



UK Hydrographic
Office

RSAHC9 UK National Report

UNITED KINGDOM NATIONAL REPORT

to the

9th Meeting
ROPME SEA AREA HYDROGRAPHIC COMMISSION
(RSAHC)

Muscat, Sultanate of Oman

15 – 17 NOVEMBER 2022



This report supplements the UK Generic National Report, posted on the UKHO website

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1. UK HYDROGRAPHIC OFFICE (UKHO)

UK Delivery of Hydrographic Services

1.1 The UK is a Contracting Government to the International Convention for the Safety of Life at Sea (as amended and including its Protocol of 1988), 1974 (SOLAS). The UK Maritime and Coastguard Agency (MCA), an agency of the Department for Transport, is the UK National Maritime Administration, and is responsible for ensuring that the UK's obligations under SOLAS are met.

UKHO Governance and Targets

1.2 This is described in the UK Generic National Report to the IHO, see www.gov.uk/government/organisations/uk-hydrographic-office/about

UKHO Organisation



1.3 Details of the UKHO's organisation are provided in the UK Generic National Report (section 1) together with general contact details ([UK Generic National Report](#)). Specific contact details relevant to the RSAHC region are included at the end of this report.

Production Systems

1.4 This is described in the UK Generic National Report.

Cooperation and Partnerships



1.5 The UK is committed to formalising partnerships through bilateral arrangements, developed in co-operation with other international government hydrographic authorities, covering a range of topics, including the use/re-use of data protected by copyright and intellectual property rights of those authorities. These also promote other forms of co-operation between the participants, helping to enhance international maritime safety and protection of the environment.

2. SURVEYS

2.1 Details of the management of civil hydrographic surveys in UK Home Waters are provided in the UK Generic National Report, and on the UKHO website. UK's National Hydrographic Committee (known as the Civil Hydrography Annual Seminar (CHAS)) meets on an annual basis and provides the necessary breadth of interests to ensure that all surveying requirements are taken into account when prioritising the work of the Civil Hydrography Programme (CHP).

Details of planned and completed CHP surveys can be found on the MCA CHP website (<http://www.gov.uk/guidance/share-hydrographic-data-with-maritime-and-coastguard-agency-mca>).

2.2 The UKHO manages a range of Hydrographic Programmes in support of the UK Government's objectives to support the sustainable economic growth of eligible States by maximizing the potential of their marine resources, helping to improve their resilience to climate change and natural disasters, protect their environment, food security and marine assets, and ultimately improve the livelihood of local communities.

2.3 Since the establishment of the Hydrographic Programmes team, seabed mapping data collection has taken place using the range of collection methods across the UK's Overseas Territories and eligible Commonwealth nations.

2.4 Any requests for hydrographic assistance from nations within the RSAHC region will be considered, as the UKHO has a dedicated team of specialists that manages our portfolio of survey and hydrographic development programmes. In addition to survey advice, the team are configured to provide support and advice in the development of hydrographic governance and identifying funding. Further information can be obtained from HydrographicProgrammes@ukho.gov.uk.

3. CHARTS

3.1 UK's Generic National Report provides information on UK's portfolio of chart products and services. The following paragraphs provide information specifically relevant to the RSAHC region.

Paper Charts



3.2 The paper chart folio, released under the ADMIRALTY brand, comprised prior to the start of the sunset of about 3760 charts, 93% of which are metric, 82% are referred to WGS84 or ETRS89, 37% are adopted, and 24% are INT versions. The colour separated bases of all charts are held as high-resolution raster images and it is these that are updated for Notices to Mariners and New Editions before being used as source for digital printing by the UKHO or it's Distributors.

"The UKHO has now announced its intention to withdraw from paper charts by the end of 2026. Whilst we do this, we will continue to maintain charts through Notice to Mariners or New Editions for safety updates. More information is available at <https://www.admiralty.co.uk/sunsetting-paper-charts>"

The following new charts have been published since the last RSAHC meeting:

| GB Chart Number | Title | Published |
|-----------------|-----------------------------|----------------|
| 3708 | Port of Fujairah (Fujayrah) | 27 June 2019 |
| 3796 | Ar Ruways Terminals | 5 May 2022 |
| 3722 | Mugharra Port | 11 August 2022 |
| | | |
| | | |
| | | |

The following new editions have been published since the last RSAHC meeting:

| GB Chart Number | Title | Published |
|-----------------|--|-----------|
| 40 | Karachi Harbour | 23-May-19 |
| 58 | Approaches to Karachi | 06-May-21 |
| 59 | Port Muhammad Bin Qasim and Approaches | 23-May-19 |
| 1214 | Khalij al Kuwayt | 30-Jan-20 |
| 1235 | Khawr `Abd Allah and Approaches to Shatt al Arab or Arvand Rud | 18-Apr-19 |
| 1265 | Khawr al Amaya and Khawr al Kafka | 18-Apr-19 |
| 2441 | Greater Tunb to Jazireh-ye Forur | 21-Mar-19 |
| 2442 | Jazireh-ye Sirri to Sir Abu Nu'ayr | 21-Mar-19 |
| 2443 | Sir Abu Nu'ayr to Zirkuh | 21-Mar-19 |
| 2444 | Eastern Approaches to Jazirat Das and Jazirat Halul | 28-Jul-22 |
| 2837 | Strait of Hormuz to Qatar | 03-Oct-19 |
| 2847 | Qatar to Shatt al `Arab | 03-Oct-19 |
| 2851 | Masirah to the Strait of Hormuz | 12-Nov-20 |
| 2858 | Gulf of Oman to Shatt al Arab | 03-Oct-19 |
| 2883 | Jazireh-ye Lavan to Kelat and Ra's Tannurah | 21-Mar-19 |
| 2884 | Mina az Zawr to Al Basrah and Bushehr | 11-Aug-22 |
| 2887 | Dubai (Dubayy) and Jazireh-ye Qeshm to Jazirat Halul | 21-Mar-19 |
| 2888 | Jask to Dubai (Dubayy) and Jazireh-ye Qeshm | 25-Nov-21 |
| 2889 | Dubai (Dubayy) to Jabal Az Zannah and Jazirat Das | 21-Mar-19 |
| 2896 | Mina' Salalah and Approaches | 07-Apr-22 |
| 3171 | Southern Approaches to the Strait of Hormuz | 25-Nov-21 |
| 3172 | Strait of Hormuz | 25-Jun-20 |
| 3173 | Strait of Hormuz Northern Part | 25-Jun-20 |
| 3174 | Western Approaches to the Strait of Hormuz | 25-Nov-21 |
| 3175 | Jazirat Al Hamra' to Dubai (Dubayy) and Jazireh-ye Sirri | 04-Nov-21 |
| 3176 | `Ajman to Sir Abu Nu`ayr | 04-Nov-21 |
| 3177 | Outer Approaches to Abu Dhabi (Abu Zaby) | 12-Sep-19 |
| 3178 | Approaches to Mubarras Terminal including Zaqqum Traffic Separation Scheme | 21-Mar-19 |
| 3179 | Jazirat Das to Ar Ruways | 05-May-22 |

