



# ECOTONE®



March 2022



GPS TELEMETRY





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## GPS TELEMETRY

Ecotone offers a wide selection of GPS telemetry trackers, all with remote programming and data download. The experience gained over the years under research has enabled us to introduce own solutions, adapted to the research projects and reflecting specific requirements of the species.

### GPS-GSM-GPRS/UHF trackers

Advanced & multifunctional GPS loggers for worldwide all-year-round animal tracking in fine resolution. Except GPS tracks, can be collected precise activity reports, raw acceleration data recorded in bursts, diving depth profiles, barometric pressure, temperature, immersion duration and more. Data are collected into GPS-SMS and GPS-GPRS/UHF separate memory banks, which are individually programmable and use different data transmission.

### Milestones:

- UHF transmission included in all GPS-GSM trackers from 2020;
- Almost unlimited & low cost data transfer via GPRS/3G;
- Over-the-air (OTA) automatic firmware upgrade via 3G link;
- Detailed daily activity reports based on acceleration sensor.

### Key features:

- Independently programmable GPS-SMS and GPS-GPRS/UHF data collection;
- Worldwide & USA 2G/3G quad band HSPA/GSM communication range;
- Data access & programming: from web profile or via long range (LR) UHF link;
- OTA - automatic firmware upgrading via GPRS /3G network;
- GPS intervals: from 1 minute to 24 hours or 1s to 30s in bursts;
- GPS controlled by: duty-hours schedule, light sensor (day/night), immersion or motion sensor;
- Data export to MOVEBANK;
- Long-life rechargeable battery;

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- Highly efficient solar charger, works as well in a low light conditions;
- 2 GB memory capacity allows to record totally >10 million data records

### Functions:

- “No GPS signal”- detects weak GPS signal and switches off logger in a burrow etc.;
- “Stops in the base range” - UHF base station signal can terminate the GPS data collection to protect the battery in a burrow, den or when animal is in the nest;
- UHF digital telemetry. It has ~50% bigger range than UHF communication link. Enables easier animal locating and getting close enough to download the data. It is not for tracking like with VHF;
- GPS can be controlled by the acceleration sensor - logger records positions only when animal is moving. This feature allows to track movements with better resolution and save energy when object does not move;
- All loggers are equipped with acceleration sensor and can collect raw acceleration data recorded in programmable (1-30 Hz ) bursts as well record precise daily activity reports;
- The “activity report 480” for the GPS-UHF-GPRS download not increases the power consumption and not increases data transmission significantly. Records are collected every 3 minutes and consists of an amount of recorded movements, sampled every 4 seconds and summarised separately for the X, Y, Z axis (3x480 records daily).
- Acting as a “flying base station” to receive data from smaller Ecotone UHF loggers anywhere in the world.

### Optional:

- TDR (temperature and depth recorder);
- Wet/dry diving detection sensor and diving duration logger;
- Pressure-proof version for diving birds or turtles;
- Barometric pressure & temperature sensor;
- VHF beacon with an automatic modes enabling mortality detection.;
- Customized attaching points for harness, gluing or taping to the feathers.

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## Data & transmission methods

### SMS:

Mainly used to keep communication between user and tracker, for settings change & limited GPS data transfer even in places where very weak GSM 2G or 3G signal is present. Data collected for SMS transmission: GPS position, temperature, mortality-activity index, battery voltage, GSM signal strength, logger operating parameters & optionally activity report (“report 48”) send in one SMS daily. Due to a high energy use for transmission as well GSM charges, collection maximum of 4-8 GPS positions/day is recommended, however if necessary, 48 GPS positions daily are possible.

### GPRS/3G:

Present in all trackers with GSM modem, except the lightest TRINGA model. Transmits all data collected by the logger. This transmission channel uses far less energy comparing to SMS and allows to collect and send almost unlimited data, including acceleration and TDR data. Data collected for GPRS/UHF transmission: GPS position, GPS programmable bursts from 1 s interval, speed, GPS altitude, GPS precision parameters (HDOP, VDOP, PDOP), GPS heading, barometric pressure or hydrostatic pressure, temperature and immersion duration, acceleration 3-axis data recorded in a programmable bursts (1-30 Hz), detailed activity report (called “report 480”) and logger operating parameters like voltage, internal temperature, light level etc.

