



# User Notes to Accompany EarTraX and FLiteTraX GPS/GSM/UHF Terrestrial & Avian Tags

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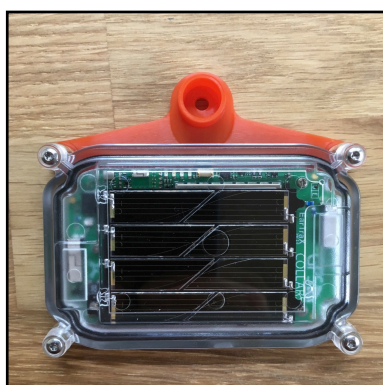
# 1. Introduction

The GPS/GSM/UHF EarTraX Tags and FLiteTraX tags provided by GPS Collars AS contain many features that make them one of the most advanced wildlife telemetry GPS collars/tags available to purchase at this moment in time. At its simplest, the unit collects GPS data and then transmits that data via the cell-phone network to the servers of GPS Collars Ltd which is then available to view/download by the you either on a PC or smart phone.



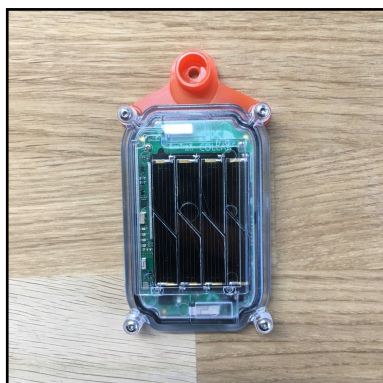
## 2. Turning on the unit.

EarTraX and FLite are fully charged when they are shipped and are turned on. Once received, all you need to do is put the unit outside with a clear view to the sky to connect with GPS satellites and to charge the battery. They must be MOVING - No movement - No GPS. The accelerometers determine the activity of the GPS receiver. If there is no movement, then the unit will not send any GPS data - except if the mortality sensor is activated. Once you receive the unit, please be in touch about the GPS and GSM schedule that you require.

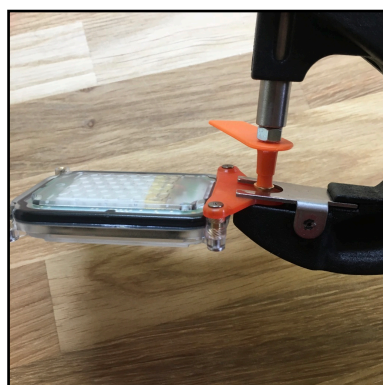


The larger knobby bit of the ear tag fitting is always on the same side as the solar panel. This means that the solar panel is always facing away from the ear of the animal.

The longer ear tag fitting allows the EarTraX unit to sit in the horizontal plane



The shorter ear tag fitting allows the EarTraX unit to sit in the vertical plane.



The EarTraX tag is now ready for fitting to the animal.

This picture shows how the tag and pin are loaded into the applicator.

**DO NOT PLACE BEHIND A WINDOW OR WINDSCREEN. WINDOWS OFTEN HAVE LEAD IN THE GLASS WHICH REDUCES GPS SIGNAL STRENGTH AND SOLAR GAIN BY UP TO 50%.**

The unit ID is on the back of the unit below the battery. Log into your webpage with your user name and password and confirm that the unit has logged with our servers and is displaying the correct date and time at the correct location.



## 4. Flashing LEDs.

There are four LEDs that flash on the units. Each colour has an explanation and reassures the customer that the unit has done something.

1. Blue LED: Heartbeat. Flashes every 3-4 seconds when unit is awake and every 15 Seconds in Sleep mode.
2. Green LED: GPS.
  1. Single Flash = GPS acquiring data.
  2. Double Flash = GPS Position Locked
3. Orange LED: GSM.
  1. Single Flash = GSM On
  2. Double Flash = Logged in to a Network,
  3. Triple Flash = Connected to the Server
4. Red LED – Tick – Low Battery (This tends to not happen, because the under voltage circuitry on the solar charge IC just turns off power to the micro.)

LED Settings can be updated from the server. The default is '1':

- 0 = LED's always off
- 1 = LED's on for 15 minutes after removing the magnet, thereafter, no flashing.
- 2 = LED's always on

To be clear, on the default setting, the "light display" will only occur for 15 minutes after the unit is turned on. After 15 minutes, the LEDs will no longer flash, but the unit will still be working.

## 5. Battery Life.

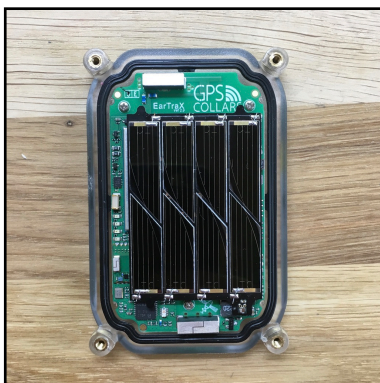
### 5.1. Variables that affect battery life.

These include:

1. View to the sky. With a clear view to the satellites, then GPS can acquire a location very rapidly and use little power. However, where the unit is hidden by vegetation, then more power is required and battery life in the collar will be shorter or battery recharge time in FLiteTraX and EarTraX will take longer.
2. Proximity of cellphone towers. If a unit is close to a tower, then little power is used, but if the cellphone mast is many km distant then power usage is high.
3. 3G/GPRS/SMS. FLiteTraX and EarTraX are unique in that they can switch between Data using 3G/GPRS and text using SMS. All tags and collars preferentially use 3G/GPRS but when these are not available then the collars and tags switch over to SMS. Data is unlimited but the power used is heavy, while text is limited to a single location but power use is minimal. There is therefore a trade off between power use and data collected/transmitted. Talk to staff at GPS Collars to ensure that your specific requirements are met.

### 5.2. Expected Battery Life.

1. Solar EarTraX and FLiteTraX Tags: :30 minute GPS and daily transmit with indefinite life.
2. Without any solar input, FLiteTraX and EarTraX will provide GPS data every four hours for up to 10 days.



3. We are happy to provide variable settings for different collars for you to test various scenarios. Just let us know and we will do our best to set something up.

## **6. GPS and GSM Schedules.**

### **6.1. GPS data collection: Archive, Buffer and Immediate.**

GPS Location Data on each unit is handled in three different ways...

Buffer: GPS Data is collected and stored into buffer (in addition to storing to archive) ready to be sent upon next GSM 3G connection.

Archive: GPS Data is collected and stored into archive (locally) on board the unit and is extracted upon an explicit command from our servers. GPS data to be stored into archive can be collected more frequently than GPS data stored into buffer.

Immediate: GPS Location Data is collected (stored into archive and buffer) and is sent immediately by SMS text.

Note that the interval between successive GPS location points stored into archive and successive GPS location points stored into buffer can be different. GPS power drain is extremely small while GSM power drain is very high particularly where 3G signals are poor. Therefore, in poor GSM areas, we can set the archive GPS data to a high rate - 15 minutes for example, while the GPS data to buffer can be far lower - 4 hours for example. When the unit connects in poor service areas, then only a small packet of data is sent from the buffer which is more likely to be successful. When the unit comes into a better service area, we can then request to download all the data out of archive.

### **6.2. GSM data: Data and SMS.**

FLiteTraX and EarTraX are the only collars/tags on the market that can switch between a data call using the 3G & GPRS networks or SMS using the traditional 2G network.

