editor intended to prepare routes for AutoGRAPH-NAVIGATOR and AutoGRAPH-INFO devices. This application compiles the file, including sound files, stops list, and other files required to the proper route processing.

**Route loading in AutoGRAPH-NAVIGATOR**
Compiled route file must be loaded in *\RouteControl* folder located in the device SD-card root directory. If there is no *\RouteControl* folder in the SD-card root directory, create it manually.

NOTE

*For more detailed information on route compilation, see the document "Route Editor".*

**To switch the device to Auto informer mode**

- Turn on AutoGRAPH-NAVIGATOR and wait until the device acquires position. The state of position acquisition is indicated on the Status bar.
- Then select the Modes option in the Main menu to go to the Modes menu (Fig.27). This menu allows the user to switch the device to the required mode of operation. Current version of the device firmware supports one mode – Auto informer.
- Switch the device to the Auto informer mode. This mode requires prepared route file. In this mode, the device displays name of current route and vehicle next stop (Fig.28). If the route file hasn't been selected, the rout and next stop fields are empty.
- To select a route, press the Route button, then select the required route. The route list (Fig.29) contains all route files stored in the *\RouteControl* folder. To scroll the list use Up and Down buttons.

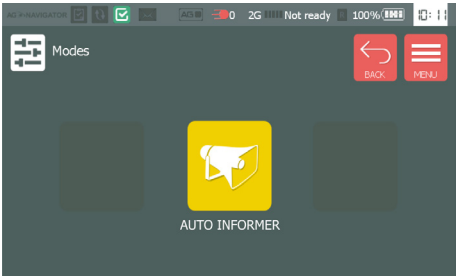


**Fig.27. Modes.**

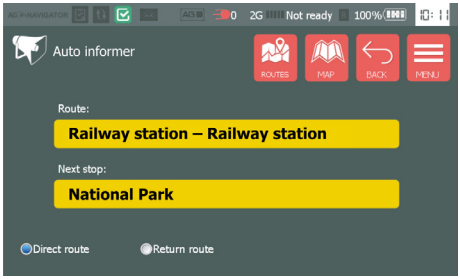


**Fig.28. Auto informer mode.**

• When route is selected, the device starts operation in the Auto informer mode – announces next stop name and notifies of closing the vehicle doors .

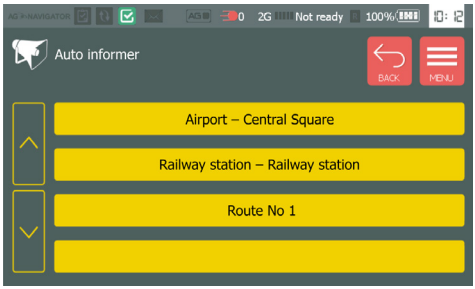



**Fig.29. List of available routes.**

• When following the route, the device announces name of public transport stops which vehicle enters. The next stop name is displayed on the device display (Fig.28). The Direct route and Return route options provides selection of the route direction. Stops of both directions can be configured in the Route Editor.

To return to the Navigation menu keeping Auto informer mode, press the Map button in the Auto informer menu. To return back from the Navigation menu, press the Back button (Fig.30).

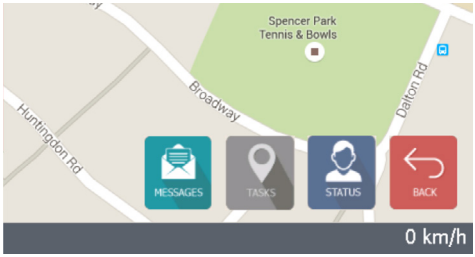



**Fig.30. Return back to the Auto informer menu.**

# Task management

AutoGRAPH-NAVIGATOR supports task management function providing control of tasks performance by a driver.

NOTE

*Task file is a list of geofences which a vehicle must enter to. Depending on settings, task can be exact requiring the exact order of geofences passing and not exact allowing random order of geofences passing. The task is considered to be completed, if all geofences of task are passed.*

## New task

Task files are created in the Task editor supplied with the AutoGRAPH.NET software. The compiled task file can be sent to AutoGRAPH-NAVIGATOR via server or manually loaded in the device SD-card. The transmission via server is provided by Chat module supplied with the AutoGRAPH.NET software.

**To create task file:**

- Run the AutoGRAPH.NET software and install the Task editor if it hasn't been installed yet.
- Install the Chat module if it is necessary to send task file to AutoGRAPH-NAVIGATOR via server.
- Task file is compiled on the basis of geofences list. Add all required geofences into the Task editor, then set geofences order and specify task options.
- Save the task file. To sent the file to the device via server, select *Save and sent* option in the Task editor. To save the file in the device SD-card, select *Save as* option.
- The Task Editor creates following files: .kml, .agth. и agtz. The .kml, .agth. files are required to copy load task in the device SD-card. All task files must be stored in the «Tasks» folder located in the SD-card root directory. Sample structure of «Tasks» folder is given on Fig.31.
- The .agth file is required to send the task to the device via server. This file must be sent to the device using Chat module.
- Also sound files can be associated with task file to play them when vehicle enters task points.
- Sound files can be matched to task file using the Editor of public transport stops supplied with the AutoGRAPH.NET software. Also all necessary sound files must be copied in the *\Tasks\Wav* directory in the device SD-card.

