Fact sheet 4

Fishing and space-based technologies

Existing and emerging satellite technologies can been used to efficiently monitor our marine estate and improve forecasting of events that affect the management of commercial fisheries.

Satellite offerings fall into three main categories:

- **Remote sensing:** Uses sensors and cameras to monitor an area from a distance
- **Connectivity:** Allows sensors, devices and computers to communicate with each other
- **Geolocation:** Provides information on positioning and navigation, for example GPS

Emerging uses of ocean remote sensing for wild catch and sensors in fisheries have the potential to reduce costs and improve profit margins.

Vessel tracking

Geolocation is an embedded technology across many rural industries and is widely used for navigation and positioning in fisheries. Importantly, it provides a vital safety service for fishing vessels at sea[1].

Vessel monitoring systems that use Inmarsat satellites are used by the Australian Fisheries Management Authority to track fishing vessels.

Geolocation through satellites allows for accurate fishing zone maps and sea vessel tracking. These tools underpin sustainable fisheries and enable product traceability and provenance.

Communication

Iridium operates a system of 66 active satellites which are used for worldwide voice and data communication, including hand-held satellite phones and sensors.

Fishing vessels can communicate privately with other vessels in the fleet and can access weather information with the Iridium Certus service. This can increase vessel efficiency as they can receive up-to-date information about fishing conditions.

Tracking catches

Satellite-enabled sensors in fisheries are still emerging in Australia. BlueSenz, from Slovenia, uses devices and GPS/Iridium satellites to track fishing activities. It provides tags for fishing gear to capture data such as the number of winch revolutions and when nets were submerged and hauled. This details the precise fishing effort for each location, allowing better management of fish stocks.

Satellite positioning is also used to identify where nets are deployed – an example of how connectivity and geolocation can work together.

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Monitoring the oceans and environment

Satellite data on weather patterns, visible identification of runoff to predict algal bloom events, data on fish migration patterns and tracking of fishing vessel activity are important tools to maintain the sustainability of fish stocks and fisheries.

A combination of remote sensing data from satellites and machine learning algorithms can be used to identify conditions that promote fish aggregations, such as areas of upwelling with nutrient-rich water. Satellite-derived fishery aid charts developed using this data can significantly reduce the search time for commercial fishing vessels.

In Greece and North Macedonia, the Satellite Near Real Time Monitoring Network uses Sentinel data to produce maps of sea surface temperature and water transparency. This provides decision support for fishers and fish farms in the area by monitoring algal events and water quality[2].

Sensors in fisheries and aquaculture can be used for localised, near-real-time weather and water quality monitoring[3]. Depending on the location and data transfer requirements, data from sensors may be best transmitted by satellite telecommunication. This can be achieved via direct-to-satellite technologies or a local ground station network with satellite backhaul.

The Australian Institute of Marine Science uses satellite-enabled marine sensors as part of its Integrated Marine Observing System. These sensors capture real-time, fine-scale ocean events, including weather, water temperature and currents.

Prawns and El Niño

Remote sensing can be used to track sea level and temperature, as well as wave and current activity. Using remote sensing data, research by CSIRO analysed possible causes of the lowest-ever catches in wild redleg banana prawns, which occurred during 2015-16[4].

Satellite data showed sea surface levels dropped by up to 18cm compared with usual levels, which researchers linked to an El Niño event. Understanding environmental conditions and the impact on prawns and fish is useful, as it allows fishers to predict and quickly respond to low-abundance years by, for example, switching target species. Another example of responsive, data-driven decision-making was outlined in a 2017 Fisheries Digital Data Framework workshop, hosted by the Fisheries Research and Development Corporation. The workshop highlighted that lobster fishers have optimised harvest locations by using continuous digital data streams that combine satellite data, ground radar and ocean current sensors to avoid losses from strong ocean currents[5].

Reference

[1]Fisheries Research and Development Corporation (FRDC), Identifying electronic platforms to increase safety at sea in the Australian commercial fishing fleet, FRDC, 2019

[2]European Commission, The ever growing use of Copernicus across Europe's regions: a selection of 99 user stories by local and regional authorities, European Commission, NEREUS, ESA, 2018.

[3]New South Wales Department of Primary Industries (NSW DPI), FarmDecisionTECH – Fisheries Pilot, NSW DPI.

[4]E Plaganyi-Lloyd, "An El Niño hit this banana prawn fishery hard. Here's what we can learn from their experience", ECOS, CSIRO, 2020.

[5]C Norwood, "Data-smart fishing", Fish, Vol 25 (4), 2017

→ Find out more

Read the full report *Space-based technologies – opportunities for the rural sector.*

Please note: *Some commercial products have been named in this fact sheet to provide examples. These examples are not exhaustive and are not meant as an endorsement of any particular product or enterprise.*