



SEATRACK
Seabird Tracking

GPS-GSM protocol for 2024

Important information on GPS-GSM transmitters !!!



GPS-GSM devices in SEATRACK

This document contains the most important information about the GPS-GSM transmitters, which are introduced for the first time for deployment on large gulls as part of SEATRACK. The protocol is based on advice from Ornitela and previous experience of SEATRACK partners. For detailed instructions, please consult the Ornitela user manual.

This year, we aim to deploy a total of 50 devices on Lesser-black-backed gulls, Herring gulls and Glaucous gulls.



GPS-GSM transmitters which were not deployed should be fully charged (battery level 100%), turned off (on magnetic pad) and sent back to:

**Norsk Polarinstitutt
Att: Svenja Neumann
Postboks 6606 Stakkevollan
N-9296 Tromsø
NORWAY**

GSM subscription and data fees

GSM service subscription and actual data transfer costs are paid for by SEATRACK.

IMPORTANT: Please notify us (providing serial number) in the following situations:

1. The transmitter is not deployed in the 2024 season.

In this case SEATRACK will contact Ornitela and temporarily suspend the GSM service subscription. The account will be reactivated the next field season.

2. The transmitter has stopped working permanently.

In this case SEATRACK will contact Ornitela and permanently terminate the GSM subscription and service fees. Please consider carefully if the transmitter stopped functioning permanently or if sending positions is temporarily suspended. Transmitters may stop sending data for extended periods of time, for example when a bird migrates to an area without GSM coverage and stays there for months, or when battery discharges during poor light conditions (e.g. winter at high latitudes). The transmitter will start sending data again when the bird enters an area with GSM coverage and/or light conditions improve. If GSM subscription is terminated, it cannot be reactivated.

GPS-GSM transmitter model

OrniTrack-15 - solar powered GPS-GSM/GPRS tracker on magnetic pad



Included:

- Ornitracck-15 transmitter on magnetic pad
- 6.35 mm Teflon band (100 cm)
- Aluminium clamps (8x)
- Light foam pad to place under the device (2x)



Precautions

- Make sure the transmitter does not overheat (*i.e.* temperature should not exceed 50°C).
 - For example, do not keep transmitters in direct sunlight on the car dashboard and avoid sudden temperature changes.
- Do not place the device next to strong magnetic fields.
- Do not drop or disassemble the device.
- Do not turn on and use the transmitter in areas with poor GPS conditions (e.g. indoors), this may lead to rapid battery depletion.



Photo: Roos Kentie & Kees Camphuijsen

Turning the device on and off

The transmitters are supplied turned off and charged (above 90% battery charge). The device is equipped with a magnetic switch.

Start up :

- The transmitter will be turned on once it is taken out of the special holding pad that contains a built-in magnet (see figure on previous page).
- After removing the transmitter, you will see a flashing red LED:



The red LED flashes several times and at a slow rate: correct start-up of the transmitter.



The red LED flashes briefly and at a high rate : complete discharge of the battery.

Shut down:

- When the transmitter is placed back into the holding pad, the LED will light-up once, indicating that the transmitter was successfully turned off.



Initial test of the device

To verify correct operation of the unit the device is supplied with pre-defined GPS and GSM test settings (GPS fix interval – 900 s, data transmission interval – 14400 s).

Please test the device as follows:

- 1) Remove the transmitter from the holding pad and place it on a level surface in an outdoor area with an open sky view and good GSM coverage.
- 2) With the pre-defined settings, the standard test should last a little over 4 hours.
- 3) After a 4+ hour test period, re-insert the transmitter into the magnetic holding pad and the transmitter will turn off.
- 4) Access the online control panel for the transmitters here: <https://cpanel.glosendas.net/>.