IMPORTANT

*To ensure file transmission via server servicing the AutoGRAPH-NAVIGATOR device, the device must be added in the AutoGRAPH.NET software, as well as the user sending the file must have access to the device data.*

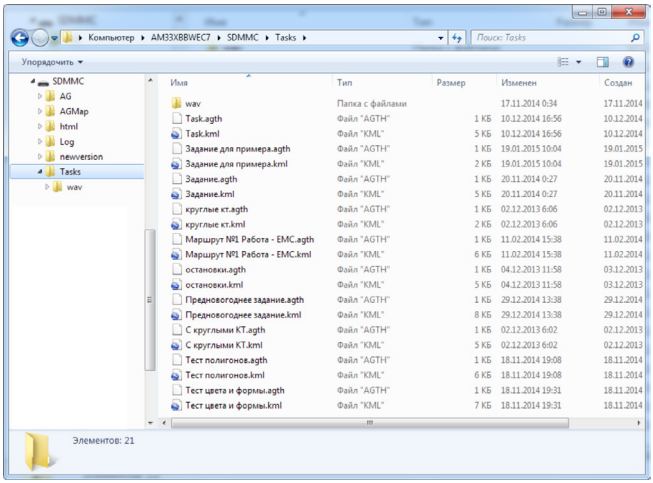



**Fig.31. Sample Tasks folder.**


*Detailed information on how to create a new task using Task Editor and how to load task file in AutoGRAPH-NAVIGATOR is given in the "Application Note: AutoGRAPH-NAVIGATOR tasks and messages" document.*

## Task control

- When task file is loaded in SD-card, insert the SD-card in the device. Then, turn on AutoGRAPH-NAVIGATOR.
- If task file is sent via server, it will be loaded in the device as the device connects to GSM network. Task files transmitted via server are also loaded in the *\Task* folder. When the device receives a new task, the new task indicator on the Status bar turns on.
- To select a task and start its control, go to the Task menu. This menu contains a list of tasks, stored in the *\Task* folder of the device SD-card. To scroll the list, use Up and Down buttons.
- Move an interesting task to the preview menu to view task details (Fig.32): task start and end date and short description.
- Then press the button to start the task control. When task is controlled, its status is indicated on progress bar (Fig.32). If there is no task to be controlled, message "No task is set, 0%" is displayed instead of the progress bar.
- The task performance state depends on the task settings. Exact task is considered completed if its geofences have been passed in the specified order. Non-exact task is considered completed if all task geofence have been passed ignoring the order.
- AutoGRAPH-NAVIGATOR supports processing of a task file with built-in route. The route file of .agth or .agtz format can be created in the AutoGRAPH.NET software. Tasks with specified routes allow route display on map providing optimal path of task points passing.

• If the device was turned off while task control, that task is automatically set to control after the device turning on provided that the task progress is set to zero.

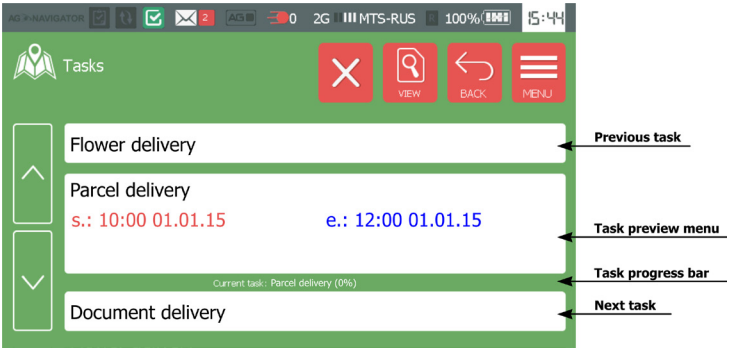



**Fig.32. Task menu.**

• To finish the task control, press the button (displayed instead of button , when a task is set for control).

• When the task is set to control, the user can view a list of task geofences. To view the task content, press the View button . Completed task points are highlighted green. Time before a point displays the time remaining till the scheduled entrance to the point. Time after a point displays the time remaining till the scheduled exit the point.

• Scheduled entrance and exit times can be set up when compiling task file in the Task editor. A timeline is highlighted red if late arriving (or exit) is expected. If a vehicle arrives late in a point, message “late” is displayed. If a vehicle stays on a point, message “delay” is displayed. Also in case of late arriving and departure, AutoGRAPH-NAVIGATOR sends a notification to a dispatcher.

