



NAVISET

2014

USER MANUAL



NAVISET SEAPOINT

IRIDIUM

INDEPENDENT

SATELLITE BEACON

Version 1.0

Discovery Telecom

04.04.2014

1. APPLICATION and MODIFICATION

Navigation independent beacon «NAVISET SEAPOINT IRIDIUM» is designed for continuous operation in independent mode, control of the movable/stationary object location, transmission of status of the discrete and analog sensors connected to the device. It has ultra-low consumption in standby mode (up to 18mA).

NAVISET SEAPOINT IRIDIUM



Unique and affordable GLONASS/GPS terminal with transmission of its location through IRIDIUM satellite constellation at any point on the earth's surface. Location coordinate data transmission can be performed both by an event, and in automatic mode according to schedule.

It supports the connection of discrete, analog, and frequency sensors. Built-in temperature control.

The device has two main modifications:

1. **NAVISET SEAPOINT** is a standard modification for stationary objects, is used to determine the a subject outgo from the geofence created at the first turning on and is equipped with two antenna jacks for GLONASS/GPS and IRIDIUM antenna. The device is always in sleep mode, wakes up according to schedule to check the outgo from the geo-fence, and in case of outgo, it transmits alarm signals. It is possible to transmit periodic reports of the status of the connected sensors.
2. **NAVISET SEAPOINT TRACK** is a satellite navigation terminal for movable objects, it is designed for remote monitoring of movement in real time, it is equipped with an antenna summarizer to work through a single IRIDIUM antenna. The device is in sleep mode until a high level appears at the «Track» input (for example, switching on the ignition). In active mode, depending on the settings it transmits the coordinates and data from the sensors in specified time intervals or distance defined by user. The analog input can be used to connect a fuel sensor.

2. THE CORE CAPABILITIES

- **Bookmark mode.** The device is in sleep mode and transmits the data and coordinates according to schedule or on outgoing from the geofence.
- **Automatic tracking.** Automatic transmission of data of the location and status of the input signals in a specified time period. It is turned on when on «Track» input the level is high.
- **Dynamic geofence.** The ability to create an event when going out from the geofence, which is created automatically when you first turn on the device or remotely with the command.
- **In «Automatic tracking» mode** the fast-moving objects, such as aircraft, weather balloons, high-speed trains, and others the function of data transmission in a predetermined distance is provided.
- **Configuration via satellite channel.** It is possible to change or create a new configuration via WEB interface and to transmit it to the device at any point of the earth.
- **Satellite traffic counter.** It allows the limit of the incoming/outgoing traffic to be set at the operator's discretion. The value of the outgoing+ incoming traffic counter is transmitted to the server.

On default the device transmits:

- Coordinates and time
- The sign of the batteries discharge
- Sign of the data packet type (periodic according to scheduled, outgoing from the geofence, the first turning on or input response)
- Discrete values of inputs and outputs

Data transmitted additionally (are set):

- The direction and speed of movement
- Temperature
- The value of the outgoing and incoming traffic counter
- The value of Input signal on the «Ain» input
- The value of the covered distance in auto tracking mode

3. THE MAIN ADVANTAGES

- Ultra-low power consumption to operate in fully autonomous systems (in standby mode up to 18mkA).
- Integrated antenna summarizer in the SEAPOINT TRACK modification allows one external antenna to be used for the transmission and reception of satellite data.
- Highest degree of IP67 dust and dump protection extends the application.
- Extended temperature range
- Alarm of discharge. When the battery is below the minimum operating voltage, the device goes into discharge alarm mode. In this mode it is possible to transmit not more than 20 messages and it is in sleep mode not more than 30 days.
- Remote control of commands or through the SAT2IP service

4. SPECIFICATIONS

SPECIFICATION	VALUE
Supply voltage, V (DC)	6...16
Protection against input voltage excess, V	n/a
Current consumption when supply voltage is 6V, mA:	
Power saving mode, μ A*	18
The operating mode, mA	20
Data transmission/data reception, A	0,2...1
Battery backup	n/a
the number of inputs, including:	
Analog input for squarewave signal voltage/frequency measurement	1
Universal discrete input	3
Input auto-tracking mode activation	1
Number of outputs (open collector)	1
The maximum output load current, A	0,5
RS-232 interface, TTL	1
The temperature measurement sensor inside the device	available
Minimum IRIDIUM antenna viewing angle , degrees	70
SATELITE chip Iridium	SBD9602
GPS/GPS+ГЛЮHACC chip	mBlox MAX-7Q
The network, transmission, satellites Capture indicators	available
The antenna jack of the external antenna	SMA
The average operating time from the battery 12V / 7A / h, days **	750-1200
Temperature range, degrees. Celsius	-40 ... +55
Dampproofness	IP67
The efficiency, the height above sea level	0...16000
Overall dimensions, mm	110 * 60 * 40

* - Current consumption specified in the specifications complies with the external power voltage of 6V. When external voltage increases, the current increases proportionally.

