THE
INTERNATIONAL HYDROGRAPHIC
ORGANIZATION
(IHO)
The International Hydrographic Organization (IHO) is an intergovernmental consultative and technical organization established in 1921 to support the safety-of navigation, and the protection of the marine environment.
FORMATION OF THE IHB

• 1908 - International Congress of Navigation, St Petersburg
• 1912 - International Maritime Conference, St Petersburg
• 1919 - International Hydrographic Conference, London
• 1921 - 24 nations signed up to the establishment of the IHB. Objectives of this new body - to support Safety of Navigation and the Protection of the Marine Environment.

At the invitation of HSH Prince Albert 1st, a noted marine scientist, it was headquartered in Monaco where it remains today.
FORMATION OF THE IHO

In 1970, an intergovernmental convention entered into force which changed the Organization's name and legal status, creating the **International Hydrographic Organization (IHO)**.

2 Important Components of the IHO are;

- **an International Hydrographic Conference and**
- **the International Hydrographic Bureau.**
The Objectives of the IHO are to:

- Co-ordinate the activities of national hydrographic offices
- Maximise uniformity of nautical charts and documents
- Adopt reliable and efficient methods of carrying out and exploiting hydrographic surveys
- Develop the science of hydrography and techniques used in descriptive oceanography
The Strategic Issues include:

- Achievement of an adequate global hydrographic data coverage
- Capacity building
- Providing services other than for navigation
- Transition to the digital era
- Managing the external environment
- Achievement of adequate funding
Profile of IHO

- Member States: 73 + 7 Pending
- 400 hydrographic/oceanographic vessels.
- 40 MS provide training at national/international level.
- Member States capabilities vary from world wide to minimal chart coverage.
- Data collection and chart production are systematically performed based on agreed IHO standards and National/International charting programs.
COOPERATION AND COORDINATION INITIATIVES

REGIONAL HYDROGRAPHIC COMMISSIONS

OCEAN MAPPING PROJECTS
- GEBCO - world wide
- IBC - regional
REGIONAL HYDROGRAPHIC COMMISSIONS

The IHO encourages the establishment of Regional Hydrographic Commissions (RHC), and offers advice on their formation.

To date, 15 such commissions, have been established, which meet at regular intervals to discuss issues of mutual interest.
Nordic Hydrographic Commission (NHC)
North Sea Hydrographic Commission (NSHC)
East Asia Hydrographic Commission (EAHC)
US/Canada Hydrographic Commission (USCHC)
Mediterranean and Black Seas Hydrographic Commission (MBSHC)
Baltic Sea Hydrographic Commission (BSHC)
Eastern Atlantic Hydrographic Commission (EAtHC)
South-East Pacific Hydrographic Commission (SEPHC)
South-West Pacific Hydrographic Commission (SWPHC)
MESO American & Caribbean Sea Hydrographic Committee (MACHC)
Southern Africa and Islands Hydrographic Commission (SAIHC)
North Indian Ocean Hydrographic Commission (NIOHC)
ROPME Sea Area Hydrographic Commission (RSAHC)
IHO Hydrographic Committee on Antarctica
THE INTERNATIONAL (INT) CHART

Adopted in 1971 - worldwide chart series (INT Charts) produced to a single set of agreed specifications. Under this arrangement, member nations wishing to print their own versions of another members INT charts, may do so by obtaining (by mutual agreement), copies of the necessary reproducible material and printing their own copies.
The programme for small scale (1/10 000 000 and 1/3 500 000) INT charts, has been completed and many of the charts at medium and larger scales have also been published.
Ocean Mapping Projects

General Bathymetric Charts of the Ocean (GEBCO) - World Wide Ocean Cover.

International Bathymetric Charts (IBC) - Regional Mapping Projects.

IHO/IOC Gazetteer of Undersea Feature Names
Deep ocean track line survey data.
BATHYMETRIC MAPPING

General Bathymetric Charts of the Ocean (GEBCO) World Wide Ocean Cover.

Published as a pair of CD-ROMs

* Full set of GEBCO contours (updated) and trackline control information

* GEBCO One Minute Grid

* Set of digital global coastlines

* IHO/IOC Gazetteer of Undersea Feature Names

* Trackline inventory of data at the IHO Data Centre for Digital Bathymetry

* Complete documentation on data sets

* PC based Windows Software Interface to select, view and export data
Regional Mapping Projects – International Bathymetric Charts

IBCAO International Bathymetric Chart of the Arctic Ocean

IBCCA International Bathymetric Chart of the Caribbean Sea & Gulf of Mexico

IBCEA International Bathymetric Chart of the Central Eastern Atlantic

IBCM International Bathymetric Chart of the Mediterranean

IBCWIO International Bathymetric Chart of the Western Indian Ocean

IBCSEP International Bathymetric Chart of the South Eastern Pacific

IBCWP International Bathymetric Chart of the Western Pacific
MAI N STANDARDS OF I HO

1. Standards for Hydrographic Surveys
2. Standards for education and training
3. Standards for nautical publications
4. Standards for paper charts
5. Standards for electronic charts.
S-44 IHO Standards for Hydrographic Surveys

The principal aim of this publication is to specify minimum standards for hydrographic surveys to ensure that;

- data collected is sufficiently accurate for navigation
- and spatial uncertainty can be adequately quantified.
Chart Specifications of the IHO and Regulations for International (INT) Charts.