| | | |
|--------|--|-----------|
| 3404 | Ports in Ras al Khaimah (Ra's al Khaymah) | 25-Nov-21 |
| 3405 | Ports in 'Ajman, Sharjah and Umm al Qaywayn | 25-Nov-21 |
| 3412 | Hamriyah to Mina' Seyaha | 24-Mar-22 |
| 3413 | Oil and Gas Terminals in Qatar and the United Arab Emirates | 05-May-22 |
| 3414 | Dubai (Dubayy) and Approaches | 04-Nov-21 |
| 3518 | Ports and Anchorages on the North-East Coast of Oman | 26-Mar-20 |
| 3520 | Khawr Kalba and Dawhat Diba to Gahha Shoal | 23-Jul-20 |
| 3523 | Approaches to Said Bin Sultan Naval Base | 28-Jul-22 |
| 3709 | Port of Fujairah (Fujayrah) and Offshore Terminals | 27-Jun-19 |
| 3715 | Abu Dhabi (Abu Zaby) | 12-Sep-19 |
| 3734 | Khalifa Bin Salman Port and Approaches | 25-Aug-22 |
| 3736 | Mina Salman and Approaches | 25-Aug-22 |
| 3738 | Outer Approaches to Bahrain | 25-Aug-22 |
| 3739 | Jebel Ali (Mina' Jabal `Ali) and Approaches | 04-Nov-21 |
| 3752 | Khalifa Port and Approaches | 24-Oct-19 |
| 3759 | Approaches to Port of Sitrah | 25-Aug-22 |
| 3773 | Ra's Al Khafji to Jazirat Bubiyan | 18-Apr-19 |
| 3778 | Ar Ruways and Jabal Az Zannah | 05-May-22 |
| 3779 | Approaches to Ar Ruways and Jabal Az Zannah | 05-May-22 |
| 3780 | Outer Approaches to Ar Ruways and Jabal az Zannah | 05-May-22 |
| 3782 | Doha (Ad Dawhah) and Approaches | 05-Mar-20 |
| 3783 | Mesaieed (Musay'id or Umm Said) | 20-Feb-20 |
| 3787 | Approaches to Mesaieed (Musay `id or Umm Said) , Hamad Port and Doha (Ad Dawhah) | 20-Feb-20 |
| 3788 | Fasht al Jarim to Ra's Abu `Ali | 20-Oct-22 |
| 3789 | Hamad Port | 20-Feb-20 |
| 3790 | Ra's Rakan to Ra's Tannurah | 20-Oct-22 |
| 3950 | Mesaieed (Musay'id or Umm Said) to Ra's Laffan | 20-Feb-20 |
| 3951 | Sir Bani Yas to Khawr al `Udayd | 28-Jul-22 |
| IN 251 | Sir Creek to Dwarka | 31-Mar-21 |

Digital Charts



3.3 As noted in section 3.1, UK's Generic National Report provides information on UK's portfolio of chart products and services. The following paragraphs provide information specifically relevant to the RSAHC region.

ENCs

3.4 Within the RSAHC region, the UKHO has released a total of 121 ENC cells. The breakdown by usage band is shown in the table below:

| RSAHC Region Released Cells | |
|-----------------------------|--------------------|
| ENC Usage Band | Number of GB ENC's |
| 1 | 2 |
| 2 | 7 |
| 3 | 31 |
| 4 | 42 |
| 5 | 37 |
| 6 | 2 |
| Total Number of ENCs | 121 |

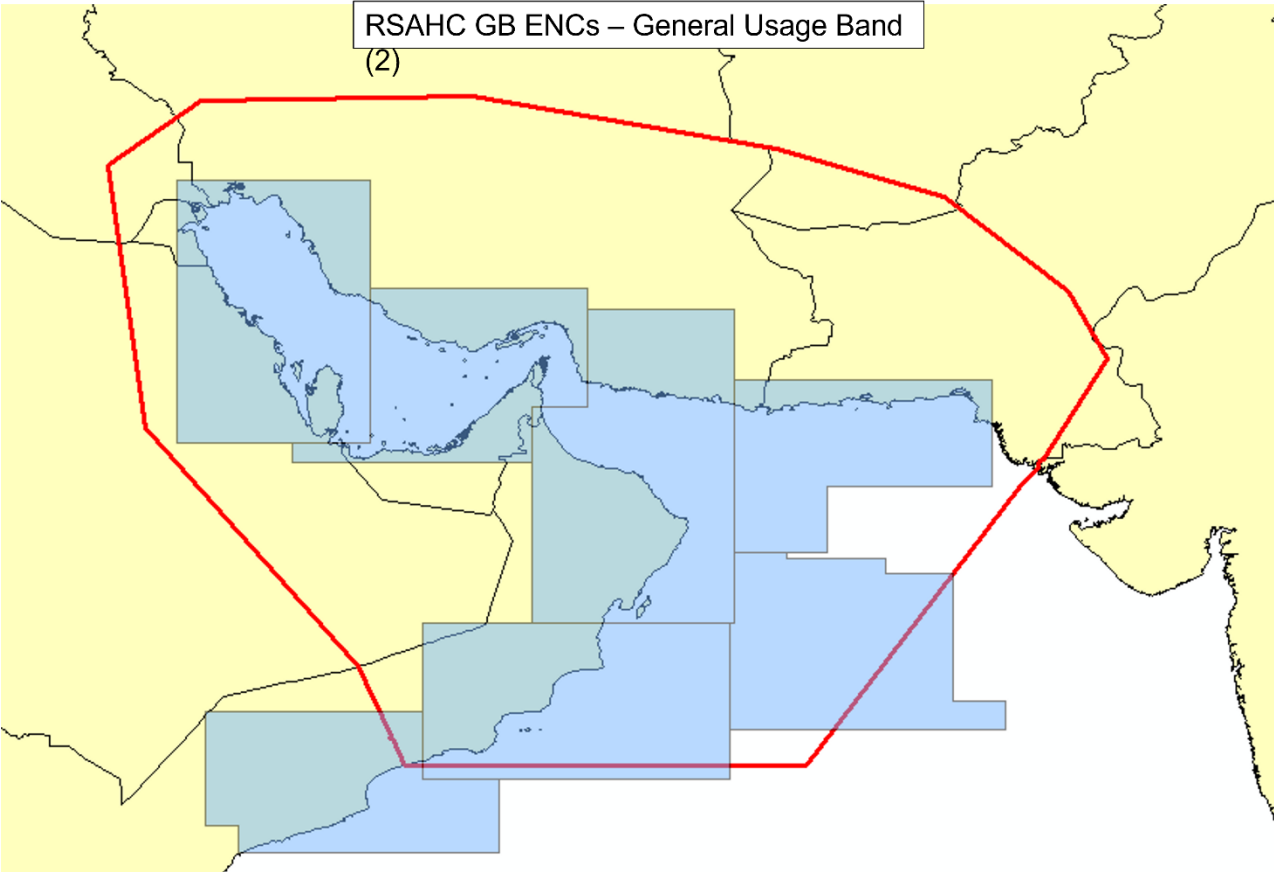
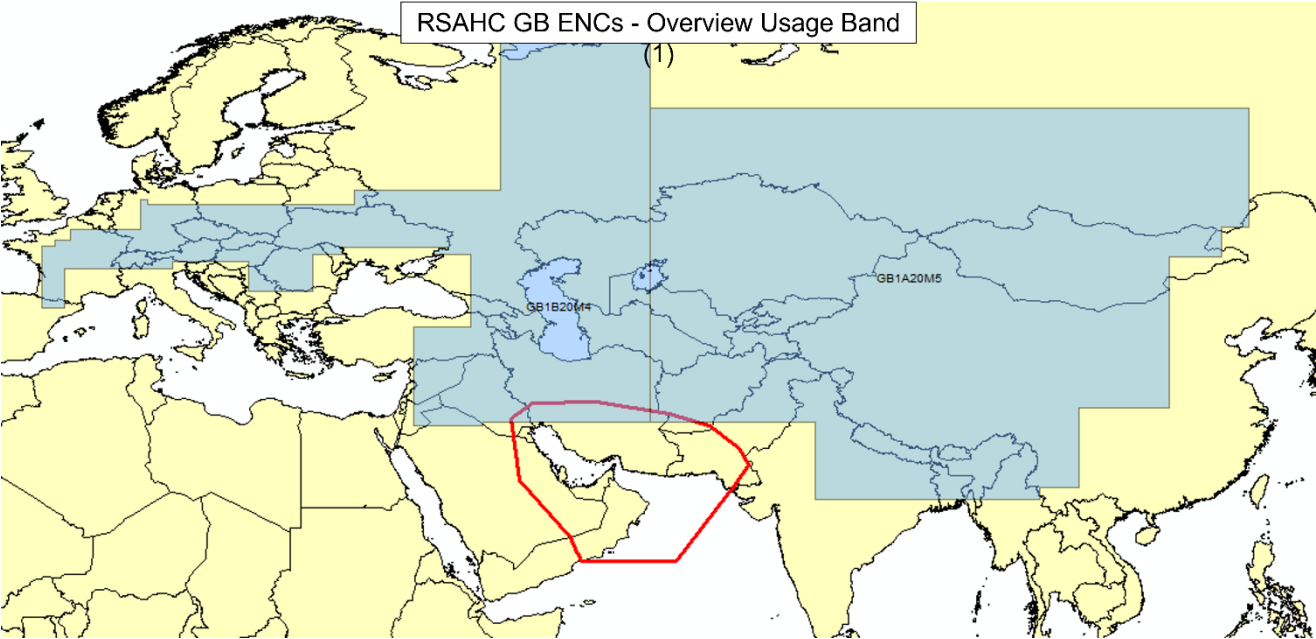
ENC totals by usage band as produced by UKHO