** - Operation time depends on battery type and self-discharge time. Operation time, indicated in the specifications, does not consider self-discharge. To achieve maximum independent operation time it is recommended to use disposable batteries instead of rechargeable ones. When powered from the onboard network of vehicle, you should take into account the on-board network voltage, which at the maximum engine speed should not exceed 16V.

5. INTERFACE APPLICATION AND DESCRIPTION OF TERMINAL PINS

The device is placed in a plastic case, which has a fastener and contains an efficient microcontroller and satellite transmitter. The microcontroller takes all the actions to the receive and perform signals. All electronic components are placed on the circuit board, fastened to the case base.

The Figure 1 shows the placement of the interface connectors, cable gland and antenna jack:

- (1) – Connector for IRIDIUM Antenna connection, SMA type
- (2) - Connector to connect GLONASS / GPS antenna, SMA type (in SEAPOINT TRACK modification)
- (3) - Connector for external sensors of the device power supply.

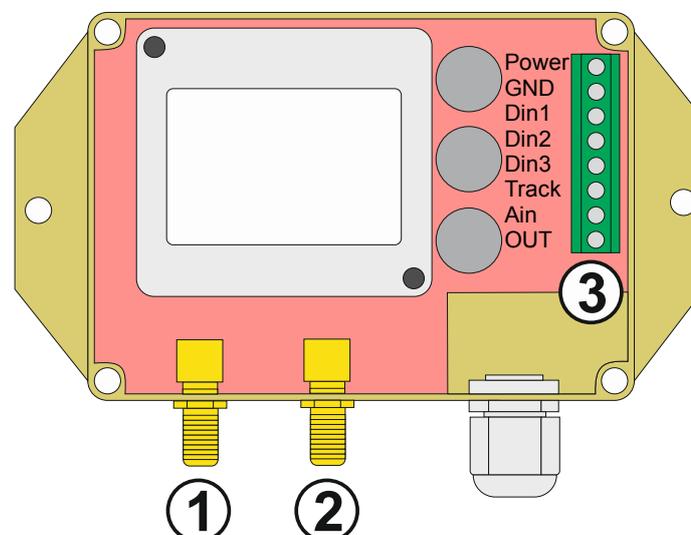


Figure 1 – Description of interfaces

Table 1 – Description of the terminals functions

Terminal	Functions performed
Power (+6...14B)	Power input to connect a battery(6...14B)
GND	Total power cord, minus
Din1	Universal discrete input
Din2	Universal discrete input
Din3	Universal discrete input
Track	Discrete input, «Automatic tracking» mode terning on
Ain	Analog/frequency inputвход
OUT	Analog output, active level - "0", passive - impedance

ATTENTION!!!

The input for external battery connection is not protected against the specified voltage exceeding ! When an operating voltage is above 14V, it is necessary to install an external power supply regulator.

Discrete input Din1 ... Din3 – to connect discrete sensors, logic level "1" when the input voltage is over 4V. The voltage level above 16V is not permitted. The status is transmitted in each packet, regardless of the settings.

Discrete Track – Specialized input to turn on the "Auto-tracking" mode. The function is activated when the voltage at the input is more than 4C for 5 seconds. The voltage level above 16V is not permitted .

Frequency-Analog InputAin – Measuring input. It measures the voltage of from 0 to 14V in multiples of 0.1V or squarewave signal frequency in multiples of 1 Hz. It has an event on a signal level change in the three ranges (voltage below the lower threshold, above the upper threshold and above the low below the upper).

