Intelligent Studies with VECTRONIC External Sensors

VECTRONIC Aerospace VERTEX Plus collars provide information on GPS positions and activity of your study animals. Now VERTEX Plus collars offer a new possibility for studying wildlife remotely: The VERTEX Plus collar is able to monitor external sensors and send messages remotely about their status. VECTRONIC Aerospace has developed sensors which use UHF technology to provide new data on birth, mortality, body temperature and interactions between different animals. You can download the sensor data remotely with a UHF handheld terminal, receive sensor status messages via Iridium or GSM and even get a real time alert if your study animal gives birth or dies.These external sensors can be used for:

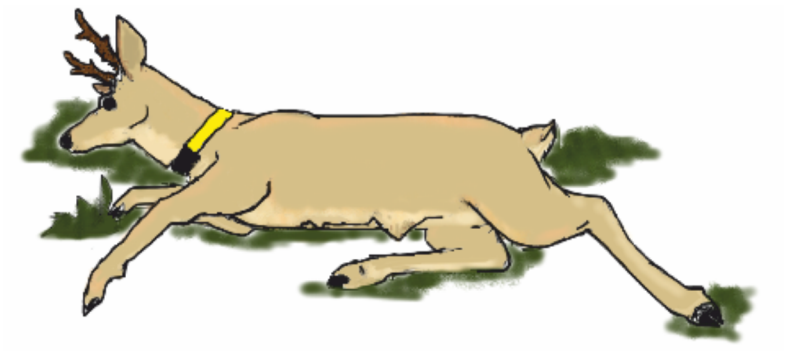
- Instant mortality detection: Mortality Implant Transmitter
- Information about birth and calving sites: Vaginal Implant Transmitter
- Intergroup dynamics: Separation Sensor Application
- Mother-Offspring behaviour: Expandable Fawn Collar
- Species interaction: Proximity Sensor Application

Mortality Implant Transmitter (MIT)

The MIT is designed to inform you immediately if your study animal has died. The Mortality Implant Transmitter is a stainless steel tube which can be placed either into the rumen or into the abdominal cavity of the animal. It contains a highly sensitive acceleration sensor and a temperature sensor. Unlike the mortality sensors based on activity inside VERTEX Plus collars, the MIT is able to detect the heartbeat of the animal. The MIT frequently sends status messages of the animal to the VERTEX Plus collar using UHF communication. With each position message, the most recent body temperature and the status (alive/dead) can be sent as well.

Heartbeat and motion: A highly sensitive acceleration sensor detects the slightest movements like a heartbeat or breathing. If no motion has been detected for four minutes, the animal is presumed dead and a mortality message with the current GPS position data is sent via GSM or Iridium (optional). The VERTEX Plus collar's VHF beacon will also switch to mortality mode.

Temperature: Body temperature is measured with an accuracy of 0.1°C. Following pre-defined intervals, the temperature is sent to the GPS PLUS collar and stored in the collar memory.



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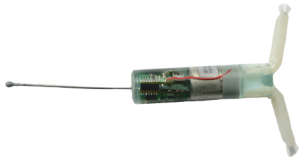
Vaginal Implant Transmitter (VIT)

The Vaginal Implant is a UHF transmitter which provides data about birth events. The VIT is encapsulated in a small tube which can be inserted into the vagina of a pregnant ungulate. It is suitable from medium to big-sized species. The VIT continuously measures the body temperature and motion, and sends the data to the VERTEX Plus collar in regular intervals. All the data is stored on the collar memory. VERTEX Plus collars with Iridium or GSM communication can provide data about the birth events remotely. In the event of birth, the VIT is pushed out of the mother's body by the newborn.

