United Nations

General Assembly

United Nations Open-ended Informal Consultative Process on Oceans and the Law of the Sea

Twenty-third meeting

Contribution to the twenty-third meeting of the United Nations Open-ended Informal Consultative Process on Oceans and the Law of the Sea

Submitted by Australia

1. Australia was pleased to welcome the topic "*New maritime technologies: challenges and opportunities"* at the informal consultations for the General Assembly resolution on oceans and the law of the sea in November 2022. At these consultations, Australia encouraged the proposed theme and reaffirmed our understanding that the United Nations Convention on the Law of the Sea (UNCLOS) will continue to apply to new and emerging maritime technologies as the comprehensive legal framework within which all activities in the oceans and seas must be carried out. The General Assembly emphasised this understanding in the text of the oceans and the law of the sea resolution (77/248) which was adopted on 30 December 2022. In Australia's view, the key pillar of the Convention's success is its flexibility. It is this flexibility that has provided the opportunity for new maritime technologies to fall under the Convention.

2. As an island continent, Australia has sovereign rights over a vast area of ocean. Australia's maritime jurisdiction has some of the world's largest coral and rocky reef systems, 12 per cent of the word's blue carbon ecosystems, the third largest area of mangroves globally and 50 per cent of the world's seagrass species. Australia is committed to practising effective and sustainable management to protect and strengthen our vast ecosystem of ocean and coastal assets and adapt to and mitigate the effects of climate change. We recognise that the conservation and sustainable use of marine biodiversity is critical, particularly in our Pacific Region.

3. We still understand so little about the oceans. Further advances in maritime technology offer both the potential of greater exploitation of ocean resources but also, through increasing our understanding, the promise of greater protection. It is for this reason that we must seek to finalise the implementing agreement on the conservation and sustainable use of marine

biological diversity of areas beyond national jurisdiction at the next negotiating session and strike an appropriate balance in the regulatory framework to govern exploitation of the mineral resources of the deep seabed which is being negotiated in the International Seabed Authority.

4. Australia has welcomed and will continue to welcome new maritime technologies which will not only provide new opportunities for the full and effective implementation of UNCLOS, but also allow us to build ocean health and resilience in the face of the challenges of climate change. The use of new maritime technologies will further establish a maritime domain which is stable, peaceful, prosperous and respectful of sovereignty.

New maritime technologies: opportunities for the full and effective implementation of UNCLOS

Data exchange standards

5. UNCLOS contains clear rules for establishing maritime boundaries. New technologies on advanced data exchange standards contributes to States' understanding of maritime boundaries. Australia (Geoscience Australia) has assisted the International Hydrographic Office (IHO) to publish version 1, of S-121, a data exchange standard to represent maritime limits and boundaries. The S-121 Maritime Limits and Boundaries Product Specification is intended for the encoding and exchange of digital maritime boundary information including maritime limits, zones and boundaries as described under UNCLOS.

6. This marine data standard was integrated into the International Organization for Standardization's Land Administration Domain Model (ISO-19152) to harmonise the definitions and depictions of regulated areas and their associated rights, restrictions, and responsibilities.

7. The relevant publications on these marine data standards are set out below:
   a) The International Hydrographic Organization – S-121 Maritime Limits and Boundaries: http://s100.iho.int/product%20specification/division-search/s-121-maritime-limits-and-boundaries

   b) ISO – 19152:
      i. https://committee.iso.org/sites/tc211/home/standards-in-action/user-story-challenge/australia---geodesyml-for-effici.html
      ii. https://www.iso.org/standard/51206.html

Mapping the ocean floor

8. Australia has a dedicated ocean research vessel, the *RV Investigator*, which is operated by the Marine National Facility. The vessel is equipped with an array of new maritime technologies, including sonar mapping sensors and advanced seabed mapping instrumentation that allows data to be collected in 3D. This combination of new technology systems allows high quality and large quantities of data to be collected from any depth in Australia's maritime jurisdiction.

9. The seabed mapping products produced by CSIRO's Geophysical Survey and Mapping team aboard the *RV Investigator* produce seabed models which can allow Australia to understand the depths of its maritime jurisdiction including the seamounts, canyons and ridges.

10. This scientific and technical understanding has furthered our understanding of the features, ecosystems and biodiversity of Australia's marine environment. It is therefore also contributing to Australia's ongoing implementation of UNCLOS.

11. Further information on the *RV Investigator* and ocean mapping may be found here:
    a) https://www.csiro.au/en/showcase/mapping-the-sea-floor

New maritime technologies: responding to the challenges of climate change

12. Marine ecosystems are increasingly facing pressures under the challenges of climate change. Australia is harnessing the latest technology to understand the changing tropical marine environment – embedding new technologies and the latest data science into its response to these pressures.