### UHF:

The UHF long range link (LRD) is available in all GPS-GSM models from 2020. It can be activated without additional charges by admin command. The same data collected for GPRS can be transmitted via UHF to the field installed, hand operated or installed on drone base station. This transmission consumes little power, at the same time avoiding GSM charges for the data. Recommended for places where GPRS transmissions are not possible. Transmission range in good conditions and in the line of sight: ground-to-ground ~800m, ground-to-air or air-to-ground >6km.

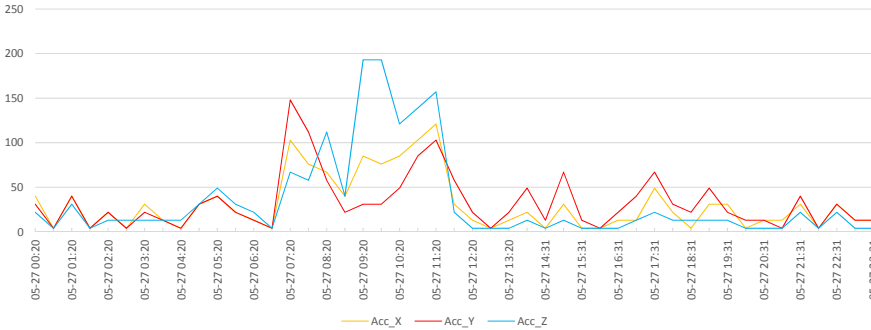
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### Sample data:

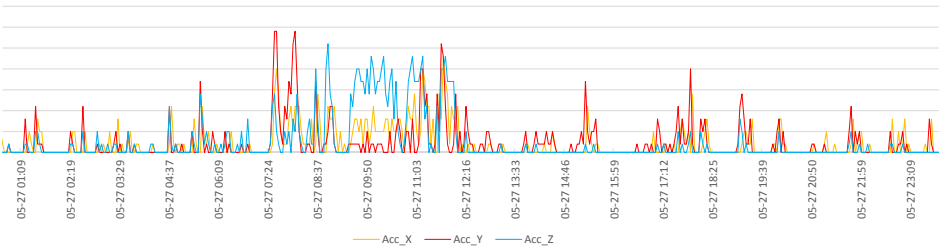
Acceleration & activity reports.

The graphs below show one day of activity data of the same vulture individual, recorded simultaneously by three different methods.

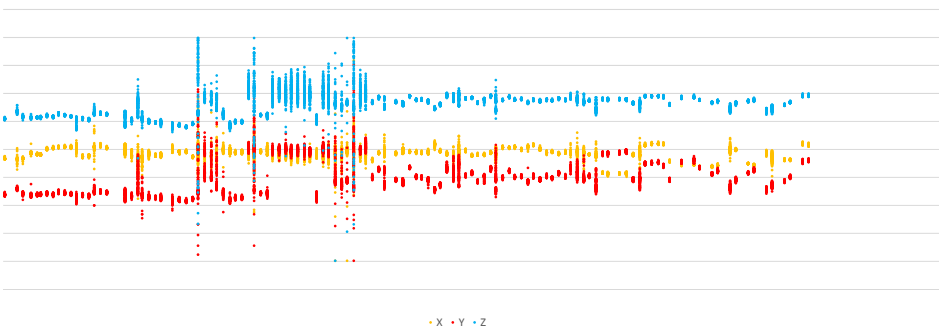
- Activity report 480 (480 points/day x 3 axis), download via GPRS or UHF



- Activity report 48 (48 points/day x 3 axis), download in one SMS daily



- Acceleration raw data recorded in bursts, download via GPRS or UHF



- One burst from above plot
- Sample data plot & tracking data

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## Groups of Ecotone telemetry loggers & accessories

### Ecotone GPS Loggers: GSM-GPRS-UHF (UHF-LRD - long range download)

Advanced & multifunctional GPS loggers with multichannel data transmission via Worldwide & USA 2G/3G quad band HSPA/GSM and long range UHF. Designed for worldwide all-year-round animal tracking in fine resolution. Except GPS tracks, can be collected precise activity reports, raw acceleration data recorded in bursts, diving depth profiles, barometric pressure, temperature, immersion duration and more. Data are collected into GPS-SMS and GPS-GPRS/UHF transmission in separate memory banks, which are individually programmable. All loggers from this group are available in versions with GSM-GPRS-UHF or only with UHF communication.



