PORT INFORMATION MANUAL ©

For ship-port interface data

Version 3.01

©

Contents

Foreword 6

1. Introduction 7

1.1. Scoping of the data 7

1.2. Scoping of geographical extent 7

1.3. Data standards 8

1.4. Data ownership and data sharing 8

2. Standardization bodies 10

2.1. General 10

2.2. IEC 11

2.3. IHO 11

2.4. IMO FAL 11

2.5. ISO 11

3. Port information 12

3.1. Introduction 12

3.2. Data definitions for objects 15

3.2.1 Port 15

3.2.2 Terminal 16

3.2.3 Berth 17

3.2.4 Berth position 18

3.2.5 Pilot Boarding Place 19

3.2.6 Water section 20

3.3. Data definitions for attributes – connected to object “port” 21

3.3.1 General information 21

3.3.2 Contact Information 24

3.3.3 Weather and tidal Information 25

3.3.4 Reports and documentation 25

3.3.5 Regulations and Exemptions 27

3.3.6 Port safety 27

3.3.7 Services 28

3.4. Data definitions for attributes – connected to object “water section” 29
3.4.1 Vertical restrictions 29
3.4.2 Horizontal restrictions 30
3.4.3 Visualization of data definitions 31
4. Nautical charts and publications 32
4.1. Introduction 32
4.2. Data definitions 33
5. Port passage plan 34
5.1. Introduction 34
5.2. Data definitions 36
5.3. Visualization of data definitions 38
6. Berth planning arrival 39
6.1. Introduction 39
6.2. Data definitions 41
6.3. Visualization of data definitions 41
7. Port planning arrival 42
7.1. Introduction 42
7.2. Data definitions 44
7.3. Visualization of data definitions 44
8. Notifications and declarations 45
8.1. Introduction 45
8.2 Data definitions 48
9. Nautical service planning 50
9.1. Introduction 50
9.2. Data definitions 51
9.3. Visualization of data definitions 53
10. Vessel and cargo service planning 54
10.1. Introduction 54
10.2. Data definitions 55
10.3. Visualization of data definitions 57
11. ISPS 58

11.1. Introduction....58

11.2. Data definitions....60

12. Port planning departure....61

12.1. Introduction....61

12.2. Data definitions....62

12.3. Visualization of data definitions....63

13. Appendix 1 – Business process....64

14. Appendix 2 – Determining standards for ship-port interface data....66

15. Appendix 3 - Technical documentation for event data....71

Document Revision history

Version 1.0	**April 2019**	**Initial version created**
Version 1.3.1	**June 2019**	**Updated following initial comments.**
Version 1.4.4	**August 2019**	**Updated following Gothenburg meeting**
Version 1.4.5	**December 2019**	**Updated following input NP100, IMO GIA and WPCAP**
Version 2.0 – (007)	**April 2020**	**Updated following feedback of IHO NIPWG 7, IMO GIA and IT departments: update of definitions and formats, nomenclature of data elements as per business process, increasing scope to all ship-port interface related data. Per data set the impact on IMO objectives, on data owner, and current issues regarding data quality and availability, current developments, call for action. An extra chapter re. standardization bodies has been added**
Version 2.0 – (008)	**July 2020**	**Updated following feedback collected during Subject Matter Expert meetings discussing the introduction paragraph of each chapter**
Version 3.0	**August 2020**	**Final version for 2020 with editorial corrections**

Copyright Notice

Please cite this document as: Industry Partners, Standards Partners and Endorsers of the ITPCO, IHMA, IAPH and UKHO: Port Information Manual.

Foreword

Dear Reader,

The Port Information Manual (PIM) has been written by the International Taskforce Port Call Optimization (ITPCO) and aims to provide a better understanding of the data exchanged in the ship-port interface and of the existing international standards that connect ships and ports.

As such, this work contributes to current efforts of the industry and IMO to accelerate digitalization (resolution MEPC 323(74) and achieve the GHG emissions reduction target for the shipping industry:

- It aims to support the efforts of the IMO Global Industry Alliance to Support Low Carbon Shipping (GIA), which is systematically assessing options to reduce emissions related to the ship-port interface, with a view to subsequently ranking options in accordance with their potential to cost-effectively reduce emissions
- It aims to contribute to the International Hydrographic Office activities regarding product specifications for Marine Harbour Infrastructure
- It aims to contribute to the work of the IMO Expert Group Data Harmonization (EGDH) and to the IMO Compendium on Facilitation and Electronic Business by further extending it to operational data in the port-ship interface,
- It contributes to the IMO E-Navigation initiative
- It contributes to the development of a World Bank Transport paper on the critical actions to improve the resilience of the maritime logistic chain at the time of COVID-19 with a focus on digitalization
- It is leading to a step-by-step guide for ports how to digitize their port data

This edition has been aligned with the Mariners Handbook (NP100) containing the same definitions. NP100 is a publication that can be found on the shelf of most SOLAS vessels and provides guidance to seafaring and shore personnel alike.

On behalf of the International Taskforce Port Call Optimization many thanks to:

- Standard partners: IHO, IMO FAL, UK Hydrographic Office, GS1 and Jonathan Pritchard as consultant
- Industry partners in shipping: CMA CGM, Inchcape Shipping Services, Maersk, Mediterranean Shipping Company S.A. and Agency, Oldendorff Carriers, Shell, Vopak Agents
- Industry partners in ports: Ports of Algeciras, Auckland, Busan, Gothenburg, Houston, Hamburg Vessel Coordination Center, Houston, Ningbo Zhoushan, Rotterdam, Singapore, Tanger Med
- Endorsers: BIMCO, Chainport, Green Award Foundation, IALA, IAPH, ICS, IFSMA, IHMA, INTERCARGO, Lloyds Marine Intelligence Unit, MarineTraffic, Navelink, STM, The Nautical Institute, UK P&I Club

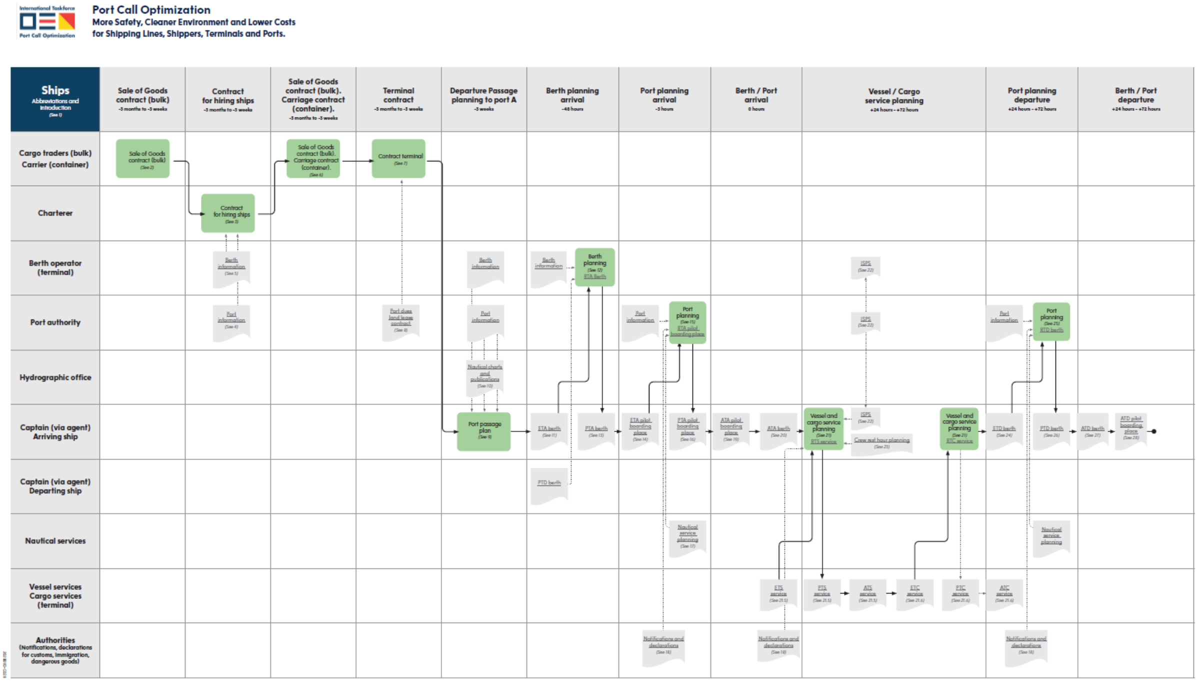
Ben van Scherpenzeel

Chairman International Taskforce Port Call Optimization

1. Introduction

1.1. Scoping of the data

The scope of data defined is the ship-port interface data, directly or indirectly related to the port authority, and based on a trade and port agnostic business process, taking into compliancy with IMO regulations, contractual obligations and authorities such as customs. Improvement of ship-port interface data normally results in an improvement of safety, environment and security, which is a justification for any investments related to such data improvement. Efficiency is interconnected with these matters, but can be different for every port. This is not an objective of IMO and therefore not included in this document.



Visualization of business process - see also www.portcalloptimization.org

1.2. Scoping of geographical extent

The scope of ship-port interface data for the deep-sea vessel is restricted to operations between the pilot boarding place and the fender line of the berth including anchorage areas. Prior to the pilot boarding place this data is normally the domain of the national hydrographic office, and beyond the fender line of the berth this data is normally the domain of the terminal.

1.3. Data standards

Ports can receive up to 116.000 different ships and the global shipping industry operates in a network of up to 9.000 different ports. These numbers are approximate, depending upon whether one takes into account only cargo vessels or also fishing vessels and tugs, or whether this only includes ports directly connected to sea. In order to achieve optimization of both ports and shipping a minimum set of standards to connect all parties globally is needed.

Please note: if standards have been adopted, meaning that they are not under development or review, then they've been printed using normal format.

If standards are not yet adopted, meaning they are still being in development or need to be submitted for approval to a recognized standardization body, then they've been printed using *italics.*

1.4. Data ownership and data sharing

Sharing data by the data owner is an important aspect of data quality. If the data owner does not share data, data updates can be delayed and might contain errors. However, this is not easy to organize. The ability of port authorities to organize data ownership and data sharing varies per port – this may be the most challenging part of improving data quality and availability.

First the power of the port authority to organize data ownership and sharing depends on the power of the port authority in general. Ports may be controlled by:

- Local community or state
- National or federal authority
- A mix of local / state community and national / federal authority
- Private parties

Local community or state

There might be more focus on the local community or state needs. Thereby creating more challenges to implement measures for efficient shipping, especially if the income generated by the port is dictated by income from real estate versus income from shipping. Better communication might exist as the distance is shorter and the relationship tighter.

National or federal authority

There might be more focus on the national needs of shipping, and therefore fewer difficulties to implement measures for efficient shipping. Certainly this is the case if the national or federal interest is large, e.g. if a country is an island or has no own natural resources like oil and gas. However, due to the larger distance between port and national authority the communication might be more difficult.

A mix of local / state community and national / federal authority

There might be a balance between the pro's and con's as described before.

Private parties

Normally only remote ports, with only 1 or 2 terminals, are controlled by private parties. These private ports may have a local public authority.

Data sharing and data ownership is in such instances normally no problem due to the limited size of the port, and the direct relationship between private / public port authority, terminal, and service providers.

Second it depends on whether nautical and vessel services are private or public.

