Service. Work with polygonal geofences

User Manual

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Necessary tools, devices, materials

1. Galileosky 7.0 or Galileosky Base Block tracking devices with a microSD card (hereinafter - tracking device). The detailed tutorial on how to configure and set the tracking device can be found at the link: https://galileosky.com/podderzhka/dokumentacziya.html

2. A computer running Windows with the installed service software for configuration of Galileosky tracking devices - "Configurator". We recommend you to install the latest version of the service software from our site https://galileosky.com/podderzhka/programmyi.html
General Information

Geofences or geographic zones are special areas on the map, which are used to control movements of the objects inside these areas.

Geofences can have a shaped form (hereinafter - polygon geofences), they look like a polyline (for example, a street), a polygon (for example, a city or a factory territory) or they can have a simple form and look like a circle.

Functionality of work with polygonal geofences is available on Galileosky 7.0 or Galileosky Base Block tracking devices (except of Lite versions) with the firmware version 20.5 or later. The algorithm for work with polygonal geofences is configured by Easy Logic technology https://galileosky.com/products/easylogic.html. It significantly extends the basic functionality of the tracking device.

Attention! Work with polygonal geofences is not supported by the 1.x, 2.x, 5.x tracking devices. The functionality of work with simple geofences should be used on these tracking devices. Detailed manual for work with simple geofences can be downloaded at the link https://galileosky.com/podderzhka/dokumentacziya.html Support -> User Guides -> Instruction on connecting and configuring -> Service functions -> "Service. Set-up and Application of Geofences".
The main features of work with polygonal geofences

The following geofence types are considered as polygonal geofences:

1. Polygon (Pic. 1)
2. Polyline (Pic. 2)
The main features of work with polygonal geofences are the following:

1. the number of points in a geofence should not be more than 2000. A point is defined as the place of geofence boundaries intersection which is a vertex of a polygon or a bend of a polyline;
2. the maximum number of polygonal geofences that can be used on one tracking device should not be more than 1000.
3. the width of the polyline is 50 metres.
KML file creation

To work with polygonal geofences it is necessary to create KML file and upload it to the microSD card of the tracking device. Polygonal geofences can be created in Google Earth https://www.google.com/intl/ru/earth/ or in Wialon monitoring software and exported as KML file.

To create geofence in Google Earth click "Add polygon" (Pic. 4) and configure the appeared parameters.

Then export the data of created geofence in KML file. To do this click mouse right button on the created geofence (or a group of geofences) and choose "Save Place As..." (Pic. 5) with *.kml file extension.
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(version 2 of 02.04.2019)

To create a geofence in Wialon monitoring software choose "Geofences" -> "Create", configure the necessary parameters (name, colour, type etc.) (Pic. 6), then draw a geofence on the map (Pic. 7).

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Pic. 6
Creation of polygonal geofences on Wialon monitoring software
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Pic. 7
An example of polygonal geofences in Wialon monitoring software
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Saving of a KML file is carried out as follows: click on the name of an account -> "Import/Export", "Export in KML/KMZ" In the appeared window choose necessary geofences and click "OK".

**Attention!** Geofences created in Wialon monitoring software will be recorded to the KML file in the order they were chosen.
The structure of KML file

KML file can be edited manually. To do this add the information containing geofences coordinates in created KML file. An example of KML file fragment is shown in picture 8.

```xml
<Placemark>
  <name>1</name>
  <styleUrl>#men_ylw-pushpin</styleUrl>
  <Polygon>
    <tessellate>1</tessellate>
    <outerBoundaryIs>
      <LinearRing>
        <coordinates>
          37.57490566244183, 55.66507473803023, 0 37.57646087328848, 55.665174398043, 0
        </coordinates>
      </LinearRing>
    </outerBoundaryIs>
  </Polygon>
</Placemark>

<Placemark>
  <name>2</name>
  <styleUrl>#men_ylw-pushpin</styleUrl>
  <Polygon>
    <tessellate>1</tessellate>
    <outerBoundaryIs>
      <LinearRing>
        <coordinates>
          37.56861220522031, 55.66886081073001, 0 37.56987178696868, 55.6670581165506,
        </coordinates>
      </LinearRing>
    </outerBoundaryIs>
  </Polygon>
</Placemark>
```

Pic. 8
Geofence in KML file

The created geofence is situated between <Placemark> and </Placemark> tags.

**Attention!** The geofences are numbered from up to down in accordance with their place in KML file. In case the geofences overlap, the geofence situated higher has a priority.
Tracking device setting for work with polygonal geofences

To configure the tracking device to work with geofences it is necessary to upload the created KML file to microSD card. To do this connect microSD card to the Computer and create a GEOFENCES folder in the root directory of the microSD card. Then put KML file into the created folder.

Place microSD card with the recorded KML file into the tracking device. Some additional system files, which are necessary to work with geofences, will be created on the microSD card automatically (Pic. 10).

Geofences uploading can also be done remotely with the help of webdav file synchronization. Detailed manual "Service. Remote Synchronization of Files in Galileosky Tracking Device SD-card" can be found at the link https://galileosky.com/podderzhka/dokumentacziiya.html (Support -> User Guides -> Instruction on connecting and configuring -> Service functions -> "Service. Remote Synchronization of Files in Galileosky Tracking Device SD-card").
Work with geofences using Easy Logic

With the help of Easy Logic, you can create a simple algorithm to find a tracking device in the particular geofence. An example of algorithm fragment is shown in picture 11.

The fragment shows the fact of presence of the tracking device in the particular geofence. If the tracking device is present in the geofence then the message "Inside the Geofence 2" will appear. If the tracking device is not in the geofence, then the message will be "Left geofence 2".

You can also control the number of the geofence in which the tracking device is situated now. If the algorithm works then the message with the number of the geofence will appear in diagnostics (Pic. 12). If the tracking device is not in the particular geofence then the number of the geofence in the diagnostic message will be "-1".
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.