By using 3G and GPRS networks, high volumes of data stored in the buffer since the last connection can be sent to our servers. Additionally, all the data stored in the collar archive can be downloaded using an explicit command from our servers. All collars and tags preferentially transmit using a data call on the 3G or GPRS networks. Therefore, if the unit is logging data every hour (to archive and to buffer) and the transmit is every 3.5 days, then 84 GPS locations will be sent to our servers and displayed onto your web page. By saving the data to buffer which is then sent and also saving the data to archive is a double back up storage feature. Data is never erased from the unit.

If the unit is not able to connect to a 3G mast (too far away) and will connect to the mobile phone network via 2G, then the unit will transmit the last known location via SMS text. Therefore, if the unit is logging every hour and the transmit is every 3.5 days, then 83 locations will be stored into archive on board the unit and the last (84th) will be sent by text using SMS. If this situation continues, only the 84th GPS location is ever sent and all the other data is archived (stored) on

board the unit. However, if the unit then comes back into a good 3G network, then all data in buffer (84 locations) since the last transmission, 3.5 days earlier, will be sent. If the unit remains in a good 3G network, the archived data can be requested and a data dump of all data on board the unit will be downloaded to the server and then on to your web page.

If you require data to be sent back to our servers more frequently than once per day, then this can also be achieved depending on battery power. In such scenarios, location data can be sent via text as frequently as once every 15 minutes. This does however come at a cost - it is expensive and would be out-with the standard monthly fee.

The SIM card in each unit can switch between up to two network providers, while SMS will be transmitted over ANY network provider.

### **6.3. Default Settings upon receipt of the FLiteTraX and EarTraX**

All FLiteTraX and EarTraX are shipped with a default of hourly GPS (archive and buffer) and 3.5 day GSM transmit. So if you test FLiteTraX or EarTraX on the default mode, then be sure to move the units once per day for at least ten seconds. If the unit is in within a 2G or poor 3G reception, only the last known GPS location will be sent which will be by text, all other collected GPS data will have been stored into archive for later download when the unit comes into better 3G reception.

### **6.4. GSM Transmission**

FLiteTraX and EarTraX are the only collars/tags on the market that can switch between a data call using the 3G & GPRS networks or SMS using the traditional 2G network.

## **7. Mortality - personal alert.**

All units come with a mortality sensor. This is activated when no movement is recorded by the on-board accelerometers. This time window can be set to anything between 5 minutes and 24 hours and can be set remotely.

If the mortality is activated, then in practice the GSM will still transmit and include the last known GPS co-ordinates. An SMS will also be sent to our servers and then an SMS is sent to your personal or work mobile alerting you to the fact that the unit is stationary and perhaps the animal is dead. If however, the unit keeps firing off false alerts, then we can change the activation settings to a higher time of inactivity before an alert is set.

Therefore to activate mortality, send to the staff at GPS Collars Ltd, the chosen "inactive" period and your mobile number to receive the text alerts. Please only activate the mortality on a collar once it has been fitted to an animal otherwise there can be a lot of false alerts as a tag is left on the shelf or in a car for extended periods of time.



## 8. UHF Tracking Beacon.

The tracking beacon on our collars and tags use UHF rather than VHF. This provides a significant number of advantages.

1. All tags use the same frequency, but are separated by their unique ID which is their eight character serial number such as 19FC c81f.
2. The carrier signal also carries the last known GPS location with specific GPS Co-ordinates.

Therefore, when you lock into a specific animal you get the last known GPS location which will take you to where the animal last was. The UHF transmit this information every 4.3 seconds.

Our receiver works with both a patch antenna and a Yagi Antenna and can pick up and separate multiple units at the same time providing individual GPS locations for every unit received.

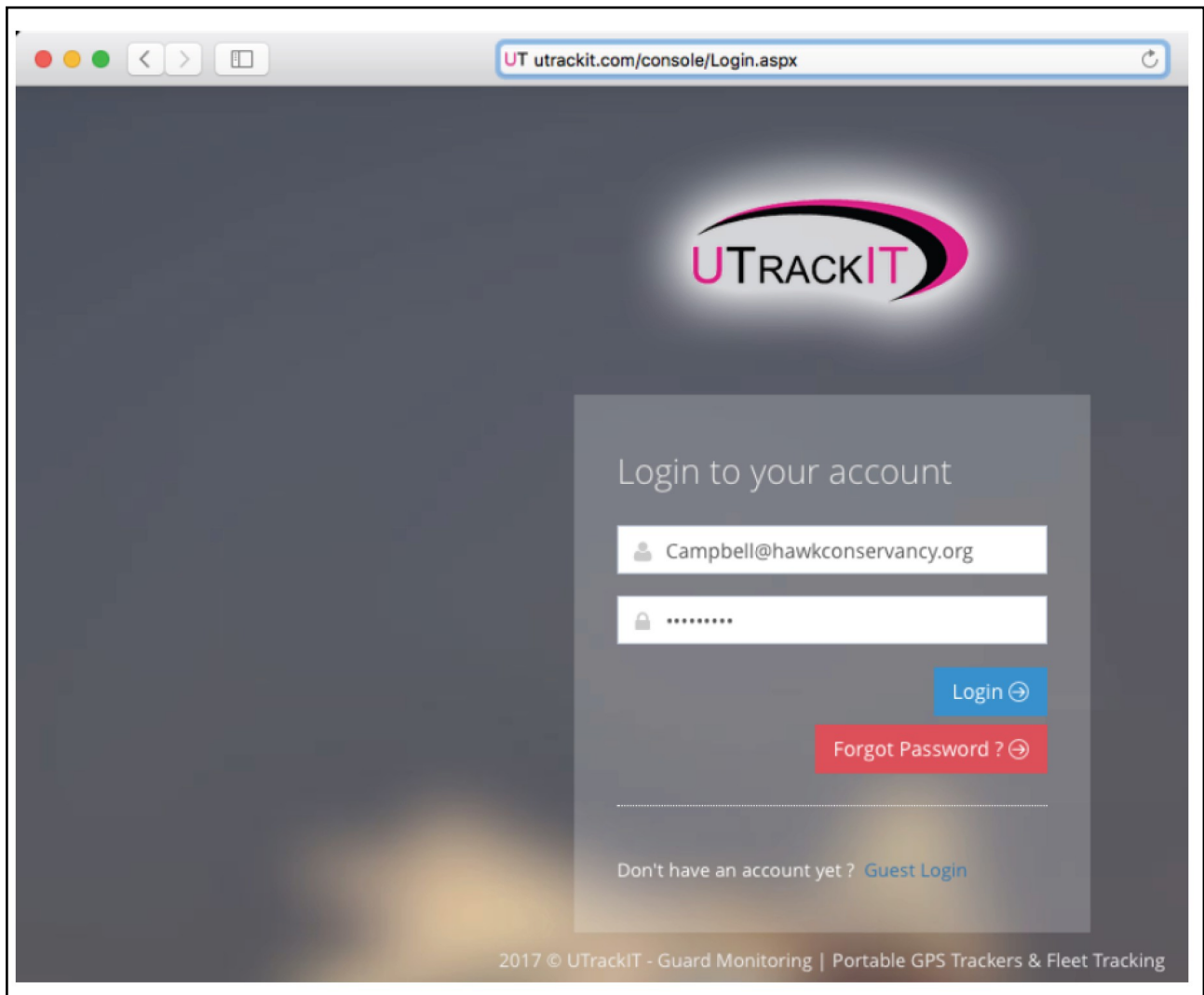
The Patch antenna can pick up a signal from the unit over a range of 5km in a 270 degree arc. 50% of the time the unit will also receive signals over a range of 15km. This means that the use of the patch antenna can be used over an extended range and does not need multiple points in order to triangulate the location of an individual.