Nautical services: data sharing with e.g. tugs, pilots or linesmen is much more easier if these parties are employed by the port authority (as a public service) versus if these parties are independent private companies.

Cargo services: data sharing by terminals is much more easy if the port is a public service or service port (the port operates the terminals) versus a landlord or tool port (the port leases land or equipment out to terminals).

Vessel services: e.g. bunker operators or waste collector, might be controlled through e.g. "License to Operate" or assignment as "Internal Operator".

Last but not least: the data owner may be different per body of water and per data type.

For master data: the data owner of e.g. depth data may be different for the deep-water route, the fairway, the harbor basin or the berth pocket. It can be for example the national hydrographic office, the national authority for waterways, the coast guard, the port authority or a private party.

For event data: the data owner of e.g. Requested Time of Arrival Pilot Boarding Place might be the local port authority, the national Vessel Traffic Management Center, or agreed upon by ship agent together with pilots and tugs. It may even not be clear who accepts the responsibility of the planning of the pilot boarding place.

2. Standardization bodies

2.1. General

Robust standardization bodies should be non-commercial (i.e. run by neutral organizations), have a robust funding (e.g. not dependent on temporary subsidies) and have established sufficient trust with the industry. They should build up sufficient experience over the years to maintain standards in the foreseeable future. Procedures should be in place ensuring a democratic and transparent process for adoption of amendments to existing standards or conception of new standards. In addition, an overarching hierarchy should be in place to ensure that the interrelation between various standards is secured, avoiding compatibility issues when one standard is amended.

Standards in the ship-port interface should be endorsed by the IMO – being the only robust, neutral and authoritative body that has an overarching role to play in the domain of the ship-port interface.

It is fundamental for acceleration and acceptance of digitalization in the ship-port interface that both shipping and ports commit to the same IMO endorsed standards avoiding a proliferation of solutions and incompatibility between standards and systems.

Considering the scope of the ship-port interface data, the following are IMO recognized standardization bodies:

- For nautical information (chapter 3, 4, and 5): IHO, as this information is critical for safe berth to berth navigation as per SOLAS
- For time stamp information (chapter 6, 7, 9, 10, 12): IMO FAL, as time stamps are also used for notifications, declarations, ISPS, MLC and JIT Arrival. For digital exchange: IEC, as they develop the S-4xx standards for e.g. ECDIS systems, ensuring the time stamps can also be communicated with the ECDIS
- For notifications and declarations (chapter 8): IMO FAL
- For ISPS (chapter 11): IMO FAL, as it relates to notifications and declarations. As an example, data elements as names of visitors and crew members should use same format as immigration declarations
- For general standards regarding unique identifiers for locations, time stamp formats or time stamp exchange: ISO

2.2. IEC

The International Electrotechnical Commission (IEC) is the world’s leading organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

Close to 20.000 experts from industry, commerce, government, test and research labs, academia and consumer groups participate in IEC Standardization work.

The IEC is one of three global organizations (IEC, ISO, ITU) that develop International Standards for the world.

When appropriate, IEC cooperates with ISO (International Organization for Standardization) or ITU (International Telecommunication Union) to ensure that International Standards fit together seamlessly and complement each other. Joint committees ensure that International Standards combine all relevant knowledge of experts working in related areas.

2.3. IHO

The International Hydrographic Organization is an intergovernmental organization that works to ensure all the world's seas, oceans and navigable waters are surveyed and charted. Established in 1921, it coordinates the activities of national hydrographic offices and promotes uniformity in nautical charts and documents. It issues survey best practices, provides guidelines to maximize the use of hydrographic survey data and develops hydrographic capabilities in Member States.

2.4. IMO FAL

The Facilitation Committee (FAL) deals with matters related to the facilitation of international maritime traffic, including the arrival, stay and departure of ships, persons and cargo from ports. The Committee also addresses electronic business, including the single window concept, and aims to ensure that the right balance is struck between regulation and the facilitation of international maritime trade.

The IMO Expert Group Data Harmonization is the central place to discuss and agree on data standards and initiatives for maritime and port electronic data exchange. The IMO Compendium deals so far with existing standards from UNECE/EDIFACT, ISO and WCO. As it grows other standards from international organizations will also be adopted / recognized like those from IHO.

2.5. ISO

ISO is an independent, non-governmental organization made up of members from the national standards bodies of 164 countries.

ISO members play a vital role, meeting once a year for a General Assembly that decides strategic objectives. The Central Secretariat in Geneva, Switzerland, coordinates the system and runs day-to-day operations, overseen by a Secretary General.

3. Port information

3.1. Introduction

General

The term "Port information" in context of the Port Information Manual is the generic term to describe information on the port infrastructure and services between the Pilot Boarding Place and the Berth.

This can be general port information (e.g. reporting formalities) or specific port information of specific port sections (e.g. depth of berthing pocket).

Port information from port authorities is important for charterers and ship owners. Especially in the tanker and dry bulk trades these data sets are used to select the right ship that fits at the berth both in the load port and in the discharge port. Vessel and charterer operators are in future looking to use automated online systems that will expedite this vetting process. These trades represent about 85% [1]cargo ton-miles in the overall shipping business. These data can also feed national hydrographic office data bases to create both Electronic Navigational Charts (ENC's) and Navigational Publications such as Sailing Directions (SD's).

Impact on safety, environment and security

Safety

Most incidents happen in the approaches, anchorages or harbour basins of ports [2], as this is by far the busiest time for the mariner and vessel. Therefore the quality and the availability of port information is an important risk mitigation strategy as it will help the mariner to execute safe navigation from pilot boarding place to berth and vice versa.

Environment

Most emissions from shipping originate at sea[3]. If the charterer can charter the right ship with optimized amount of cargo on board based on the maximum allowed dimensions in both the load and discharge port, this is already an improvement in emission savings per carried ton.

Testimonials of operational people involved in the ship-port interface of operational people in the ship-port interface

Most discussions between owner, charterer, terminal and port authority are about the identification of the terminal and berth (are we talking about the same location). Today the only unique identifier is the UNLOCODE, which is not accurate enough as it's on a port level only.

---

[1] https://www.statista.com/statistics/264024/number-of-merchant-ships-worldwide-by-type/
[2] http://www.emsa.europa.eu/news-a-press-centre/external-news/item/3734-annual-overview-of-marine-casualties-and-incidents-2019.html
[3] https://www.motorship.com/news101/industry-news/study-highlights-cost-of-lengthy-port-stops

If the terminal and berth are known, the next discussion concerns the available depth (referring to the same Chart Datum) and maximum draught (using same Under Keel Clearance definition). Many ports only provide information on maximum draught, which leaves the responsibility to the charterer and ship's owner if they comply with the required Under Keel Clearance policy of their contract or company. Trying to compare information from multiple sources and to determine what is the correct information is very difficult. It happens that a vessel chartered and loaded to the maximum draught only detect on arrival at the discharge port that there was not sufficient depth available, forcing it to make alternative arrangements such as discharging cargo first onto barges.

Impact on data owner

In most charter parties there are "safe port, safe berth, always afloat" clauses. That means that a charterer may send a vessel only to a safe port. A widely accepted legal definition of a(n) (un) safe port under common law is the following: "*a port will not be safe unless, in the relevant period of time, the particular vessel can reach it, use it and return from it without, in the absence of some abnormal occurrence, being exposed to danger which cannot be avoided by good navigation and seamanship*".
The foregoing means that a charterer before selecting a ship for the intended voyage(s) (i.e. prior to the conclusion of a charter party), in order to warrant to the owner the safety of the places the ship is intended to call, is required to obtain information on – but not limited to – the following:

- Depths and dimensions of the vessel
- Specific conditions that may be relevant for the intended call
- Availability of nautical services
- Availability of information when the vessel is entering port, and
- Safe mooring and ship access information

The above five requirements are part of the general 'safe port' requirement. If a court determines that required information was not available, the port might be declared as "unsafe", which would have a negative impact on the reputation of the port and its business.

Hydrographic offices have a legal and moral obligation to provide accurate, contemporary data. The clear capture and sharing of data allows the adoption of best practices and helps to demonstrate due diligence has been observed. It ensures Hydrographic Offices and Port Authorities have worked together to discharge their collective SOLAS responsibilities for the benefit of each nation and the safety of the mariners. It strengthens the legal position of the port in the event of an incident.

Current quality and availability

Hydrographic offices of the IHO Nautical Information Provision Work Group experience a lack of data availability and consistency of port authorities, resulting hydrographic offices being unwilling to publish port infrastructure data in their charts and publications as they cannot guarantee the correctness of the data. If ports share data, it should meet the IHO standards (e.g. for surveys the S-44 standard), otherwise the hydrographic office is unable to use that survey in an official ENC (or paper chart).

The port then publishes their own information on websites etc., which conflicts with official ENC.

Shipping lines experience a lack of data availability too, resulting in questionnaires to mariners, ship agents, etc. to collect the data.

Ports face difficulties to share the data as they have to reply on many unstructured questionnaires from so many parties (e.g. ship agents, publishers of port information, shipping lines).

Ports also face difficulties to gather data from all data owners in the port, as the port authority is not data owner of all port data (e.g. the national authority may be the data owner of depths in the port area).

Current developments

Data definitions for port infrastructure have been proposed to IHO Nautical Information Provision Working Group via Port Information Manual 1.4.5 through the International Harbour Master Association, and their comments have been processed in this document with thanks to Jonathan Pritchard and the European Harbour Master Committee for funding this work. In progress are the harmonized definitions for allowances for Under Keel Clearance, air draught and quay heights.

A data model for the exchange of port data does not yet exist. Based on the Port Information Manual 1.4.5 a first draft of the port data exchange set has been developed by Jonathan Pritchard. This draft will be tested and experiences will be shared with IHO NIPWG and see whether a logical data model can be formalized for exchanging data between port authorities and national hydrographic offices, following the S-100 framework.

Call for action

Ports need to provide port information preferably in a worldwide-harmonised format. This Port Information Manual provides the ports with a template to satisfy this request.

Related operations and/or infrastructure to improve the ship-port interface

When ports contract surveying companies, or purchase their own survey vessel, it should meet the IHO sea survey standard of the IHO S-44.

In general there are insufficient mooring points to moor the ship safely, and the information about these mooring points is lacking: e.g. their position and their Safe Working Load, which results in delays during mooring operations or even hazardous situations during the mooring process.

In general ports do not have sufficient lay-by positions. After completing commercial operations at the terminal, there should be an “escape” to bring the ship alongside if problems occur.

If fenders are missing or if steel structures of fenders are sticking out, the ship should be notified as it may cause point loads on the ship’s side and the hull integrity may even become compromised.