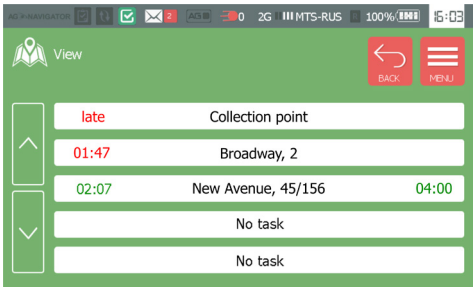



**Fig.33. List of task points.**

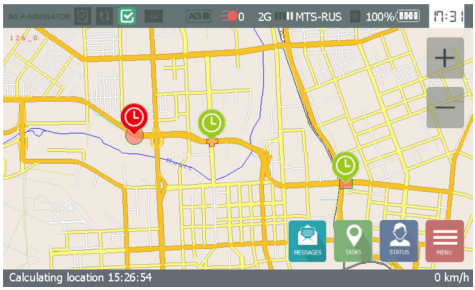



**Fig.34. Task points on map.**

• When a task is set to control, its points are displayed on map. Scheduled points are marked with an additional label changing colour depending on the time remaining till the scheduled entrance and exit (Fig.34).

• If both entrance and exit times are scheduled, at first the device process the entrance time. As vehicle arrives the point, the device starts processing of the point exit time.

# Messaging

AutoGRAPH-NAVIGATOR allows the user to send messages to dispatcher and receive incoming messages. Messaging is provided by Chat module supplied with the AutoGRAPH.NET dispatch software.

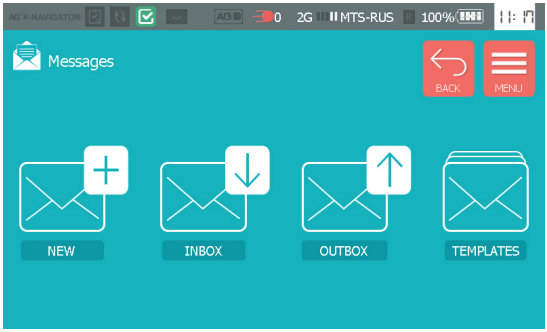



**Fig.35. Messages menu.**

To create new messages and receive incoming messages, turn on the device and go to the Messages menu.

## New message

To create a new message, go to the New menu providing a simple text editor (Fig.34).

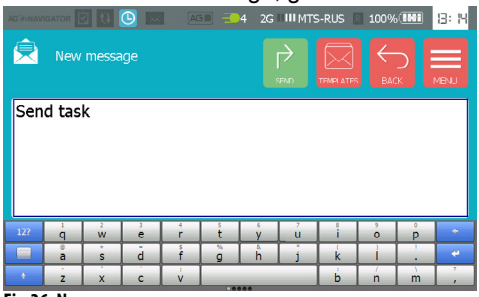



**Fig.36. New message.**

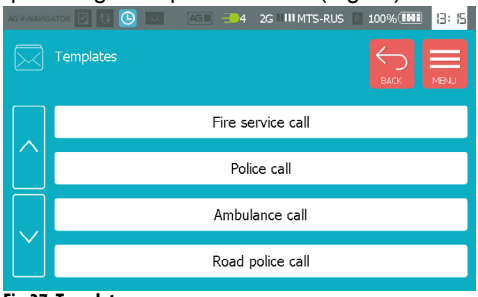



**Fig.37. Templates.**

To send new message, enter the required text then press Send button.
Messages which are sent from the AutoGRAPH-NAVIGATOR will be delivered to all dispatchers provided with access to the device data. Also the user can use templates to send quick messages. To send a template, go to the list of templates (Fig.37) by pressing the Templates button on upper right of the New message window. Then tab a templates to send it.

## Inbox

When device receives a new message, the new message indicator on the Status bar turns on. A numbered icon on the right of the indicator displays a number of new incoming messages.

To view incoming message, go to the Inbox menu. New incoming messages are displayed on the New tab. Incoming messages that have been read already are displayed on the Inbox tab.

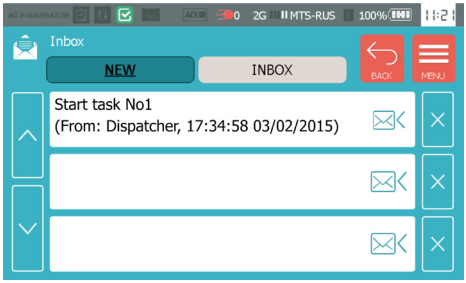



Fig.38. Inbox. New messages.