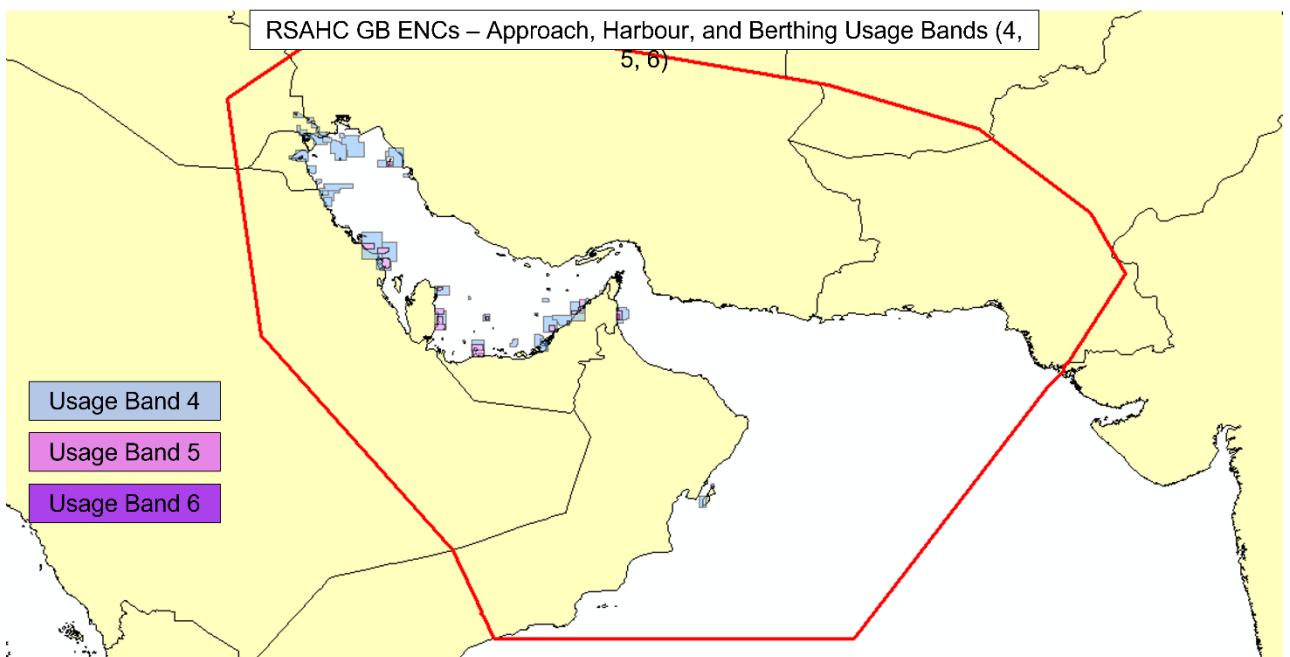
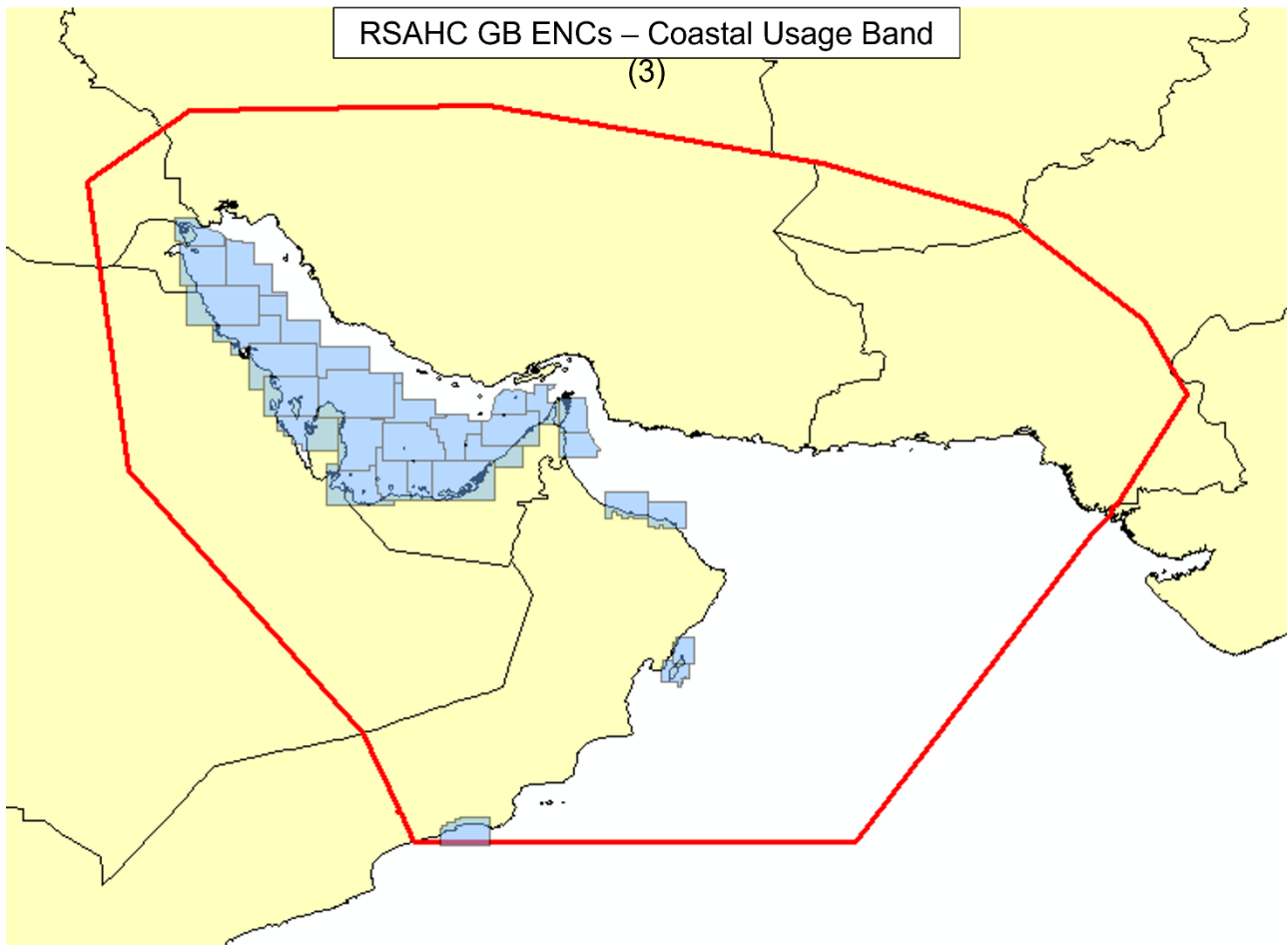
The tables below show revisions to GB ENC coverage for the RSAHC Region during 7th February 2019 to 23rd June 2022. The subsequent diagrams illustrate the current coverage of GB ENCs within the RSAHC Region.