## 9. Accessing Data

Go to [www.gpscollars.co.uk](http://www.gpscollars.co.uk) and login using your username and password.

Alternatively go to [www.utrackit.com](http://www.utrackit.com) and login using your username and password.



Once logged in you will be taken to the DashBoard. The reference to species below are for a bird fitted with a FLiteTraX tag Ensure the date range is correct.

UTRACKIT

Hawk Trust (Ian Hulbert)

Dashboard Last Refresh: 20 Apr 2017 11:27:28

Dashboard Filter Dashboard 17 APR 2017 - 23 APR 2017 Actions

The table below contains all unit data for a select period of time. Action are available from the relevant Actions drop-down menu.

Display as Distance

Display as Speed

Global Overview

Refresh Page Data

|     | Description                      | Site | Movement | Alarm | 17 Apr | 18 Apr | 19 Apr | 20 Apr | Monthly | Daily |
|-----|----------------------------------|------|----------|-------|--------|--------|--------|--------|---------|-------|
| 001 | 170AE32B (Hawk Trust)            | -    | -        | -     | 0      | 0      | 0      | 0      | 0       | 0     |
| 002 | 18C6FB29 (Hawk Trust)            | -    | -        | -     | 0      | 0      | 0      | 0      | 0       | 0     |
| 003 | 18C70E08 (Hawk Trust)            | -    | -        | -     | 0      | 0      | 0      | 0      | 0       | 0     |
| 004 | Last GPS @ 11:27:27 (Hawk Trust) | -    | -        | -     | 0      | 0      | 0      | 0      | 0       | 0     |

Mouse-Over the sequence number to quickly check Date/Time of latest data.

When there is data you can click this number and access past days / periods

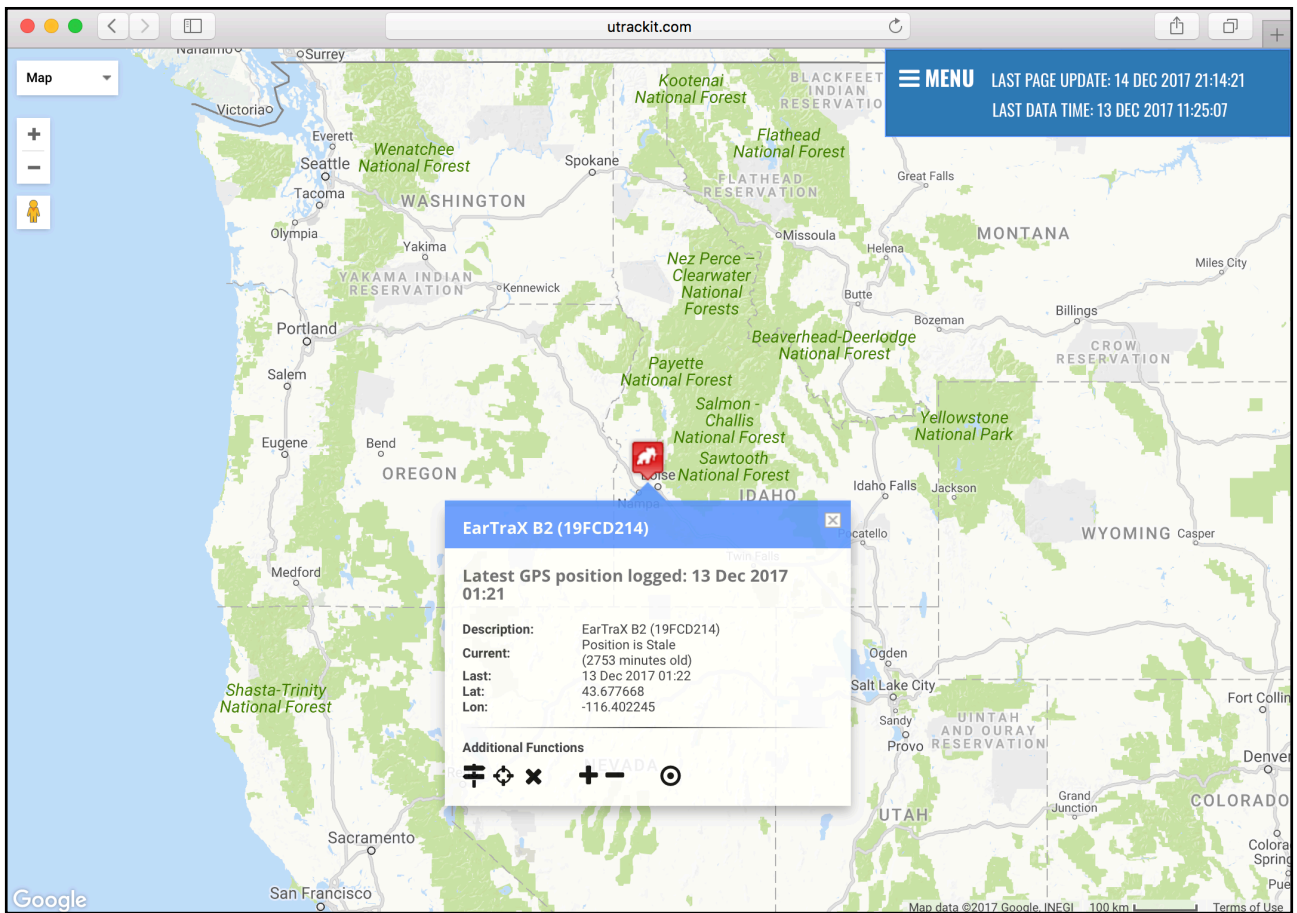
These columns report the estimated km travelled during that day

\*\* This is not going to be 100% on a hawk because the data is only recorded every 10 minutes (or longer) \*\*

[Actions] Global Overview opens up a map showing all devices (see next page)

Click on the Unit ID to proceed to the mapping page..

