

# MARINE AREAS

Analysing, surveying and understanding our marine environment to enhance decision-making, anticipation and protection



# CLS at work in marine areas

## Marine environment



- In situ observation systems (setting up programmes to collect and archive ocean data, etc.)
- Advice and provision of satellite ocean observation data
- Studies and definition of indicators

## Fauna & habitat



- Monitoring animal tracking programmes
- Advice and support for setting up programmes
- Studies of marine ecosystems
- Studies of habitats and the impact of protection measures

## Human activity



- Monitoring human activity at sea: fishing, maritime traffic and pollution
- Real-time surveillance systems for monitoring human activity at sea
- Detection of pollution, with early warning system and drift forecasting

## CLS IS THERE TO HELP AT EVERY STAGE ...

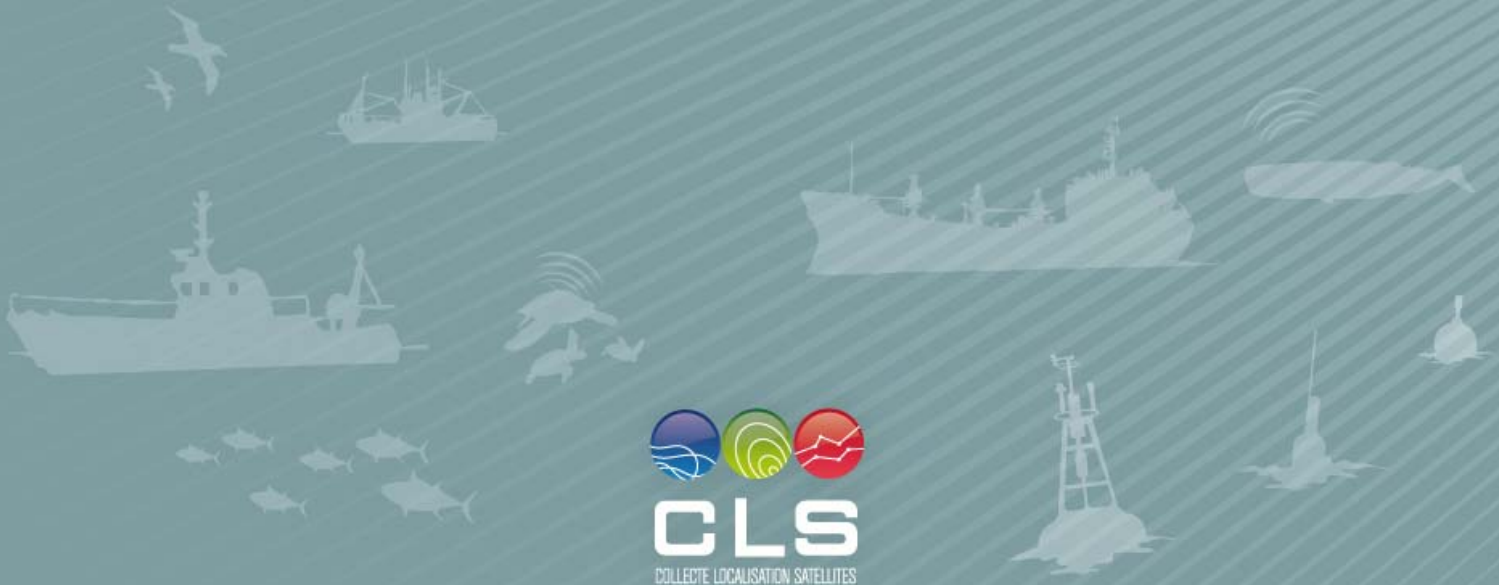


## ABOUT CLS

CLS is a subsidiary of CNES (the French Space Agency) and IFREMER (the French Research Institute for Exploitation of the Sea) and since 1986 it has offered satellite services in location, data collection, ocean observation and surveillance to government authorities, scientists and commercial companies concerned with the sustainable management of marine resources, environmental surveillance and maritime security.

CLS works closely with French and other space agencies (CNES, NOAA, Eumetsat, etc.) and national authorities.

# HUMAN ACTIVITY





# MEASURING THE IMPACT OF HUMAN ACTIVITY

CLS offers solutions for measuring and monitoring fishing, maritime traffic or pollution in protected marine areas.

## FISHING

CLS has been monitoring sea-fishing activities over the entire world for almost 25 years, for national and international regulatory bodies.

