



Technology Offer

BLE-based micro-transmitter and monitoring app

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A lightweighted, long-life, long-range and low-cost Bluetooth Low Energy (BLE)-based tracking system with monitoring app.

Background

Radio-Frequency IDentification (RFID) systems are broadly used to track assets, objects or animals. In agricultural settings, RFID- ear tags are used to identify e.g. cattle or sheep. In behavioral sciences, e.g. migrations of wildlife animals are observed by microchip-tagging of e.g. whales or birds. Even pets can be implanted with an RFID-chip for simplified identification in case of loss / runaway.

The RFID system comprises an RFID reader, which constantly emits an electromagnetic field. It comprises further the microchip transponders, which send their data to the reader as soon as they receive enough power via electromagnetic transmission from the reader-emitted field. The transmission and data-transfer is very fast and can span long distances, however maintenance of the magnetic field required high energy-input.

In most cases, the RFID system is simply used to identify a given object at a certain place, ideally with a date-and-time stamp. Certainly, modern electronic and communication techniques offer much broader possibilities. The successful identification of a given individual can be used as trigger for all sorts of downstream activities, like to open doors, to provide access to food or medicine and to start video recording, to name a few. However, using these features requires a flexible platform that allows for the custom-built composition and control of existing technical solutions.

Technology

Scientist of the Max Planck Institute of Ornithology in Seewiesen have developed a lightweighted, long-life, long-range and low-cost Bluetooth Low Energy (BLE)-based tracking system. The BLE micro-transmitter exclusively transfers low-energy ID-information and instead of using batteries, harvests solar energy, which significantly reduces power consumption and thereby weight, size and production costs of the device. With a total weight of < 1 g, manufacturing costs of ~ 10 € and a lifelong maintenance-free operation, the micro-transmitter makes it possible to not only equip animals with body sizes as low as 20 g (birds, rodents etc.), but to also track large numbers of animals over their lifetime. This estimation is based on a load not exceeding 5 % of the body weight of the carrier animal but could, likely, be higher in case of small mammals.

Within a range of 1 km the ID-signal can be received by any BLE-enabled devices like smartphones or computers after installing a customized application. The signal is then further enriched by metadata of the BLE-enabled devices including position, detection time or other relevant information, and sent to a central distributed data storage. The ubiquitous availability of BLE receivers in smartphones, computer or other devices allows for establishment of a global tracking network and significantly increases communication antenna range. Pooling of all gathered information on a cloud server enables app user to map the current position of animals, monitor movements over long distances and time periods and predict future positions.



Transmitter specifications

- Size 8 x 14 x 2 mm
- Weight: < 1 g
- Production costs: ~ 10 €
- Life estimate: lifetime
- Power: + 20 dbm (100 mW)
- Range: 1 km

Patent Information

A PCT application was filed on March, 1st 2019: WO2019166646A1. National in EP, US, CA and AU.

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