| New cells Date | Week No. |
|-------------------|----------|
| GB603708 | |
| GB503479 | 25/22 |
| GB503722 | 21/22 |
| GB503796 | |
| | |

| Cancelled cells | Week No. | |
|-----------------|-------------|--|
| date | | Replacements |
| GB401369 | 43/19 | IR47703A IR47703B IR47703C IR47703D |
| GB303173 | 45/19 | IR318610 |
| GB44132E | 51/19 | OM400301 OM50007B |
| GB44132A | 50/19 | OM400255 |
| GB55026A | 51/19 | OM500100 |
| GB54131A | 51/19 | OM500054 |
| GB54131B | 50/19 | OM400254 |
| GB44131A | 51/19 | OM400256 |
| GB44132D | 51/19 | OM400301 |
| GB302851 | 41/19 | IR308601 IR308602 |
| GB303763 | 50/19 | OM301207 |
| GB403762 | 51/19 | OM400252 |
| GB402853 | 51/19 | OM400257 |
| GB54132C | 50/19 | OM400254 |
| GB52896A | 46/21 | OM500102 |
| GB54132A | 05/22 | OM500052 |
| GB402896 | 46/21 | OM400303 |

ENC CHARTS





ENC Distribution

3.5 The UKHO, along with other European hydrographic offices, was a founder member of the IC-ENC RENC. IC-ENC (International Centre for ENC) concentrates its efforts on the validation and consistency of ENC data and leaves the marketing of ENCs to the shipping industry to its value-added resellers and chart agents. Additional details can be found on the IC-ENC website (www.ic-enc.org).

The UKHO also acts as a VAR, providing a global range of ENCs under the AVCS brand as part of its successful ADMIRALTY range of navigational products. Additional details can be found on the ADMIRALTY website (www.admiralty.co.uk).

S-100

3.6 The UKHO is at the forefront of developing S-100 based products and services; we are doing this by working in collaboration and actively engaging with other Hydrographic Offices and our industry partners. We are sharing our knowledge and experiences with others as we go on this journey. With regard to S-100 based products and services, the UKHO is focusing on the detailed development of S-101 (Electronic Navigational Chart (ENC)), S-102 (Bathymetric Surface), S-104 (Water Level Information for Surface Navigation) and S-111 (Surface Currents). It anticipates roll-out of initial commercial services from 2024 onwards.

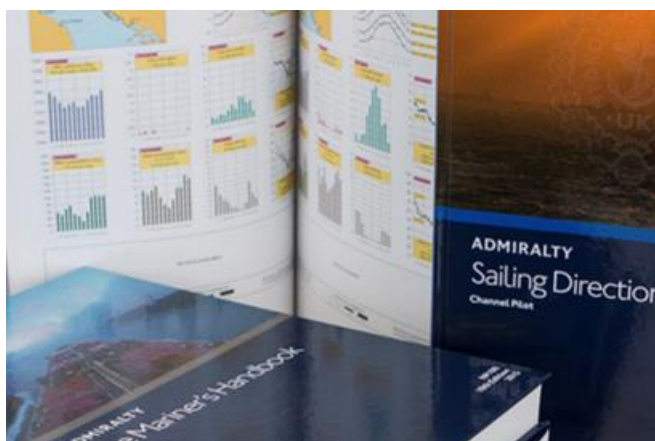
Data Improvement including Gridded ENC Rescheme

3.7 UKHO has chosen the parameters of a gridded ENC scheme for S-57 and S-101 which is applicable to all GB ENCs across the globe at all scale bands. UKHO has engaged with many FGHOs and RHCs to explain the chosen scheme and is keen to share the parameters, our experience and offer any guidance to HOs who would wish to align their ENC scheme with the UK grid.

The GB ENC rescheme is the foundation of UKHO's future strategy to deliver an interactive digital stack of data including S-100 and other products and services to the mariner. The GB ENC rescheme is also part of a wider Data Improvement Programme of work which specifically aims to improve the usability of GB ENCs, resolve user pain-points, and enhance safety for the mariner.

4. PUBLICATIONS

Paper Publications



4.1 The Admiralty Sailing Directions in the RSAHC region are as follows:

- **NP63** – Persian Gulf Pilot. Edition 19, last published 3rd December 2020
- **NP64** – Red Sea and Gulf of Aden. Edition 20, last published 8th April 2021

- **NP38** – West Coast of India Pilot. Edition 19, last published 5th December 2019. A new edition is currently being prepared, planned publication date is 9th March 2023.

These publications are all maintained on a continuous revision cycle and new editions are published as required.

Full details of the ADMIRALTY publication range and their status can be found on the ADMIRALTY website <https://www.admiralty.co.uk>.

Digital Publications



4.2 The UKHO produces a range of ADMIRALTY Digital Publications which are digital versions of ADMIRALTY paper Nautical Publications to support the IMO mandate of ECDIS. These publications provide mariners with additional functionality, are subscription-based, and automate the task of updating through Notice to Mariners.

- **ADMIRALTY e-Nautical Publications (AENP):** e-Book versions of ADMIRALTY Sailing Directions and reference publications.
- **ADMIRALTY Digital List of Lights (ADLL):** Digital versions of ADMIRALTY lights publications.
- **ADMIRALTY TotalTide (ATT):** Digital versions of ADMIRALTY tidal publications.
- **ADMIRALTY Digital Radio Signals (ADRS):** Digital versions of ADMIRALTY radio signal publications.

4.3 The ADMIRALTY Digital Catalogue (ADC) can be downloaded free from the ADMIRALTY website (www.admiralty.co.uk). It includes details of all paper and digital charts and publications and is updated weekly. It is a useful tool to check chart coverage within the region, and to show the latest edition dates of both charts and publications.