3.2. Data definitions for objects

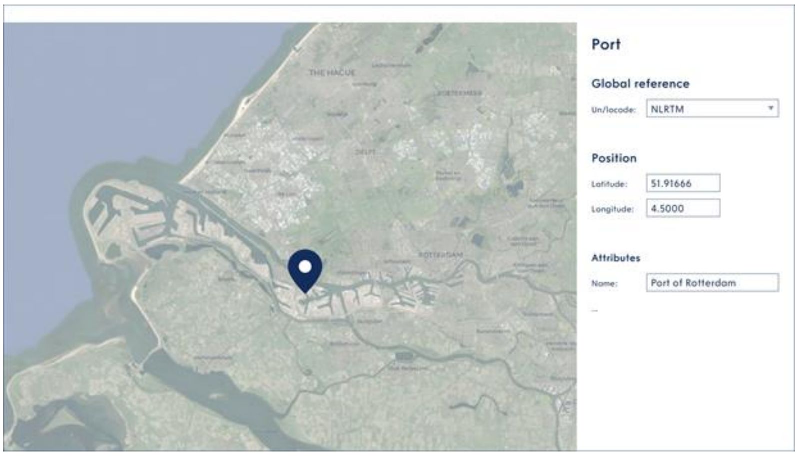
3.2.1 Port

Definition

Any port, terminal, offshore terminal, ship and repair yard or roadstead which is normally used for the loading, unloading, repair and anchoring of ships, or any other place at which a ship can call.
The word “port” also embraces geographically, a city or borough which serves shipping interests.
Other national standards and frameworks may describe such administrative entities already (IHO S-32).

Location

A single position which represents the port as a whole. Generally a centre of gravity position is chosen to represent the port’s location. This is aligned with the airline industry.



Indirect reference

UN/LOCODE; E.g.: NLRTM for Port of Rotterdam

Direct reference

Decimal degrees to a defined precision, (minus to indicate South and West)
Datum: WGS 84
E.g.: 51.9166666, 4.5000000 for Port of Rotterdam

Other references

Name of the port

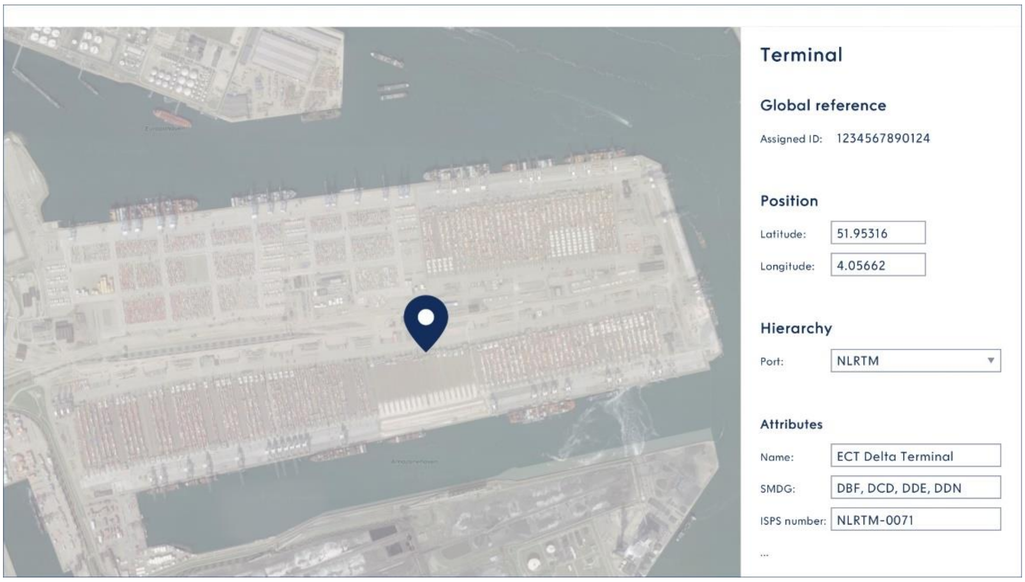
3.2.2 Terminal

Definition

A number of berths grouped together and provided with facilities for handling cargo (IHO S-32)

Location

A single position which represents the terminal as a whole. Generally a centre of gravity position is chosen to represent the terminal's location



Indirect reference

Global Location Number (GLN) (ISO/IEC 6523)

E.g. 1234567890124 for ECT Delta Terminal

Direct reference

Decimal degrees to a defined precision, (minus to indicate South and West). Datum WGS 84

E.g.: 51.95316, 4.05662 for ECT Delta Terminal

Other references

Name of the terminal

ISPS number

SMDG code (for container / ro-ro sector only)

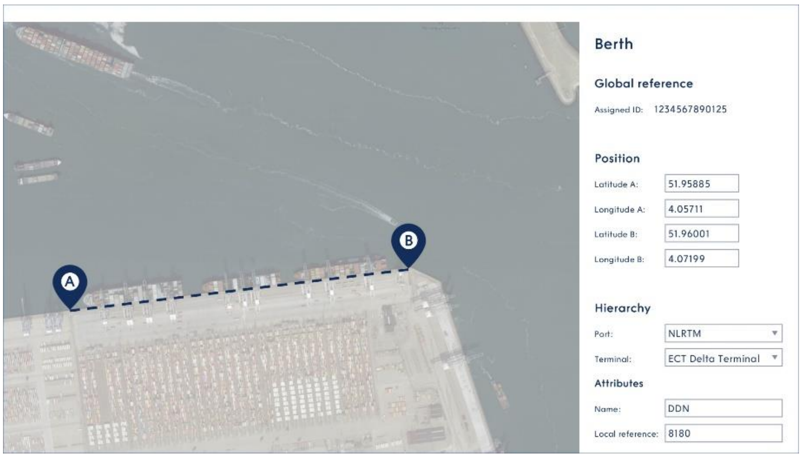
3.2.3 Berth

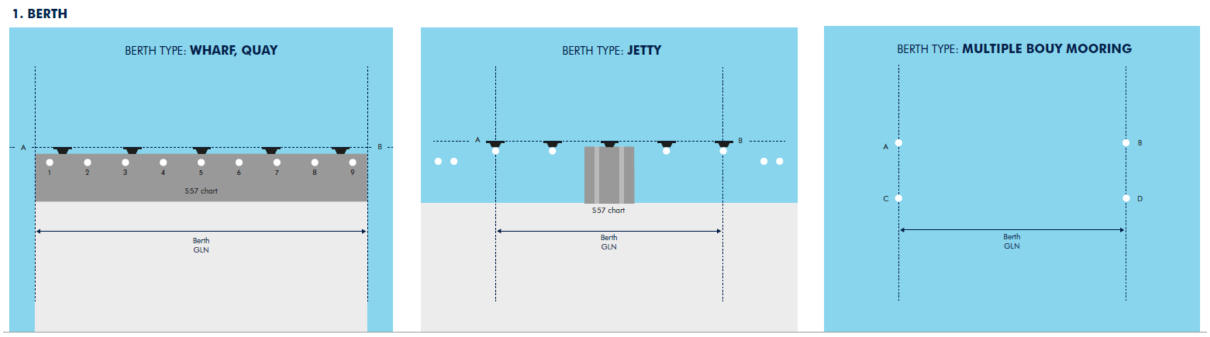
Definition

The space assigned to or taken up by a ship when anchored or when lying alongside a quay, wharf, jetty, or other structure (IMO reference data model).

Location

Quay walls, berth or jetty: The berth's extent is between its two extremities as shown in the diagram below, measured in a straight line, indicated by A and B. Every point should be named and/or numbered. Orientation is not important. Letters are normally used over numbers.





Indirect reference

Global Location Number (GLN) (ISO/IEC 6523)

E.g.: 1234567890125 for ECT Delta Terminal DDN

Direct reference

Decimal degrees to a defined precision, (minus to indicate South and West). Datum WGS 84.

E.g.: A: 51.95885, 4.05711, B: 51.96001, 4.07199 For ECT Delta Terminal DDN

Other references

Name of the berth

Local reference

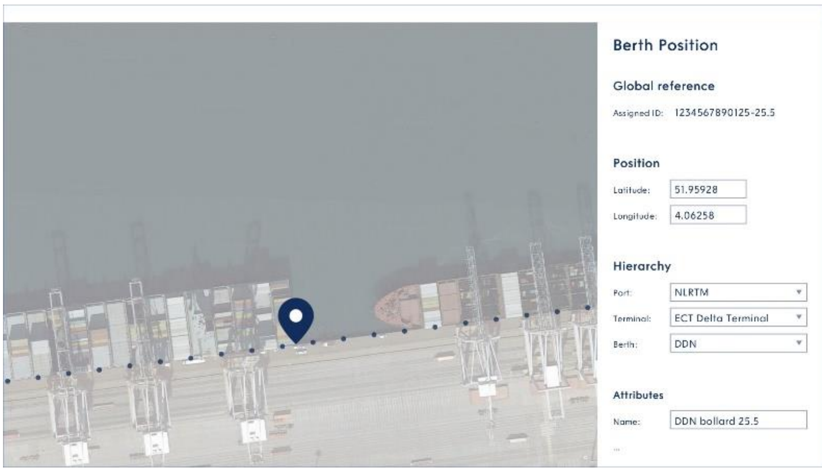
3.2.4 Berth position

Definition

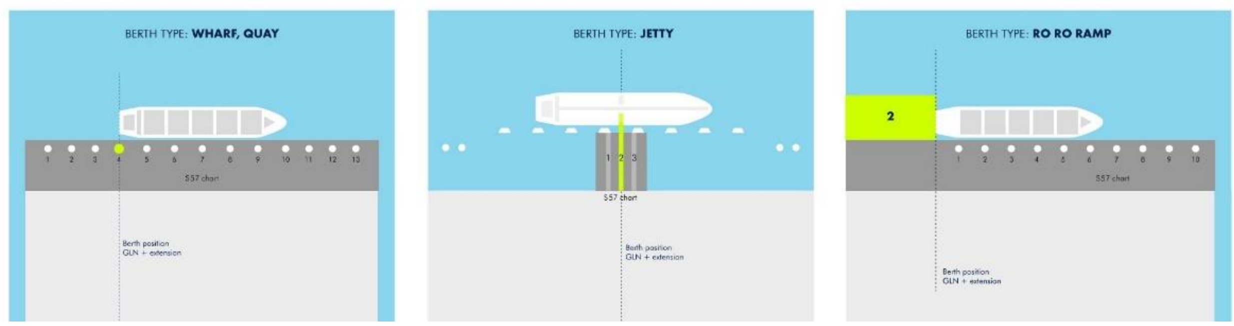
The position along the line of a berth, specified by one point (e.g. bollard, manifold or ramp number), allowing the ship to berth in the correct position along the berth (IHO S-32, IMO reference data model).

Location

A single point



2. BERTH POSITION



Indirect reference

Global Location Number of Berth (ISO/IEC 6523) with extension (for bollard/meter mark, manifold or ramp number). E.g.: 1234567890125-25.5

Direct reference

In decimal degrees to a defined precision, (minus to indicate South and West). Datum WGS 84.

Example: 51.887190, 4.284030

Other references

Name of berth and bollard number or meter mark number (some ports)

3.2.5 Pilot Boarding Place

Definition

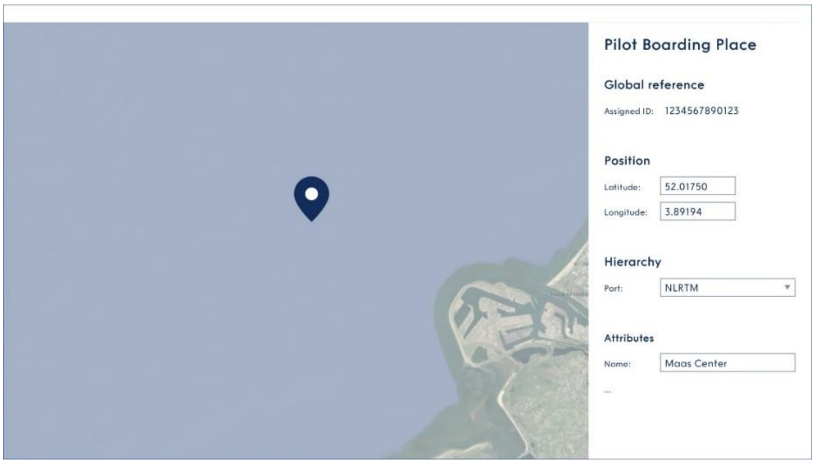
In voyage planning, a point on the vessel's route where a pilot is intended to be embarked / disembarked.

