

Home

Last edited by [JULIEN](#) 1 year ago

Indian Ocean sea Turtle Project - Documentation

Topics

General info

[Workspace installation](#)

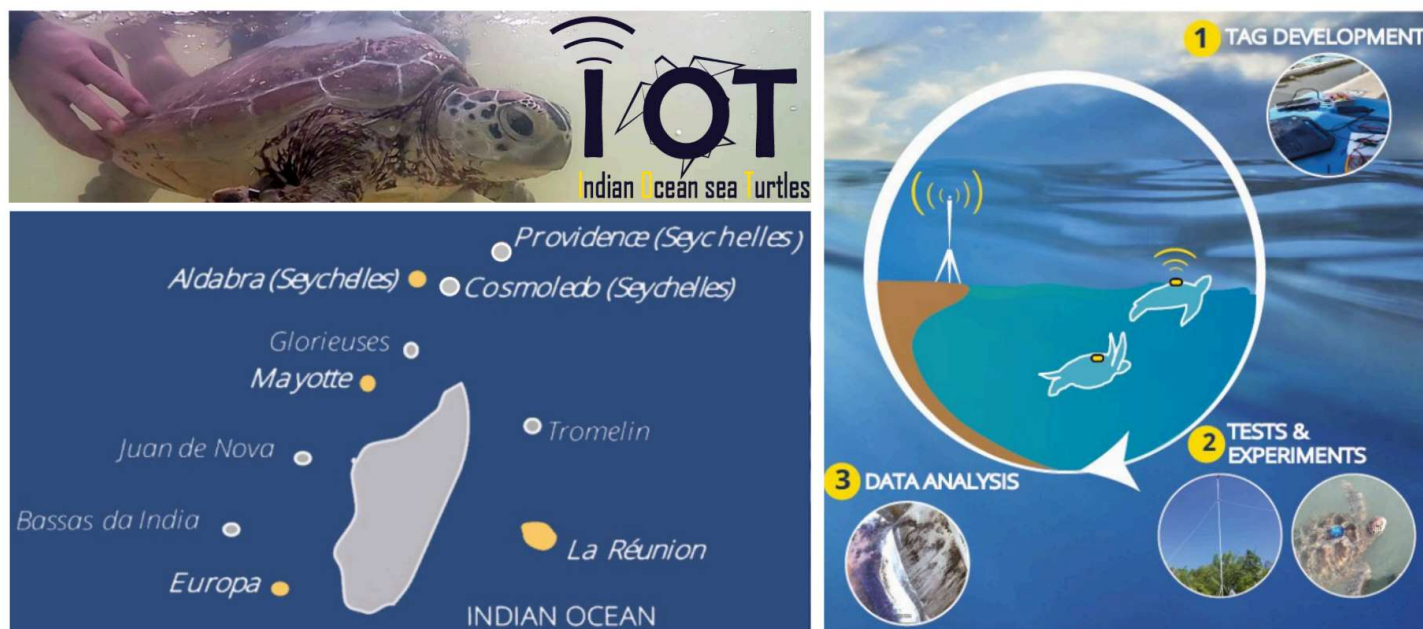
Releases info

version-MEEpaper2024

- [Code structure](#)
- [Payload description and decoding](#)

Project presentation

The IOT project consists of deploying 10 beacons and 5 receiving stations, spread over different study sites across the south-western basin of the Indian Ocean (Reunion, Mayotte, Eparses Islands, Seychelles), between 2018 and 2021. The aim is to complete technological developments and the pre-industrialisation of a new generation of beacons, as well as creating the 1st regional observation network for marine turtle movements.