## Mapping Page

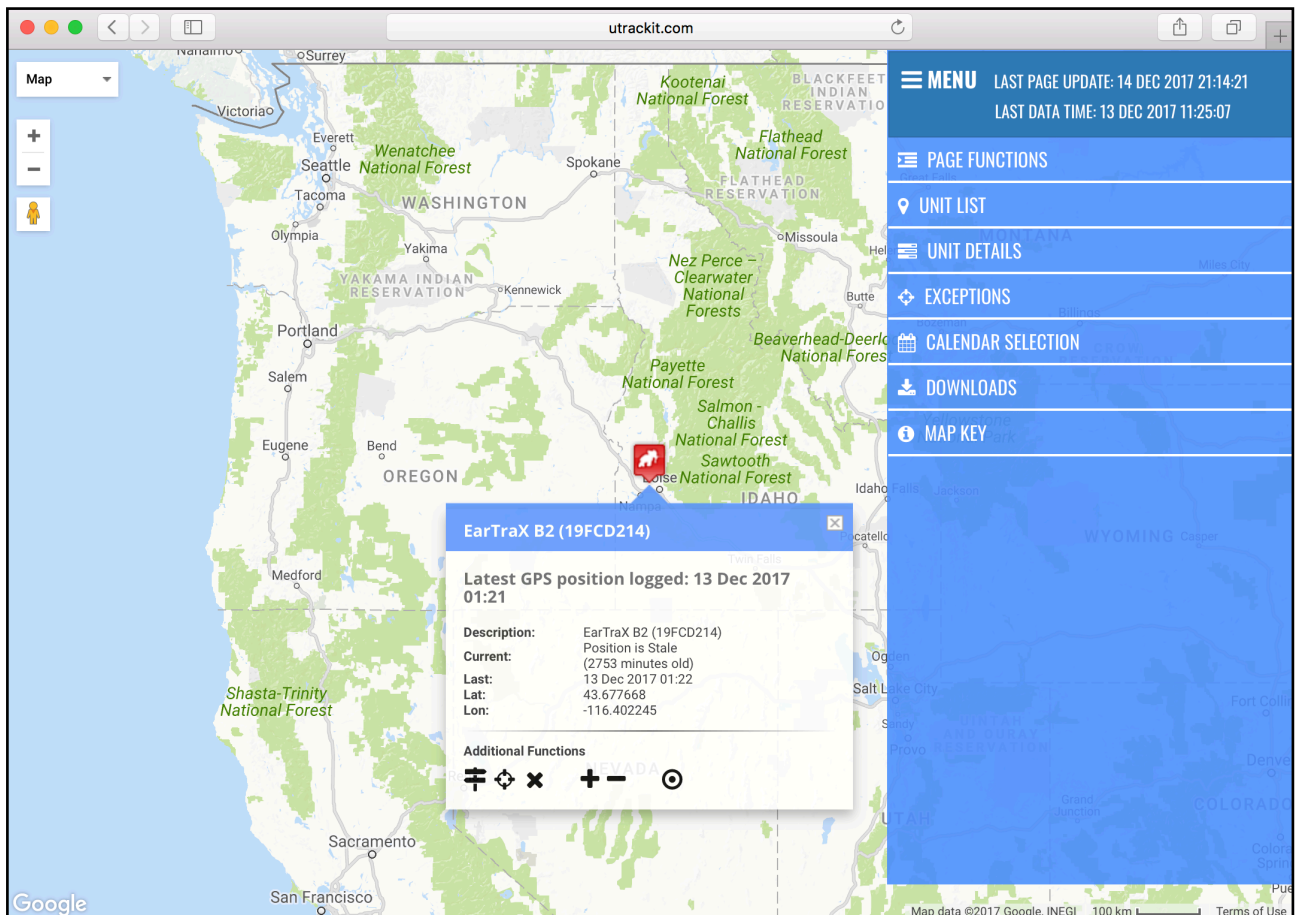


Within the dialogue box, the unit ID is displayed with the time of the last saved location and its latitude and longitude.

Move the mouse over to the small icons to show trail, fit to trail, clear trail, zoom in and out and to centre the map on this device.

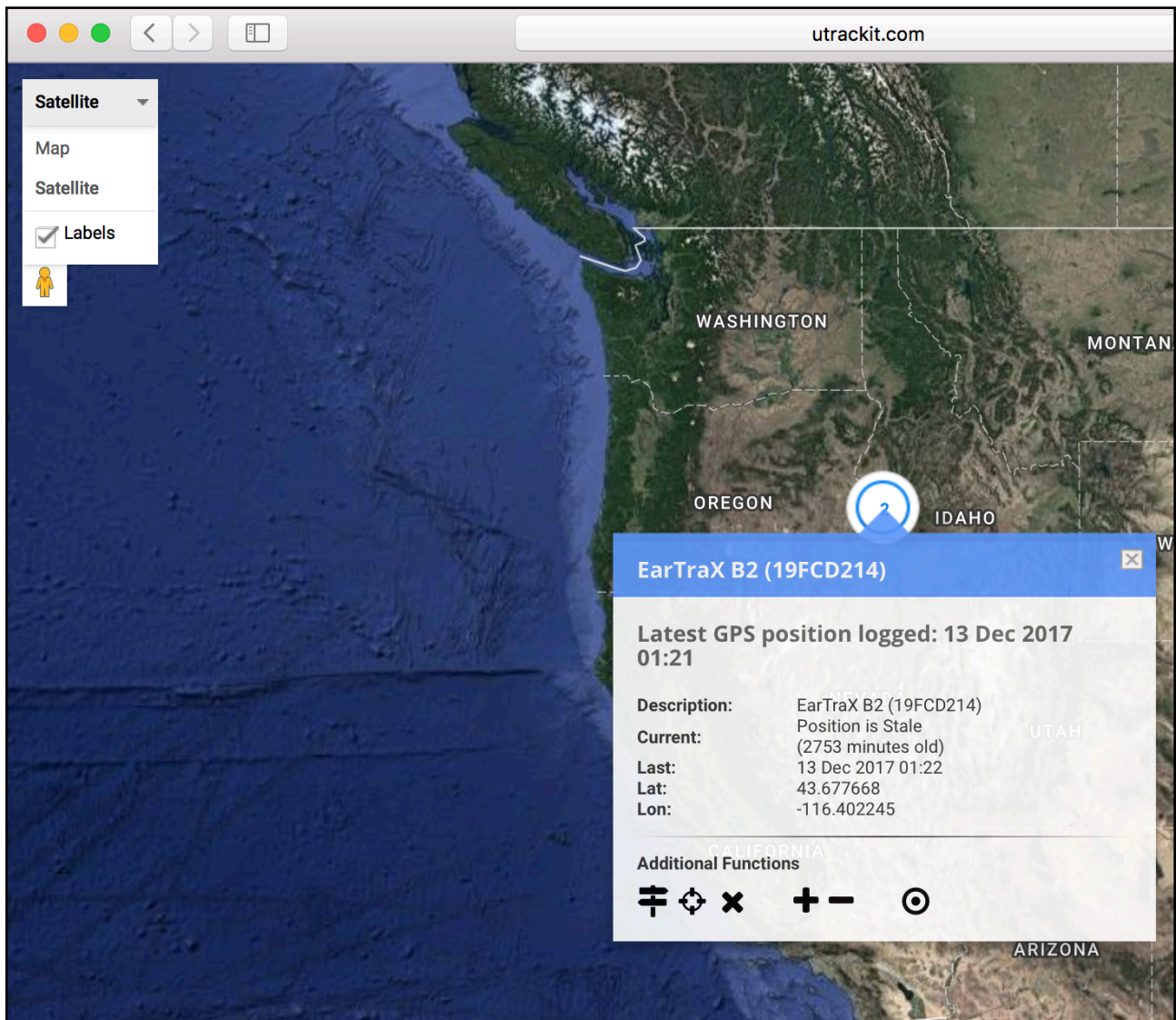
Click on Menu to reveal further information





Switch between satellite and map mode..





To move back to Dashboard use "Page Functions" rather than back button on your browser. Within the Menu, you can select between the Unit List, the Unit Details, Calendar Selection and Downloads. Exceptions and Map key still need to be refined.

Clicking on the Unit List will reveal all units.