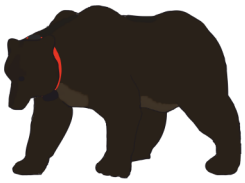


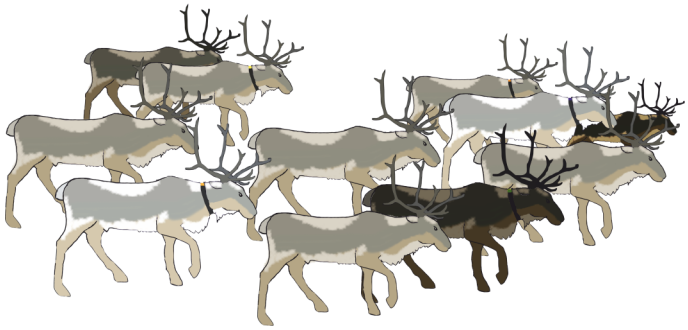
Birth detection: When the VIT is pushed out of the mother's body, two things are expected to happen: the temperature around the VIT will most likely drop and the motions will stop. When either of these happens, the VIT will send a birth event message to the VERTEX Plus collar.

Separation: The VIT continuously transmits an ID code on a UHF frequency to the mother's VERTEX Plus collar. When the mother moves away from the calving site, the ID signal is not received any longer. The VERTEX Plus collar will send a separation message after one hour has passed without detecting the ID signal.

To locate the calving site, the VIT is equipped with a VHF beacon transmitter. Before implanting the VIT, it is possible to program the VHF beacon to transmit only on certain days and hours. The VHF beacon pulse rate will double when the VIT is pushed out of the mothers body.

UHF-ID Tags





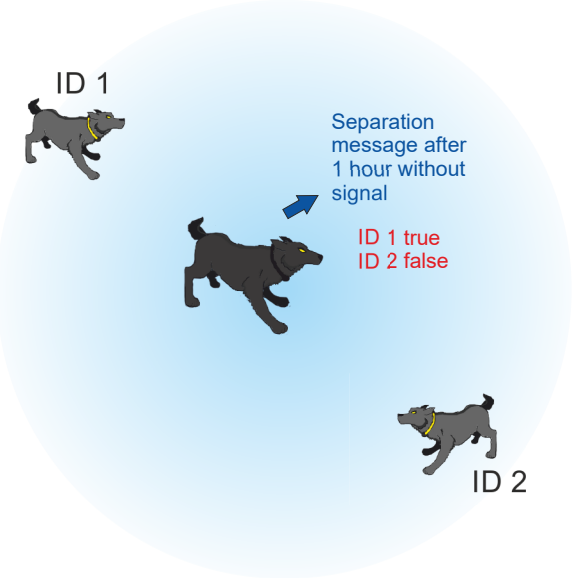
For studying intra- and interspecies interactions, we offer small, energy-efficient, and inexpensive UHF-ID tags. These ID tags can be deployed to any kind of collar or they can be integrated into a VERTEX Plus collars. It can be equipped with several sensors and a VHF beacon transmitter. Depending on the application different data is transmitted between the ID tag and the VERTEX Plus collar.

The ID tag's signal is received and recorded using the UHF data communication in a VERTEX Plus collar. The maximum range is about 130 meters but the IDs signal output can be adjusted to the needs of your study.

UHF-ID Tags: Separation Sensor Application

The Separation Sensor Application has been developed to study mother-offspring behaviour, but it can also be a useful tool for monitoring inter-group dynamics. The VERTEX Plus collar is able to monitor signals from up to eight UHF-ID tags with the Separation Sensor Application.

The VERTEX Plus collar listens to the ID tags in pre-defined intervals. If an ID tag signal has not been received for one hour, the VERTEX Plus collar stores a separation event and optionally sends a message via GSM or Iridium. The ID tag's signal does not only contain the ID, but also the information if the tagged animal is dead or alive. If an animal is dead this information is automatically sent to the collar, independent of the communication schedule.