At sea, the meeting place to which the pilot comes out (IMO reference data model)

Also known as Pilot point. (IHO S-57, IHO S-4).

Location

A single position which represents the pilot boarding place



Indirect reference

Global Location Number (GLN) (ISO/IEC 6523). E.g. 1234567890123 for Maas Center

Direct reference

In decimal degrees to a defined precision, (minus to indicate South and West). Datum WGS 84.

Example: 51.887190, 4.284030

Datum: WGS 84. Held in decimal degrees to a defined precision, (minus to indicate South and West)

E.g.: 52.01750, 3.89194 for Maas Center

Other references

Name of the pilot boarding place e.g. "Maas Center"

3.2.6 Water section

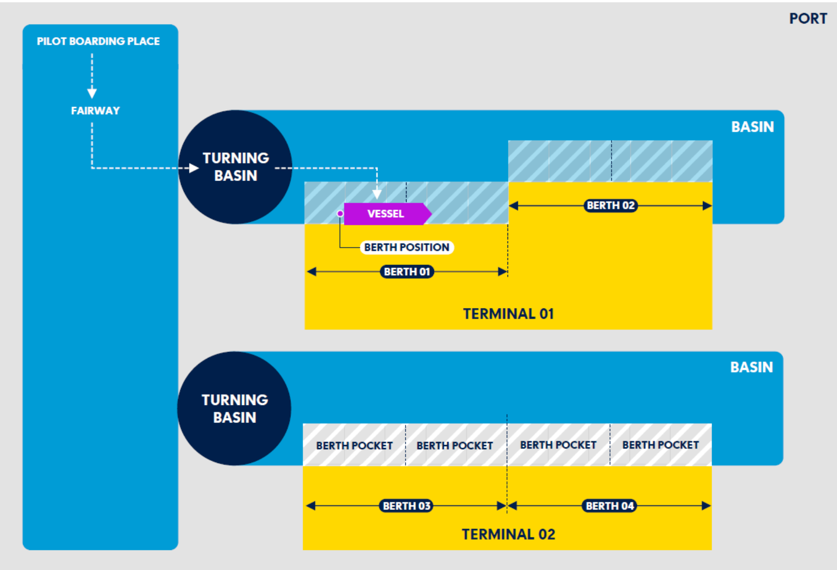
Definition

Ports can have multiple different types of water sections. The most common ones are:

- Anchorage*: An area in which vessels anchor or may anchor (NP100)*
- Fairway*: The main navigable channel in the approaches to, or within, a river or harbour. Sometimes called the Ship Channel (NP100)*
- Turning basin*: An area of water or enlargement of a channel in a port, where vessels are enabled to turn, and which is kept clear of obstructions such as buoys for that purpose (NP100)*
- Basin: A sheltered body of water available for port operations connecting either with the sea, with an outer port or with another basin. Generally an almost land locked area leading off an in inlet, firth or sound. Also, an area of water limited in extent and nearly enclosed by structures alongside which vessels can lie (IHO S-32)
- Berth Pocket*: Body of water at the berth or anchor berth with sufficient footprint to allow the vessel to make fast to the shore or mooring buoys or to anchor (NP100)*

Location

Named bodies of water or delimited



Port sections

Indirect reference

Global Location Number (GLN) (ISO/IEC 6523)

Direct reference

Sequence of positions, ordered in clockwise rotation. Decimal degrees to a defined precision, (minus to indicate South and West). Datum WGS84. E.g.:51.92000000, 4.5000000 for Waalhaven

Other references

Name of the port section

3.3. Data definitions for attributes – connected to object "port"

3.3.1 General information

This section defines general information about the port area.

General information

General, introductory information about the port. This should be confined to information not contained in any other definitions.

Format:

- Free text

Developments

Details of any active development affecting traffic in the port. Long term development plans should not be covered here but reference can be made to a section on the port website.

Format:

- Free text
- Expected completion date (DDMMYYYY)

Limits description

Description of the area covered by the information specified.

Format:

- Free text

ISPS security level

Current security level of the port or area within the port. Defined by The International Ship and Port Facility Security Code[4]:

Format:

- ISPS Security Level: Fixed Text: One of "ISPS Level 1", "ISPS Level 2","ISPS Level 3"
- Qualifying remarks: free text

Load Line Zone

The load line zone in which the port is located. Defined by the IMO's International Convention on Load Lines.

Format:

- Free text according to the IMO Load line convention with respect to the seasonal zones: Summer Winter, Tropical,, Winter North Atlantic, Fresh, Tropical Fresh

[4] http://www.imo.org/

Port - Maximum vessel sizes

Any size constraints on vessels using the port as a whole. It is not intended to capture constraints that may exist within an individual berth or port section as each section may have its own limits such as channel widths, swinging areas dimensions etc – these should be captured in the appropriate section.

Format:

- Maximum allowed overall length of a vessel: in decimal meters, resolution .0.01m
- Maximum beam: in decimal meters, resolution .0.01m
- Maximum (air) draught (height of the highest point of the vessel above the waterline): : in decimal meters, resolution .0.01m
- Supplementary information: free text

Time Zone

Time zones applicable to the port. All times should be expressed in Coordinated Universal Time (UTC) unless otherwise stated using ISO8601 formatting. Daylight Saving and Local Time are expressed as offsets, added to UTC to obtain the local time.

Format:

- Standard Time Offset from UTC +/- hh:mm
- Daylight Saving Time Offset from UTC +/- hh:mm
- Daylight Saving Time Start: date and local time: ISO8601
- Daylight Saving Time End: date and local time: ISO8601

Local holidays

Dates and names of any Non-Standard Working Day, such as local or national holidays that may affect the working of the port.

Format:

- Supplementary Information (including Name): free text
- Start Date and Time: date/time – ISO8601
- End Date and Time: date/time – ISO8601

Port Authority Contact Working hours

Periodic working days and hours for the Port Authority when they are contactable. There may be multiple entries to specify the working hours completely. It does not define the specific working times of various port services or terminals: These should be recorded as individual services.

Format:

- Start: day and time: ISO8601. Day is one of Monday-Sunday
- End: day and time: ISO8601. Day is one of Monday-Sunday
- Week Day Start: Enumeration: Day is one of Monday-Sunday
- Week Day End: Enumeration: Day is one of Monday-Sunday

Cargo

Summary of all types of cargo handled by the port.

Format:

- Cargo type: List of free text cargo types, suitably delimited.
- Weight of goods: weight of goods or number of containers per calendar year in tons
- Supplementary information: free text

Chart/Navigational Publication Description

Charts and Navigational Publications such as tide tables that can be used to navigate the port approaches and port basins and waterways. A nautical chart or nautical publication is a special-purpose map or book, or a specially-compiled database from which such a map or book is derived, that is issued officially by or on the authority of a Government, authorized Hydrographic Office or other relevant government institution and is designed to meet the requirements of marine navigation (SOLAS V/2 1974).

Format (per chart or publication):

- Chart number: free text: (Chart only)
- Identifier: free text (chart number or publication number)
- Title: free text
- Producer: free text

Shipping announcements

Local shipping announcements relevant to port users (including hyperlinks to local notices and advisories to mariners or sounding survey publications).

Format:

- Free text

Legal disclaimer

Any additional legal disclaimers that a port wish to make.

Format:

- Free text

Website

Hyperlink to the official port website.

Format:

- Free text

3.3.2 Contact Information

This section defines the content of contact details.

Contact details will generally be supplied for:

- All people and service providers who are the recipients of reports under the “reports and documentation section
- The emergency coordination center
- The service provided referenced under “nautical services” and “vessel services”

General contact information

Introductory text or high level, nonspecific information for contacting people in the port. This does not contain specific name, address or other contact details for any individual or service (these are defined as individual “point of contact”).

Format:

- Free text

Contact Details

Detailed contact information for an official point of contact within the port.

Format:

- Contact
  - Individual Name [text]
  - Department / Administrative division [text]
  - Role [text]
  - Contact Instructions [text]
- Contact Details – Preferred
  - Service Type Radio, Voice, Fax, Email, Online: Enumeration
  - Number [text]
  - Address (online or email) [text]
  - Radio Frequency [text]
  - Call Name / Call Sign [text]
  - Service Working Hours (described in in Service Hours)
- Contact Details – Alternate (Optional)
  - Service Type Radio, Voice, Fax, Email, Online: Enumeration
  - Number [text]
  - Address (online or email) [text]
  - Radio Frequency [text]
  - Call Name / Call Sign [text]
  - Service Working Hours (in Service Hours)
- Address (1 per contact)
  - Delivery Point / Administrative Area [text]

    - City [text]
    - Postal Code [text]

Inter ship communication

Specification of a communication channel for vessels in the port or a port section.
Format:

- VHF usage: fee text
- VHF channel(s): free text
- Information: free text

3.3.3 Weather and tidal Information

This section defines weather and tidal information for the port area.

Real time weather and tidal information

Links to any official real-time weather or tidal information provided by the port.
Format:

- Address: Free text or reference to a port website

Local weather and tidal phenomena

Details of any important local weather of tidal conditions within the port.
Format:

- Phenomena: free text
- Details: free text
- Location: free text
- Expected period start: MM
- Expected period end: MM

3.3.4 Reports and documentation

This section defines the various reports (e.g. notification, declarations, reports) and documentation that a visiting vessel will be expected to send to the port either before arrival, during its stay in port or before and after departure. Port's reports will be in fixed formats and will require completion. Documentation involves standardized documents that need to be presented to the port authorities. The exact requirements will vary per port.

There are two different reports:

- Reports that always need to be sent to authorities (e.g. customs, immigration, port health, port authority)
- Reports that need to be sent in case of a deviation, spill, etc. as per IMO report category (IMO Report category: One of (1) Sailing Plan, (2) Position Report, (3) Deviation Report, (4) Final Report, (5) Dangerous Good Report, (6) Harmful substances Report, (7) Marine Pollutants Report, (8) = Any Other report

Pre-Arrival Reports

Detailed requirements for each report that needs to be sent to the port before arrival.
Format:

- Identifying name of Report: Free Text
- Date Issued: Date – ISO8601 format
- “Reporting party” – Who needs to send report
- Contact Details of recipient
- “How” – How report is to be sent: Free Text
- “When” – When report is required: Date – ISO8601 format
- “What” – Report requirements Text: Free Text
- Supplementary Information: free text

In Port Reports

Detailed requirements for each report that needs to be sent to the port while in port.
Format:

- Identifying name of Report: Free Text
- Date Issued: Date – ISO8601 format
- “Reporting party” – Who needs to send report
- Contact Details of recipient
- “How” – How report is to be sent: Free Text
- “When” – When report is required: Date – ISO8601 format
- “What” – Report requirements Text: Free Text
- Supplementary Information: free text

Pre Departure Reports

Detailed requirements for each report that needs to be sent to the port before departure.
Format:

- Identifying name of Report: Free Text
- Date Issued: Date – ISO8601 format
- “Reporting party” – Who needs to send report
- Contact Details of recipient

- “How” – How report is to be sent: Free Text
- “When” – When report is required: Date – ISO8601 format
- “What” – Report requirements Text: Free Text
- Supplementary Information: free text

Documentation requirements

Details of any documentation that vessels will be required to provide to authorities in port.
Format:

- Vessel type: free text
- Document: free text

3.3.5 Regulations and Exemptions

This section defines details of any relevant local regulations that apply in the port such as bunkering procedures, use of linesmen or Pilot Exemption Certificate (PEC). This does not include national or international regulations which may be documented elsewhere. This also includes any exemptions that may apply to classes of vessel or suitably qualified people.