*Photo.Cezary Korkosz\_ ŁABĘDŹ KRZYKLIWY (Cygnus cygnus)*

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## Ecotone GPS Loggers: UHF (UHF-SRD - short range download)

The smallest and the lightest GPS trackers from our offer. Remote programming and data access via UHF link - no need to recapture animals. Designed for tracking animals (birds, bats, reptiles) during the breeding season that regularly return to their nests, burrows etc. As well all-year-round tracking of migrants is possible, but with data download when tagged animals will be again in the UHF range. Except GPS tracks, can be collected diving depth profiles, barometric pressure, temperature, immersion duration and more.

### Ecotone GPS loggers accessories: BS-P5 UHF base station

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The base station is necessary to download data from the loggers equipped with UHF SRD or LRD link as well as to change loggers' settings. Base station can be hand-operated as well as installed for automatic data download in place visited by the tagged animals., ie.: in the colony, near the water holes or roost. When base station works continuously, loggers will upload collected data each time when appear in the base station range. Presence in the range (in the colony, nest, roost) will be also recorded in a base station memory. The base station signal can disable GPS data collection when logger is in its range, to save energy.

### Key features:

enables remote, automatic data download from the loggers and sending new settings to all Ecotone GPS-UHF trackers;

distance of bidirectional communication varies between 200m to 6 km and depends on the logger's specification, antenna's version and field conditions.

records data in a 2GB internal memory without connection to the PC; for data safety base station uses double memory banks (one as a backup);

power supply by the battery grip, any USB charger or dedicated rechargeable power bank which can work with a solar charger.

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## Ecotone GPS Loggers

### **CREX**

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Advanced & multifunctional GPS logger for worldwide animal tracking in fine resolution and for all year round. Available in versions with GSM-GPRS-UHF or only with UHF communication.

- Dimensions (L/W/H): 40x18x18 mm
- Weight: 14g
- Body mass from: 700g
- Mounting method: backpack
- Data transfer: SMS/GPRS/UHF
- Solar charger: Yes
- Antenna: external
- Designed for: birds
- Examples of use on: falcons, big waders, gulls



### **TRINGA**

Advanced & multifunctional GPS logger for worldwide animal tracking in fine resolution and for all year round. Available in versions with GSM-GPRS-UHF or only with UHF communication.

- Dimensions (L/W/H): 31x19x12mm
- Weight: 9,9g
- Body mass from: 300g
- Mounting method: backpack
- Data transfer: SMS/UHF
- Solar charger: Yes
- Antenna: external
- Designed for: birds
- Examples of use on: falcons, big waders, gulls



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## KITE -L

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Advanced & multifunctional GPS logger for worldwide animal tracking for all year round. Examples of use on birds with thin plumage and short feathers which will not cover solar charger on a low profile housing.

- Dimensions (L/W/H): 50x27x18 mm
- Weight: 16,9g
- Body mass from: ~570g
- Mounting method: backpack
- Data transfer: SMS/GPRS/UHF
- Solar charger: Yes
- Antenna: internal
- Designed for birds: e.g. Common buzzard, Peregrine Falcon, Great cormorant, European herring gull



## KITE -M

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Advanced & multifunctional GPS logger for worldwide animal tracking for all year round. Examples of use on birds with thicker plumage which may cover solar charger on a low profile housing.

- Dimensions (L/W/H): 50x27x24 mm
- Weight: 19g
- Body mass from: ~640g
- Mounting method: backpack
- Data transfer: SMS/GPRS/UHF
- Solar charger: Yes
- Antenna: internal
- Designed for birds: e.g. Black Grouse, Northern pintail, Caracara, Red Kite



*Photo: Didier Vangeluwe  
Royal Belgian Institute of Natural Sciences*

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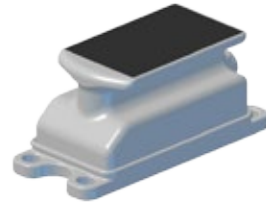


## **KITE -H**

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Advanced & multifunctional GPS logger for worldwide animal tracking for all year round. Examples of use on birds with thick plumage and long feathers. Designed for: e.g. Mallard duck, Osprey, Greater spotted eagle, White stork.