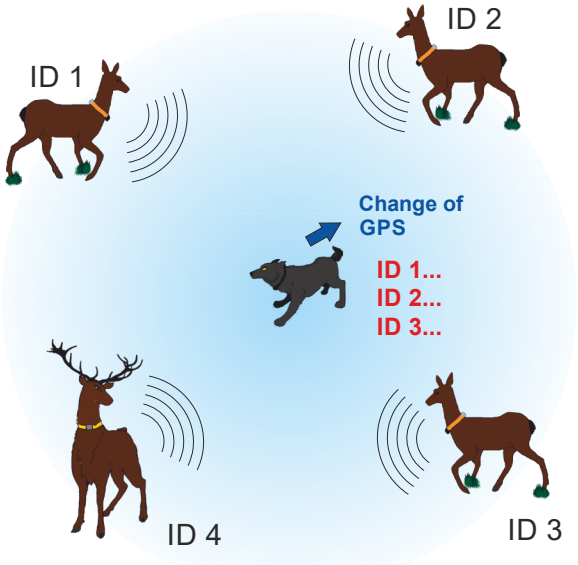
UHF-ID Tags: Expandable Fawn Collar

The Expandable Fawn Collar has been designed for attaching a UHF-ID tag on a fawn. This collar is very light and made of elastic material which is folded in several layers. The layers are sewed together with cotton yarns, which allow the layers to unfold with the effect from wear, time and weather. The combination of elastic and folded material ensures a good fit for a growing neck of the fawn.

UHF-ID Tags: Proximity Sensor Application

The Proximity Sensor Application is a helpful tool for studying the interactions between different animals such as predator and prey or encounters between individuals of different social groups. The received ID signals will be stored in the VERTEX Plus collar with a time stamp and signal strength. A list of all encountered IDs can also be transmitted with each position message via GSM or Iridium (optional).

The VERTEX Plus collar can switch to an alternate GPS schedule automatically when receiving the signal of an ID tag. Choosing a more frequent GPS schedule for these events, you will receive a fine-scale picture of your animal's movement during an encounter.



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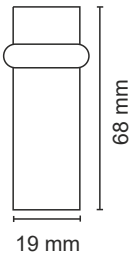
Technical Data

Mortality Implant Transmitter (MIT)

Dimensions: length: 68 mm, diameter 19 mm

Weight: 73 g

Lifetime: 1 to 2 years, depending on configuration



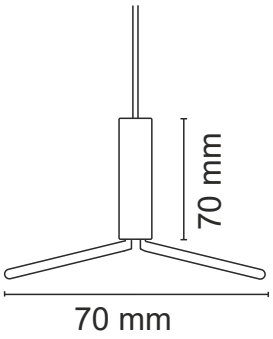
Vaginal Implant Transmitter (VIT)

Dimensions: tube: 70 mm x 20 mm, wing span: 70 mm,
antenna length: 65 mm

Weight: 30 g

Lifetime: 5 to 13 months, depending on configuration

VHF beacon:
VHF frequency: 130 - 400 MHz (factory setting)
Output Power: +10 dBm
Pulse Length: 12 ms
Repetition Rate: 2 s, 1 s after birth



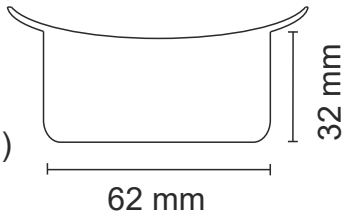
UHF-ID Tag

Dimensions*: 62 mm x 32 mm x 49 mm

Weight*: 120 g

Lifetime: 36 months without VHF Beacon
18 months with VHF Beacon

VHF beacon:
VHF frequency: 130 - 400 MHz (factory setting)
Output Power: +10 dBm
Pulse Length: 12 ms



Expandable Fawn Collar

Dimensions*: battery pack: 33 mm x 31 mm x 25 mm

* The dimensions depend on customer‘s specification.

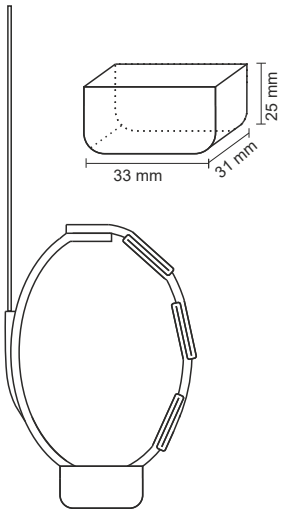
Belt Width: 30 mm

Belt Size: depending on customer‘s specifications

Weight*: 56 g (with a belt size of 24 cm → 33 cm)

Lifetime: 10 to 26 months, depending on configuration

VHF beacon:
VHF frequency: 130 - 400 MHz (factory setting)
Output Power: +10 dBm
Pulse Length: 12 ms



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