MENU

LAST PAGE UPDATE: 14 DEC 2017 21:19:21

LAST DATA TIME: 13 DEC 2017 11:25:07

PAGE FUNCTIONS

UNIT LIST

Filter Unit List:

Show All:

NO

IDAHO DEPT OF FISH AND GAME (44)

EarTraX (19FCC4CC)

EarTraX (19FCC659)

EarTraX (19FCCBEF)

EarTraX (19FCCDDF)

EarTraX (19FCCF23)

EarTraX (19FCD0A0)

EarTraX (19FCD9A2)

EarTraX (19FCD9E8)

EarTraX (19FCDD1B)

EarTraX (19FCDF5B)

UNIT DETAILS

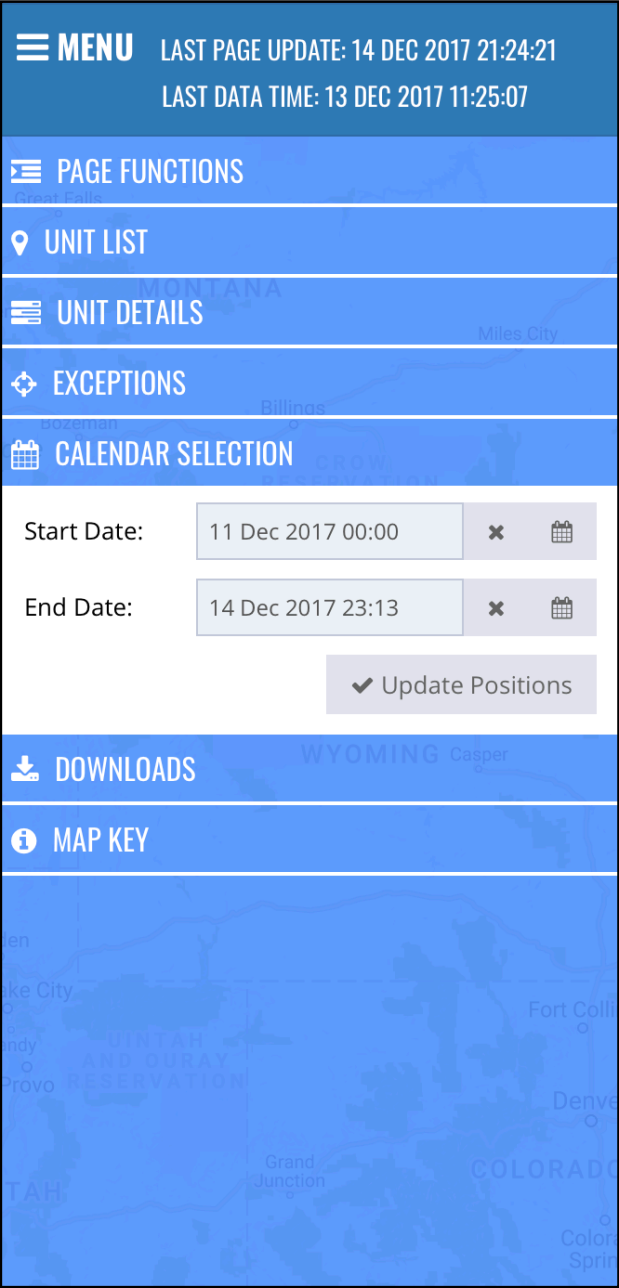
EXCEPTIONS

CALENDAR SELECTION

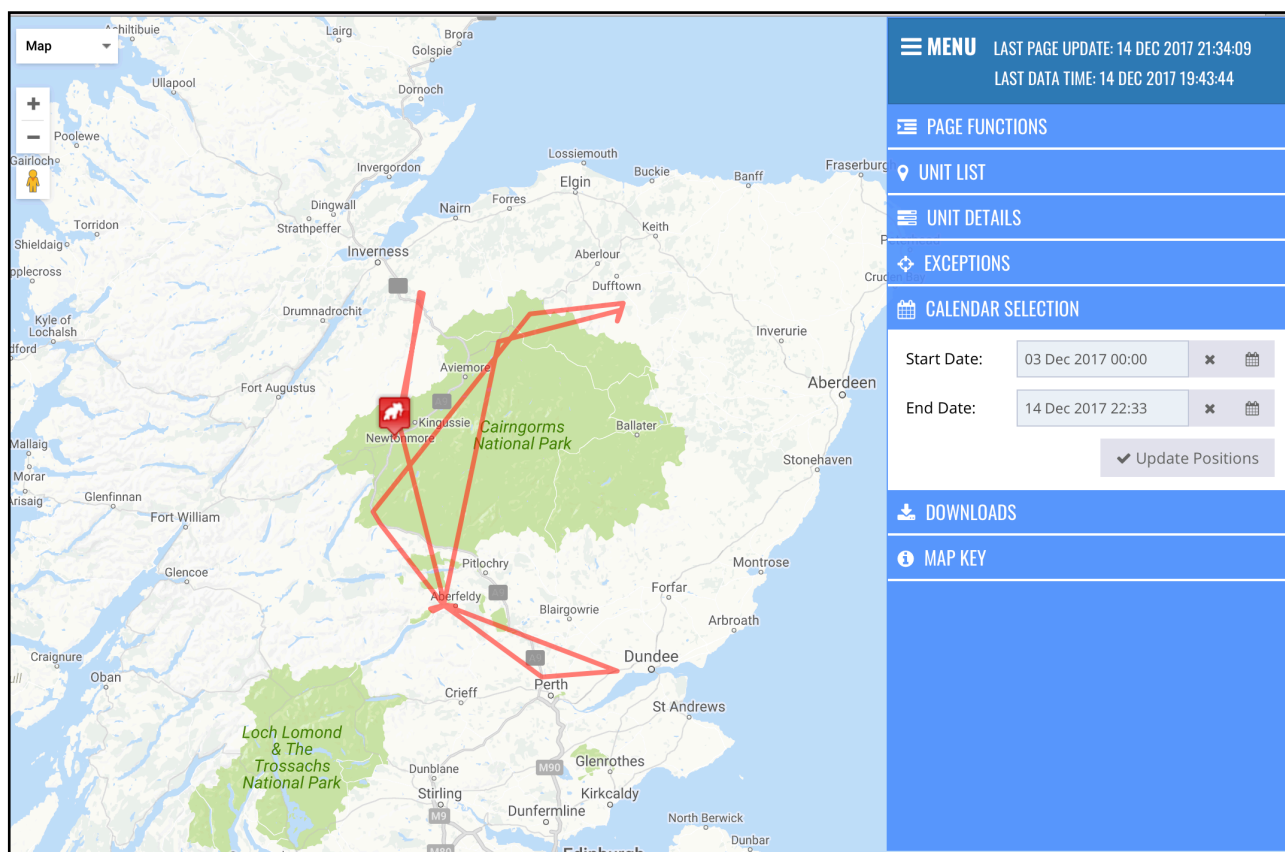
DOWNLOADS

MAP KEY

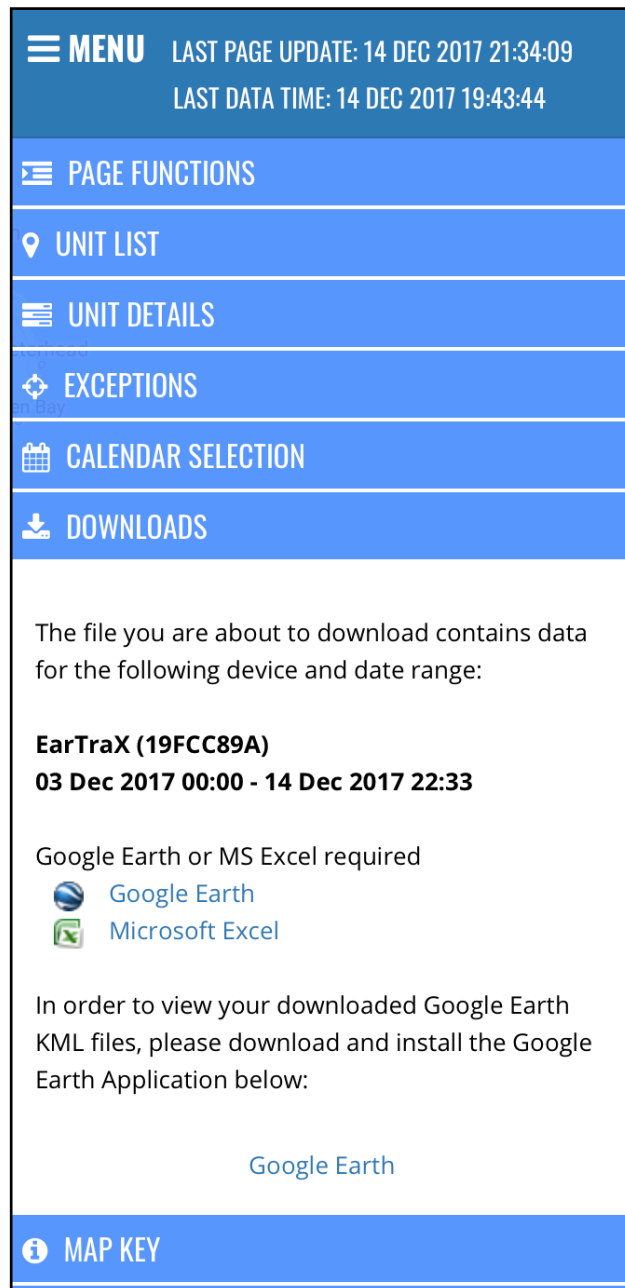
Click on Calendar Selection and the window below will appear. The dates selected are the dates for interrogating our server to receive data already collected from the collar or tag. Click “Show Trail” in the unit dialogue box and the trail of locations within the selected calendar range will be displayed on the map.



Trail of an EarTraX unit under test in Scotland over a period of 11 days.



To download data, click on Downloads. Data can be downloaded as a Google Earth .kmz file or a Microsoft Excel .csv File. Once clicked an orange or green dialogue box will appear indicating the progress of download. The file will appear in your Downloaded Files.



At present the Microsoft Excel is as displayed below...

Other data such as HDoP, satellite number, accelerometer data will be displayed shortly and can be downloaded retrospectively.

Remember that if the unit is within 3G range, then ALL the data will be transmitted to our servers and which can then be downloaded. However, if the unit can only communicate with SMS, then only the last data point is transmitted and can then be downloaded. At first sight this would then appear that all the other data is lost. However, remember that all data is archived on the unit and can be downloaded later with a batch file data dump. When this occurs the missing data is then filled in.



| EarTraX19FC                                       |             |                 |                  |                       |           |             |              |                |         |      |
|---|-------------|-----------------|------------------|-----------------------|-----------|-------------|--------------|----------------|---------|------|
| Home Insert Page Layout Formulas Data Review View |             |                 |                  |                       |           |             |              |                |         |      |
| Paste   |             | Cut Copy Format |                  | Calibri (Body) 12 A A |           | = = =       |              | Wrap Text      |         | Ge   |
| A1  |             | fx Description  |                  |                       |           |             |              | Merge & Center |         |      |
|   | A           | B               | C                | D                     | E         | F           | G            | H              | I       | J    |
| 1   | Description | Notes           | Date-Time        | Latitude              | Longitude | Travel (km) | Speed (km/h) | Altitude       | Heading | Temp |
| 2   |             |                 | 05/12/2017 08:59 | 56.622562             | -3.919992 | 29.14       | 16           | 118.7          | S       |      |
| 3   |             |                 | 05/12/2017 08:59 | 56.622393             | -3.91992  |             | 17.6         | 115.6          | SE      |      |