Regulations

Details of any local regulations that apply in the port or its surrounding waters.
Format:

- Identifier: free text
- Relevant Authority: Free text
- Regulation: Free text or reference to a port website
- Exemptions which may apply including contact details: Free Text.
- Supplementary information : Free Text.

3.3.6 Port safety

This section defines identification of equipment, procedures and points of contact that should be used in case of an emergency within the port.

Emergency coordination centre

The Emergency Coordination Centre information for the port. Individuals should be entered as a “Point of Contact” and referenced within this information.
Format:

- Free text

Emergency response equipment

Types, locations and availability of emergency response equipment.

Format:

- Equipment type: free text
- Equipment availability: free text

Emergency procedures

Relevant emergency response procedures.

Format:

- Category of emergency: free text
- Emergency procedure: fee text

3.3.7 Services

This section defines details of nautical and vessel services.

Nautical services

Services related to the safe passage and berthing of the vessel: e.g. VTS, Pilotage, Towage/Tugs, Lines.

Format:

- Supply service type: free text
- Service name: free text
- Service location description: free text
- Service area description: free text
- Start: day and time: day = Monday-Sunday time=ISO8601
- End: day and time: day = Monday – Sunday time=ISO8601

Vessel services

Supply services related to the vessel and her cargo: Bunkers. Lube Oil, Potable Water, Provisions, Stores, Waste per IMO class, Repairs, Lashing, Cargo Survey, Draught Survey, Vetting.

Format:

- Supply service type: free text
- Service name: free text
- Service location description: free text
- Service area description: free text
- Start: day and time: day = Monday-Sunday time=ISO8601
- End: day and time: day = Monday – Sunday time=ISO8601

3.4. Data definitions for attributes – connected to object “water section”

3.4.1 Vertical restrictions

This section defines vertical restrictions per water section, such as anchorage, fairway, turning basin, basin, berthing pocket.

Maximum draught

Maximum vertical distance from the bottom of the keel to the waterline (NP100).

Units: decimal meters to a defined water density measured in kg/m3

Maximum air draught

Maximum distance from the surface of the water to the highest point on a vessel.

Units: decimal meters

Maintained depth

The Depth at which a channel is kept by human influence, usually by dredging (NP100).

Units: decimal meters with reference to a specific Sounding Datum

Sounding

Measured or charted depth of water or the measurement of such a depth (IHO S-32).

Units: decimal meters with reference to a specific Sounding Datum

Overdredge

An additional depth margin provided by a dredging operation to ensure that the depth at a specific location is never less than the pre-determined maintained depth over the interval between programmed dredging operations (NP100).

Units: decimal meters

Height of tide

The vertical distance from the chart datum to the level of the water at a particular time (IHO S-32).

Units: decimal meters with reference to a specific Sounding Datum

Observed depth

The vertical distance from the sea surface to the sea floor, at any state of the tide.

Minimum Water Density

The minimum water density value within a particular area. (NP100).

Units: kg/m3

Fresh Water Allowance (FWA)

The change in draught of a vessel due to the difference between salt and fresh water (NP100).
Units: decimal meters

Under Keel Clearance (UKC)

The difference between the draught of a vessel and the available depth of water. This is usually the distance between the lowest point of the ship's hull, normally some point on the keel, and the sea bed but consideration must also be given to possible obstructions on the sea bed (IHO S-32).
Units: a defined value in decimal meters or a percentage of draught and/or beam

Under Keel Clearance (UKC) policy

A restriction imposed by an authority on a vessel to ensure the depth below the keel meets an acceptable (usually minimum) single or range of values. May apply to a specific area, type of vessel on arrival, alongside or departure.
Units: decimal meters or a percentage of draught and/or beam

Nature of bottom

The feature of the bottom including the material of which it is composed and its physical characteristics (IHO S-57).
Format: Fixed format text according to IHO S-4 and IHO S-57 values. E.g. Sand, Mud, Clay, Silt, Stones, Gravel, Pebbles, Cobbles, Rock, Boulder, Coral

3.4.2 Horizontal restrictions

This section defines horizontal restrictions per water section, such as anchorage, fairway, turning basin, basin, berthing pocket.

Maximum length

Maximum permitted length overall (LOA).
Units: decimal meters

Minimum Parallel Mid-Body alongside (for berth pocket only)

The minimum Parallel Mid-Body length (the measurement (length) at the water line of the flat side of the vessel) requirement for the berth during time alongside, including both arriving and departing the berth.
Units: decimal meters

Maximum beam

Maximum permitted beam.
Units: decimal meters

Maximum Arrival Displacement (for berth pocket only)

The maximum displacement of the vessel on arrival at the berth.

Units: Tonnes (1000 kg) or Tons (2240lb)

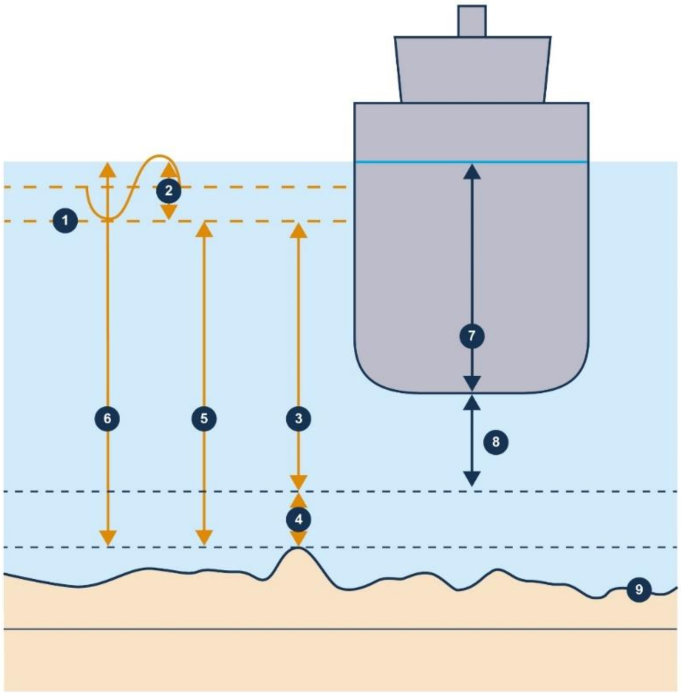
Maximum Displacement Alongside (for berth pocket only)

The maximum displacement of the vessel whilst alongside the berth.

Units: Tonnes (1000 kg) or Tons (2240lb)

3.4.3 Visualization of data definitions

1) Chart Datum
2) Height of tide
3) Maintained depth
4) Overdredge
5) Sounding
6) Observed depth
7) Draught
8) Under Keel Clearance (UKC)
9) Seabed



4. Nautical charts and publications

4.1. Introduction

General

Nautical charts (Electronic Navigational Charts, ENC's) and publications (Sailing Directions, SD's) are both used to navigate the vessel. ENC's are used in the Electronic Chart Display Information System (ECDIS), which is one of the primary navigational tools to navigate a vessel. SD's provide additional information related to chart information (printed and digital) in a particular area. Both are building an information entity and must be carried by every SOLAS vessel. Both nautical charts (ENC or paper charts) and SD's (in printed or digital format) are issued officially by or on the authority of a Government authorized Hydrographic Office or other relevant government institution. The United Kingdom Hydrographic Office (UKHO) offers a global coverage for SD's and could be used if aa national hydrographic office doesn't provide SD's for the relevant national areas. Charts and SD's need input from the port authorities. Ideally, the chart information of the bridge team has the same source and the same time stamp as of the pilot advising the bridge team.

Impact on safety, environment and security

Safety

As this information is the foundation for a passage plan for safe berth-to-berth navigation, this information is important for safety.

Environment

As accidents can also result in a breach of hull integrity, safe berth-to-berth navigation is also important for protection of the environment.

Impact on data owner

A port stakeholder provides data under their responsibility to a responsible port authority. The port authority provides these data to the responsible hydrographic office, preferably structured according to the relevant IHO S-100 compliant data model. The hydrographic office implements these data into an appropriate IHO product according to S-100 compliant product specifications. Relevant Meta Data provide the mariner with the source information. That ensures that the port authority is still visible as data owner.

Current quality and availability

Port data quality and the availability of port infrastructure information are especially important issues, as hydrographic offices do normally not receive timely updates from port authorities, nor receive for instance the port ENC, in which it is hard to detect what the data changes are compared to those ENC's provided by the responsible national hydrographic office.

In the past corrections on ENC's and SD's were sent as hard copy by mail. Today corrections are being sent electronically, so today's expectations about the correctness of data are much higher.

Testimonials of operational people involved in the ship-port interface

In most ports the berth is not identified in the nautical chart. Frequently the berth is not displayed at all, and sometimes even the port is not displayed. Often the identification of the terminals and berths in the ENC is different from the SD's or other publications.

Terminals may check soundings, especially oil terminals, as part of their yearly Terminal Inspection Report (TIRE). However these soundings are normally not shared with the national hydrographic office or shared without the required S-44 format, causing a mismatch between the ENC and the terminal data.

In general there is a lot of conflicting information. Conflicting data may be more recent, but cannot be relied upon if not provided through a hydrographic office - most decisions are based on data from the nautical chart. Normally the Master selects the safest value (the least depth) and/or approaching the berth very careful, at low speed and using extra tugs.

Current developments

Data definitions and data models are in development to allow a smooth data exchange between the local port authority and the national hydrographic office and/or authorized third party data provider. The IHO S-100 Geospatial Information Registry[5] is an appropriate source to access the latest versions of data concepts, data model components and supplementary information.

Call for action

Soundings to be shared with the national hydrographic office, using the relevant IHO standards.

Some nations can process the data swiftly, some are less fortunate. IMO could encourage Member States to improve the data exchange and data processing between port authorities and national hydrographic offices.

Related operations and/or infrastructure to improve the ship-port interface

NA

4.2. Data definitions

Data definitions for nautical charts and publications are organized and maintained by the International Hydrographic Organization (IHO). They are not part of the Port Information Manual, as this document only aims to provide input to a subset of the IHO data – being the Marine Harbour Infrastructure.

[5] http;//registry.iho.int

5. Port passage plan

5.1. Introduction

General

SOLAS Chapter V Regulation 34 requires the voyage to be planned in accordance with IMO guidelines: *the master shall ensure that the intended voyage has been planned using the appropriate nautical charts and nautical publications for the area concerned, taking into account the guidelines and recommendations developed by the Organization: referring to A.893(21)*. Such planning results in a so-called “voyage plan”, a document describing the passage from berth to berth.