### Historical data:

Where these bodies allow us to do so, we can provide you with a record of fishing activity in your region of interest.

### Real-time fishing surveillance systems:

CLS offers complete surveillance systems for fishing vessels:

- A range of Vessel Monitoring System (VMS) terminals whether for industrial-scale or traditional fishing vessels;
- Electronic logbooks/Electronic Reporting Systems (ERS);
- Control centres for monitoring and overseeing fishing activities: an integrated system for tracking fleets in real time.

### Systems for managing marine resources:

By strengthening its partnership with IFREMER, CLS intends gradually to extend the services that a Marine Protected Areas agency can offer, by setting up effective practical and upgradeable systems for managing marine resources. This service offer includes the following features:

- Audit studies of the technical and organisational aspects of current systems;
- Integration of flows of regulatory data (VMS fleet tracking, ERS capture reporting system, etc.);
- Integration of data flows from local observers (other types of data);
- Production of statistical data to assist with decision-making (dashboards, area reports).

### Detecting illegal fishing:

CLS brings acknowledged expertise to the interpretation of satellite radar images, including the detection and identification of ships and analysis of their movements. CLS also offers technical solutions based on coastal radar systems enabling the authorities to monitor fishing activities.

### Impact studies:

CLS carries out impact studies, simulations or evaluations concerning the introduction of measures limiting or banning fishing.

## OUR STRENGTHS

- 25 years of experience in the fishing sector
- A genuinely integrated offer, from fishing boat to administrator
- Real expertise in the management of marine resources
- Complete, upgradeable technical solutions, adapted to your needs



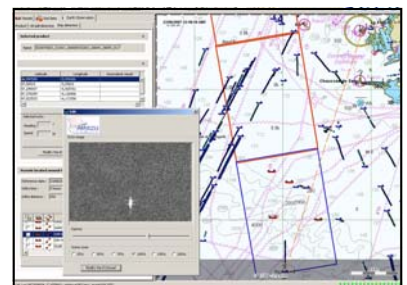
Our range of transmitters includes models for every type of fishing, including traditional fishing methods (above, the MAR-GE/T transmitter).



Our products and systems are officially approved throughout the world for tracking fishing vessels in real time.



We can offer a range of solutions for transmitting electronic logbooks.



We provide monitoring and decision-support software.

## MARITIME TRAFFIC

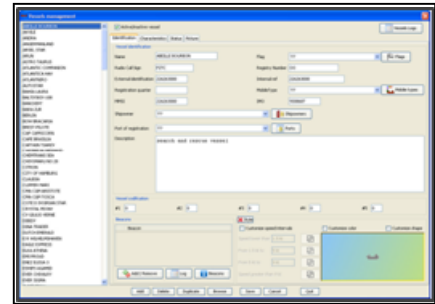
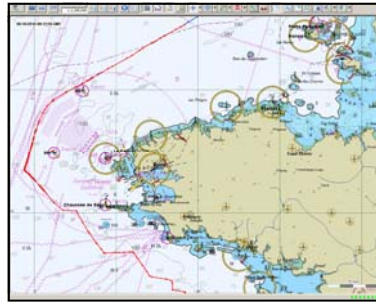
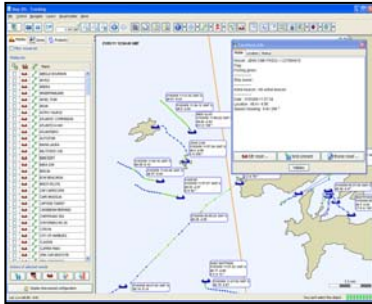
CLS works closely with maritime surveillance authorities. We track more than a third of the world's shipping via Long-Range Identification and Tracking (LRIT) data centres that we manage on behalf of the authorities in a number of different countries.

### Historical data:

If authorised by the authorities concerned, CLS can supply customers with historical data of maritime traffic to help measure the pressure on areas of interest.

### Real-time surveillance of maritime traffic:

CLS supplies a range of equipment for tracking mobile transmitters as well as software for integrating multi-source data (AIS, LRIT, SAT-AIS, coastal radar, Inmarsat, Argos, Iridium, etc.) for optimum surveillance.



Manage maritime traffic in real time via a user-friendly interface. Display all your data overlaid on advanced maritime charts (C-MAP®). An administrative interface allows you to manage the fleet concerned.

## OUR STRENGTHS

- Proven hardware and software
- A control centre operating 24/7
- A flexible and multi-source system for monitoring maritime traffic over a given area

## POLLUTION

Our services enable regular periodic surveillance of protected areas, for detecting oil-spills and reacting rapidly.