Photo: Svenja Neumann

Initial test of the device

- 5) Enter your username and password (will be send out via mail), which will take you to the OrniTrack devices main page:

The screenshot shows the OrniTrack Control Panel interface. At the top, there is a logo for 'Ornitela' and 'OrniTrack Control Panel'. Below the logo, there is a navigation bar with 'Welcome, SEATRACK', 'Financial', 'Settings', and 'Logout' buttons. A green banner displays the message: 'Your data transfer fee balance for the account 'seatrack' on 2024-02-29 was 0 Eur.' Below this, there are controls for 'Select', 'Deselect', 'Show 25 devices per page', and a search field. A table lists several devices, all of type 'OT-15-4G' with S/N numbers ranging from 243334 to 243338 and a status of '100'. The table has columns for Name, S/N, Status, Last GPRS data, Next GPRS data, and Device notes. Below the table, it says 'Showing 51 to 55 of 55 devices' and has 'Previous', '1', '2', '3', and 'Next' navigation buttons. A detailed view of a device is shown below the table. The device name is 'OT-15 4G' with S/N: 243284 and Model: OT-15-4GEC, FW: 2006231010. It shows 'Last data received by GPRS: 2024-04-18 15:48:58 (UTC+3)' and 'Next data session expected: 2024-04-26 15:48:58 (UTC+3)'. There are options to download data in various formats (KML, KMZ, CSV, SMS, GPX) and a 'Device settings' button. A satellite map is displayed on the right side of the detailed view, showing a location in Europe. At the bottom, it says 'Show all devices on map, 55 of 55 devices'.

- 6) On the OrniTrack devices main page, you will see that the tested transmitter has transferred the acquired data (under last GPRS data)

This screenshot is similar to the one above, showing the OrniTrack Control Panel. The main difference is that a red box highlights the 'Last GPRS data' column in the device list table. The table contains the same five devices as in the previous screenshot. The 'Last GPRS data' values for the devices are: 2024-04-15 14:38:38, 2024-04-15 14:38:38, 2024-04-15 14:38:26, 2024-04-15 14:38:31, and 2024-04-15 14:38:39. The 'Next GPRS data' values are: 2024-04-26 14:38:38, 2024-04-26 14:38:38, 2024-04-26 14:38:26, 2024-04-26 14:38:31, and 2024-04-26 14:38:39. The interface also shows 'Showing 51 to 55 of 55 devices' and navigation buttons.

Initial test of the device

- 7) If the device continues to connect to the GSM network (as seen from the timestamp of the "Last GPRS data" on the main page of the OrniTrack Control Panel) this may indicate incorrect placement of the transmitter into the holding pad.

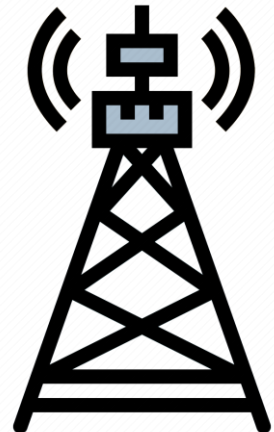


Important:

- Before deployment, the GPS and GSM settings should be **adjusted to recommended species-specific settings** as the pre-programmed test-settings are rather intense and will drain battery power.
- Information on how to adjust the GPS and GSM settings is provided on the following pages.

Transmitter settings: background

- Under optimal GPS conditions and a GSM schedule of one data upload per day, a fully charged OrniTrack-15 can record ca. 800 GPS positions.
- Connection to the GSM network and data upload is energetically expensive.
- Therefore, the GSM module is turned off most of the time and activated only at predefined intervals, when it searches for a network, connects, receives pending new settings and uploads the collected data.
- If no network is available, the GSM module switches off after a timeout until the next scheduled connection attempt.
- Battery consumption of a single GSM session is equal to logging approximately 25 GPS positions, depending on GSM signal strength and the amount of data uploaded.



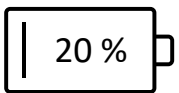
Transmitter settings: background



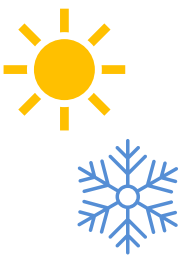
To prevent excessive battery discharge, GPS position logging is discontinued when the battery is depleted.