A port passage plan is describing a part of the voyage plan: it is a detailed description of the passage from the berth position (or anchor berth) to the pilot boarding place at the departure port or from the pilot boarding place to the berth position (or anchor berth) at the arrival port. It consists out of a route plan, manoeuvring plan, and berthing plan.

The pilot has extensive knowledge available about the local area and circumstances, the Master has extensive knowledge about the ship. Notwithstanding the ultimate responsibility of the Master for berth-to-berth voyage plan, sharing and agreeing on a detailed port passage plan is a shared responsibility of the bridge team and the pilot.

Impact on safety, environment and security

Safety

The significance of this activity is highlighted by the fact that most accidents happen between the pilot boarding place and the berth[6].

Environment

As accidents can also result in a breach of hull integrity, safe berth-to-berth navigation is also important for protection of the environment.

Testimonials of operational people involved in the ship-port interface

Ships may face a deficiency issued by Port State Control when a berth-to-berth voyage plan is not available, regardless whether the Captain can show that the berth is not even displayed in the nautical chart, or the berth was not even known due to last minute changes of the terminal nomination or the berth planning. In addition to this the pilot may have his own ENC on the Portable Pilot Unit, displaying different data than the ENC on the ECDIS.

Today, the exchange of information on the port passage plan happens during the Master Pilot Exchange. However this may be too late for the bridge team and the pilot to align their port passage plans on ECDIS, as well as on the Portable Pilot Units where available.

[6] http://www.emsa.europa.eu/news-a-press-centre/external-news/item/3734-annual-overview-of-marine-casualties-and-incidents-2019.html

Impact on data owner

After a nautical incident has happened, the Marine Accident Investigation Authorities often conclude that there was a lack of port passage information being exchanged before the ship's arrival. This can have an impact on the reputation of the port.

Current quality and availability

Some ports around the world share port passage plans before the vessel arrives at the pilot boarding place. In most ports there are no detailed, shared and agreed port passage plans available.

Current developments

Data definitions for port passage plans, currently existing in IMO, IHO or ECDIS systems have been brought together but need to be formalized. A data model to exchange port passage plans is in development at IEC (IEC 63173-1 ED1, maritime navigation and radiocommunication equipment and systems - data Interface - Part 1: S-421 route plan exchange based on S-100).

Call for action

Allow all ECDIS to absorb S-421.

Formalize the data definitions for port passage planning.

A detailed passage plan, i.e. one that allows timely and unambiguous interventions when deviations occurs, should be shared between the bridge team and the pilot before the pilotage commences. Achieving fine-tuning of the ship's passage plan, based on advice and updates from pilots or harbour master is a shared responsibility between the bridge team and the pilot. Port passage plans based on pilot's advice could be published as part of the Sailing Directions.

Waiting for a technical solution is not needed – today such port passage plans can also easily be shared by sending a pdf file as an attachment to e-mail.

Related operations and/or infrastructure to improve the ship-port interface

NA

5.2. Data definitions

Voyage plan

Consists of a sea passage plan and a port passage plan

Sea passage plan

Covers the intended navigation route from pilot disembarkation point at the departure port to the pilot embarkation point at the arrival port

Port passage plan

Section of the Voyage Plan from the Berth Position (or Anchor Berth) to the Pilot Boarding Place at the departure port or from the Pilot Boarding Place to the Berth Position (or Anchor Berth) at the arrival port. It consists out of a route plan, manoeuvring plan, and berthing plan

Route plan

Consists of a track, waypoints, legs, corridors, no go areas, safety contour, safe speed, speed limit, safety margin and commit point

Manoeuvring plan

Is the plan for the dynamic positioning phase of the voyage, i.e. for the final approach to the berth or anchor berth

Berthing plan

The intended static positioning of the vessel once at berth position or anchor berth

Track

The path followed, or to be followed, between one position and another. This path may be the ground track, over the ground, or the water track, through the water. Used in the sense of ground track in the term recommended track

Waypoint

A geographical position which, together with berth points and pilot points, define the legs that comprise a passage. There may be a turn radius associated with the way point, especially in confined waters.

Format: In decimal degrees to a defined precision, (minus to indicate South and West). Datum WGS 84. Example: 51.887190, 4.284030

Leg

The basic component of a passage. Each leg is terminated by two points which may be waypoints, berth points or pilot points

Corridor

The areas on each side of the track that represent the planned navigable area for a specific vessel. A corridor is associated to a leg and it is defined by its starboard width and port width (in meters) from the track

No go area

Non-navigable geographical areas (polygons) defined by a safety contour or by fixed man-made structures (breakwaters, berths)

Safety contour

Is the bathymetric line (in meters with 1 decimal) referred to the chart datum and defined by e.g. the vessel maximum draught plus the expected reduction of UKC due to the motion in the water

Safe speed

An interval of expected speeds over ground per individual leg (minimum and maximum decimal knots)

Speed limit

Any speed restriction (in decimal knots) associated to any leg, either in due to regulations or safety of navigation

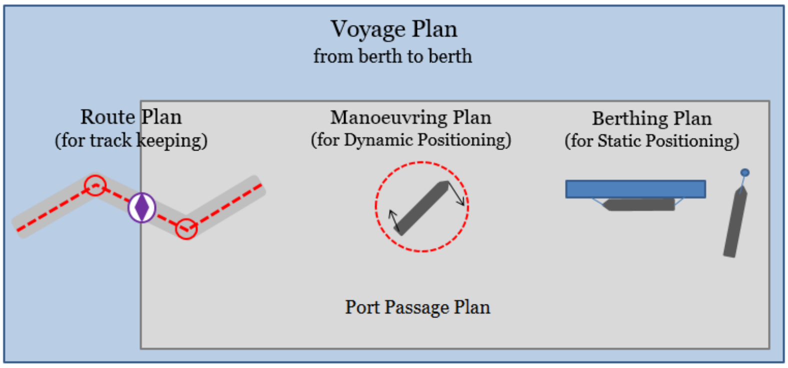
Safety margin

The additional area between the edges of the corridors and the no go areas available as reserve in case of unplanned circumstances. The safety margin can also be the reserve speed over ground between the speed limit and the maximum planned speed

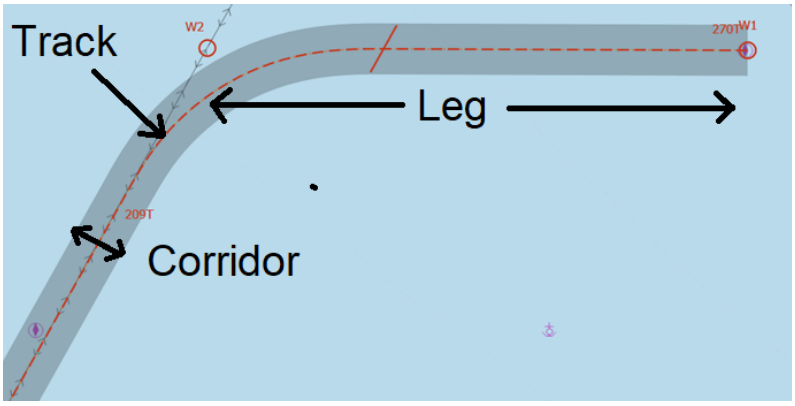
Commitment point

The geographic point of no return located on the track, beyond which the vessel is committed to enter a fairway (either inbound or outbound) or committed to a course of action

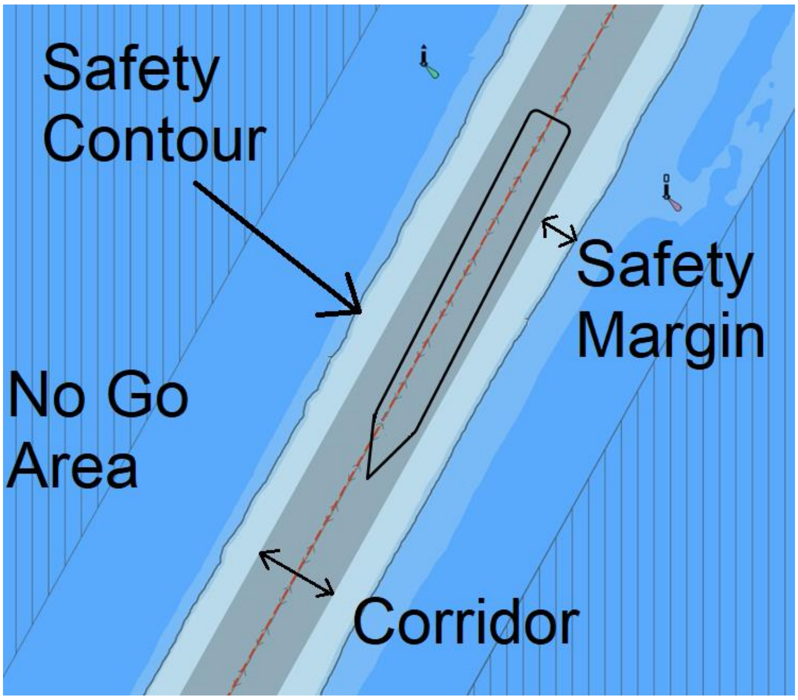
5.3. Visualization of data definitions



Voyage, Port Passage, Route, Manoeuvring and Berthing plan



Track, Corridor, Leg



Safety contour and margin, corridor, no go area

6. Berth planning arrival

6.1. Introduction

General

Berth planning for an arriving ship is normally organized by the terminal operating that berth: it tells which ship will be moored at which berthing position, which side alongside and at what time.

Impact on safety, environment and security

Safety

The berth planning for an arriving ship is the corner stone to allow a ship to optimize speed well ahead of time, ensuring it can maintain sufficient steering speed and to avoid dropping anchor. Both contribute to a safe approach and less incidents on the anchorage or in the approaches. Apart from this, better berth planning also allows better rest hour planning of crew (so they're available when the ship is safely alongside and finished with engine(s)), and of nautical services.

Environment

Optimising speed has also a significant impact on the environment. As most ships have voyages of less than 48 hours[7], the impact of e.g. a 12-hour notice of the terminal has a large impact on the speed of the vessel and therefore the emissions. Fuel consumption in relation to the ship's speed is exponential; therefore a small speed reduction results in large reduction of overall emissions. In addition better hinterland transport planning (next modality planning) due to improved berth planning can realize an even larger impact on environment.

Apart from speed optimization: less waiting time at the anchorage or manoeuvring at low speeds close the pilot boarding place results in less biofouling. This attachment of marine organisms to the hull of a ship, which has been a perennial headache for the shipping industry for centuries, is a particular problem for high fuel consumers such as container ships. Less biofouling has a positive impact on the environment due to less fuel consumption[8].

Security

Allowing the ship to avoid anchoring has also a positive impact on security, especially in those areas affected by piracy.

Testimonials of operational people involved in the ship-port interface

In a large majority of terminals the berth planning is not specific enough or not timely available to allow optimization of speed. It should be noted that this is trade specific. As examples, the cruise and LNG industry the berth planning is available months ahead of time. In the oil industry, the berth planning

[7] Marine Traffic data

[8] https://container-news.com/the-growing-threat-that-lurks-bleow-the-waterline

might be available for a refinery, but not for an oil storage terminal. In the container sector the berth planning is very dynamic and is often unavailable till very last moment.

Impact on data owner

Sharing data about berth planning might be commercially sensitive, especially if the terminal is serving multiple customers, and/or if the commodity being handled at that terminal has an impact on the market price. Therefore the data owner might want to control the distribution of such data – it is important to address this issue. Apart from this, it might need extra resources to keep the data up to date and to exchange it electronically.

