Installation and connection of tracking devices

Galileosky Base Block Iridium

User Manual

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Necessary tools, devices, materials.

To connect Galileosky Base Block Iridium tracking device (hereinafter the tracking device) it is necessary to have:

1. Electrical tools.
2. Set of connecting wires.
3. A computer running Windows version 7 or higher with the installed service program of configuration of Galileosky tracking devices—"Configurator" version 4.0 or higher. We recommend you to install the latest version of the service program from our site https://galileosky.com/podderzhka/programmyi.html
General Information

Apart from GSM-module Galileosky Base Block Iridium is additionally fitted with Iridium module. Due to this, the tracking device is able to transmit information about the location and condition of the vehicle, even in the area of low cellular network.

Picture 1 shows a scheme explaining the process of data transmission from the Galileosky tracking device via the Iridium satellite channel (hereinafter referred to as the Iridium channel). In the current configuration of the Iridium channel:

− Data transfer is carried out in a one-way direction from the tracking device to the monitoring server;
− Voice communication and sending commands via Iridium channel are not supported.
The connection of Galileosky Base Block Iridium

Preparation of the tracking device connector, inserting of SIM-cards in the tracking device, installation, connection and configuration of the tracking device for data transfer via GSM-channels is carried out in accordance with the recommendations of the manual "Installation and connection of Galileosky tracking devices". You can download the relevant version of the manual at the link: https://galileosky.com/podderzhka/dokumentaciya.html

Connecting the Iridium aerial

There is an aerial for Iridium satellite connection in the equipment set of the tracking device (hereinafter - Iridium aerial). Aerials are produced by different manufacturers and may differ in appearance (Pic. 2).

Connection of Iridium aerial is carried out to the corresponding connector as follows from the Picture 3.
The procedure of placing the aerials on the vehicle and connecting to the tracking device is as follows:

- place the GSM aerial in the cab as close as possible to the windshield or on the roof of the car, as shown in Picture 4;
- place the GLONASS/GPS aerial in the cab as close as possible to the windshield or on the roof of the car, as shown in Picture 4;
- place Iridium aerial on the roof of the car in accordance with Picture 4. To ensure good communication through the Iridium channel, it is recommended to install the Iridium aerial on a horizontal surface at a zero angle to the horizon, with a 360-degree all-round vision.
- connect the aerial wires to the tracking device installation site and connect them to the appropriate connectors, as shown in Picture 3.
Setting the tracking device for data transmission via Iridium channel

The Iridium module is disabled in the normal operation mode of the tracking device. When the tracking device detects the absence of GSM network, it starts counting the time interval to turn on the Iridium module. At the same time the tracking device tries to restore the GSM-channel network. If the connection cannot be restored, the Iridium module is automatically turned on and within 10 minutes the tracking device tries to send monitoring data via the Iridium channel.

After the data is successfully sent, the tracking device waits during the specified time interval again. If there is still no GSM coverage, the tracking device sends the packet again via the Iridium channel.

The time interval for enabling the Iridium module and transferring data via the Iridium channel is set in the Configurator or by Sputnik command (Table 1). The setting order in the Configurator is as follows:

1. start the Configurator and connect the tracking device to the computer;
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(version 1 of 11.07.2019)

2. go to the "Settings" tab of the Configurator -> "Data transmission";
3. set the "Data transmission protocol" if the "Galileosky with compression" Protocol is selected, then tick the "Minimal data set" box of the Satellite package as described in "configuring the Protocol for data transfer through the Iridium channel with compression ";
4. set the time interval in seconds in the "Time before communication via satellite channel" field (Pic. 5). If the value is 0, the satellite modem is not used;
5. set "Transmission mode"
6. set "Max session length" if "Send archive" transfer mode is selected;
7. Click "Apply" button.

The format and description of Sputnik command are given in Table 1 of this manual.

Command format
Sputnik t,m,b

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>t</td>
<td>period of contact with the help of satellite modem, [sec]. If the value is 0, the satellite modem is not used;</td>
</tr>
<tr>
<td>m</td>
<td>data transfer mode. 0 – one point with current data, 1 – data stored in the internal memory;</td>
</tr>
<tr>
<td>b</td>
<td>the maximum number of bytes transmitted in a single communication session.</td>
</tr>
</tbody>
</table>

Example
Request: Sputnik 1200,1,1000
Answer: SPUTNIK:Timeout=1200,Mode=1,MaxBytes=1000;
Setting the tracking device for data transmission via Iridium channel with compression

The Galileosky Base Block Iridium tracking device can transmit only one point with the current coordinates through the Iridium channel or a recorded archive within the set maximum session volume.

Configuration of the main package or satellite package is performed on the "Protocol" tab of the Configurator (Pic. 6).