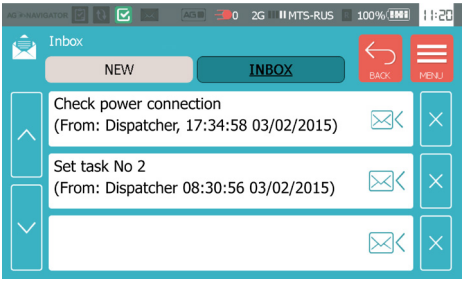



Fig.39. Inbox. Incoming messages.

To send a message to AutoGRAPH-NAVIGATOR use Chat module supplied with AutoGRAPH. NET software.

- To view new incoming message, go to the Inbox menu on the New tab. Double click a message opens it.
- When a message has been read, it is removed to the Inbox tab.
- To send a reply on an incoming message, press the button on the preview field of the required message.
- To delete a message, press the button on the preview field of the required message.

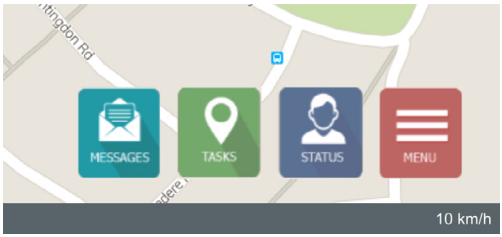



Fig.40. Quick buttons of the Navigation menu.

The Inbox menu providing list of incoming messages can be launched from the Navigator menu by pressing the Messages button (Fig.40).

## Outbox

To view messages which have been sent by the device, go to the Outbox menu. If a message is sent but not delivered yet, it is displayed on the Outbox tab. As the message is delivered to the server, it is removed to the Sent tab.

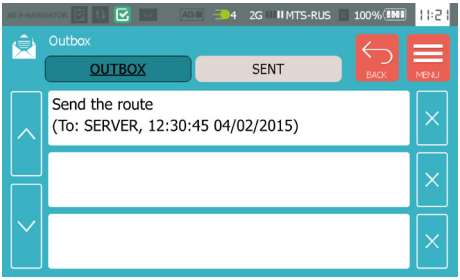



Fig.41. Not delivered messages.

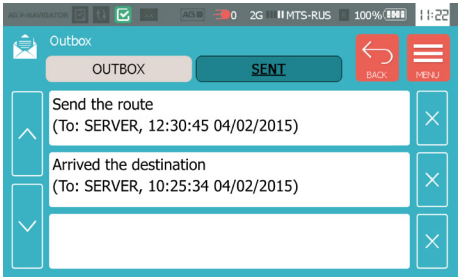



Fig.42. Delivered messages.

- To delete an outgoing message, press the button on the preview field of the required message.

# Voice communication

AutoGRAPH-NAVIGATOR allows the user to make and receive voice calls.
The device is equipped with an internal microphone and an internal loud speaker amplifier to provide voice call function.

## Receive a call

- To make a call to the AutoGRAPH-NAVIGATOR device, dial a number of the device active SIM.
- An incoming call is indicated on the screen (Fig.43).
- To answer a call, press the button .
- To decline a call, press the button . This button also allows to finish a call.
- During a telephone call, its duration is displayed on the device screen.

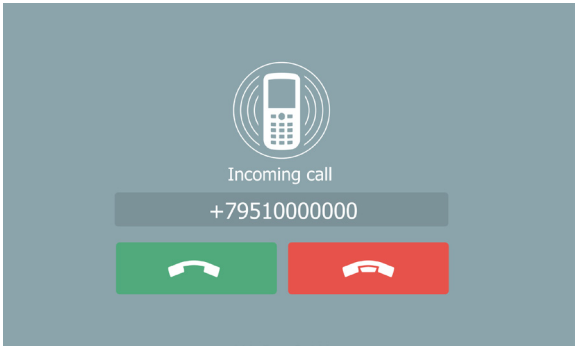



**Fig.43. Voice call indication.**

## Make a call

To make a call on AutoGRAPH-NAVIGATOR, go to the Voice call menu (Fig.44). To do it, select the Voice call option on the Main menu.

Upon the device turns on, some time is required to initialize GSM modem and become ready to make voice calls. While GSM modem is not initialized, voice communication is not available and keypad is disabled – label is displayed on top of menu (see Fig.44).

**To make a voice call:**

- Enter a number using keyboard. When entering, the number is displayed in the dial string, e.g. 89510000000, on Fig.44. Alternatively, you can select a number from the phone book. To do it, press the Contact button on the Voice call menu, then select a subscriber. Phone number of the selected subscriber will be entered in dial string.
- To delete incorrect number from the dial string, press button
- To dial entered number, press button .
- When dialling, a call state is indicated above the dial string.
- AutoGRAPH-NAVIGATOR is equipped with a loud speaker amplifier. The voice communication is provided in a loudspeaker mode.
- To end the call, press button .

