

HORIZON

Argos GPS 500ml Tracked Plastic Water Bottle

Supplementary Information

v28.01.23 HORIZON-DEV-ARTIC-R2

Overview

HORIZON – Argos GPS 500ml Tracked Plastic Water Bottle

Welcome to open source ocean plastic pollution tracking.

Our ready-to-deploy satellite tracked plastic water bottle was originally designed to mimic a typical everyday plastic item for National Geographic's Sea to Source Plastics Expedition, matching the shape and size of a standard plastic 500ml water bottle in comparison to larger, heavier ocean drifting buoys or similar objects that move differently in the water due to their size, weight and drag.

On completion of the National Geographic Society's Sea to Source Expedition, the bottles have also been used to track ocean plastic pollution across the English Channel by the Zoological Society of London as part of their One Less campaign and were deployed at the 2022 UN Ocean Conference in Lisbon, revealing the route and destination of plastic waste from beaches in Lisbon, Portugal to the open ocean.

Inside each bottle is an embedded Arribada Horizon GPS logger, Argos ARTIC R2 transmitter and a 6.5A lithium primary cell battery pack. The Horizon board utilises an nRF52840 that wakes to aquire GPS at a pre-determined interval based on deployment length / battery life. GPS locations are logged and saved to memory with the last GPS position transmitted via Argos to passing satellites.

An Argos airtime account is required to transmit GPS locations to the Argos satellite network. Visual dashboarding is available free of charge to follow and track your bottles via the CLS dashboard interface.







(Above) To date, over 75 bottles have been deployed globally to understand the destination of plastic marine litter, including deployments from the Chagos Archipelago, Singapore, Malaysia, Thailand, Portugal, the UK and Sao Tome & Principe.

Technical Overview

Inside each bottle is an Arribada Horizon ARTIC R2 Developer's Kit, developed to unlock access to open source ARGOS / Kinéis telemetry, encapsulated for water ingress protection together with 6500 mAh of battery capacity. If configured to acquire a GPS fix every 4 hours, the bottle will transmit its location up to 8 times a day for 2.5 years in total.

(Below) A transparent render detailing the internal configuration of the bottle. The weight of the batteries in the base acts as the centre of gravity necessary to self-right the bottle if it is flipped over by wave movements.



In Detail

Feature	Description
Microcontroller	InsightSiP ISP1807-LR-ST system in package incorporating Nordic nRF52840 Bluetooth 5.0 radio and 32-bit ARM Cortex M4F, 1MB flash, 256kB SRAM
Memory	16MB 166MHz flash
GNSS	uBlox NEO-M8N receiver, GPS, Galileo, GLONASS, Beidou
GNSS antenna	2J quad band 25mm ceramic patch
Satellite connectivty	Kineis ARTIC R2 satellite radio transceiver with uplink and downlink support. Maximum uplink transmit power 27dBm
Inertial Measurement Unit (IMU)	Bosch BMX160 9-axis sensor with accelerometer, gyroscope and magnetometer

For more information and purchase details:

Email: hello@arribada.org Web: https://arribada.org/horizon-gps-tracking/