| 4   |             |                 | 05/12/2017 09:55 | 56.827925             | -4.211937 | 33.27       | 107          | 424            | W       |      |
| 5   |             |                 | 05/12/2017 09:55 | 56.82838              | -4.213    |             | 102.9        | 420.1          | W       |      |
| 6   |             |                 | 05/12/2017 09:58 | 56.859178             | -4.24841  | 103.49      | 72.8         | 452.6          | NW      |      |
| 7   |             |                 | 05/12/2017 09:58 | 56.85967              | -4.248745 |             | 68.9         | 451.6          | NW      |      |
| 8   |             |                 | 05/12/2017 10:59 | 57.35093              | -3.523995 | 129.34      | 88.4         | 181.1          | N       |      |
| 9   |             |                 | 05/12/2017 10:59 | 57.351573             | -3.523802 |             | 88.1         | 181.6          | N       |      |
| 10  |             |                 | 05/12/2017 12:02 | 57.376398             | -3.097887 | 132.64      | 0.1          | 410.2          | N       |      |
| 11  |             |                 | 05/12/2017 12:02 | 57.376398             | -3.097885 |             | 0.2          | 410.4          | N       | 23.1 |
| 12  |             |                 | 05/12/2017 12:03 | 57.3764               | -3.097883 |             | 0            | 410.4          | N       |      |
| 13  |             |                 | 05/12/2017 13:03 | 57.347782             | -3.11194  | 134.57      | 21.8         | 437.3          | S       | 8.9  |
| 14  |             |                 | 05/12/2017 13:03 | 57.34765              | -3.112147 |             | 23.1         | 436.4          | S       |      |
| 15  |             |                 | 05/12/2017 13:56 | 57.332392             | -3.12698  | 134.58      | 0.2          | 495.5          | N       |      |
| 16  |             |                 | 05/12/2017 13:56 | 57.332373             | -3.12694  | 137.71      | 0.1          | 497.6          | N       |      |
| 17  |             |                 | 05/12/2017 14:38 | 57.359298             | -3.11214  | 172.5       | 33.6         | 569.2          | NW      |      |
| 18  |             |                 | 05/12/2017 14:38 | 57.359548             | -3.112172 |             | 33.6         | 569.6          | NW      |      |
| 19  |             |                 | 05/12/2017 17:04 | 57.281907             | -3.671063 | 247.42      | 87.4         | 215.1          | SW      |      |
| 20  |             |                 | 05/12/2017 17:04 | 57.281487             | -3.672015 |             | 88.1         | 213.5          | SW      |      |
| 21  |             |                 | 07/12/2017 18:42 | 56.623187             | -3.919837 | 247.47      | 0.2          | 114.2          | N       |      |
| 22  |             |                 | 07/12/2017 18:42 | 56.623185             | -3.919858 |             | 0.4          | 113.6          | N       |      |
| 23  |             |                 |                  |                       |           |             |              |                |         |      |

The status of the data can be further interrogated to obtain more information such as temperature and battery voltage and where data is missing etc.