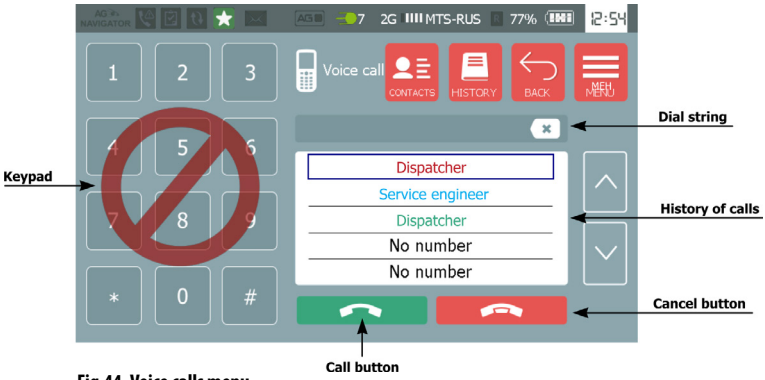



Fig.44. Voice calls menu.

NOTE

*Phone book of the Voice call menu is edited in the NAVIGATOR configuration tool. For more detailed information see section "Device configuration".*

The keypad can be disabled using the NAVIGATOR configuration tool. In this case the label ⊘ is displayed on top of menu (see Fig.44), as well as the GSM modem is not initialized yet.

Last calls history is displayed on the Voice call menu. Only contact from the Phone book is displayed in the short history. Depending on a call type, records are highlighted as follows:

- green – incoming call;
- red – missed call;
- blue – outgoing call.

To see full history of voice calls, press the History button. The History menu (Fig.45) contains three sections:

- Missed – a list of missed calls;
- In – a list of incoming calls;
- Out – a list of outgoing calls.

To go to the Main menu, press Menu button in the Voice call menu. To return to previous menu, press Back button.

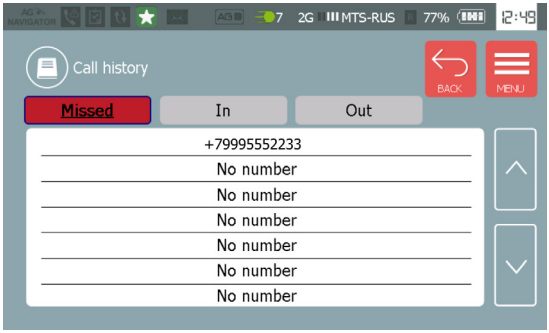



Fig.45. History of voice calls.

# Drivers installation

This section covers the installation procedure of the AutoGRAPH-NAVIGATOR device drivers.

*The AutoGRAPH-NAVIGATOR drivers (AGUSBDriver) can be downloaded for free from the official web site of the manufacturer (www.tk-nav.com). The drivers are compatible with Microsoft Windows XP, 7, Vista, 8, Server 2003, Server 2008 and Server 2012.*

**To install the device drivers onto a Microsoft Windows 7 OS:**

**1.** Download the archived drivers folder from the official website of TechnoKom - AGUSBDriver.zip file and extract files to a temporary directory on a hard drive.

**2.** Connect AutoGRAPH-NAVIGATOR to a PC using USB AM – USB miniB 5pin data cable. The system will automatically search for new equipment – AG_Navigator (Fig.46).

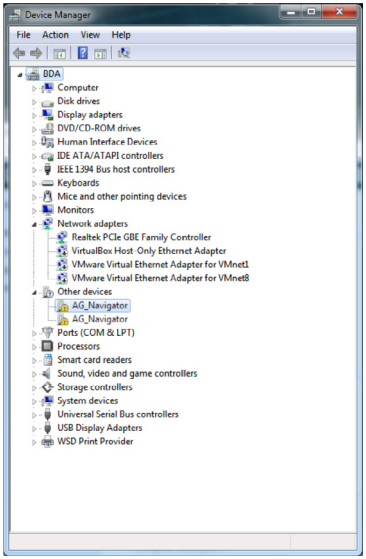



**Fig.46. New equipment «AG_Navigator».**

**3.** Launch the driver update wizard for new equipment (AG_Navigator) and select “Browse my computer for driver software” to search for drivers manually.