5 WEBSITE MAPPING SERVICE

5.1 A Web Map Service (WMS) is the most widely used and simplest form for displaying GIS data on the web. It uses a standard protocol from the Open Geospatial Consortium (OGC) which describes how to serve any georeferenced map/chart images over the Internet. It provides data as a visual representation through the internet with basic querying options, enabling users basic zooming, panning, and assisting organisations to serve GIS data as images with quick rendering speeds. WMS is using an HTTP interface, most often an Application Programming Interface (API).

5.2 As part of the WMS Services, the UKHO has built, and continues to build, several API offerings which include:

ADMIRALTY Vector Chart Service (AVCS) Online: it is a shore-based version of the world's leading maritime chart service used on board most ships trading internationally to support shore-based maritime decision-making, such as vessel tracking, voyage planning and Accident and Emergency incidents. It is not to be used for navigation. It provides world-leading coverage with images from over 16,000 AVCS ENCs across the globe, including all available scales just like AVCS used on ships. It

has got similar functionality as ECDIS, including display controls and pick reports where users can select a feature for more information. Like AVCS, ENC images are automatically updated every week.

APIs: the UKHO builds different APIs for users to meet their regulatory and planning needs. These APIs include the regulatory APIs for users to meet Safety of Life At Sea (SOLAS) carriage compliance for users to retrieve their much needed Product Permits, Keys and Schedules for AVCS, ADP and ARCS. Other APIs include APIs accepted and used by the UK MCA, many other national maritime safety authorities (i.e., Port Authorities, national Search and Rescue agencies, etc.) as well as separate commercial companies in the future (i.e., UK ENC API, Maritime Features API, etc.). These APIs are for non-navigation purposes and are mainly used as aid to navigation planning.

6 MARITIME SAFETY INFORMATION

6.1 Responsibilities.

Maritime Safety Information (MSI) is provided through the IHO World Wide Navigation Warning System (WWNWS) on behalf of IMO. UKHO, on behalf of IMO, UK, hosts the IMO NAVTEX Coordination Panel. Muscat sits within NAVAREA IX with the relevant NAVAREA coordinator based in Pakistan. The NAVTEX Coordination Panel works closely with the NAVAREA IX Coordinator, together with all other NAVAREA Coordinators, to ensure that an efficient MSI service is provided.

6.2 GMDSS.

The NAVTEX Coordination panel works with the IMO Secretariat and all NAVAREA Coordinators to ensure their GMDSS status is updated on the GMDSS Master plan within Global Integrated Shipping Information System (GISIS) and that any changes in status are reflected accordingly within GISIS.

6.3 Notices to Mariners.

Assistance with promulgating Notices to Mariners and other paper and electronic chart correcting material should also be encouraged through co-operation with other hydrographic offices in the region if required. The current ADMIRALTY weekly Notices to Mariners are now supplemented by daily updates; these are available on the UKHO website.

7 C-55 LATEST UPDATE

7.1 As described in the UK Generic National Report, the UKHO is committed to providing regular updates to the C-55 entries for UK Home Waters and its Overseas Territories. The latest status is correctly depicted within C-55.

7.2 UK also provides assistance to other coastal states to update C-55 entries where UKHO retains the primary charting responsibility; recognizing that local input remains critical to the maintenance of C-55 as an up-to-date and authoritative reference document.

8 CAPACITY BUILDING

8.1 The UK fully supports the IHO Capacity Building Sub-Committee (CBSC) strategy and particularly its emphasis on getting Phase 1 and appropriate Phase 2 capacity in place to enable coastal states to meet their obligations under SOLAS Chapter V Regulations 4 and 9. UK will continue to contribute resources to both CBSC initiatives and to providing bilateral assistance.

8.2 UKHO has a post dedicated to International Capacity Building. Its key aims are to ensure that capacity building is properly considered in UKHO activity and that UKHO's capacity building activities are fully coordinated. It acts as the initial point of contact for UKHO involvement in IHO capacity building activities, including UK involvement in regional hydrographic commission initiatives and IHO Capacity Building Sub Committee (CBSC) activities. Further information can be obtained from the Capacity Building Manager - Ms Lucy Fieldhouse (Lucy.Fieldhouse@ukho.gov.uk).

Training provided by the UKHO - International Training Academy (ITA)



8.3 The International Training Academy drives forward the continuous skills and knowledge development of our global network through world-class training. Continuously listening to our stakeholders, the ITA ensures that the design of curriculum aligns to the real-world need for continuous maritime training. The international training team is the foundation of the International Training Academy, it's wealth of experience, knowledge and skills working within hydrography, cartography, education, and training ensures that world-class, relevant training is delivered either in country, online or at the UKHO HQ. Details of all UKHO awarded training opportunities currently offered by the ITA are provided on the UKHO website or by contacting internationaltraining@ukho.gov.uk



Training is offered in the following areas:

- Marine Cartography
- Hydrographic Data Processing
- Navigational Safety
- Chart Awareness
- Chart Correction
- S-57
- ENC production
- S-100 implementation

8.4 The UKHO has been recognised by the International Advisory Board as meeting its S-8 Standard of Competence for Nautical Cartographers - Category B. The advisory board comprises the Fédération Internationale des Géomètres (FIG), the International Hydrographic Organization (IHO), and the International Cartographic Association (ICA). The Category B status is awarded to programmes 'which provide a practical comprehension of nautical cartography for individuals with the skills to carry out routine nautical cartographic tasks' (S-8 Third Edition Standards of Competence for Nautical Cartographers).

The aim of this course is to provide a practical understanding of nautical cartography and the skills and techniques needed to carry out routine nautical cartographic tasks. It includes processing hydrographic data into a published form. The course is highly practical, providing a detailed

understanding of the compilation and production of paper and electronic charts using CARIS software. This course is predominately carried out at the UKHO, with elements that can be completed in country.

On successful completion of this 21-week course our delegates are issued with the globally recognised certificate of programme completion in the following subject areas:



- Fundamentals of Charting
- Geospatial Fundamentals
- Compilation
- Geospatial Concepts
- Product Construction
- Hydrography and Special Purpose Charting
- Data Assessment and Product Maintenance

8.5 The UKHO provides two annual CAT B accredited nautical cartography training opportunities to Foreign Government Hydrographic Office (FGHO) students. These are the International Hydrographic Organisation-NIPPON Foundation Geospatial Marine Analysis and Cartography (IHO-NF GEOMAC) Project course which is funded by the Nippon Foundation and the newly established UKHO course. Applications for the Nippon Foundation course are by responding to the IHO Circular Letter. The UKHO invites participants to its version of the course as part of bilateral arrangements.

8.6 All of our training courses can be delivered at the UKHO's world class training facility, or, for larger groups, the training team can conduct courses in the organisation's offices. In addition, the training team can tailor bespoke courses to meet specific needs through a detailed training needs analysis.

Royal Navy Training in Hydrography, Meteorology and Oceanography

8.7 The Royal Navy's Maritime Warfare School (MWS), through a dedicated HM Training Unit in Plymouth delivers courses which are nationally and internationally certified, with accreditation provided by the International Hydrographic Organization (IHO), the World Meteorological Organization (WMO), The University of Plymouth, the National Vocational Qualification (NVQ) Council, and the Institute of Marine Engineers, Scientists and Technicians (IMarEST).