### Historical data:

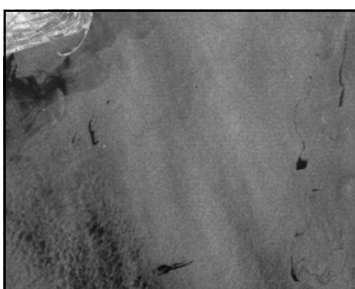
CLS supplies charts showing areas with a high risk of pollution.

### Pollution management system:

- **Detection:**  
CLS can offer both day-time and night-time surveillance via radar satellite, unaffected by weather conditions, and can detect oil spills shortly after they occur.
- **Monitoring:**  
CLS advises on the type of onsite system to deploy and supplies the necessary equipment and satellite services.
- **Forecasting:**  
If pollution is observed near your area, CLS can provide a drift-forecasting service to help you decide on emergency measures for the areas identified.

## OUR STRENGTHS

- Detection reports issued by experts in real time
- We supply and install all equipment
- A drift-forecasting service



Our solutions for pollution management include pollution detection services, equipment for tracking oil-spills and charts forecasting directions of drift.



# THE MARINE ENVIRONMENT



# UNDERSTANDING AND MEASURING THE MARINE ENVIRONMENT

We offer services to help you measure, monitor and survey your marine environment and make appropriate arrangements for conservation.

## IN SITU OBSERVATION AT SEA

CLS has proven expertise in the collection of *in situ* data for studying and protecting the environment. The principal international operational-oceanography programmes use CLS satellite services to distribute the data to weather forecasters and oceanographers around the world. As well as being the sole operator of the ARGOS system since 1986, CLS also offers its users data collection services via the Iridium satellite system. Our experts advise customers on their choice of equipment and the most appropriate satellite communication system to suit conditions in the field.

### Historical data:

CLS can advise you on the best way to obtain historical *in situ* observation data for your area of interest.

### In situ observation systems:

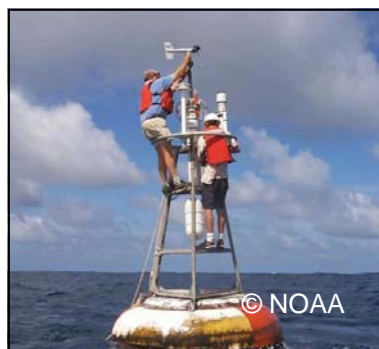
CLS can help you set up *in situ* observation systems and advise you on the best type of platform to suit your circumstances. Oceanography platforms can measure currents, temperature, salinity, oxygen levels and the pH of the water, among other parameters. A range of platforms and different sensors are available to meet your specific needs.

CLS offers:

- Advice, equipment and expertise;
- Satellite communication (air-time);
- Data processing and quality controls;
- Technical and engineering support;
- Several ways to access your data (web, ftp, email, text messages, etc.);
- Oceanographic expertise and studies.

## OUR STRENGTHS

- Historic partner of the principal international oceanography programmes
- Skilled in collecting satellite data (Argos, Iridium)
- Specific and strategic advice on *in situ* observation
- Technical support



CLS is the ideal partner to guide and advise you on how to set up an onsite observation programme for your area. CLS can track any kind of oceanography platform: drifting buoys, anchored buoys, Argo floats and gliders, etc. for *in situ* observation out at sea or in coastal areas.

## OUR STRENGTHS

- 60 oceanographers
- 20 years of experience in satellite oceanography
- A key partner in European and international projects
- Mandated by CNES for processing altimetry data

## OCEAN OBSERVATION

CLS has been taking part in the main international operational oceanography initiatives for 20 years. Our position as leading experts in satellite oceanography enables us to advise you on the data available, whether historical or real-time, undertake studies on the marine environment, and help you choose indicators and implement them.

### Advice, with provision of ocean observation data:

Our experts can advise you on the availability and characteristics of a range of products produced by combining modelling and observation data to describe ocean states:

- Temperature;
- Currents;
- Sea height;
- Concentration of plankton;
- Sea state (wind and waves).