**4.** Browse to the location where the drivers are saved ant install the drivers (Fig.47).

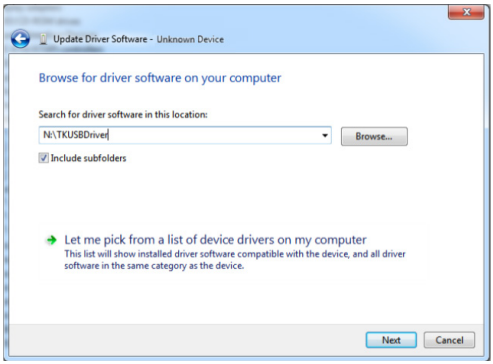



**Fig.47. Path to the drivers folder.**

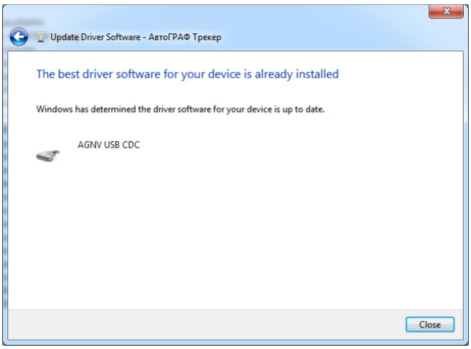



**Fig.48. The installation finishing.**

**5.** When the driver is installed the system will automatically identify connected device

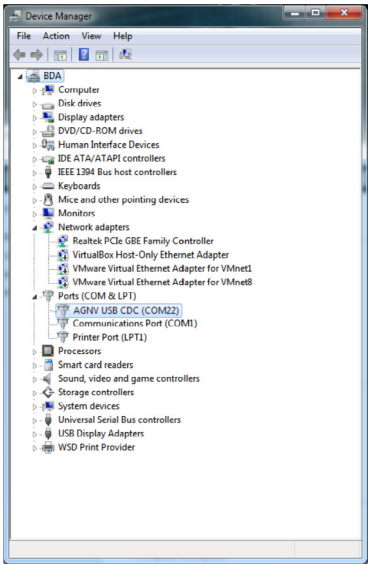



**Fig.49. AutoGRAPH-NAVIGATOR device is identified.**

# Device settings

To configure the AutoGRAPH-NAVIGATOR, you need the NAVIGATOR configuration tool (AgNavConfig. exe). It is recommended to configure the device correctly prior the first start.

NOTE

*The last version of the NAVIGATOR configuration tool is available for free on the TechnoKom official forum.*

**To configure the AutoGRAPH-NAVIGATOR follow the next:**

• Before connecting the device to a PC, install the device drivers, if they have not been installed yet. Instruction on how to install the drivers are given in the section “Drivers installation”.

• Turn on AutoGRAPH-NAVIGATOR.

• Connect AutoGRAPH-NAVIGATOR to PC using mini USB Data-cable.

• Run the NAVIGATOR configuration tool (AgNavConfig.exe).

• As the device settings have been read, it serial number and firmware version is displayed on the NAVIGATOR configuration tool.

NOTE

*If AutoGRAPH-NAVIGATOR is processing a RAM intensive task (e.g. loading large size map), an error can occur when connecting the device to PC. In this case it is recommended to load a map of low size (e.g. an internet map instead of a vector one) and try to make the connection again.*

• The device settings are grouped into four tabs:

**GSM modem tab** – is intended to configure GSM and GPRS settings;

**Voice calls** – is intended to configure voice communication and edit phone book;

**Logging tab** – is intended to enable logging options;

**Log files tab** – is intended to read log files from the device;

**Settings protection tab** – is intended to set a password to protect the device settings from modification.

• Specify the necessary settings on each tab, then press the “Save” button to write new settings in the device.

• Restart the device to apply new configuration.

• Now AutoGRAPH-NAVIGATOR is ready for operation.

Following sections contain description of settings on each tabs of the NAVIGATOR configuration tool.

NOTE

*If the device settings are protected from modification, the configuration tool will display an error message when trying to write new settings. In this case you need to enter the protection password on the Settings protection tab before applying new settings.*

# NAVIGATOR configuration tool

## GSM modem settings

To configure the device GSM modem operation, go to the “GSM modem” tab (Fig.50) of the configuration tool and specify required settings according the description given below.

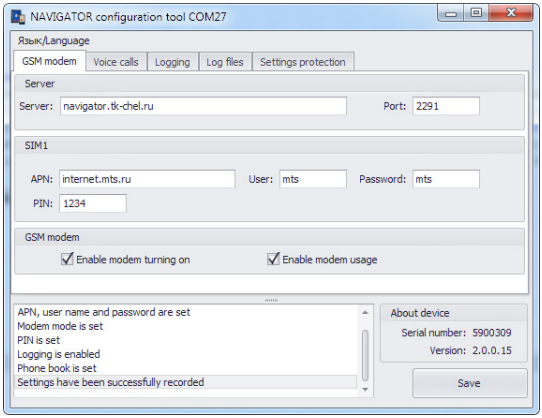



**Fig.50. Tab «GSM modem».**

### Server section:

- **Server** – an IP address or domain name of the serve which AutoGRAPH-NAVIGATOR transfers data to. The server IP address must be real and static.
- **Port** – a server port. This port number must be similar to a port specified in the server settings.