However, the battery retains a certain energy reserve, used for data transmission and basic functioning of the device until it is recharged by the solar panel.



It is recommended to always maintain battery charge above 20%. This is done by managing device settings considering light conditions (e.g. polar night) and GSM coverage (e.g. poor GSM coverage far out at sea).



Different settings are needed in summer and winter for migrating birds.

Transmitter settings

Based on previous experience of SEATRACK partners and advice from Ornitela we recommend species-specific minimum settings (see below).

The screenshot displays the OrniTrack Control Panel interface. At the top, it features the Ornitela logo and the text "OrniTrack Control Panel". Below this, there is a welcome message and a notification about data transfer fees. A table lists several devices, with columns for Name, S/N, Status, Last GPRS data, and Next. A red arrow points to the "Device settings" button in the detailed view of a device (Name: OT-15 4G, S/N: 243284, Model: OT-15-4GEC, FW: 2006231010). The detailed view includes a satellite map, download data options, and various data format icons (KML, KMZ, CSV, SMS, GPX, and a gear icon for settings).

Access the online control panel from the Ornitela website or go directly to: <https://cpanel.glosendas.net/>.

These settings can be entered in the **device settings page**, which is accessed by clicking the 'Device settings' button on the main page of the online control panel.

Transmitter settings

On the following pages you will find the species-specific transmitter settings that SEATRACK recommends.

OrniTrack Control Panel - Device Settings

Welcome, SEATRACK [Financial](#) [Settings](#) [Logout](#)

[Return to main page](#)

[Save settings](#) [Cancel all waiting settings](#)

Name: OT-15 4G, sn: 243286, fw: 2006231010 0 settings waiting for transmission to device

Device name: OT-15 4G (Max 32 characters)

Copy settings from selected device: 243284 OT-15 4G [Copy settings](#)

Setting	Out of zones	Geofence zone 1	Geofence zone 2
GSM data session interval 600..2073600 seconds	14400	0	0
GPS fix interval 0..172800 seconds, 0 - invalid value in GF1 and GF2 zones	900	0	0
GPS fix interval when battery less than 75% 0 - setting disabled, 1..172800 seconds	0	0	0
GPS fix interval when battery less than 50% 0 - setting disabled, 1..172800 seconds	0	0	0
GPS fix interval when battery less than 25% 0 - setting disabled, 1..172800 seconds	0	0	0
GPS sleep interval 0..21600 seconds	0	0	0
Enable GPS sleep 0 - disabled, 1 - enabled	Disabled	Disabled	0
GPS sleep from dusk -18..18 - sun angle	0° (UTC 18:04)	0° (UTC 18:04)	0
GPS sleep till dawn -18..18 - sun angle	0° (UTC 02:28)	0° (UTC 02:28)	0

IMPORTANT: Please use Chrome or Edge browsers to manage transmitter settings. The device settings page does not work in Firefox.

NOTE: Only the out of zones column needs to be updated (not geofence options)

[See next pages](#)

Transmitter settings

Seasons:

- There is currently no feature that connects the transmitters to the calendar.
- Seasonal settings must be set manually by changing values in the online control panel on specific calendar dates (Please see species-specific settings on the next pages).



Winter



Summer

Setting	Out of zones
GSM data session interval 600..2073600 seconds	<input type="text" value="604800"/>
GPS fix interval 0..172800 seconds, 0 - invalid value in GF1 and GF2 zones	<input type="text" value="43200"/>
GPS fix interval when battery less than 75% 0 - setting disabled, 1..172800 seconds	<input type="text" value="0"/>
GPS fix interval when battery less than 50% 0 - setting disabled, 1..172800 seconds	<input type="text" value="0"/>
GPS fix interval when battery less than 25% 0 - setting disabled, 1..172800 seconds	<input type="text" value="0"/>

Note that it is not necessary to repeat a value if the GPS interval remains the same for different battery charge levels. A value of zero means that GPS logging interval remains unchanged. This way there are fewer settings to send to a transmitter when it connects to the GSM network, which gives less room for error.