13. Australia is employing next-generation sensors, artificial intelligence, robotics, autonomous systems and cloud computing to provide more comprehensive knowledge and inform sustainable management. In doing so, Australia has worked with Traditional Owners, coral reef communities and industry experts.

14. Australia has a suite of secure marine technology test and evaluation facilities. These facilities, known as *ReefWorks*, are an initiative which offer a national capability to safely test marine technologies, uncrewed systems and new sensors. *ReefWorks* is providing an opportunity to expand Australia's capability to tackle the climate challenges facing its marine ecosystems, including coral bleaching events, by verifying technologies as fit-for-purpose, safe to operate and environmentally compliant.

15. The Australian Institute of Marine Science (AIMS) is advancing technology in the field of coral reef management. AIMS has developed *ReefCloud*, a cloud-based, open-source technology powered by artificial intelligence and robust statistical analysis that facilitates the management, analysis, and reporting of coral reef monitoring data. *ReefCloud* is designed to machine-learn from experts to efficiently automate image analysis and extract relevant reef information, including coral cover and reef composition.

16. *ReefCloud* uses facial recognition technology to identify around seven million parameters from the colour, shape and size of the coral. This technology is now being used in Australia, Palau, Fiji, Solomon Islands, Vanuatu and the Maldives. Australia also supports countries in Southeast Asia with coral reef monitoring and management by providing training on this innovative *ReefCloud* technology.

17. Australia has designed a new method for the monitoring of traditional coral reef systems. This is a modular suite of automated marine monitoring systems that translate field data into comprehensive information about the state and health of critical marine ecosystems such as coral reefs. This modular suite is called *ReefScan* which provides an 'end-to-end' approach from monitoring design to data collection, analysis and reporting.

18. The Australian Institute of Marine Science, in partnership with the University of Queensland, has designed a prototype autonomous underwater vehicle *ReefScan CoralAUV* which has advanced navigational and obstacle avoidance sensors. These allow it to complete georeferenced and repeatable surveys with a high degree of accuracy. Advanced perception and artificial intelligence capabilities for the *CoralAUV* are being developed to allow it to automatically detect and follow reef contours and slopes.

19. Further examples of the technologies being developed by Australia for the protection of the marine environment can be found here:
    a) https://www.aims.gov.au/about/facilities/reefworks
    b) https://www.aims.gov.au/research/technology/reefcloud
    c) https://reefcloud.ai/
    d) https://www.aims.gov.au/research/technology/reefscan
    e) https://www.aims.gov.au/research-topics/technology/hyperspectral-sensors
    f) https://www.aims.gov.au/research-topics/technology/dipstick-technology

New maritime technologies: opportunities for improved management of the marine space

Australia's Marine Resources Initiative

20. Under Australia's Marine Resources Initiative (MRI), Australia (The Department of Foreign Affairs and Trade, Geoscience Australia and the Australian Institute of Marine Science) is deploying world-leading technology to deliver tailored assistance to Southeast Asian partners in marine spatial mapping and coral reef monitoring. The purpose of MRI is to support Australia's Southeast Asian partners to manage and protect their marine resources.

21. Australia is using satellite imaging and modelling technology to deliver tailored assistance in marine spatial mapping to assist Australia's Southeast Asian partners with improved certainty and visibility of the geography of coastlines, seabeds and features to allow for improved management of their maritime jurisdictions. Modelling technology also supports improved understanding of climate change vulnerability and protection of the marine environment.

Bathymetric Data Compilations

22. Australia (Geoscience Australia) is working with James Cook University to create freely available bathymetric date compilations. The bathymetric data compilations can support the safe navigation of ships. They can also improve environmental management and resource development.

23. Further information on Australia's use of bathymetry data is set out below:
    a) https://www.ga.gov.au/scientific-topics/marine/survey-techniques/bathymetry

Automatic classification of seabed features

24. Australia (Geoscience Australia) collaborated with the UK (British Geological Survey and the Centre for Environment, Fisheries and Aquaculture Science), Norway (Geological Survey of Norway) and Ireland (Geological Survey Ireland) on a project to improve the automatic classification of seabed features.

25. The group created a dictionary of seabed morphology feature terms and definitions that are primarily drawn from the IHO guide on undersea feature names.

26. Further, the group provided sketches of typical morphologies for each type of feature. This project provided an opportunity to create new technologies including a search tool and software tools to automate portions of the workflow.

27. The publication on the methods of this work can be found here:
    a) https://doi.org/10.5281/zenodo.4075248

New maritime technologies: opportunities for fisheries management

New maritime technology opportunities

28. Australia is actively embracing new maritime technology opportunities for fisheries management. Drones, uncrewed surface vessels and sound traps are just a few examples of new technologies being trialled in Australia to monitor compliance and detect illegal fishing activity in Australian Marine Parks (AMPs).