UTRACKIT

Global Overview - 20 Apr 2017

18C70E08

Click here to enter the Special Administration Pages

(1) You may need to click here to open (display) the {Search}

(2) Type any description in the {search} input and press [ENTER]

### Search Results

Dashboard - Search Results

The information below is a result of a search performed for '18C70E08'.

Search Results

(3) One or more matches found  
Click on {Diagnostics} of the one you are interested in analysing

|             | Unit Description                                  | Last Communication | Last Position     | Info   | Map |
|-------------|---|--------------------|-------------------|--|-----|
| Diagnostics | Perform various device diagnostics interrogations | 19 Apr 2017 17:07  | 19 Apr 2017 17:07 | Hawk Trust - Ian Hulbert<br>S/N 000018C70E08   Batch 201703<br>Firmware 0EXLL-1.04.003.V<br>Battery 4.15   Temp 19.7 |     |
| Allocation  |   |                    |                   |  |     |

### Report Info Selection

(4) Select a report type

- Accuracy
- Battery
- ✓ Data Density
- Latitude / Longitude
- Temperature
- Tower Strength

Select Date Range

14 Apr 2017 - 20 Apr 2017

(5) Select the Date/Time of interest

00:00 AM - 11:59 PM

### 18C70E08 (Hawk Trust) - Data Density

(view large version)

Number of Data Records (stacked by type)

GPS  
Event  
Canary

Date / Time (14 Apr 2017 - 20 Apr 2017)

Device Details

**18C70E08 (Hawk Trust)**  
Hawk Trust - Ian Hulbert  
S/N 000018C70E08 | Batch 201703  
Firmware 0EXLL-1.04.003.V  
Battery 4.15 | Temp 19.7  
**Last Communication:** 19 Apr 2017 17:07  
**Last GPS:** 19 Apr 2017 17:07

(6) Submit and the Graph / Data will be called up from the database

Submit

utrackit.com

Global Overview - 20 Apr 2017

Reports system diagnostics

Dashboard - Reports

The report below displays Diagnostic based information, specifically for a device and date range.

**Report Info Selection**

Select Report Type  
Data Density

☐ Include Data Delay  
☐ Show Points Only

Select Date Range  
14 Apr 2017 - 20 Apr 2017

Time Scale  
00:00 AM - 11:59 PM

**18C70E08 (Hawk Trust) - Data Density** (view large version)

Number of Data Records (stacked by type)

GPS  
Event  
Canary

Time Range: 17:00 - 17:15  
GPS Count: 5

Click ON one of the bars in the Data Density

**Device Details**  
18C70E08 (Hawk Trust)  
Hawk Trust - Ian Hulbert

Date / Time (14 Apr 2017 - 20 Apr 2017)

18C70E08 (Hawk Trust) - 19 Apr 2017 (17:00 - 17:15)

This extracts the Data for that range

| Cause | Fix                  | BattV | Temp | RSSI | Lat         | Lon        | Spd | Delay | Source                                       |
|-------|----------------------|-------|------|------|-------------|------------|-----|-------|--|
|       | 19 Apr 2017 17:06:43 |       |      |      |             |            | 0.0 | 1     | EVT  |
|       | 19 Apr 2017 17:06:44 |       |      |      |             |            | 0.0 | 1     | EVT  |
|       | 19 Apr 2017 17:06:44 |       |      |      |             |            | 0.0 | 1     | EVT  |
|       | 19 Apr 2017 17:06:51 |       |      |      | -26.1111400 | 27.8734820 | 0.2 | 1     | GPS  |
|       | 19 Apr 2017 17:06:55 |       |      |      | -26.1111400 | 27.8734780 | 0.1 | 1     | GPS  |
|       | 19 Apr 2017 17:06:59 |       |      |      | -26.1111420 | 27.8734720 | 0.0 | 1     | GPS  |
|       | 19 Apr 2017 17:07:03 | 4.13  | 20.0 | 11   | -26.1111430 | 27.8734680 | 0.1 | 0     | GPS  |
|       | 19 Apr 2017 17:07:05 | 4.17  | 19.7 | 12   | -26.1111430 | 27.8734700 | 0.0 | 0     | GPS  |
|       | 19 Apr 2017 17:07:12 |       |      |      |             |            | 0.0 | 0     | EVT  |
|       |                      |       |      |      |             |            |     |       | No Movement in past x seconds (first notice) |

But even better - see everything (for the Date/Time range) in Excel by Exporting the Full Range {See Next Page}