### SIM1 section

- **APN** – an access point name for the first SIM card.
- **User** – a user name of the access point, specified in the “APN” field.
- **Password** – a user password of the access point, specified in the “APN” field
- **PIN** – a SIM1 PIN of the device. If the PIN check is disabled for the SIM card, leave the field empty or enter any four digits.


*Be careful specifying PIN. If wrong PIN is specified, it will block your SIM card!*


*GPRS settings should be taken from mobile operator, whose SIM-card is installed in the device. Typically these settings can be seen on the operator’s website.*

### GSM modem section

• **Enable modem turning on** – is intended for development purpose and enables the GSM modem turning on while the device operation. By default this option is enabled. If this option is disabled, AutoGRAPH-NAVIGATOR functionality related to GSM modem will be unavailable (data transmission and reception, message handling, and voice communication) and the device will operate in offline mode only recording data in internal memory.

• **Enable modem usage** – enables data reception and transmission using an internal GSM modem. If this option is disabled, the AutoGRAPH-NAVIGATOR won't transfer or receive data, but it will be able to make voice calls.

IMPORTANT

*For the device proper operation both options –"Enable modem turning on" and "Enable modem usage" must be enabled.*

NOTE

*The current firmware of the device does not support processing of the back-up SIM connection.*

### Voice communication settings

To configure voice communication go to the "Voice calls" tab (Fig.51).

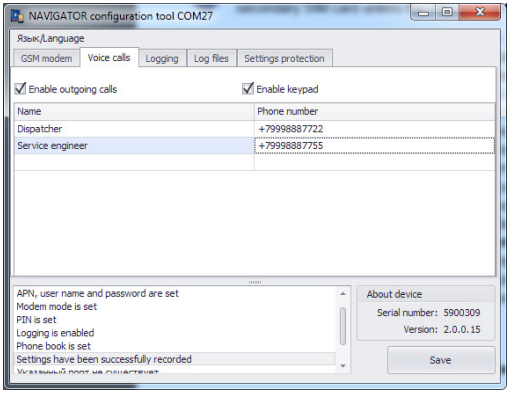



**Fig.51. Voice calls tab.**

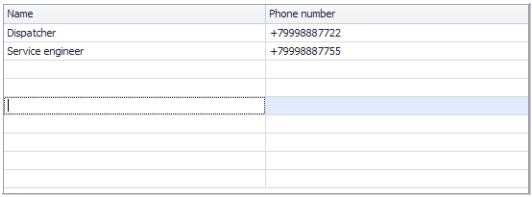
• In order to allow outgoing voice calls from the device check the box "Enable outgoing calls". If this option is disabled the device is able to receive incoming calls only and the Voice call menu of AutoGRAPH-NAVIGATOR is disabled.

• In order to enable manual phone number entering on the device, check the box "Enable keypad". If this option is disabled, It will be available to dial only phone numbers saved in the device phone book.

**Phone book**

The phone book of AutoGRAPH-NAVIGATOR is intended to store phone numbers in the device memory.

To add a number to the book, enter a subscriber name in the “Name” field. Then enter the subscriber’s phone number, including a prefix for national call (+7) and save settings in the device.



| Name | Phone number |
|---|---|
| Dispatcher | +79998887722 |
| Service engineer | +79998887755 |

**Fig.52. Phone book.**

## Logging settings

AutoGRAPH-NAVIGATOR records system events and operation information in log files which can be used for device troubleshooting and diagnostics when it is necessary.

To set up logging, go to the “Logging” tab (Fig.53).

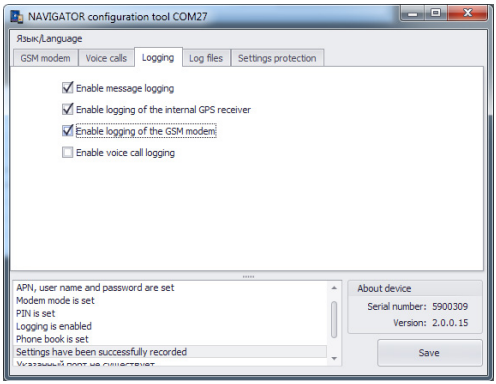



**Fig.53. “Logging” tab.**

Following options are available on the “Logging” tab:

- **Enable message logging** – allows the device to log events of message handling – incoming and outgoing messages.
- **Enable logging of the internal GPS receiver** – allows the device to log GPS receiver operation events.
- **Enable logging of the GSM modem** – allows the device to log GSM modem events.
- **Enable voice call logging** – allows the device to log events of voice communication.

Log files can be read from AutoGRAPH-NAVIGATOR using the NAVIGATOR configuration tool. This capability is available on the “Log files” tab.

### Log files content

To read log files from AutoGRAPH-NAVIGATOR, go to the “Log files” tab. There are five sections on this tab intended to display different types of log files.