- Dimensions (L/W/H): 50x27x28 mm
- Weight: 19,8g
- Body mass from: ~680g
- Mounting method: backpack
- Data transfer: SMS/GPRS/UHF
- Solar charger: Yes
- Antenna: internal

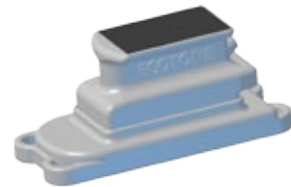


## **KITE -H LF**

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Advanced & multifunctional GPS logger for worldwide animal tracking for all year round. Examples of use on birds with thick plumage and long feathers. Designed for birds: e.g. Vultures, White-tailed Eagle.

- Dimensions (L/W/H): 79x36x36 mm
- Weight: 28g
- Body mass from: ~1000g
- Mounting method: backpack
- Data transfer: SMS/GPRS/UHF
- Solar charger: Yes
- Antenna: internal



## **GRIFFON 2xS LF**

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Recommended for eagles and vultures. Successfully working in project "Energy landscape and bird conservation: movements of griffon vultures and wind-farm development". Each logger collects daily over 125.000 data records. Designed for birds: e.g. eagles, vultures, tetrao.

- Dimensions (L/W/H): 77x36x38 mm
- Weight: 38g
- Body mass from: ~1300g
- Mounting method: backpack
- Data transfer: SMS/GPRS/UHF
- Solar charger: Yes
- Antenna: internal



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## GPS-UHF SRD trackers

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The smallest and the lightest GPS trackers from our offer. Designed for tracking animals which regularly return to their nests, burrows etc. during the breeding season. Programming and data access are possible via UHF link - there is no need to recapture animals. All-year-round tracking of migrants is also possible, but with data download after their return in the base station range.

### Key features:

- Data access & programming via UHF link;
- GPS intervals: user programmable, from 1 to 240 minutes;
- GPS controlled by the operating-hours schedule, light sensor or diving sensor;
- Delayed start: 24, 48 hours or until first diving;
- Recorded with GPS position: speed, GPS altitude, battery voltage, operating parameters, diving duration with time stamp of each event; diving depth (pressure) & temperature (only versions with a depth sensor);
- GPS-UHF SRD (short range download) link range in the line of sight: ground-to-ground >100m, ground-to-air or air-to-ground >500m;
- Diving sensor (wet/dry);
- Base station (hand operated or field installed) for automatic data download and settings change;
- Long-life rechargeable battery & charging pins;
- Highly efficient solar charger, works well also in a low light conditions;
- Memory capacity: 130.000 GPS positions.

### Optional:

- Hydrostatic pressure & temperature sensor (TDR), 0-30 bar (~300m depth), resolution 2.5 mbar (2.6 cm), absolute value accuracy 50 mbar
- Barometric pressure & temperature sensor (Altimeter), resolution 0.05 hPa (~0.5m), absolute value accuracy 0.2 hPa (~2m);
- Light sensor – day time detection;
- Customized attaching points for harness, gluing or taping to the feathers and more;

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- Wet/dry diving detection sensor and diving duration logger;
- Pressure-proof version for deep-diving birds or turtles.

### Functions:

- “No GPS signal” - detects no GPS signal and switches off logger in a den, etc.;
- Diving duration logger, records each diving event with timestamps;
- “Stops in the base range” - UHF base station signal can terminate the GPS data collection to protect battery in aburrow, den or when animal is in the nest;
- UHF digital telemetry. It has ~50% bigger range than UHF communication link. Enables easier animal locating and getting close enough to download the data. This feature is not dedicated for directional tracking as in case of the VHF.



Photo: Cezary Korkosz\_ŻURAW (*Grus grus*)





## ALLE-60

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The smallest and lightest GPS tracker from our offer.

Designed for tracking animals (birds, bats, reptiles) during the breeding season that regularly return to their nests, burrows etc.