8.8 Courses include the 14-week FIG/IHO Category B hydrographic course that is an element of RN Officers' combined HM training. After four years' experience, of which a minimum of 2 years on a platform conducting hydrographic surveys, the Cat B graduates wishing to become specialists in surveying return for the 22 weeks HM Advanced Survey Course (HMAS). This course diverged from the IHO Category A accreditation in 2021 as previous Cat B knowledge cannot be considered in attaining Category A status. The course was reviewed in 2020 to encompass modern survey and defence requirements retaining its University of Plymouth Post

Graduate Diploma accreditation and meets UK Defence requirements for military data gathering and exploiting collected information.

8.9 Both courses are open to attendance by overseas personnel (military and civilian) and applications are encouraged for these highly competitive courses.

8.10 There is scope to deliver customised training for overseas naval and civilian students in Hydrographic Survey Planning, Data Gathering and Data Processing as well as initial Data Management to meet the needs of developed and developing Hydrographic Offices. Such courses can, by mutual agreement, involve both training at the UKHO and at MWS HM in HMS DRAKE.

9 OCEANOGRAPHIC ACTIVITIES

9.1 UKHO's Ocean Environment Team maintains databases of oceanographic information collected by the Royal Navy or obtained during exchange with other nations. Data exchange is an important source of data and so UKHO are always keen to discuss new exchanges. UKHO has participated in the Argo project and in the UN's International Oceanographic Data Exchange (IODE), to work with the international oceanographic community. On behalf of the Royal Navy, UKHO has made periodic releases of data to international data centres including US NODC, for inclusion in the World Ocean Database, and British Oceanographic Data Centre (BODC).

9.2 The UK national repository for oceanographic data collected for scientific purposes, including data from UK-sponsored research cruises anywhere in the world, is British Oceanographic Data Centre (BODC) (<https://www.bodc.ac.uk/>); it is funded by the Natural Environment Research Council (NERC), and located in Liverpool. The main centre for scientific oceanography is the National Oceanography Centre (NOC) in Southampton (<https://www.noc.soton.ac.uk/>).

9.3 Seabed 2030. Following the signing of a data sharing MoU between the UKHO and the SB2030 Project, and a successful data sharing trial with the Southern Ocean Regional Centre, the UKHO are delighted to announce that they have now started supplying bathymetric survey data for non-UK waters to the General Bathymetric Chart of the Oceans (GEBCO). Data have been shared with the Southern Ocean Regional Centre covering a total area of 46,482 km², around South Georgia and Antarctica, contributing over 3.7 million new data points to the GEBCO grid.

Where UKHO is Primary Charting Authority and have the appropriate permissions, the UKHO will continue to share (100m) gridded bathymetry data with SB2030 to help improve the GEBCO grid product. The UKHO will not be sharing full resolution raw survey data. The UKHO is also supportive of other global bathymetry initiatives, such as EMODNET, where we intend to contribute data using the same rules as SB2030.

We have also entered a technical cooperation agreement with Teledyne Caris and Seabed 2030 which will allow the Seabed 2030 Regional and Global Centres to use the ADMIRALTY GAM service (Generalised Additive Model). The ADMIRALTY GAM Service was developed by the UKHO and is a tool that cleans noise in single track bathymetry survey data. This tool will help to improve the speed and human effort associated with processing of bathymetry data. The Admiralty GAM service was recently released at Ocean Business 2021 and is now also available commercially.

UKHO will also continue to actively engage with associated working groups at the IHO and Regional Hydrographic Commissions.

9.4 Global sea levels are monitored as part of the GLOSS project, by the Permanent Service for Mean Sea Level (PSMSL). This operation is based at the National Oceanographic Centre in Liverpool.

9.5 The UKHO participates on and Chairs the IHO Tides, Water Levels and Surface Currents Working Group (TWCWG). Part of the WG activities involve Member States activities and experiences with long-term [permanent] 'National' Tide Gauge Networks.

9.6 The UKHO is not directly tasked with owning and operating tide gauges at the UK national level - this is the remit of the National Tidal and Sea Level Facility (NTSLF, www.ntsrf.org), previously operated by the UK Environment Agency with a recent (summer 2021) contract to maintain and upgrade the National Tide gauge Network (NTGN) awarded to the commercial company OceanWise (<https://www.oceanwise.eu/>).

9.7 However, under the auspices of the UK Government funded Overseas Territories Seabed Mapping Programme (OTSMP), the UKHO has been working with external contractors to establish permanently installed tide gauges in Overseas Territories including to date Bermuda, Cayman Islands and the Turks and Caicos Islands. As well as being an essential part of the OTSMP work, they form an integral and important contribution to global sea level monitoring networks. These now feed into the NOAA GOES (Geostationary Operation Environmental Satellites) Collection System and linked into the IOC Sealevel Monitoring System. Such installations are instrumental for the scientific study of long-term sea-level rise. In addition, they can form part of tsunami warning systems and also provide essential observations for use in coastal inundation (storm surge) modelling studies. It is the UKHO's intent to further expand this network under the OTSMP and any future overseas work funded under other programmes



This is described in the UK Generic National Report.

10 SPATIAL DATA INFRASTRUCTURES

10.1 Status of MSDI. The UKHO is actively developing the concept of Marine Spatial Data Infrastructure in line with the United Nations Committee of Experts on Global Geospatial Information Management (UNGGIM) Integrated Geospatial Information Framework (IGIF).

10.2 Relationship with the National Spatial Data Infrastructure (NSDI). The UK does not yet have a recognised NSDI however, the UK government's Geospatial Commission was established in 2017 with partner bodies consisting of several national geospatial agencies, including the UKHO. This Commission is focused on unlocking the value of geospatial data within the UK and is currently establishing a UK Geospatial Strategy which is likely to form the foundation of a NSDI soon. The Commission is currently supporting several collaborative projects being undertaken by the UKHO which all have strong links to NSDI principles.

10.3 Involvement in regional or global MSDI efforts. The UKHO is an active member of the UNGGIM and Open Geospatial Consortium (OGC) groups which contribute towards Global MSDI activities and methodologies. The UKHO has recently upgraded its membership of the OGC from Technical to Strategic. The UKHO is also a member of the IHO MSDI Working Group. The UKHO Chairs the South West Pacific Hydrographic Commission (SWPHC) Marine Spatial Data Infrastructure Working Group (MSDIWG), the Southern African and Islands Hydrographic Commission (SAIHC) MSDIWG, Vice-Chairs the Meso American and Caribbean Hydrographic Commission (MACHC) MSDIWG and is represented on the Baltic Sea and North Sea Hydrographic Commission (BS-NSHC) MSDIWG. The UKHO has also provided briefings on MSDI to other Regional Hydrographic Commissions (RHCs) which do not yet have MSDIWGs. The UKHO represents the UK on the UNGGIM Working Group on Marine Geospatial Information and leads UK input into the UNGGIM-Americas Caribbean Geospatial Development Initiative (CARIGEO).

We are actively working at creating the appropriate standards to support national and international MSDIs, a good example is our sponsorship of the OGC S-12 pilot study to develop a standard for the exchange of Maritime limits and boundaries and our current sponsorship of the Federated Marine Spatial Data Infrastructure Pilot which looks at S-100 within an MSDI, and MSDI geospatial maturity considering the UNGGIM IGIF principles.