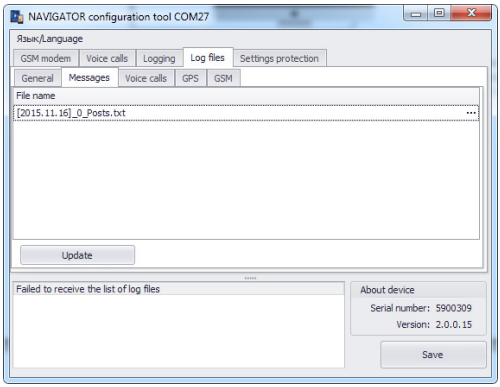



**Fig.54. “Log files” tab.**

- **General tab** – is intended to read common logs.
- **Messages tab** – is intended to read logs of message handling.
- **Voice calls tab** – is intended to read logs of voice communication.
- **GPS tab** – is intended to read logs of GPS receiver.
- **GSM tab** – is intended to read log of GSM modem.

**To read a log file:**

- go to the tab of the required log and press the Update button;
- the list of available log files will be displayed on the tab;
- to load an available log file from the device to local folder, double click the file. The selected file will be saved in the folder where the AGNavConfig.exe file is located.

Log files of AutoGRAPH-NAVIGATOR are text files which can be opened using any test editor. The device create a new log file every day. It means that each file contains daily logs of the device. A log file name contains date of the file creation.

**ВНИМАНИЕ**

*If no log file is found in the device or an error occurred when trying to request a list of log files, the message “Failed to receive the list of log files” will be displayed on the status window of the configuration tool.*

## Settings protection

Using the NAVIGATOR configuration tool, you can set a password to protect AutoGRAPH-NAVIGATOR settings from modification. If the device settings are protect with password, further settings modification will be available only after the protection reset.

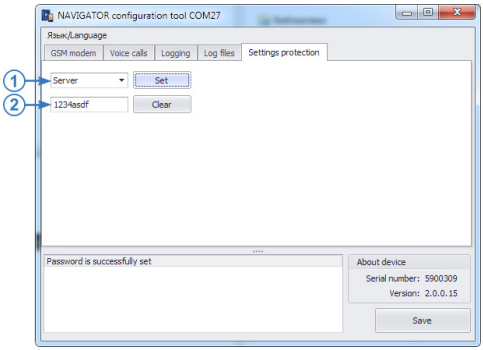



Fig.55. Settings protection tab.

To enable protection or to disable it, go to the Settings protection tab (Fig.55).
When you open this tab, the protection level of the connected device is displayed (Fig.55, i.1).

### To enable settings protection:

- connect AutoGRAPH-NAVIGATOR to a PC;
- run the NAVIGATOR configuration tool and go to the Settings protection tab;
- in the drop-down list on the tab (Fig.55, i.1), select a level of protection:

  Server – protects server settings: IP address/domain name and port;
  Full – protects all settings of the device from modification.

- in the field under the protection level selection menu, specify a password to protect settings. Password can contain figures from 0-9, uppercase and lowercase letters of Latin alphabet. The password length is not limited;
- press the Set button. If correct protection parameters are specified, the protection of the selected level will be enabled in the device. Otherwise, an error message will be display on the status window.

### To disable settings protection:

- connect AutoGRAPH-NAVIGATOR to a PC;
- run the NAVIGATOR configuration tool and go to the Settings protection tab;
- in the field under the protection level selection menu, enter the password which has been set in the device;
- press the Clear button. If correct password is specified, the protection will be disabled.

To change the device password, first you need to disable the protection, then set it again with a new password.

# Registration on server

AutoGRAPH-NAVIGATOR sends data to the AutoGRAPH server of version 5.0.

The device can be set up to send data both to TechnoKom server or the third party AutoGRAPH server.

The AutoGRAPH server 5.0 requires a user authorization to be able to provide access to data of the devices serviced by the server.

If your AutoGRAPH-NAVIGATOR send data to the AutoGRAPH server of TechnoKom, send user details to TechnoKom by email to register on server.

User information required for registration.

1. User login and password which will be used to access the server.
2. List of AutoGRAPH-NAVIGATOR device (including serial numbers) which an access must be provided to.
3. To register more than one user, send separate list of devices for each user.

New user will registered on the server on the basis of specified information. Also an access to the specified devices will be provided for the user.

To view data of AutoGRAPH-NAVIGATOR devices, use the AutoGRAPH 5 PRO dispatch software. To load data from the AutoGRAPH server servicing AutoGRAPH-NAVIGATOR devices, specify following server details in the AutoGRAPH 5 PRO: domain name – navigator.tk-chel.ru, port 2230.

NOTE

*The request on a user registration should be sent to mail@tk-chel.ru with title «Navigator».*

GLONASS GPS

AutoGRAPH

VEHICLE AND PERSONAL TRACKING SYSTEM

TechnoKom ltd.



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