- Dimensions (L/W/H): 26x16x10 mm
- Weight: 4,5g
- waterproof: up to ~10m depth
- Mounting method: backpack
- Data transfer: SMS/GPRS/UHF
- Solar charger: No
- Antenna: external
- Designed for: birds. Examples of use on: little auks, small owls, bats.



## ALLE-100

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GPS-UHF telemetry logger designed for tracking animals (birds, bats, reptiles) during the breeding season that regularly return to their nests, burrows etc.

- Dimensions (L/W/H): 35x17x12 mm
- Weight: 5,9g
- waterproof: up to ~5m depth
- Mounting method: backpack
- Data transfer: SMS/GPRS/UHF
- Solar charger: Yes
- Antenna: external
- Designed for: birds. Examples of use on: owls, small falcons, bats.



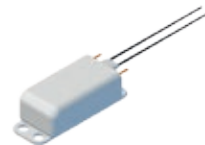
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## URIA-60

GPS-UHF telemetry logger designed for tracking animals (birds, bats, reptiles) during the breeding season that regularly return to their nests, burrows etc.

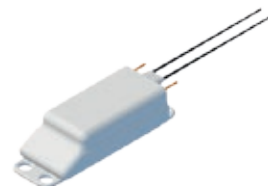
- Dimensions (L/W/H): 27x15x11 mm
- Weight: 6,0g
- Waterproof >200 m depth, optionally TDR
- Mounting method: backpack
- Data transfer: SMS/GPRS/UHF
- Solar charger: NO
- Antenna: external
- Designed for: birds, bats, reptiles.
- Examples of use on: any diving birds or reptiles



## URIA-100

Remote programming and data access via UHF link - no need to recapture animals. Designed for tracking birds that regularly return to their nests, burrows, roosts, etc. Recommended for deep diving birds.

- Dimensions (L/W/H): 35x16x11 mm
- Weight: 8,5g
- Water & pressure proof >200m diving depth, optionally TDR
- Mounting method: on harness, taped to feathers, tied to the tail
- Data transfer: SMS/GPRS/UHF (SRD)
- Solar charger: No
- Antenna: external
- Designed for: birds



*URIA-100 LPS (with solar charger)*

*URIA-300 LPS (with solar charger)*



Uria 100 LPS



Uria 300 LPS

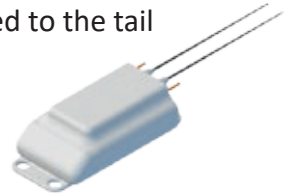
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## URIA-300

Remote programming and data access via UHF link - no need to recapture animals. Designed for tracking birds that regularly return to their nests, burrows, roosts, etc. Recommended for deep diving birds.

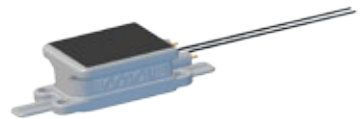
- Dimensions (L/W/H): 36x22x12,5 mm
- Weight: 13,5g
- Water & pressure proof>200m diving depth, optionally TDR
- Mounting method: on harness, taped to feathers, tied to the tail
- Data transfer: SMS/GPRS/UHF (SRD)
- Solar charger: No
- Antenna: external



## STERNA

Trackers with short-range UHF link (SRD). With solar charger, automatic data download within 200-800m range, backpack, diving sensor; used for long-term tracking. Designed for: birds. Examples of use on: small gulls, jackdaws, shearwaters.

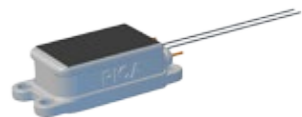
- Dimensions (L/W/H): 28x15x11 mm
- Weight: 7,4g
- Waterproof up to ~3 m depth
- Mounting method: backpack, tied to the tail
- Data transfer: SMS/GPRS/UHF(SRD)
- Solar charger: Yes
- Antenna: external



## PICA

Trackers with short-range UHF link (SRD). With solar charger, automatic data download within 200-800m range, backpack, diving sensor; used for long-term tracking. Designed for: birds. Examples of use on: bee-eaters, kestrels, great snipes, terns.