If the "Galileosky with compression" Protocol is selected:

1. go to the "Protocol" tab of the Configurator and select "Minimal data set" in the "Main package". This will further reduce the amount of data transferred in the most used tags (Pic. 7).
The "Minimal data set" includes:

- date and time;
- validity of coordinates (0-valid; 1-not valid);
- longitude;
- latitude;
- alarm (0-no alarm, 1-alarm);
- user tag data.

The size of the tag "Minimal data set" is 10 bytes and the information contained in the specified tag can replace the tags "date and time", "Coordinates", "terminal Status" and "UserTag 0" with a total size of 22 bytes, the rest of the marked tags do not change the size.

The date and time in the "Minimal data set" is transmitted in seconds starting at 00:00:00 on the first of January. The year is not transferred and is set according to the current year of the server.

Due to the reduction in the size of the data set aside for recording and transmitting coordinates, the error of the transmitted coordinates is slightly increased to 10 meters.

2. Click "Apply" button.
To receive the data from the Galileosky tracking device the monitoring software should be modified in accordance with the Galileosky protocol description. A full description of the Galileosky Protocol is available for download at the link https://galileosky.com/podderzhka/dokumentaciya.html.

Wialon monitoring software has already been modified for receiving and parsing data via Iridium channel, including data with compression. To activate the Wialon monitoring software to receive compressed data transmitted through the Iridium channel, it is necessary to set the object settings in accordance with Picture 8.
Diagnostics of the Iridium communication channel quality

When using Galileosky Base Block Iridium tracking device the requirements of the Iridium channel to the quality of the connection should be taken into account. The quality of the connection can be affected by high buildings, atmospheric conditions, other objects and circumstances that prevent the establishment of connection between the aerial and the Iridium satellite.

It is also necessary to take into account the fact that Iridium satellites are constantly moving relative to the Earth's surface, and it may take up to 10 minutes to establish connection between the aerial and the satellite.

The quality of the established connection can be evaluated through the Configurator. The evaluation procedure is as follows:

1. disable GSM aerial;
2. start the Configurator and connect the tracking device to the computer;
3. go to the Settings tab -> data Transmission, set the "Time before communication via satellite channel" value up to 30 seconds;
4. go to the Troubleshooting tab and check the box "Time" and "Satellite modem", remove the remaining checkboxes;
5. click "Start Diagnostics" button and wait for 10 minutes;
6. after the diagnosis is complete, reset "Time before communication via satellite channel" and connect the GSM aerial.

During the diagnostic process following messages are shown:

```
Sat Power on
Sat Net is found
Sat IMEI: 300000000000000
Sat < ATE0
Sat > ATE0
Sat > OK
Sat < AT+CULK?
Sat > +CULK:0
Sat > OK
Sat < AT+CSQF
Sat > +CSQF:4
Sat > OK
Sat < AT+SBDWB=16
Sat > READY
Sat > ATE0
Sat < AT+SBDI
```
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Sat > OK
Sat > +SBDI: 1, 2268, 0, 0, 0, 0
Sat Message is send
Sat End session, send 0
Sat < AT*F
Sat > OK

The CSQ parameter shows the quality of the connection established with the satellite. CSQ can range from 0 (no connection) to 5 (maximum connection quality).

SBDWB parameter informs about the size of the package to send via the Iridium channel.

Sputnik message Send Message informs about the successful transmission of the packet via the Iridium channel.
Control of costs for data transmission via the Iridium channel

To be able to use the Iridium satellite channel, the user makes a contract with the Iridium partner (hereinafter - the service provider) for the provision of a communication channel. The service provider provides end users with tariffs for the use of Iridium satellite communication channels.

After signing the contract for the provision of communication services, the user sends a request to the service provider to activate the tariff. In the process of services usage, the provider examines the statistics on the usage of the Iridium channel and, based on the provided statistics, issues invoices for the rendered communication services.

When using the Iridium channel, the issue of cost control is a priority. The algorithm of Galileosky tracking device operation allows to minimize and control these costs:

- the Iridium channel is used after a specified time interval when the main communication channel is unavailable;
- there is an option to disable the use of Iridium channel;
- it is possible to configure the sending of compressed data;
- when a communication session is established through the Iridium channel, the tracking device transmits only one last recorded point of the main packet or recorded archive in the amount of the set "Maximum session volume"

Configuration of the Galileosky Base Block iridium tracking device to transfer data through satellite channel is completed, the tracking device is ready to operate.

RSA “Galileosky”, LLC produces satellite monitoring equipment for GPS and GLONASS real time vehicles monitoring. The tracking devices determine the mobile object location recording the time and route as points with geographical coordinates and send the data to the server to be further processed and sent to the traffic controller panel.

In addition, a number of other vehicle parameters are recorded: the state of analog and discrete inputs of the tracking device and the state of digital interfaces.

The tracking devices can be used in any vehicle.