Lesser black-backed gull

SUMMER : 1 March – 30 August

Setting	Out of zones
GSM data session interval 600..2073600 seconds	<input type="text" value="21600"/>
GPS fix interval 0..172800 seconds, 0 - invalid value in GF1 and GF2 zones	<input type="text" value="900"/>
GPS fix interval when battery less than 75% 0 - setting disabled, 1..172800 seconds	<input type="text" value="0"/>
GPS fix interval when battery less than 50% 0 - setting disabled, 1..172800 seconds	<input type="text" value="7200"/>
GPS fix interval when battery less than 25% 0 - setting disabled, 1..172800 seconds	<input type="text" value="14400"/>

WINTER: 1 September – 28 February

Setting	Out of zones
GSM data session interval 600..2073600 seconds	<input type="text" value="86400"/>
GPS fix interval 0..172800 seconds, 0 - invalid value in GF1 and GF2 zones	<input type="text" value="900"/>
GPS fix interval when battery less than 75% 0 - setting disabled, 1..172800 seconds	<input type="text" value="0"/>
GPS fix interval when battery less than 50% 0 - setting disabled, 1..172800 seconds	<input type="text" value="7200"/>
GPS fix interval when battery less than 25% 0 - setting disabled, 1..172800 seconds	<input type="text" value="14400"/>



Herring gull

SUMMER: 1 March – 30 August

Setting	Out of zones
GSM data session interval 600..2073600 seconds	<input type="text" value="86400"/>
GPS fix interval 0..172800 seconds, 0 - invalid value in GF1 and GF2 zones	<input type="text" value="900"/>
GPS fix interval when battery less than 75% 0 - setting disabled, 1..172800 seconds	<input type="text" value="0"/>
GPS fix interval when battery less than 50% 0 - setting disabled, 1..172800 seconds	<input type="text" value="7200"/>
GPS fix interval when battery less than 25% 0 - setting disabled, 1..172800 seconds	<input type="text" value="14400"/>

WINTER: 1 September – 28 February

Setting	Out of zones
GSM data session interval 600..2073600 seconds	<input type="text" value="604800"/>
GPS fix interval 0..172800 seconds, 0 - invalid value in GF1 and GF2 zones	<input type="text" value="14400"/>
GPS fix interval when battery less than 75% 0 - setting disabled, 1..172800 seconds	<input type="text" value="0"/>
GPS fix interval when battery less than 50% 0 - setting disabled, 1..172800 seconds	<input type="text" value="43200"/>
GPS fix interval when battery less than 25% 0 - setting disabled, 1..172800 seconds	<input type="text" value="0"/>



Glaucous gull Iceland

Note: the summer and winter periods **are different** for glaucous gulls from Iceland!

SUMMER: 1 March – 14 August

Setting	Out of zones
GSM data session interval 600..2073600 seconds	<input type="text" value="86400"/>
GPS fix interval 0..172800 seconds, 0 - invalid value in GF1 and GF2 zones	<input type="text" value="900"/>
GPS fix interval when battery less than 75% 0 - setting disabled, 1..172800 seconds	<input type="text" value="0"/>
GPS fix interval when battery less than 50% 0 - setting disabled, 1..172800 seconds	<input type="text" value="7200"/>
GPS fix interval when battery less than 25% 0 - setting disabled, 1..172800 seconds	<input type="text" value="14400"/>

WINTER: 15 August – 28 February

Setting	Out of zones
GSM data session interval 600..2073600 seconds	<input type="text" value="604800"/>
GPS fix interval 0..172800 seconds, 0 - invalid value in GF1 and GF2 zones	<input type="text" value="43200"/>
GPS fix interval when battery less than 75% 0 - setting disabled, 1..172800 seconds	<input type="text" value="0"/>
GPS fix interval when battery less than 50% 0 - setting disabled, 1..172800 seconds	<input type="text" value="0"/>
GPS fix interval when battery less than 25% 0 - setting disabled, 1..172800 seconds	<input type="text" value="0"/>



Glaucous gull Coats Island

Note:
same settings
all year round
for glaucous gulls
from Coats Island!