### Studies:

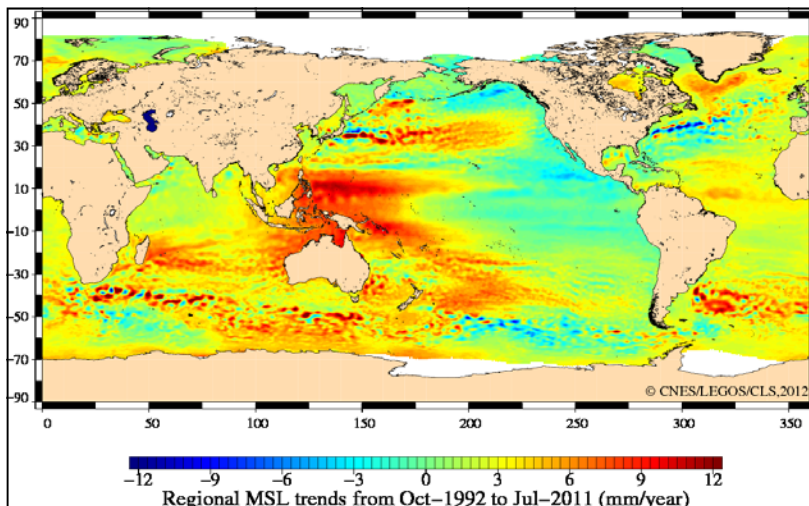
CLS teams carry out:

- Statistical studies;
- Correlations between the marine environment and animal migrations;
- Monitoring and forecasting studies of oceanographic conditions.

### Setting up indicators:

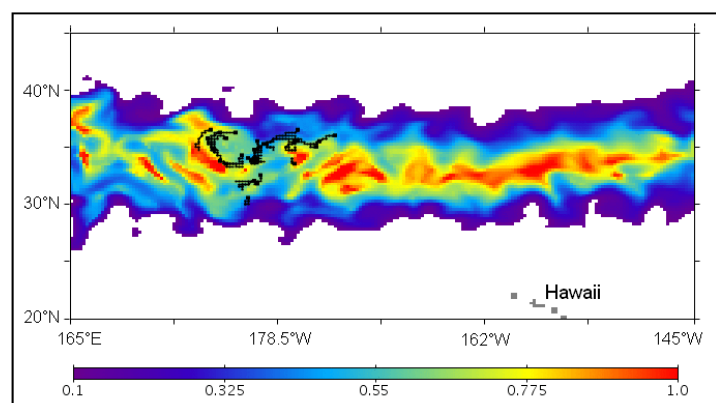
CLS can help you set up indicators for measuring changes to the ocean environment.

- Climate change indicators: rising sea levels, heat content, variations in surface temperature;
- Biological indicators.



A chart illustrating indicators of mean ocean levels, calculated by our experts.

A correlation study associating the itineraries of a group of loggerhead turtles and the feeding areas predicted by modelling.





# FAUNA & HABITAT



# CHARACTERISING AND STUDYING FAUNA AND HABITATS IN YOUR REGION

If you are responsible for protecting fauna and habitats, then CLS can facilitate your work.

## ANIMAL TRACKING PROGRAMMES

The ARGOS satellite telemetry system has helped rewrite the history of animal migrations over the last 30 years. This system has improved our ability to identify priority areas for protection, as a function of the fauna found there and the way it uses space, and to assess the effectiveness of such areas.

### Historical data:

As sole operator of the Argos system for the last 30 years, we are able to supply meta-data (on species, number of individuals, purpose of research, duration, organisation, etc.) about the monitoring programmes carried out in your area, with the agreement of programme managers.

### Setting up animal-tracking programmes:

CLS can help set up programmes to track animals within your area of interest, and can also simplify the administrative procedures. We can provide:

- Advice & expertise;
- Satellite communication (air-time);
- Data processing and quality controls;
- Technical and engineering support;
- Distribution of data (web, ftp, email, text messages, etc.).

### Expertise:

CLS can help you interpret these data, on request.

### Processing archival tag data:

In close collaboration with the scientific community, CLS helps to improve light-based location, and currently proposes a processing service for archival tag data. Our services are based on expertise in two fields: the analysis of oceanography data and geolocation.

### Publishing research results:

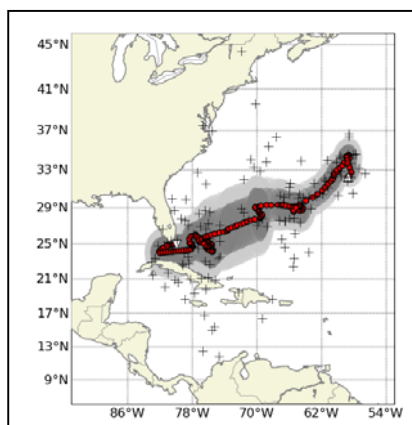
CLS publishes articles showcasing the research of our scientific users in our own review, ArgosForum, which is distributed to 4,000 users of the Argos system and institutional partners.