Current quality and availability

Today shipping lines complain that a lack of timely and transparent berth planning does not allow them to optimize speed.

Current developments

In 2019 it has been proposed that IMO [9]should develop guidelines related to the port call optimization process, and in particular the implementation of the framework on Just-In-Time (JIT) Arrivals, which encourages voluntary cooperation between the port and shipping sectors to contribute to reducing greenhouse gas emissions from ships (Resolution MEPC 323/74).

As part of the IMO's drive to harmonise data reporting from ships through the FAL Convention, BIMCO has initiated the development of a special charter party clause. The purpose of the clause will be to encourage shipowners to adopt the use of standard data segments when transmitting port logistic operational data and real time data, e.g. ETAs and ships' position related information, to ports and other stakeholders prior to arrival. Although the BIMCO clause is voluntary, the use of harmonised data segments will help build integrated global data sharing capability.

Today there is no data model available that addresses all operational needs and is maintained by a robust organization.

Submission to IMO FAL (FAL 43/7/1) to define the time stamps and locations of ship arrival and departure has been made.

Submission to IMO FAL (FAL 44/18/2) has been made, which contains a proposal for inclusion of a new output in the agenda of the FAL Committee to develop guidelines for harmonized communication and electronic exchange of operational data for port calls.

[9] IMO MEPC 323/74

Call for action

Propose a value proposition to provide berth planning to allow ships to optimise speed without disclosing commercial sensitive data.

Related operations and/or infrastructure to improve the ship-port interface

NA

6.2. Data definitions

Estimated Time of Arrival (ETA) Berth

The date and time the ship estimates to arrive at a specified location (e.g. specified berth)

Format: yyyy-mm-ddThh:mm:ssZ

Requested Time of Arrival (RTA) Berth

The date and time the ship is requested to arrive at a specified location (e.g. specified berth)

Format: yyyy-mm-ddThh:mm:ssZ

Planned Time of Arrival (PTA) Berth

The date and time the ship plans to arrive at a specified location (e.g. specified berth)

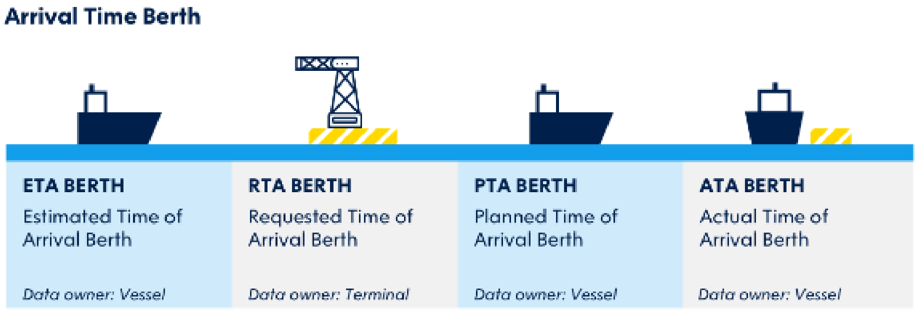
Format: yyyy-mm-ddThh:mm:ssZ

Actual Time of Arrival (ATA) Berth

The date and time the ship arrives at a specified location (e.g. specified berth) (first line secured in ship's logbook)

Format: yyyy-mm-ddThh:mm:ssZ

6.3. Visualization of data definitions



Arrival time berth

7. Port planning arrival

7.1. Introduction

General

Port planning for an arriving ship is organized normally by the port authority, based on the berth planning of the terminal in their port area. It tells which ship is welcome at which pilot boarding place, based on maximum sizes and conditions, availability of the berth, fairway, nautical services and clearance by authorities. Arrival in port requires normally a notification to port authorities, which is related to chapter “Notifications and Declarations”.

Impact on safety, environment and security

The impact is the same as for berth planning.

Testimonials of operational people involved in the ship-port interface

Most ports provide information at the first Calling In Point of the Vessel Traffic Service area.

Most delays are experienced at so-called “first in first out” ports.

Some ports have a platform for sharing the port planning.

Impact on data owner

Sharing port planning data is generally not commercially sensitive, as the port authority is often a public organization without commercial interest. If the port is directly linked to the berth planning of a terminal, it might cause discussions with the related terminal.

Current quality and availability

Today shipping lines complain that the lack of quality, transparency and timely availability of the port planning does not allow for speed optimization. Apart from this, port authorities normally share the port planning through Vessel Traffic Services (VTS), which use Very High Frequency (VHF) radios to inform ships. The maximum range of VHF is limited to approximately 30 nautical miles, which is not sufficient for shipping to optimize speed.

Current developments

Today there is no data model available that addresses all operational needs and is maintained by a robust organization.

Submission to IMO FAL (FAL 43/7/1) to define the time stamps and locations of ship arrival and departure has been made.

Submission to IMO FAL (FAL 44/18/2) has been made, which contains a proposal for inclusion of a new output in the agenda of the FAL Committee to develop guidelines for harmonized communication and electronic exchange of operational data for port calls.

Ideal scenario is to relay the Requested Time of Arrival (RTA) pilot boarding place directly to the Electronic Chart Display Information System (ECDIS). Technically this is possible: the RTA may be expressed in the schedule of the ship's voyage plan through the route exchange (RTZ) format (part of IEC 61174) and the succeeding S-421 format (IEC 63173-1). If there is no voyage plan available, it's technically possible to use a "fake" route with only RTA pilot boarding place and berth (S-421 requires two waypoints). The perfect solution would be to send the port passage plan, with an RTA at both the pilot boarding place and berth. In practice today most ECDIS systems cannot yet absorb this data.

Sharing RTA pilot boarding place through other means (e.g. e-mail) is possible; the officer on duty can watch the list of e-mails no different than for example ones related to Navtex, weather charts etc., although these are only secondary to for example ECDIS and radar. However not every bridge is equipped with an e-mail account.

Satcom-C updates are preferred as they are printed off automatically. The officer on duty can simply tear off the paper segment and read it without having the full distraction of downloading and reading through multiple e-mail headers. Satcom-C is compulsory on every SOLAS ship.

Call for action

If the port planning could be sent to the ship e.g. 12 hours in advance instead of being relayed at the first Calling In Point, it would allow the vessel to reduce speed in a timely manner.

Allow all ECDIS to absorb S-421. Improve and automate vessel schedule management in ECDIS and encourage ship officers to include schedule information in the voyage plan.

Related operations and/or infrastructure to improve the ship-port interface

The safety of anchorages can be improved by for example ensuring that the seabed is clear of lost anchors and other debris, having anchor berths in place with sufficient diameter to allow for dragging and swinging, and provision of current information during the approach to the anchorage.

Acknowledging that especially container ships prefer to drift, a so-called "designated drifting area" could be advised to the ships in Sailing Directions.

VTS should be the one and only source for the ship when and where the ship needs to be – avoiding multiple requests to the ship by multiple parties (e.g. agent, terminal, etc.).

7.2. Data definitions

Estimated Time of Arrival (ETA) Pilot Boarding Place

The date and time the ship estimates to arrive at a specified location (e.g. specified pilot boarding place)

Format: yyyy-mm-ddThh:mm:ssZ

Requested Time of Arrival (RTA) Pilot Boarding Place

The date and time the ship is requested to arrive at a specified location (e.g. specified pilot boarding place)

Format: yyyy-mm-ddThh:mm:ssZ

Planned Time of Arrival (PTA) Pilot Boarding Place

The date and time the ship plans to arrive at a specified location (e.g. specified pilot boarding place)

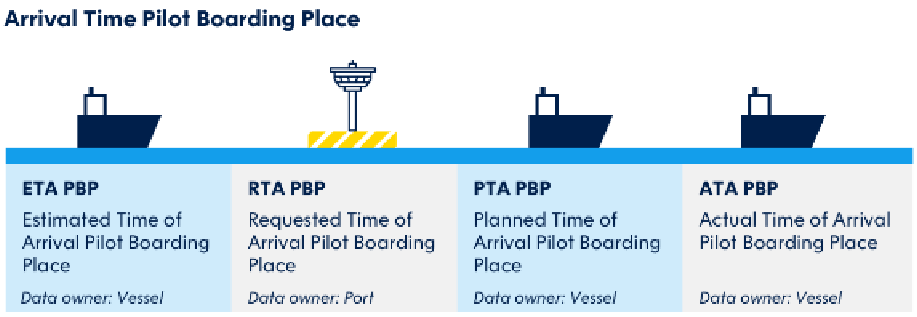
Format: yyyy-mm-ddThh:mm:ssZ

Actual Time of Arrival (ATA) Pilot Boarding Place

The date and time the ship arrives at a specified location (e.g. specified pilot boarding place)

Format: yyyy-mm-ddThh:mm:ssZ

7.3. Visualization of data definitions



Arrival time pilot boarding place

8. Notifications and declarations

8.1. Introduction

General

Notifications and declarations must be provided by the ship to the authorities concerned to require ship-, cargo-, and persons' clearances. Typical clearances come from customs, immigration, port health, and port authorities.

Some clearances are needed prior to entering port (e.g. ship clearance, health), other prior to the start of operations (e.g. customs) and others prior to departing port. Therefore the timing of such clearances for facilitating the arrival or departure of the ship or starting loading or unloading activities is very important.

Certain requirements for ship services also need to be reported to authorities, such as MARPOL related services (e.g. waste collection or bunkers).

Normally the ship agent sends to the ship which data should be completed in which format. The Master is normally in charge to complete this data and returns it to the ship agent, who again processes this data into an application (of for instance the Port Community System) or into hard copy forms – depending on the port.

Impact on safety, environment and security

Safety

Completing declarations and notifications between two ports may be resource intensive and this is usually carried out by ship agents, representing the ship Master. However without the support from ship's agents and bearing in mind the limited time available to the Master to complete this administrative task may affect the safe navigation of the ship.

Environment

Unpredictability of time needed for clearance of cargo operations by customs on arrival and departure often leads to waiting times of ships at the anchorage, as they build this uncertainty into their schedules, especially for container ships. This additional time at anchorage has the effect of increasing ship's emissions in port.

Testimonials of operational people involved in the ship-port interface

Even ports that are close to one another in the same country use different formats. It starts with the name of the crew member: every port requires a different sequence of first names, middles names, surnames and has different requirements when it comes to e.g. the use of e.g. comma's etc. This is followed by whether this person is male or female, nationality, again in different formats and sequence.

Impact on data owner

If the data is not completed correctly, the ship may not be granted clearance to the port. If the data is found incorrect when checked by the authorities, the local authority may issue a deficiency, fine or even imprisonment. The administrative burden may therefore be the main reason for a lot of anxiety by the Master to complete the data correctly.

Current quality and availability

Typing so many different crew names of different nationalities, with their own spelling characteristics, and having different orders of appearance of first name and last name, or having multiple last names, into so many different formats (every port uses its own format) results in low data quality.

Some ports have a Port Community System, facilitating Business to Government (B2G) reporting and allowing easy sharing of this kind of data with the local authorities. However this does not change the administrative burden of completing the data when different formats remain common practice.

