

IRIDIUM® TECHNOLOGY IMPROVES CLIMATE MONITORING

Iridium technology integrated by CLS in marine buoys will work together with the Sentinel satellites designed to deliver data and imagery for the European Commission's Copernicus program. The program helps monitor Earth's land, oceans, and atmosphere to help scientists understand large-scale global weather, climate, and environmental dynamics.

THE CHALLENGE

Meteorologists and oceanographers study and forecast weather and climate variability by assimilating observational data from various sources, including satellites, weather balloons, land stations, floats, ships, and data buoys.

Space-borne ocean measurements (remote sensing) have been an increasingly important component of the climate data collection process, which led the European Commission to establish the Sentinel satellite program that measures the temperature, color, and height of the sea surface, as well as the thickness of sea ice. These measurements are used

COMPANY

- **Collecte Localisation Satellites (CLS)** is an Iridium partner using IoT technology to deliver satellite-based monitoring and surveillance solutions to protect the planet.
- **Iridium** commands the world's only truly global satellite communications network, with solutions that span from pole-to-pole. Iridium voice and data products provide superior communications solutions that allow global companies, government agencies, and individuals to stay connected everywhere.

CHALLENGES

- Earth observations satellites need in-situ (situational) data for instrument calibration and validation purposes.
- Oceanographic and meteorological numerical modelling requires large volumes of real-time data.
- Ocean drifters must be cost-efficient and small in order to facilitate storage, transportation, and deployment; therefore, modems must be small form-factor.
- Modems onboard drifters must be power-efficient in order to operate over long periods of time and allow for long-term studies of the ocean.

BENEFITS

- The Iridium network provides global and real-time coverage, allowing modems to send the accurate locations of buoy drifters and retrieval of situational data that enables scientists and meteorologists to monitor climate change and predict extreme weather events.
- Iridium transceivers are small with low power consumption, allowing them to transmit data for over a year.
- Measurements collected by the buoys with Iridium technology allow for large volumes of oceanographic data to be sent to researchers efficiently.

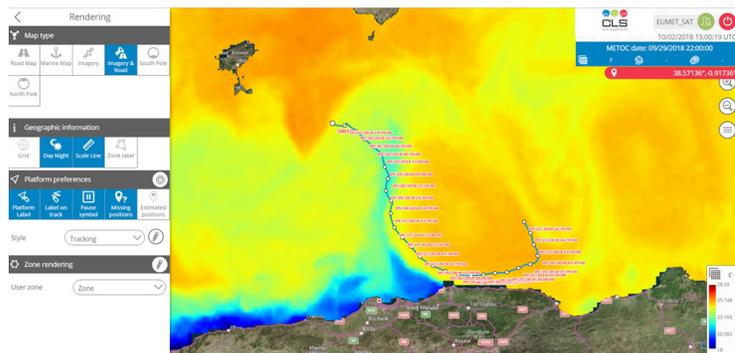
to monitor changes in sea level, ocean heat content, and biological productivity.

Situational data acquired by instruments deployed in the ocean (measuring Sea Surface Temperature (SST), pressure and currents for most of them) also play a critical role in the global ocean observing system, allowing data from remote and inaccessible places to be acquired and assimilated in models and studies.

For the Sentinel program, data from marine drifting buoys is also used to calibrate and validate measurements from the satellites. The European Organization for the Exploitation of Meteorological Satellites (EUMETSAT) recently issued a Tender in order to fund a suitable project aimed at manufacturing and deploying a network of more than 100 marine drifting buoys with high resolution sensors. These buoys were designed to calibrate instruments on-board the Sentinel 3 satellites.

THE SOLUTION

Iridium partner CLS, in collaboration with its partners nke INSTRUMENTATION, SHOM, Meteo France, JCOMMOPS and BSH was awarded the contract, with the project TRUSTED (towards fiducial reference measurements from High-Resolution Sea Surface Temperature HRSST drifting buoy). The consortium developed a new oceanographic buoy: Surface Velocity Platform drifter with Barometer and Reference Sensor for Temperature (SVP-BRST). Thanks to the SHOM's high-quality metrology, its sensor is capable of validating the most up-to-date HRSST observations from Europe's Sentinel-3 satellite mission, supporting ocean forecasting systems, as well as environmental and climate monitoring.



Screenshot of CLS display system showing a drifter track, plotted together with space-borne sea surface temperature measurements

Iridium plays an important role in the project since the high-resolution data is delivered to the TRUSTED project team through the Iridium network. The buoys use Iridium Short Burst Data® (SBD®) and Iridium 9602 transceivers to relay HRSST

Service Provider: [Collecte Localisation Satellites \(CLS\)](#)
Enabling Product: Iridium 9602 Transceiver
Enabling Service: Iridium Short Burst Data® (SBD®)

data, along with buoy position and other ocean parameters to CLS, which then processes the data and makes it available to the international scientific community. The buoy data is then used by various agencies, including Meteorological bodies, for assimilation in numerical weather forecasting models.

The global coverage of the Iridium network allows the Copernicus drifter buoys to be deployed across the global oceans, ensuring a truly global situational sampling campaign. Real-time data, enabled by Iridium SBD, is required for oceanographic and meteorological numerical modeling to predict global or regional weather events and ocean disturbances. Additionally, the low-power Iridium 9602 modem is able to transmit large volumes of data efficiently while fitting perfectly in the small buoys.

THE RESULT

The measurements collected by the buoys and transmitted through the Iridium network allow scientists to calibrate and validate the Sentinel-3 temperature sensors, the main objective of the fiducial reference project TRUSTED.

“ Iridium is a crucial satellite system for the scientific community because weather and climate studies depend on accurate observations of environmental parameters coming from remote areas. The ocean is particularly important to weather prediction and understanding climate change and Iridium makes it possible to integrate real-time HRSST observations of the SVP-BRST into weather and climate models. Iridium will continue to be the satellite telemetry solution for data relay of the Copernicus TRUSTED project, thanks to real-time, global coverage, and high-volume capability of the Iridium SBD modems. ”

—Marc Lucas
Trusted Project Manager, CLS

The first SVP-BRST buoy prototypes were deployed in April 2018. The first batch of 50 production buoys are scheduled to be deployed in early 2019, followed by an additional 50 later in the year. The buoys will continue to provide real-time data measurements of the sea surface temperatures for 18 months. In addition to their satellite calibration purposes, these measurements will be used within the ocean forecasting system to monitor environmental and climate variations.

TAKE AWAY

Real-time, global coverage and high-volume capability to improve weather forecast accuracy make Iridium SBD the ideal satellite telemetry solution for meteorological and oceanographic data collection projects, as well as tackling the effects of climate change.