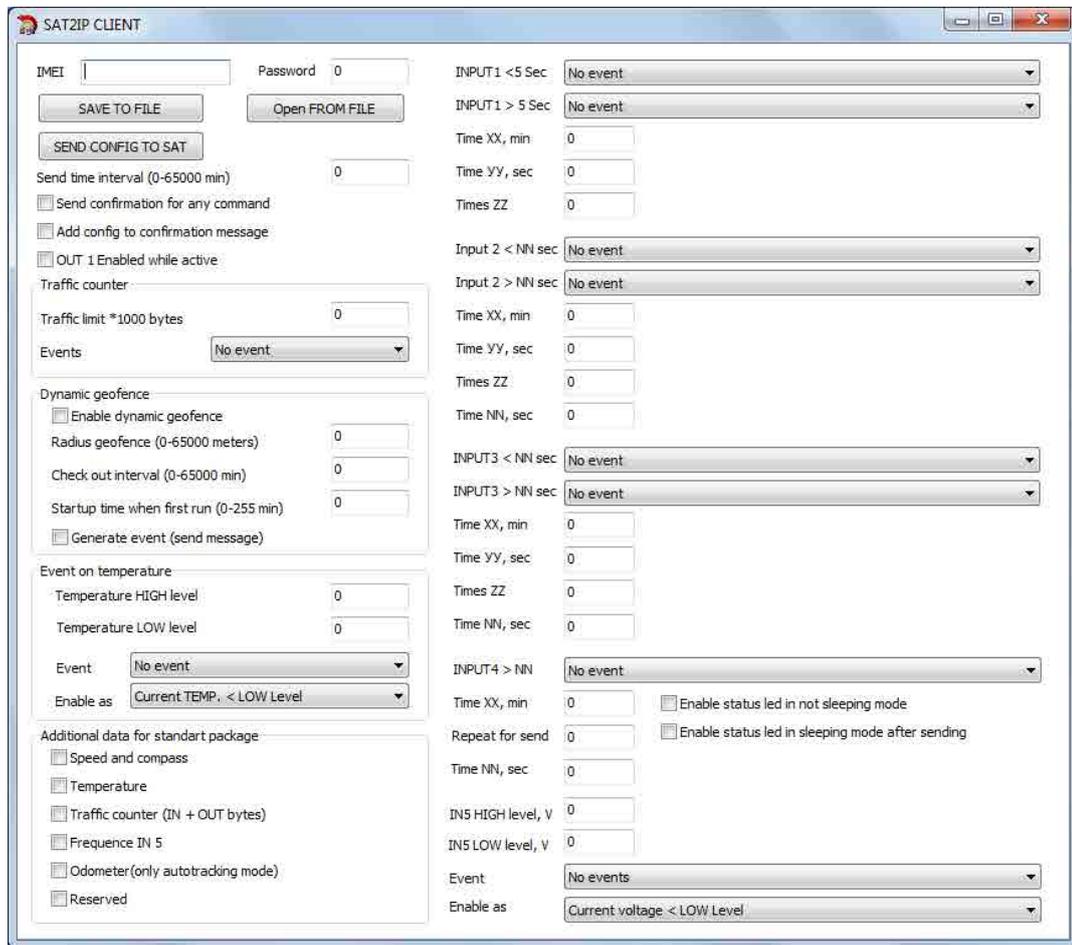
Table 2 - Description of the device indicating operation

	GNSS indicator (red)	SEND indicator (green)
No configuration	Alternating flashing every 0.5 seconds 5 times	
Configuration is loaded	Simultaneous flashing every 0.5 seconds 5 times	
There is a capture of satellites	Flashing once per 0.5sec	-
Satellites are captured	Горит постоянно	-
Initialization of satellite communication	-	Flashing once per 0.5sec
Data transmission to the satellite	-	Light is on permanently
The data are transmitted	-	Lights off
No satellite network	-	Light is not on
Sleep mode	Light is not on	Light is not on

6. DEVICE SETTING

The settings are performed through the specialized Configurator program or WEB interface. In this case the device is not connected to the computer. All settings are downloaded to the device through a satellite channel during a regular communication session. If the device is configured for the first time, the communication session should be carried out by hand, by feeding voltage of more than 4 V for the period of no more than 5 seconds to the IN1 input. During the first communication session the antenna of the device must be located outside and have the sky view of at least 120 degrees. During the first turning on after the configuration loading it may take 5-15 minutes to build the satellite atlas. This value is set by the user. To modify SEAPOINT TRACK the zero value can be set.

To make settings through the configurator run the sat2ip_interface.exe program, specify the necessary parameters and click «SEND CONFIG TO SAT» button. Then initiate the data transmission by feeding power voltage to the input 1. The process of configuration loading takes 20 to 60 seconds. After receiving the configuration GNSS and DATA indicators will simultaneously blink 5 times. If it fails If this is not the case, initiate the device communication again. In case of a configuration loading error the, check the location of the antenna and make sure that the operator has connected the device to the IRIDIUM satellite system.



ATTENTION!!! The device can take configuration only during communication session with the IRIIDIUM satellite, so after sending configuration is necessary to awaken the device on the input «Din1» or wait for the next scheduled data transmission.

The configuration size is 60 bytes, the transmission is charged in accordance with the chosen operator's tariff plan.

All inputs have an ability to produce an event when going to active state. Depending on the time of being in the active state two different events are produced. If the input was active for less than specified time period and more than specified time period. At the input 1 time to threshold is set to 5 seconds, this parameter is not changed. Input 5 produces an event according to voltage level change within the specified boundaries. After setting the lower and upper boundaries of the voltage level one of the states is selected (below the lower boundary, above the lower and below the upper, above the upper one), when an event is selected.

The happened event, if an action is select for it, transmits data in accordance with the selected algorithm:

1. To send several messages in a row
2. To send messages with a selected interval during the set time period
3. To send one message until it is sent

For the **Track** input three variants of events are available:

1. Going to the automatic tracking mode without sleeping - the device is always on and sends the coordinates with the specified time interval. It is the standard mode for automatic tracking for operation from the onboard network of amobile object.
2. Going to the the automatic tracking mode with sleeping - after transmission of the coordinates the device goes to sleep until the next point trnsmiton time comes. In this mode the maximum energy saving is achieved, but more time is needed to capture the satellite. It is used when running on batteries to provide long time autonomous operation.
3. Going to the automatic tracking mode without sleeping - the device is always on and sends the coordinates in run distance set by the user. It is used for high-speed moving objects (aviation).

Transmission interval in automatic tracking mode is set by the user and may differ from the interval of regular reports. In case if this value is "0", automatic tracking interval is equal to the interval of regular reports.