The same settings all year round

Setting	Out of zones
GSM data session interval 600..2073600 seconds	<input type="text" value="604800"/>
GPS fix interval 0..172800 seconds, 0 - invalid value in GF1 and GF2 zones	<input type="text" value="43200"/>
GPS fix interval when battery less than 75% 0 - setting disabled, 1..172800 seconds	<input type="text" value="0"/>
GPS fix interval when battery less than 50% 0 - setting disabled, 1..172800 seconds	<input type="text" value="0"/>
GPS fix interval when battery less than 25% 0 - setting disabled, 1..172800 seconds	<input type="text" value="0"/>

Some important information

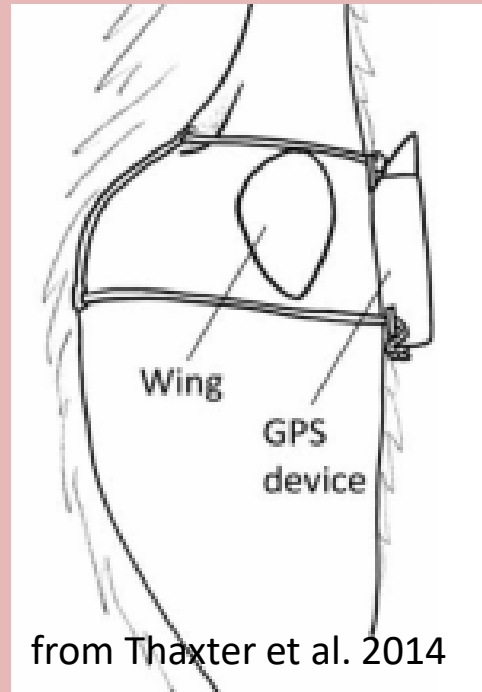
- After entering the settings in the online control panel and before going into the field, make sure that the transmitter has **accepted the new settings**. This is done by turning the device on and off using the magnetic pad
- SEATRACK partners manage their own devices and can adapt the settings to their own needs and interests as long as these **minimum settings** are taken care of.
- Please make a note of the device settings used and send this to Svenja Neumann (Svenja.neumann@npolar.no).
- While SEATRACK partners have their own individual user accounts, the SEATRACK project group can see all the devices via a master account.
- It is important not to push the transmitters too hard at the end of summer and to make sure that the battery is well charged at the start of winter. This particularly true for devices deployed on **glaucous gulls**, as there may be limited solar recharge for this species during winter.
- We don't recommend logging GPS positions in bursts or logging sensor data at higher frequencies independently from GPS position fixing. This will fill up the transmitter memory fast, and quickly drain battery power.

Please get in touch with Svenja Neumann if you wish to discuss device settings (Svenja.neumann@npolar.no).

Deploying GPS-GSM transmitters

IMPORTANT:

- SEATRACK partners should ensure that device attachment is safe and secure without harmful effects on the birds.
- Transmitters should be fully charged prior to their deployment on birds.



from Thaxter et al. 2014

For more information on harness technique see the papers below or consult individual SEATRACK partners.

Thaxter, C. B., Ross-Smith, V. H., Clark, J. A., Clark, N. A., Conway, G. J., Marsh, M., Leat, E. H. and Burton, N. H. K. (2014). A trial of three harness attachment methods and their suitability for long-term use on lesser black-backed gulls and great skuas. *Ringing & Migration* 29: 65–76. Doi: 10.1080/03078698.2014.995546.

Clewley, G. D., Clark, N. A., Thaxter, C. B., Green, R. M., Scragg, E. S and Burton, N. H. K. (2021). Development of a weak-link wing harness for use on large gulls (*Laridae*): methodology, evaluation and recommendations. *Seabird* 33: 17-22.