## OUR STRENGTHS

- Sole operator of the ARGOS system
- 11,000 animals tracked every month, including 300 protected species
- Expert in geolocation services



CLS assists and advises on the setting up of animal tracking programmes.



Our archival tag data processing service minimises positioning errors and is a considerable improvement compared to original light-based-only geolocation systems (crosses, on the chart). Here, seen via the itinerary of a Bluefin tuna in the Atlantic.

## OUR STRENGTHS

- Expertise in ocean modelling, coupling physical and biological aspects
- Halieutic expertise for developing scenarios and recommendations
- Operational simulations for real-time monitoring of protected areas (possibility of issuing alerts)

## THE MARINE ECOSYSTEM

It is essential to track changes to marine ecosystems for the sustainable management of resources that are of great economic importance to the region, while respecting long-term ecological requirements. CLS combines innovative ecosystem modelling solutions with observation data to help manage fishing zones and protect biodiversity.

### Studying habitats:

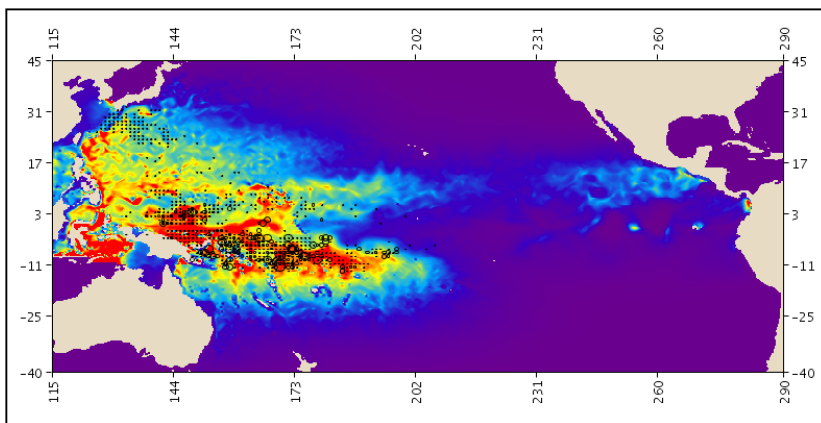
By first entering various types of data on ocean conditions and biomass (sea surface temperature, phytoplankton, micronekton) in numerical models of the movements of marine populations and then relating the results to observations of animal behaviour (monitoring by satellite, fishing data, etc.), CLS is able to identify and characterise, for certain species (tuna and small pelagic fish):

- Areas favourable for laying;
- Areas over which juveniles disperse (e.g. turtles);
- Areas forming the habitat of adults;
- Migration corridors;
- Areas where fishing activities can threaten protected or controlled species.

### Analysing the impact of protection measures:

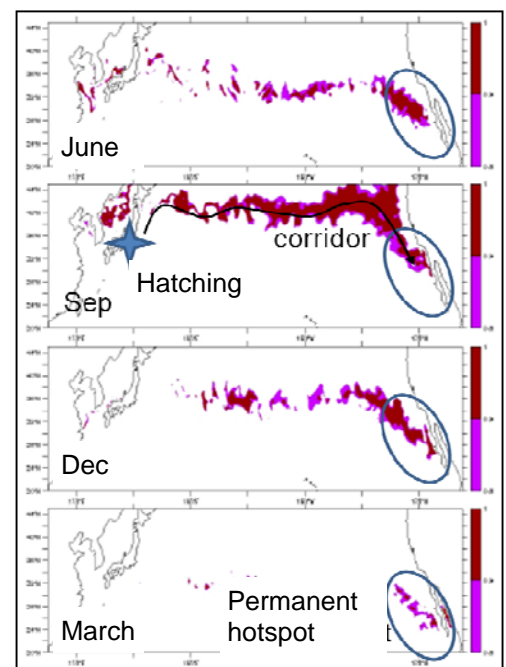
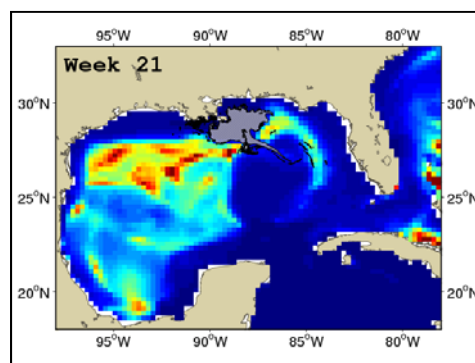
Our experts can analyse the effects of different environmental protection measures by studying:

- The impact of fishing activities;
- The impact of time-limited or space-limited fishing restrictions;
- The impact of changes to fishing methods;
- The interactions between multiple species and multiple fishing fleets.