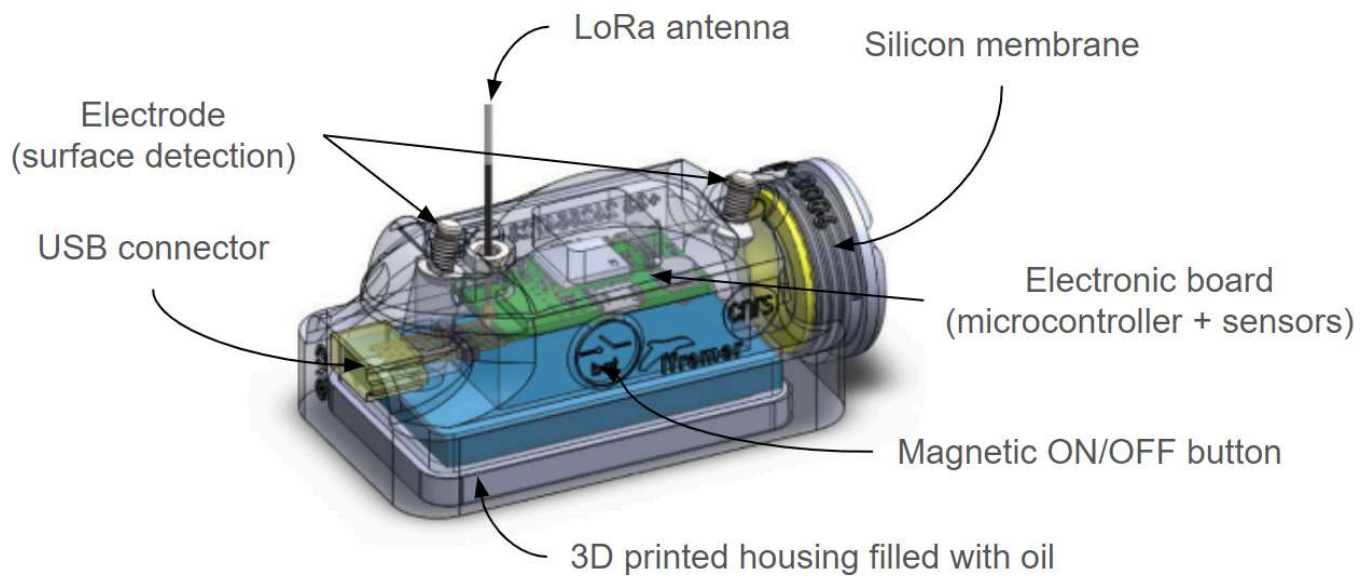


<https://ocean-indien.ifremer.fr/Projets/Innovations-technologiques/plOT-2018-2020-IOT-2018-2021/IOT-2018-2021>

The IOT tag

A Low-cost and open-source LoRaWAN bio-logger dedicated to real-time sea turtles monitoring

Our sea turtle monitoring device transmit its sensor data using the LoRa/LoRaWAN technology. The low power consumption and ability to transmit over long distances, up to several dozen kilometres under ideal conditions, make it an attractive solution for designing miniature and long-lasting devices.



The embedded pressure and temperature sensors measure the environmental conditions. Their raw data are used to draw the individual's dive profile at every dive with an accuracy of 10 cm and maximum depth of 25.5 m. The dive profile is represented by N values with adaptive time steps (ts) to adapt to longer dive time. Minimum time step is 15 seconds, and doubles every time the dive duration is greater than $N \times ts$.

We integrated a surface detection mechanism to records surface events. We based the detection on a conductivity measurement thanks to the embedded micro-controller's ADC that captures the signal between two electrodes placed on top of the housing. The system also integrates a GPS chipset and IMU sensors, bypassed for this application but ready to use if needed. Using GPS localisation or IMU sensors significantly increase the power budget thus reduce the device autonomy.

The device sends almost real-time data as it transmits the last measurement every time the individual reaches the surface. Transmitted data contains: a number used to identifying the measurement, the last dive profile, the last time spent on surface, the average temperature recorded during this dive, and the mandatory LoRaWAN meta-data. Meta-data includes, the reception timestamp, the device ID (devEUI), a payload ID (Fcnt), and information about the receiving gateway, such as the signal strength (RSSI) and its coordinates (latitude, longitude) when known.

Related ressources

[Gitlab repository for the IOT tag CAD files](#): CAD files for the electronic board and the 3D-printed housing with associated documentation

Indian Ocean sea Turtle project (IOT) - Ifremer/CNRS - 2024

Comments