Export Full Range Previous Next Close

S/N 100018C70E08 | Batch 201703

|    | A     | B                | C     | D    | E    | F           | G         | H   | I     | J         | K  |
|----|-------|------------------|-------|------|------|-------------|-----------|-----|-------|-----------|--|
|    | Cause | Fix              | BattV | Temp | RSSI | Lat         | Lon       | Spd | Delay | Data Type | Annotation                                       |
| 1  |       |                  |       |      |      |             |           |     |       |           |  |
| 2  |       | 14/04/2017 18:07 |       |      |      | -26.1111483 | 27.873428 | -   | 1     | EVT       | Archive Buffer Write Point                       |
| 3  |       | 14/04/2017 18:07 |       |      |      | -26.1111483 | 27.873428 | -   | 1     | EVT       | Archive Buffer Read Point                        |
| 4  |       | 14/04/2017 18:07 |       |      |      | -26.1111483 | 27.873428 | -   | 1     | EVT       | Power-ON Reset (Time-linked settings cleared).   |
| 5  |       | 14/04/2017 18:08 |       |      |      | -26.1111483 | 27.873428 | -   | 0     | EVT       | No Movement in past x seconds (first notice)     |
| 6  | T     | 14/04/2017 18:08 | 4.18  | 15.1 | 11   | -26.110992  | 27.87366  | 0.7 | 1     | GPS       |  |
| 7  | T     | 14/04/2017 18:08 |       |      |      | -26.110992  | 27.873643 | 0.3 | 1     | GPS       |  |
| 8  | T     | 14/04/2017 18:08 |       |      |      | -26.110993  | 27.873635 | 0.3 | 1     | GPS       |  |
| 9  | T     | 14/04/2017 18:08 |       |      |      | -26.111002  | 27.873615 | 0.1 | 1     | GPS       |  |
| 10 | T     | 14/04/2017 18:08 | 4.28  | 15.5 | 11   | -26.111007  | 27.873597 | 0.4 | 1     | GPS       |  |
| 11 |       | 14/04/2017 18:09 |       |      |      | -26.1110067 | 27.873597 | -   | 0     | EVT       | No Movement - device to shut off (second notice) |
| 12 |       | 15/04/2017 18:07 |       |      |      | -26.1110067 | 27.873597 | -   | 1     | EVT       | Power-ON Reset (Time-linked settings cleared).   |
| 13 |       | 15/04/2017 18:07 |       |      |      | -26.1110067 | 27.873597 | -   | 1     | EVT       | Archive Buffer Write Point                       |
| 14 |       | 15/04/2017 18:07 |       |      |      | -26.1110067 | 27.873597 | -   | 1     | EVT       | Archive Buffer Read Point                        |
| 15 |       | 15/04/2017 18:07 |       |      |      | -26.1110067 | 27.873597 | -   | 1     | EVT       | Power ON No-Movement                             |
| 16 |       | 15/04/2017 18:08 |       |      |      | -26.1110067 | 27.873597 | -   | 0     | EVT       | No Movement in past x seconds (first notice)     |
| 17 | T     | 15/04/2017 18:08 |       |      |      | -26.111125  | 27.87323  | 0.1 | 1     | GPS       |  |
| 18 | T     | 15/04/2017 18:08 |       |      |      | -26.111125  | 27.873253 | 0.8 | 1     | GPS       |  |
| 19 | T     | 15/04/2017 18:08 | 4.18  | 17.5 | 11   | -26.111123  | 27.873265 | 0.1 | 0     | GPS       |  |
| 20 | T     | 15/04/2017 18:08 |       |      |      | -26.111123  | 27.873267 | 0.4 | 1     | GPS       |  |
| 21 | T     | 15/04/2017 18:08 | 4.22  | 17.9 | 11   | -26.111122  | 27.873267 | 0.1 | 1     | GPS       |  |
| 22 | T     | 15/04/2017 18:15 |       |      |      | -26.111125  | 27.873183 | 0.7 | 1436  | GPS       |  |
| 23 | T     | 15/04/2017 18:15 | 4.17  | 17.8 | 8    | -26.111128  | 27.873187 | 0.1 | 1436  | GPS       |  |
| 24 |       | 16/04/2017 18:10 |       |      |      | -26.1111283 | 27.873187 | -   | 1     | EVT       | Power ON No-Movement                             |
| 25 |       | 16/04/2017 18:10 |       |      |      | -26.1111283 | 27.873187 | -   | 1     | EVT       | Power-ON Reset (Time-linked settings cleared).   |
| 26 |       | 16/04/2017 18:10 |       |      |      | -26.1111283 | 27.873187 | -   | 1     | EVT       | Archive Buffer Read Point                        |
| 27 |       | 16/04/2017 18:10 |       |      |      | -26.1111283 | 27.873187 | -   | 1     | EVT       | Archive Buffer Write Point                       |
| 28 |       | 16/04/2017 18:11 |       |      |      | -26.1111283 | 27.873187 | -   | 0     | EVT       | No Movement in past x seconds (first notice)     |
| 29 | T     | 16/04/2017 18:11 |       |      |      | -26.111114  | 27.873312 | 0.1 | 1     | GPS       |  |
| 30 | T     | 16/04/2017 18:11 | 4.23  | 18.4 | 9    | -26.111114  | 27.87331  | 0.4 | 1     | GPS       |  |
| 31 | T     | 16/04/2017 18:11 |       |      |      | -26.111148  | 27.873342 | 0.5 | 1     | GPS       |  |
| 32 | T     | 16/04/2017 18:11 |       |      |      | -26.111148  | 27.873357 | 0.2 | 1     | GPS       |  |
| 33 | T     | 16/04/2017 18:11 | 4.24  | 18.9 | 9    | -26.111115  | 27.873375 | 0.3 | 1     | GPS       |  |
| 34 |       | 16/04/2017 18:12 |       |      |      | -26.111115  | 27.873375 | -   | 0     | EVT       | No Movement - device to shut off (second notice) |
| 35 | T     | 17/04/2017 14:07 |       |      |      | -26.111125  | 27.873407 | 1.0 | 249   | GPS       |  |
| 36 | T     | 17/04/2017 14:07 |       |      |      | -26.111123  | 27.87341  | 0.4 | 249   | GPS       |  |
| 37 | T     | 17/04/2017 14:13 |       |      |      | -26.111114  | 27.873377 | 0.2 | 243   | GPS       |  |
| 38 | T     | 17/04/2017 14:13 |       |      |      | -26.111132  | 27.873392 | 0.2 | 243   | GPS       |  |
| 39 |       | 17/04/2017 18:15 |       |      |      | -26.1111317 | 27.873392 | -   | 1     | EVT       | Power ON No-Movement                             |
| 40 |       | 17/04/2017 18:15 |       |      |      | -26.1111317 | 27.873392 | -   | 1     | EVT       | Archive Buffer Read Point                        |
| 41 |       | 17/04/2017 18:15 |       |      |      | -26.1111317 | 27.873392 | -   | 1     | EVT       | Archive Buffer Write Point                       |
| 42 | T     | 17/04/2017 18:15 |       |      |      | -26.110942  | 27.873028 | 0.5 | 1     | GPS       |  |
| 43 | T     | 17/04/2017 18:15 |       |      |      | -26.110947  | 27.87302  | 0.1 | 1     | GPS       |  |
| 44 | T     | 17/04/2017 18:15 | 4.21  | 17.5 | 12   | -26.110952  | 27.873015 | 0.3 | 0     | GPS       |  |
| 45 | T     | 17/04/2017 18:15 |       |      |      | -26.110953  | 27.873013 | 0.1 | 1     | GPS       |  |
| 46 | T     | 17/04/2017 18:15 | 4.21  | 17.9 | 11   | -26.110955  | 27.873007 | 0.3 | 1     | GPS       |  |
| 47 |       | 17/04/2017 18:15 |       |      |      | -26.110955  | 27.873007 | -   | 1     | EVT       | No Movement in past x seconds (first notice)     |
| 48 | T     | 18/04/2017 10:28 |       |      |      | -26.111113  | 27.873385 | 0.4 | 394   | GPS       |  |
| 49 | T     | 18/04/2017 10:29 |       |      |      | -26.111111  | 27.873387 | -   | 393   | GPS       |  |
| 50 | T     | 18/04/2017 10:34 |       |      |      | -26.111111  | 27.873397 | -   | 388   | GPS       |  |
| 51 | T     | 18/04/2017 10:34 | 4.18  | 19.4 | 11   | -26.111112  | 27.873388 | 0.1 | 388   | GPS       |  |
| 52 |       | 18/04/2017 17:01 |       |      |      | -26.1111117 | 27.873388 | -   | 2     | EVT       | Power-ON Reset (Time-linked settings cleared).   |
| 53 |       | 18/04/2017 17:01 |       |      |      | -26.1111117 | 27.873388 | -   | 2     | EVT       | Archive Buffer Read Point                        |
| 54 |       | 18/04/2017 17:01 |       |      |      | -26.1111117 | 27.873388 | -   | 2     | EVT       | Archive Buffer Write Point                       |
| 55 |       | 18/04/2017 17:01 |       |      |      | -26.1111117 | 27.873388 | -   | 2     | EVT       | Power ON No-Movement                             |
| 56 |       | 18/04/2017 17:02 |       |      |      | -26.1111117 | 27.873388 | -   | 1     | EVT       | No Movement in past x seconds (first notice)     |
| 57 | T     | 18/04/2017 17:03 |       |      |      | -26.111212  | 27.873092 | 0.4 | 1     | GPS       |  |
| 58 | T     | 18/04/2017 17:03 | 4.31  | 20   | 10   | -26.111213  | 27.87309  | 0.3 | 0     | GPS       |  |
| 59 | T     | 18/04/2017 17:03 |       |      |      | -26.111215  | 27.873087 | -   | 1     | GPS       |  |
| 60 | T     | 18/04/2017 17:03 |       |      |      | -26.111215  | 27.873085 | 0.1 | 1     | GPS       |  |
| 61 | T     | 18/04/2017 17:03 | 4.24  | 20.5 | 11   | -26.11122   | 27.873075 | 0.1 | 1     | GPS       |  |
| 62 |       | 18/04/2017 17:03 |       |      |      | -26.11122   | 27.873075 | -   | 1     | EVT       | No Movement - device to shut off (second notice) |