10.4 National implementation of the Shared Data Principles - including any national data policy and impact on marine data. The UKHO is a lead sponsor of the Marine Environment Data Information Network (MEDIN) which coordinates the delivery of INSPIRE obligations to Findable, Accessible, Inter-operable and Re-usable (FAIR) standards. The UKHO is actively engaged with projects directed by the UK Geospatial Commission to improve the handling and publication of Government datasets. This work involves improving the discoverability of data as well as working towards a set of shared principles within UK Government. The UKHO also continues to produce Electronic Navigational

Charts to the IHO S-57 standard which contains a defined structure for metadata and the modelling of maritime related features. Work is ongoing to transition to the future IHO S-100 standards.

10.5 MSDI national portal. The UKHO's ADMIRALTY Marine Data Portal continues to grow and develop. As the organised gateway to our non-navigation data and services, it gives users easy and timely access to marine location-based information from seabed to surface to help them with sustainable maritime-decision making. The portal allows users access to several free of charge datasets and services mainly covering the UK territorial waters. The portal also provides access to premium data sets which can be purchased. The underlying Marine Data Portal technology has the capability to host other agencies', or even other nation's datasets.

11 AUTONOMOUS NAVIGATION

11.1 The UKHO have been engaging with several industry experts and project initiatives surrounding Maritime Autonomous Surface Ships (MASS) to try and understand the navigation data needs as momentum gathers in this area.

UKHO have proactively sought out a number of organisations such as Thales, Atlas Elektronik, TGP Polaris and Marine AI (the team behind the historic Mayflower Project) and discussed the issues with current products and services and have provided data to stimulate discussions about what they see as gaps in the current offering and identify the new products going forward.

In our work with industry operators, UKHO have supplied data to facilitate discussion and allow operators to explore what the future navigation services might look like.

The establishment of the Maritime Autonomous Surface Ships (MASS) Navigation Project Team (MASS PT) was approved at HSSC13 following a proposal by the United Kingdom, Norway, and Singapore, to address Maritime Autonomous Surface Ships (MASS) requirements on navigation data and services, of which UK are Chair. The project Team have conducted an extensive gap analysis of the S-100 standards and have made a number of recommendations to address these gaps to the relevant Working Group and Project Team chairs to ensure S-100 is fit for purpose for both manned and unmanned navigation.

12 OTHER ACTIVITIES

UK Celebrations for World Hydrography Day

12.1 The UKHO celebrated World Hydrography Day 2022 by coming together at an internal exhibition to showcase the important work carried out by our teams in support of the global hydrographic community. The theme this year was "*Hydrography – contributing to the United Nations Ocean Decade*" and a link to a short film can be found [here](#).

Broader UK Government Work

12.2 **UK Centre for Seabed Mapping (UK CSM).** In support of a more integrated Marine Geospatial Sector for the UK, both nationally and internationally, the UKHO has created the UK CSM, with a core focus on bathymetry and its associated data. Through increased coverage, quality and access of seabed mapping data collected from public money or in collaboration with industry, the UK CSM aims to enable a more unified voice to promote seabed mapping, and the resultant data, as the foundation data set to ocean mapping. The UK CSM is also a UK government voluntary commitment to the UN Ocean Decade and a policy commitment within the National Strategy for Maritime Security.

12.3 The UK Member State, consisting of the UK, the Overseas Territories and Crown Dependencies, was audited in late 2021 (delayed from late 2020 due to issues surrounding COVID-19) against the IMO Instrument Implementation Code's (IIIC) and Mandatory IMO Member State Audit Scheme (MIMSAS). The work of the UKHO was specifically mentioned as an example of best practice in this field. This has raised awareness of the importance of maritime compliance and the benefits to everyone. To complement the work of the UKHO's OTSMP, the UK Maritime and Coastguard Agency have a UK Government aid funded programme to review maritime obligations compliance, search and rescue and oil pollution response.

12.4 **UK ocean priorities:** The UK is a global ocean leader, continuing to take action and push for increased ambition on climate, pollution, and biodiversity loss issues working with counterparts in

the UK and overseas to help achieve these aims. The UK is continuing to push for strong action at key negotiations and conferences in 2022 including BBNJ, CBD, Our Ocean, UN Ocean, UNFCCC COP27 and UNEA. The UK launched a £500m Blue Planet Fund that will support developing countries to protect their marine environment and reduce poverty.

12.4.1 UK Government (through the Centre for Environment, Fisheries and Aquaculture Science) has started a new three-year phase which builds on the previous 6-years work under the [UK Gulf Marine Environment Partnership \(GMEP\) Programme](#). This new phase of work – focussing on climate, health, and environmental resilience – has projects across five of the Gulf Cooperation Council countries (Bahrain, Kuwait, Qatar, Saudi Arabia, and the United Arab Emirates) as well as with Iraq, Iran, and Oman through collaboration with RSAHC. There is planned project work on One Health anti-microbial resistance, Marine Protected Area management, climate change adaptation and resilience, pollution, biodiversity, and blue carbon. Through this programme, Cefas is working with partner organisations across the Gulf to tackle the shared environmental challenges of climate change, biodiversity loss, enabling blue economies, and protecting human health. It is doing this by helping to strengthen regulation, build management capacity and develop the knowledge base to inform future management.

Background and Key 2022 information

Conferences:

12.5 UN Ocean Summit in Lisbon June 2022. Lord Goldsmith led the UK delegation, joined by Minister Pow. FCDO SIDS Envoy Rebecca Fabrizi and RAdm Rhett Hatcher of the UK Hydrographic Office were among the 30-strong visiting group. The UK hosted, with Fiji, a side event on sustainable ocean finance. Lord Goldsmith announced £154m for COAST, a new global programme to protect and restore habitats, support small-scale fisheries, and unlock aquaculture, and £100m to support Marine Protected Areas (MPAs), both under the Blue Planet Fund. The UK also joined the High-Level Panel for a Sustainable Ocean Economy and, with the US and Canada, launched the IUU Fishing Action Alliance to tackle illegal, unregulated, and unreported fishing. RAdm Rhett Hatcher joined an International Hydrographic Organisation led panel session, which aimed to raise awareness about the role of hydrography / seabed mapping, and how it contributes to marine spatial planning for sustainable management of the marine environment and knowledge of the world's oceans.

12.6 One Ocean Summit in France February 2022. The UK was represented by Lord Goldsmith, with the Prime Minister delivering a video message of support. At the Summit, the UK announced it would be joining the High Ambition Coalition for Biodiversity Beyond National Jurisdiction along with EU Member States and 16 other countries. The UK is committed to agreeing an ambitious BBNJ Agreement as soon as possible in 2022.

The UK is supportive of the Our Ocean Conferences, the 7th of which was held in Palau in April 2022, in collaboration with the US. The UK has continued work on the commitments submitted to the conference in 2019 and has recently submitted further commitments for 2022.

The UK will look to harness the momentum garnered in Glasgow, Brest, Palau and of the UN Ocean Summit in Lisbon and work with partners to maintain momentum on ocean action into UNFCCC COP27 in Egypt and the CBD COP15 negotiations in Montreal.

12.7 Convention on Biological Diversity 7 - 19 December 2022 Canada. The UK is committed to playing a leading role in developing an ambitious post-2020 global biodiversity framework to be adopted at COP15 of the Convention on Biological Diversity (CBD), including ambitious outcomes for the ocean through targets on marine protection, ecosystem restoration and nature-based solutions, pollution reduction, sustainable fisheries, and the reform and elimination of harmful subsidies. The UK is committed to championing international ocean action to drive ambitious outcomes for ocean from CBD COP15, including through our role as leader of the Global Ocean Alliance.