29. Sound traps are compact self-contained underwater sound recorders for ocean acoustic research that have provided the opportunity for Australia (Parks Australia) to understand the activities of small vessels in AMPs. Sound traps are also informative for the development of compliance and risk management strategies.

30. In 2023, Australia will be trialling a range of measures to better understand the vessel activity in Australian Marine Parks. The use of Uncrewed Surface Vessels (USVs) known as 'Bluebottles' are just one such measure. These vessels are equipped with 360-degree day and night infrared cameras, radar and satellite communications and can autonomously monitor designated vehicles for months at a time. Bluebottles are powered by solar, wind and wave energy and can carry up to 300 kilos of sensors and equipment. The use of USVs such as Bluebottles has the potential to help protect the plant and animal species in Australian Marine Parks and further testing will evaluate the technology's potential to support compliance operations.

31. Further information on new maritime technologies which are being used by Australia in fisheries management is set out below:

a) https://minister.dcceew.gov.au/plibersek/media-releases/new-technology-monitor-australian-marine-parks
b) https://www.fisheries.noaa.gov/new-england-mid-atlantic/collaborative-ocean-acoustics-research-projects
c) https://www.nssn.org.au/news/2020/6/19/ocius-bluebottles-to-protect-australias-maritime-borders

Vessel Monitoring Systems

32. Electronic and vessel monitoring systems provide significant opportunities for fisheries management and conservation. There are opportunities for greater uptake of electronic and vessel monitoring systems globally. Australia is continually improving and adopting new maritime technology in fisheries and marine protected areas. Australia's Electronic and Vessel Monitoring Systems (EVMS) Assistance Program is one example of how Australia is using these technologies to assist its fishing industry to comply with marine park regulations and provide greater certainty to the wider community that fishers are operating sustainably.

33. Australia has implemented vessel monitoring systems (VMS) to monitor the movement of all Commonwealth endorsed fishing vessels. VMS allows the Australian Government to receive vessel information through International Maritime Satellite (INMARSAT) communications.

34. VMS are an effective type of maritime technology for assisting compliance with fishery management arrangements, particularly where fishing activities are restricted to certain areas or zones.

35. The Australian Government has recently awarded $5.5 million in grants as a part of a larger funding package designed to assist in the uptake of e-monitoring and vessel monitoring systems in AMPs. The adoption of vessel monitoring technology has reinforced Australia's confidence that commercial fishing industries are continuing to adopt best practice for compliance and conservation, while operating at the highest standards in AMPs.

36. Further information on vessel monitoring systems which are being used by Australia in fisheries management is set out below:
    a) https://www.afma.gov.au/monitoring-enforcement/satellite-monitoring-fishing-boats
    b) https://www.afma.gov.au/fisheries-services/vessel-monitoring
    c) https://parksaustralia.gov.au/marine/pub/AMP-Fisheries-assist-engage-package-Oct2021.pdf
    d) https://www.fisheries.noaa.gov/new-england-mid-atlantic/collaborative-ocean-acoustics-research-projects

Electronic Monitoring (E-Monitoring)

37. Electronic monitoring is a system of sensors and video cameras that are capable of monitoring and recording fishing activities which can later be reviewed against logbook data. E-monitoring

is a maritime technology that has significant proven benefits in assisting States with fisheries management and conservation.

38. Australia's e-monitoring program uses video and sensor data to independently verify fishing operations and fisheries' logbook information. The Australian Fisheries Management Authority (AFMA) has made e-monitoring mandatory in the Eastern Tuna and Billfish Fishery, the Western Tuna and Billfish Fishery, the Gillnet, Hook and Trap Fishery, and the Small Pelagic Fishery.

39. E-monitoring in Australia provides greater insight into the state of fish stocks and the impacts of fishing on the marine environment. E-monitoring can be a cost-effective option in generating accurate data and higher rates of compliance in fisheries, which in turn can lead to more sustainable fishing practices.

40. Further information on E-Monitoring employed by Australia in fisheries management is set out below:
    a) https://www.afma.gov.au/sites/default/files/australian_fisheries_management_authority_electronic_monitoring_program_june_2020.pdf
    b) https://www.afma.gov.au/monitoring-enforcement/electronic-monitoring-program

Sustainable marine transport

41. Australian industry is taking advantage of new maritime technology opportunities, with continual development in sustainable marine transport.

42. Further information on sustainable marine transport is set out below:
    a) https://www.thedcn.com.au/news/specialist-shipping/incat-looks-to-deliver-zero-emissions-ferry/
    b) https://statements.qld.gov.au/statements/95079
    c) https://www.anl.com.au/news/1835/anl-completes-biofuel-powered-voyage-in-oceania