IHO publication M-4, is an example of an IHO standard that has resulted in the adoption of consistent colours, symbols, nomenclature and general presentation for charts produced by IHO Member Organization.
S-61 Product Specifications for Raster Navigational Charts (RNC)

S-61 defines the minimum requirements that a Raster Navigational Chart (RNC) must have in order to satisfy the IMO Performance Standard for a Raster Chart Display System (RCDS).
S-52 provides guidance regarding

- issuing of Electronic Navigational Charts (ENC),
- their display in an Electronic Chart Display and Information System (ECDIS) and
- their updating.

S-52 was developed in conjunction with the IMO Performance Standards for ECDIS.
S-57 IHO Transfer Standard for Digital Hydrographic Data

S-57 is the IHO standard used:

- for the exchange of digital hydrographic data between national hydrographic offices
- and for the distribution of products to data users – e.g. ENC.
TO BE AVOIDED!
S-57 EDITION 4.0

BARRIE GREENSLADE

UNITED KINGDOM

HYDROGRAPHIC OFFICE
WHY A NEW EDITION?

- Standard needs expanding to support additional functionality and data types e.g.

  REAL TIME FUNCTIONALITY:
  
  MATRIX :   RASTER
  
  DIGITAL BATHYMETRY
  
  TRUE 3D/4D
  
  GML:       SVG
  
  WEB DATA AND MAPPING SERVICES
WHY A NEW EDITION?

- Standard needs expanding to enhance existing product specifications and support new ones
  - BATHYMETRIC PROD SPECS
  - NAUTICAL PUBS PROD SPECS
  - WEB BASED PROD SPECS
  - ENC/DNC INTEROPERABILITY
- To fully embrace the SCOTS concept
NEW CHALLENGES

Ship operators are building and operation larger vessels.
GREATER DEMANDS FROM THE USER

Ship’s Draft = Top Line profit margin

- Profit
- Fees & Charges
- Insurance
- Operating Cost
- Capital Cost

Under-keel clearance
Tide-Aware ENC

7Cs Tide Demo
Nautical Chart Business Model

The Marine Geospatial Data Business Model

Now?

Determination of Maritime Boundaries

S-57 Work Items

Object Catalogs & Registries

ENC Product Specs

Raster & Gridded Requirements

3D & Temporal

Metadata

Base Documents

Bathymetric Content Specification

Portrayals

Paper Chart
WORK ITEM 2.1 – FEATURES
(ISO 19109, 19110, 19126, 19135)

- Registry concept
- Data dictionary
- Feature catalogue
- Xml register produced
- Object and attribute review
W. I. 2.2 – ENC PRODUCT SPEC
(ISO 19131)

• Some effort but in reality cannot be progressed further until S-57 profiles are completed

• New version will be inclusive instead of exclusive as now

• Study to widen the mandatory scope – more prescriptive
The Imagery and Gridded component of S-57 will be built upon the framework given in 19129 (Imagery, Gridded and Coverage Data Framework).

S-57 takes from ISO 19123 various types of grid structures including a rectangular grid, a tiled grid, an irregularly shaped grid, a grid with variable cell sizes and a multi-dimensional grid.
W. I. 2.3 – COVERAGES, RASTER & MATRIX

(ISO 19123, 19129)

• ISO 19129 - Standard for Imagery, Gridded and Coverage delayed

• IHO taking a leading part in progressing the standard as quickly as possible

• IMAGERY – XML meta, JPEG2000

• GRIDDED - XML meta, neutral array definition - possibly Network Common Data Form (NetCDF)
W. I. 2.4 – TEMPORAL & 3D

(ISO 19108,19109)

• Requirement study completed at SWG 4 – May 2003
• Further discussions at SWG 6 – Mar 2004

Sparse Quadrilateral grid with Morton traversal order and variable pixel/voxel size in Riemann hyperspace
Task

– development of a flexible metadata standard
– applicable for all IHO tasks and data at a general level
– extendible to special areas at specific levels
– based on ISO standards
W. I. 2.6 – CORE S-57

(ISO 19107, 19109, 19111, 19118, 19136)

• Spatial profile final draft due to be distributed early Jan
  – developed in conjunction with DGIWG

• Coordinate reference system profile draft due for completion mid 2004

• Core application schema in preparation

• 3&4D to be commenced early to mid 2004

• XML schema developed from core application schema
W.I. 2.7 Hydrographic Survey Content Specification

- compile a list of all known hydro/bathy standards
- refine the list of products/applications from “all possible” down to “more reasonable”
- review the relevant ISO TC211 standards required to produce a hydrographic survey application profile
- determine what metadata items are necessary
W. I. 2.8 Portrayals

• C&SWG involvement paramount

• The near future could be - a mixture of Edition 3.1 based ENC data and Edition 4 based hydrographic data, i.e. superimposed in one presentation

• Begin the transformation of selected items of the current Presentation Library to gain familiarisation with this process

• Investigate how the degradation of current ENC presentation rules can be avoided if presentations of ENC data of Edition 3.1 and e.g. bathymetric data based on S-57, Edition 4 are mixed.
Welcome to the IHO

The mission of the IHO is to ensure the provision of adequate and timely hydrographic information for world-wide marine navigation and other purposes, through the endeavors of national hydrographic offices.

A subsidiary mission is the application of hydrographic data to support science, and to promote its use in geographic information systems, principally for the sustainable development of national maritime zones.

The Directing Committee of the IHO, on behalf of the International Hydrographic Organization, wishes to acknowledge the generous contribution made by the French Hydrographic Service (SHOM), in providing the web hosting facilities for this web-site.