12.8 Blue Planet Fund. The UK has launched a £500 million Blue Planet Fund that will support developing countries to protect the marine environment and reduce poverty. Financed from the UK overseas aid budget, the Blue Planet Fund will help eligible countries reduce poverty, protect, and sustainably manage their marine resources and address human-generated threats across four key themes: biodiversity, climate change, marine pollution, and sustainable seafood. The Blue Planet Fund will mainly operate in five priority regions, including West Africa.

12.9 International Partnership on Blue Carbon (IPBC). Since 2018 the UK has been a member of the International Partnership for Blue Carbon (IPBC). The IPBC, coordinated by the Australian Government, works across society to build awareness, share knowledge, and accelerate action on the important role of blue carbon ecosystems in climate change adaptation and mitigation. The UK announced our intention to join the Partnership at the Our Ocean conference in 2018. Our membership of the IPBC enables the UK government to lead on a critical sector of the environment on the global stage. It creates multiple strategic benefits for, and synergies with, existing work across government, and complements our project delivery with a commitment to leading international policy. In 2022, the Partnership has 50 Partners, of which 17 are country government agencies. This includes representation from states including France, Norway, Portugal, and the Commonwealth Blue Charter.

12.10 Blue Belt Programme. In support of the UN Global Goals for Sustainable Development, the UK Government has committed £20 million to a four-year programme providing long term protection and sustainable management of over four million square kilometers of marine environment across the UK Overseas Territories.

The Blue Belt programme supports delivery of the UK Government's manifesto commitment to provide long term protection of:

- improve scientific understanding of the marine environment
- develop and implement evidence based, tailored marine management strategies including surveillance and enforcement
- ensure management is sustainable and long term

The programme is being delivered in partnership between the Centre for Environment, Fisheries and Aquaculture Science (Cefas) and the Marine Management Organisation (MMO) with the UK Overseas Territories on behalf of the Foreign, Commonwealth and Development Office and the Department for Environment, Food and Rural Affairs.

Further information can be found in the [Blue Belt Annual Report 2021](#) and [Annual Update 2021/22](#).

12.11 COP26. The UKHO provided material for the DEFRA's nature theme day and Department for Transport's Clydebank Declaration on green corridors at COP26 in Glasgow, November 2021. We also represented at the Glasgow University College Campus where we raised awareness of the challenges of marine data paucity and its impact on the environment.

13 UKHO's International Activities

13.1 Due to UKHO's technical expertise, primary charting responsibilities and UK OTs the UK is represented at the following groups:

| International Hydrographic Organization - HSSC | | Chair/Vice Chair | Member |
|---|---|------------------|--------|
| HSSC | Hydrographic Services and Standards Committee | | x |
| DQWG | Data Quality Working Group | | x |
| ENCWG | ENC Standards Maintenance Working Group | x | x |
| NCWG | Nautical Cartography Working Group | x | x |
| NIPWG | Nautical Information Provision Working Group | | x |
| S-100WG | S-100 Working Group | | x |
| S-101PT | S-101ENC Project Team | x | x |
| S-102 PT | S-102Bathymetric Surface Project Team | | x |
| S-121PT | S-121 Maritime Limits and Boundaries Project Team | | x |
| S-124PT | S-124 Navigational Warnings Project Team | | x |
| S-130PT | S-130 Polygonal Project Team | | x |
| S-131PT | S-131Marine Harbour Infrastructure Project Team | | x |
| TWCWG | Tides, Water Level & Currents Working Group | x | x |
| HSWG | Hydrographic Survey Working Group | x | x |
| MASS PT | Maritime Autonomous Surface Ships Navigation Project Team | x | x |
| ABLOS | Advisory Board on the Law of the Sea | | x |
| International Hydrographic Organization - IRCC | | Chair/Vice Chair | Member |
| SAIHC | Southern African and Islands Hydrographic Commission | x | X |
| SWPHC | South-West Pacific Hydrographic Commission | | x |
| IRCC | Inter-Regional Coordination Committee | | x |
| CBSC | Capacity Building Sub-Committee | x | x |
| CSBWG | Crowd-sourced Bathymetry Working Group | | x |
| MSDIWG | Marine Spatial Data Infrastructure Working Group | | x |
| WENDWG | Worldwide ENC Database Working Group | | x |
| WWNWS | Worldwide Navigational Warning Service | | x |
| GEBCO | General Bathymetric Chart of the Oceans | | x |
| HCA | Hydrographic Commission on Antarctica | | x |
| MACHC | Meso American and Caribbean Sea Hydrographic Commission | x | x |
| MBSHC | Mediterranean and Black Seas Hydrographic Commission | | x |
| NIOHC | North Indian Ocean Hydrographic Commission | | x |
| NSHC | North Sea Hydrographic Commission | | x |
| NSHC TWG | North Sea Hydrographic Commission Tides Working Group | | x |
| RSAHC | RSAHC Sea Area Hydrographic Commission | | x |
| EAtHC | Eastern Atlantic Hydrographic Commission | | x |
| International Maritime Organization | | Chair/Vice Chair | Member |
| NAVTEX | NAVTEXT Coordination panel | x | x |
| International Association of Marine Aids to Navigation and Lighthouse Authorities | | Chair/Vice Chair | Member |
| ENAV | E-navigation Committee | | x |
| Other International Bodies | | Chair/Vice Chair | Member |

| | | | |
|-----------------|--|--|---|
| IAU | International Astronomical Union | | x |
| CIRM | Comité International Radio-Maritime | | x |
| BALTICO | Navarea1 member states meeting | | x |
| ISO | International Standards Organisation | | x |
| OGC | Open Geospatial Consortium | | x |
| UNGGIM WGMGI | UNGGIM Working Group on Marine Geospatial Information | | x |
| CARIGEO | Caribbean Geospatial Development Initiative | | x |

14. CONCLUSION

14.1 As with previous reports, the UKHO has continued to experience the impacts of the COVID-19 pandemic. Our flexible working environment has enabled a hybrid working approach, with negligible impact on output. We aim to continue this hybrid approach to retain the positive aspects of the changes since the pandemic. We applaud our partners in the wider hydrographic community, with the continued commitment to serving the needs of the Mariner and marine user, despite this challenging environment.

14.2 UK continues its strong commitment to the ROPME Sea Area Hydrographic Commission (RSAHC). Furthermore, we continue our primary charting activity and efforts in developing regional hydrographic self-sufficiency through capacity building measures. This has included delivering specialist marine geospatial training and survey post-processing analysis. UK continues to explore wider funding opportunities within the region. Over the past year we have been grateful for the support, encouragement, and positive feedback that our partners have provided in response to the launch of our online training academy. More than 3,000 training places have been provided to the hydrographic community worldwide, many within the RSAHC region.

14.3 UKHO continues to support the hydrographic community through delivery of the Nippon funded IHO GEOMAC Category B course.

14.4 Good progress continues to be made to improve the availability and quality of suitable ENC coverage along with digital publications to support the digital bridge. The UKHO has supported partners through MoUs to continue to grow digital coverage. This underpins the UKHO announcement to move to a digital only environment by the end of 2026; a move reflected by the significant drop in analogue sales and usage, and the continued development of the second generation of digital navigation products and services, through IHO S-100.

14.5 Noting the increasing demand and the IHO direction to enable the maximum and widest use of Hydrographic maritime and marine information and data, the UKHO is continuing the journey into looking at how it can meet this demand as part of its efforts to develop its Marine Geospatial Information credentials.

Taunton, November 2022

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