We can provide a thorough description of the population distribution of fished species, from larvae through adulthood to capture. Above: a distribution forecast (for May 2009) of the total biomass of bonitos and actual captures (circles).

Weekly chart simulating the density of Bluefin tuna larvae in the Gulf of Mexico showing the impact of the oil-spill from the Deepwater Horizon drilling platform.



Our experts identify corridors that are favourable for migration (here for turtles) and recommend hot-spots requiring particular monitoring and/or protection.



## OUR PRODUCTS



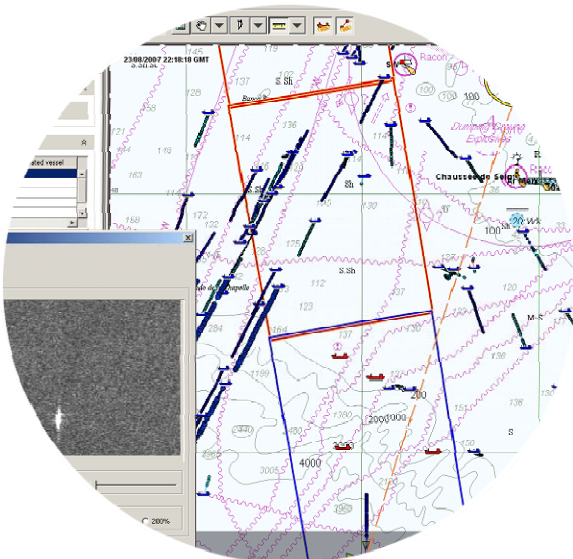
### A RANGE OF TRANSMITTERS

A wide range of transmitters for tracking vessels, for all types of fishing, from traditional to industrial fishing systems



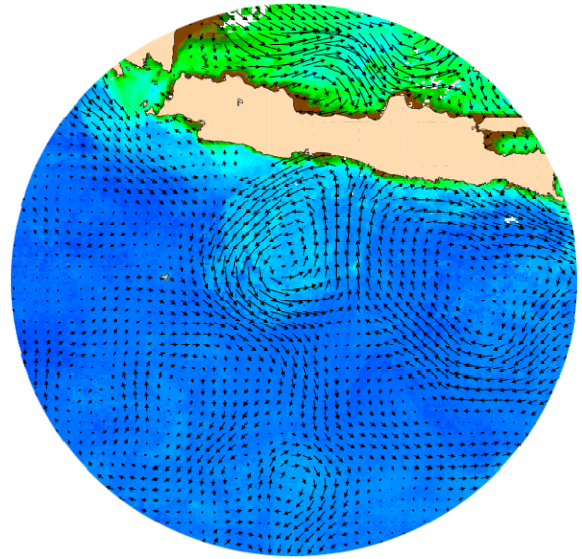
### A RANGE OF ELECTRONIC LOGBOOKS

A range of systems for keeping electronic logbooks, suitable for all kinds of fishing methods, approved by the EU



### A RANGE OF SOFTWARE APPLICATIONS

Supervision and decision-support solutions that integrate a range of data from multiple sources: monitoring fishing and/or maritime traffic, tracking drifting oil-slicks, 24-hour surveillance by radar satellite radar, etc.



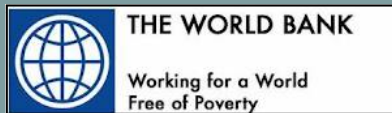
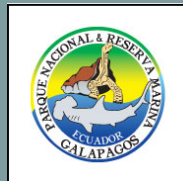
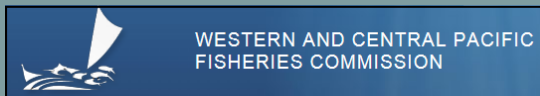
### A RANGE OF DATA

A catalogue of satellite-based ocean observation data, either in real-time or from our archives, for either management or study purposes

## OUR SERVICES



## OUR PARTNERS



...AND MANY MORE

## CONTACT US AT:

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