

# Marine Harbour Infrastructure Database Project

## Project Overview

The Marine Harbour Infrastructure Database Project aims to create a database that will improve the information exchange between harbours and hydrographic offices by acting as a neutral repository of harbour information<sup>1</sup>. The information shared through this database will aid in creating products that help execute efficient port calls and berth-to-berth route creation by describing all the available and accessible services in harbours. The Marine Harbour Infrastructure database must have a Graphical User Interface (GUI) that permit the source originators, such as harbour masters, to easily input and validate information, in a secure mode, while also allowing hydrographic offices to review and extract needed information suitable for their products made available to end-users. Where a harbour has a GIS system in place, exchanging information via Application Programming Interface (API) can simplify and expedite the information flow. Furthermore, as the users of the source data, the authorised hydrographic office could also connect their GIS systems to extract information with the same API. The Marine Harbour Infrastructure Database must therefore have such capabilities.

The International Hydrographic Organization (IHO) operated database will be S-131 (Marine Harbour Infrastructure product specification) compatible and will serve as a neutral location for all stakeholders to exchange and share unclassified but encrypted information. The Marine Harbour Infrastructure Database may act as an interim solution until replaced by national solutions for harbour information exchange or, where beneficial, be a permanent solution for the information exchange.

The Nautical Information Provision Working Group (NIPWG) stands ready to assist in the development of a database model that is compatible with S-131 and to support experimentation phases.

## Background and Purpose

Mariners must currently collect harbour information from many sources. Some information is provided in navigational charts, which may not be updated with the latest harbour information due to challenges in the information sharing between harbours and hydrographic offices. Other harbour information may be found in sailing directions or coast pilots, but these may suffer from the same challenges the navigational chart has. Therefore, it is common that a ship's agent acts as an intermediary between the harbour and the ship as to provide the ship with the necessary information to plan a berth-to-berth voyage.

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<sup>1</sup> Harbour information means location and physical characteristics of, and the facilities and services offered by major harbours, ports, terminals with priority given to information supporting safety of navigation.

The Marine Harbour Infrastructure product is intended to be used to raise situational awareness before approaching a harbour. S-131 will support berth-to-berth planning and will offer possibilities to supply detailed contextual information and additional water depth information in water features beyond what is available in navigational charts (e.g. ENC and S-102).

However, S-131 cannot by itself overcome challenges in information flow between harbours and hydrographic offices. NIPWG proposes a neutral location for information exchange has been proposed as a joint effort alongside S-131 development to improve information exchange between harbours and hydrographic offices. This neutral location should be a database infrastructure accessible by all stakeholders. This location offers transparency to the information exchange and permit harbours to choose what information they would like to share. The database should be developed to act as a repository of harbour information requested for a berth-to-berth route planning and voyage execution according to IMO resolution A.893(21) and to improve the quantity of data of charted features. The database must be compatible with S-131 to simplify the translation of information from harbours to hydrographic offices and must be constructed in such a way that it is not necessary for the harbour personnel to know the technical details of S-131.

Harbours would use the Marine Harbour Infrastructure database to submit information on a national basis, which can be accessed by harbours and hydrographic offices and addresses current gaps in the ability to share information with hydrographic offices.

In implementing this infrastructure, several benefits are created and issues in current processes are addressed:

1. There is one access point for both the contributors and users,
2. Harbours can define what information they would like to share with hydrographic offices,
3. Hydrographic offices can harvest and further process the data,
4. Formally defined API based interchange enables automated data exchange for all stakeholders,
5. The International Maritime Organization (IMO) can be encouraged Contracting Governments to reach out to ports and terminals that are not contributing, keeping in mind the harbour's contribution to the fulfilment of the relevant IMO resolution on berth-to-berth route planning, and
6. An IHO-operated database will help to build up a neutral and trusted environment.

## **IMO Berth-to-Berth Navigation**

As mentioned above the IMO can be encouraged to ensure that Contracting Governments arrange for port authorities' and terminal operators' contribution to the fulfilment of the relevant IMO resolution on berth-to-berth route planning. The database information content is IMO BLU CODE compliant and is needed for berth-to-berth planning. The Marine Harbour Infrastructure database enables harbours to contribute data and information to a single international database which will support berth-to-berth planning operations and enable hydrographic offices to provide information needed to fulfil the vessel's responsibilities under IMO Resolution A.893 (21). In addition, the IMO could have an overview on which harbours contribute to the database and could be more

specific in the submission request. IMO FAL convention initiatives may also benefit from the information provided due to the similarity of data elements.

## Vision

### General

The Marine Harbour Infrastructure Database Project is intended to improve berth-to-berth planning by developing an IHO-operated database for harbour information exchange. Data needed for berth-to-berth planning will be submitted by harbours, and can be harvested by the interested hydrographic offices. This function will improve the efficiency of creating S-131 datasets that help facilitate berth-to-berth route creation and harbour calls, and enable smooth transitions between berthing positions. Hydrographic offices implementing the S-100 framework will benefit. The database could be an interim solution and should stay in operational mode until Coastal States or HOs are able to host and operate their own systems to collect marine harbour infrastructure information on a national basis. If it is beneficial for stakeholders, the database may remain operational on a longer period of time.

API and web interfaces to be developed and to be compatible with relevant industry standards. The web interface should match the guidance set forth in IMO Circ. 1512 in terms of software quality and its human-centered design, making the tool easy to use. There should be an option to connect the database with geographic information systems (GIS) through an API. There should be a dialogue initiated with relevant port and terminal organization, like IHMA to establish processes around the data sharing beyond hydrographic offices once the database environment is fully functioning.

### IHO-operated database

The Marine Harbour Infrastructure database will be IHO-operated database to collect harbour information in a form compatible with S-131 as developed by NIPWG. Taking into account the IHO is an intergovernmental organisation, hosting such a **database by the IHO Secretariat could help to build up a trusted environment**. Harbours would know where their data are. The data entered would be S-100 and S-131 compliant, and harbours are not requested to become familiar with the technical details of S-131. Hydrographic offices **can use the extracted S-131 compliant data and implement them easily in their S-100 based production platforms**.

### Timeframe

The plan is to have the project started as soon as possible. There is a need to first determine a common agreed upon set of information that harbour authorities are willing to share. It was also agreed that the project has to adopt a global perspective. Therefore, it would be essential to identify like-minded harbours representing different regions for the testing phase of the development. NIPWG will meet in September to plan the road ahead for the product specification. **A contractor is tasked with finalizing the product specification package by mid-2022.** The expected delivery time is spring 2022, depending on the development status of the relevant components of S-100

Edition 5.0.0 on which it should rely on; thus a tentative date for S-131 Edition 1.0.0 is spring 2022. Finalization of S-131 Edition 1.0 depends on HSSC approval. With S-131 Edition 1.0.0 finalized, the database can be set up and work commence with defining which source, such as port administrations or terminal operators, is responsible for providing what elements of data. Once this source division has been generally defined, test harbours should be identified to establish sufficient examples to encourage any harbour that are hesitant to join the efforts. With the testing phase completed the system should be viewed as operational. At this stage any subsequent improvements and extended data sharing options exploration can commence.

## Glossary

Acronym	Definition
API	Application programming interface
ENC	Electronic navigation chart
FAL convention	Convention of facilitation
GIS	Geographic information systems
GUI	Graphical user interface
HSSC	Hydrographic Services and Standards Committee
IHMA	International Harbour Masters Association
IHO	International Hydrographic Organization
IMO	International Maritime Organization
NIPWG	Nautical Information Provision Working Group