- Dimensions (L/W/H): 28x15x11 mm
- Weight: 5,6g
- Waterproof up to ~3 m depth
- Mounting method: backpack
- Data transfer: SMS/GPRS/UHF (SRD)
- Solar charger: Yes
- Antenna: external



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Remote programming and data download. Some models can be equipped with a drop-off system. Strong and comfortable belts, waterproof housings, well designed shape and size, individually adapted to the project requirements.

### ***FELIS GPS with drop-off***

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FELIS GPS is the most advanced & multifunctional GPS logger for worldwide, all-yearround & fine resolution animal tracking. **The lightest and smallest GPS collar with drop-off** mechanism.

- Diameter: from 50mm
- Weight: from 80g
- Mounting method: collar
- Data transfer: GPRS/UHF (LRD)
- Solar charger: Yes
- Antenna: internal
- Designed for: mammals
- Examples of use on: wildcat, hare



### ***FLYING FOX GPS***

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FLYING FOX GPS - advanced & multifunctional GPS logger for worldwide, all year round. Examples of use on: Grey-headed Flying-fox

- Dimensions: 38x17x24 mm
- Weight: ~14g
- Mounting method: collar
- Data transfer: GPRS/UHF (LRD)
- Solar charger: Yes
- Antenna: external
- Designed for: mammals
- Examples of use on: wildcat, hare



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## ***IMPALA GPS***

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IMPALA GPS - advanced & multifunctional GPS logger with drop-off, for worldwide, all year round.

- Diameter: from 150mm
- Weight: from 250g
- Mounting method: collar
- Data transfer: GPRS/UHF (LRD)
- Solar charger: Yes
- Antenna: internal
- Designed for: mammals
- Examples of use on: antlopes, wolfs, lynxes



## ***BOAR GPS***

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BOAR GPS is the most advanced & multifunctional GPS logger with drop-off, for worldwide, all-year-round & fine resolution animal tracking.

- Diameter: from 200mm
- Weight: from 1000g
- Mounting method: collar
- Data transfer: GPRS/UHF (LRD)
- Solar charger: Yes
- Antenna: internal
- Designed for: mammals
- Examples of use on: wild boar



## ***DEER GPS***

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DEER GPS is the most advanced & multifunctional GPS logger with drop-off, for worldwide, all-year-round & fine resolution animal tracking.

- Diameter: from 200mm
- Weight: from 800g
- Mounting method: collar
- Data transfer: GPRS/UHF (LRD)
- Solar charger: Yes
- Antenna: internal
- Designed for: mammals
- Examples of use on: deer, big antelopes



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## **TURTLE-C GPS**

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Advanced & multifunctional GPS logger for worldwide, all year round.

- Dimensions (L/W/H): 41x20x18 mm
- Mounting method: glued
- Data transfer: GPRS/UHF (LRD)
- Weight: 23 g
- Solar charger: Yes
- Antenna: external
- Designed for: turtles



## **HORSE TAIL GPS**

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Advanced & multifunctional GPS logger for worldwide, all year round.

- Dimensions: 90x26x22mm
- Weight: 60g
- Mounting method: tail
- Data transfer: GPRS/UHF (LRD)
- Solar charger: Yes
- Antenna: external
- Designed for: mammals
- Examples of use on: horse



## **GANNET GPS**

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Advanced & multifunctional GPS logger for worldwide, all year round.

- Dimension (L/W/H): 78x21x18 mm
- Weight: ~25g
- Mounting method: backpack
- Data transfer: GPRS/UHF (LRD)
- Solar charger: Yes
- Antenna: external
- Designed for: birds
- Examples of use on: gannet



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## WING TAG

Based on a low profile trackers attached to the customer's wing tag plates or wing tags designed and manufactured in accordance with the user specification

- Weight: ~18g
- Mounting method: on the wing tags
- Data transfer: SMS/GPRS/UHF
- Solar charger: Yes
- Antenna: internal
- Designed for: birds
- Examples of use on: any big bird species when wing tags can be used.



## GPS TELEMETRY

Ecotone offers a wide selection of GPS telemetry trackers, all with remote programming and data download. The experience gained over the years under research has enabled us to introduce own solutions, adapted to the research projects and reflecting specific requirements of the species.

**You are welcome to visit:**



**ECOTONE TELEMETRY**  
<http://www.ecotone-telemetry.com>

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