Current developments

Recalling the ongoing work at the IMO FAL Committee in relation to the harmonization and standardization of data formats for data elements required by the FAL forms, and recognizing the benefits in establishing a maritime data element register to ensure inter-operability between services and to facilitate direct machine-to-machine communication, harmonized data models are currently being developed by the Experts Group on Data Harmonization (EGDH) of the IMO. In addition to establishing a maritime data element register the EGDH also defines the code lists and business rules that is to be applied when the data elements are implemented in a data system (i.e. Single Window). The code lists, which in essence are data variables to be used for a specific data element, will enhance the consistency of the data and the possible re-use of the data. The business rules which are defined for one data element or a group of data elements provide implementation rules when the data elements are used in a system, ensuring that various systems behave, process and validate the data elements in a predictable and similar manner.

IMO has established Guidelines for the establishment of Maritime Single Windows. These guidelines focus on the development of a single window environment for maritime transport, based on a consensus that there is a need to reduce administrative burdens on shipping, and the need to harmonize this with other trade facilitation mechanisms for trade.

In the trade and transport business environment, electronic data exchange between systems has been developed in great detail during recent decades. However, now see that the standard electronic messages, like those based on FAL forms, are being more and more replaced by specified data sets, each encompassing harmonized data elements. This approach avoids duplication and allows the reuse of data sets and data elements across transport modalities and to better arrange the authentication and authorization requirements.

Some nations already request ships to carry required software, namely a small program that the Master can use to enter relevant ship and crew data; the formatted data is then compressed and sent via ships satellite communications. Similarly, with recent upgrades to communication systems on board ships, one could envision the ship going to a live website to enter data as well – this might be the simplest way forward provided the system is set that if signal is lost the ship's system can take back up where he/she left off.

Call for action

Port authorities can align the notifications and declarations of their port with the international IMO FAL standards but are not permitted to amend those under other authorities, such as customs and immigration.

How notifications and declarations should be submitted is regulated by national law. However port authorities can align the notification and declarations related to their mandate with the international IMO FAL standards by making a request to national authority to make amendments.

Authorities should be clear and transparent about their clearance process, in order for the maritime and shipping community to know what to expect in advance and to be able to plan and act upon that process.

Harmonization of the data models, data elements and definitions for declarations and notifications should be aligned with those for operational data. To succeed this should be implemented by the port community as well as all ship systems in order to facilitate a seamless exchange of information across borders and IT platforms.

Apart from harmonization of existing data elements, new data elements need to be drafted, such as time definitions related to boarding times and clearances by local authorities.

Legal framework on the re-use of data on declarations and notifications should be developed – this prohibits that data is not shared today. Such framework could be based upon UNECE Recommendation No. 35, Establishing a Legal Framework for International Trade Single Window"

Data definitions for boarding times and clearances should be developed.

Related operations and/or infrastructure to improve the ship-port interface

Advance clearance by customs for cargo operations would eliminate a lot of idle time alongside and have a positive impact on emissions from shipping. If such advance clearance cannot be provided, to be transparent about how many hours after arrival berth clearance can be granted – a process that the ship allows to plan upon.

Inspections based on a risk-based assessment versus inspecting all ships at random can be defined as another operational improvement.

Some authorities request notifications and declarations up to 3 weeks in advance, at a time the vessel has no information yet (example: which crew will be on board due to crew changes in other ports).

In most ports it is unknown if authorities are coming, when they are coming, or whether clearance has been granted. Most authorities board the ship at different times. Immigration officers for instance may come on board at any time, forcing all crew to wake up for a “face check”, and custom officers for instance boarding 2 hours later. Both are often causing significant negative impact to the rest of crew members, causing even violation of rest hours, which is again violation of the Marine Labour Convention (MLC).

Authorities may board without any ISPS notification or identification, which may lead to the gangway watch to accept “anyone with an uniform”.

8.2 Data definitions

In its Annex, the FAL Convention contains Standards and Recommended Practices and rules for simplifying formalities, documentary requirements and procedures on ships’ arrival, stay and departure. Under the FAL Committee, IMO has developed standardized FAL documentation (known as FAL Forms) for authorities and Governments to use, and the FAL Convention urges all stakeholders to use these.

The following updated FAL Forms are effective since 1 January 2018:

- IMO General Declaration (FAL form 1)
- Cargo Declaration (FAL form 2)
- Ship's Stores Declaration (FAL form 3)
- Crew's Effects Declaration (FAL form 4)
- Crew List (FAL form 5)
- Passenger List (FAL form 6)
- Dangerous Goods (FAL form 7)

Three additional declarations entered into force on 1 January 2018:

- Security-related information as required under SOLAS regulation XI-2/9.2.2
- Advance electronic cargo information for customs risk assessment purposes
- Advanced Notification Form for Waste Delivery to Port Reception Facilities

The FAL Convention has been in force since 1967, and is kept continually amended and updated by Governments at the FAL Committee of IMO. This applies to adopting new or revised Standards and Recommended Practices in the Annex.

The scope of the IMO Compendium on Facilitation and Electronic Business is the FAL Convention, including exchange of logistics and operational port and shipping data.

The EGDH is responsible of the technical maintenance and development of the IMO Compendium, a tool for software developers that design the systems needed to support transmission, receipt, and response via electronic data exchange of information required for the arrival, stay and departure of the ship, persons, and cargo to a port. By harmonizing the data elements required during a port call and by standardizing electronic messages, the IMO Compendium facilitates the exchange of information ship to shore and the interoperability of single windows, reducing the administrative burden for ships linked to formalities in ports.

The IMO Compendium consists of an IMO Data Set and IMO Reference Data Model agreed by the main organizations involved in the development of standards for the electronic exchange of information related to the FAL Convention: the World Customs Organization (WCO), the United Nations Economic Commission for Europe (UNECE) and International Organization for Standardization (ISO).

Since April 2019, the FAL Convention makes it mandatory for ships and ports[10] to exchange FAL data electronically, and encourages the use of the so-called “single window” concept, in which all of the many agencies and authorities involved exchange data electronically via a single entry point.

[10] Only when Governments concerned have ratified the FAL Convention. Currently, 123 Contracting States ratified this Convention, representing more than 95% of world tonnage.

9. Nautical service planning

9.1. Introduction

General

Nautical services are VTS, Pilots, Tugs and Boatmen/Linesmen. Depending on national or local regulations it might be compulsory to use these services, or might be that parties are exempted from using these services (e.g. Pilot Exemption Certificate (PEC)).

Nautical service times often have a connection to the arrival or departure times at/from e.g. pilot boarding place or berth – but these can of course be different.

Impact on safety, environment and security

Safety

It goes without saying that the availability of nautical services has an impact on safe navigation.

Their arrival time also affects the crew rest hours, as some services may require the presence of crew on mooring stations or pilot embarkation stations – especially if they arrive by e.g. helicopter, which requires the presence of additional crew as well, such as in the case of firefighting squads.

Environment

Absence of these services may delay the departure of a vessel, and the corresponding arrival time of the next vessel with a cascading impact on speed optimisation.

Testimonials of operational people involved in the ship-port interface

Frequently one of the nautical services is missing, which delays the vessel. For instance if the linesmen are missing, but tugs and pilot are on time, the vessel cannot depart.

Impact on data owner

In some ports private companies offer nautical services. Data might become commercially sensitive if this data is used to claim e.g. delays – while these delays may have been caused by the delayed departure of another vessel (for different reasons, such as cargo or bunker operations).

Current quality and availability

The availability of nautical services is normally not digitally communicated, nor is it available on a timely basis and is often communicated by phone or e-mail.

It's also quite often the case that the information when and how many nautical services (e.g. tugs) are requested is also often unavailable digitally and on a timely basis.

Current developments

Today there is no data model available that addresses all operational needs and is maintained by a robust organization.

Submission to IMO FAL (FAL 44/18/2) has been made, which contains a proposal for inclusion of a new output in the agenda of the FAL Committee to develop guidelines for harmonized communication and electronic exchange of operational data for port calls.

A new submission to IMO FAL to define the starting and completion times of services is being drafted in 2020.

Call for action

NA

Related operations and/or infrastructure to improve the ship-port interface

Apart from ordering and cancelling tugs, in most ports the Master has limited understanding on tugs movements and activities. Pilots have no guidance how to inform the Master as tug orders are not provided in the IMO Standard Marine Communication Phrases.

Often berths and related traffic grow in size, but the necessary tugboat capacity (in number and bollard pull) to accommodate these larger vessels is not always available.

9.2. Data definitions

Estimated Time of Start (ETS)

The date and time a service provider estimates a specified service will start

Format: yyyy-mm-ddThh:mm:ssZ

Requested Time of Start (RTS)

The date and time a service provider is requested to start a specified service

Format: yyyy-mm-ddThh:mm:ssZ

Planned Time of Start (PTS)

The date and time a service provider plans to start a specified service

Format: yyyy-mm-ddThh:mm:ssZ

Actual Time of Start (ATS)

The date and time a service provider starts a specified service

Format: yyyy-mm-ddThh:mm:ssZ

Estimated Time of Completion (ETC)

The date and time a service provider estimates a specified service will be completed

Format: yyyy-mm-ddThh:mm:ssZ

Requested Time of Completion (RTC)

The date and time a service provider is requested to complete a specified service

Format: yyyy-mm-ddThh:mm:ssZ

Planned Time of Completion (PTC)

The date and time a service provider plans to complete a specified service

Format: yyyy-mm-ddThh:mm:ssZ

Actual Time of Completion (ATC)

The date and time a service provider completes a specified service

Format: yyyy-mm-ddThh:mm:ssZ

Nautical service times are normally recorded in logbooks. Typical entries are:

Starting times:

- Pilot on board – ATS pilot service
- Tug(s) standby & ready to assist – ATS tug service
- First line ashore / First line released – ATS mooring service

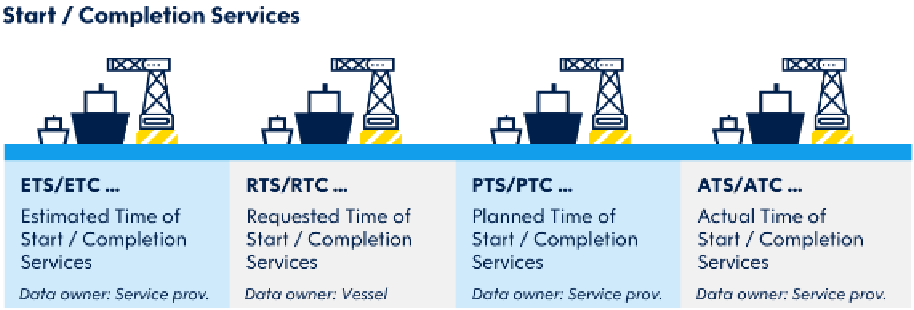
Completion times:

- Pilot disembarked – ATC pilot service
- Tug(s) dismissed – ATC tug service
- Last line secured / Last line released – ATC mooring service

Other logbook entries related to nautical services, but normally not rendered by a third party:

- All Fast – All lines tight and secured, ETOPS secured if applicable
- All Clear – All lines clear of propellers and thrusters
- Safe Access to Shore open: gangway in position as per applicable regulations (e.g. safety in place)
- Safe Access to Shore closed: gangway not accessible as per applicable regulations (e.g. safety has been removed)

9.3. Visualization of data definitions



Start / completion times services

10. Vessel and cargo service planning

10.1. Introduction

General

Vessel services are normally planned by the ship agent in collaboration with the Master and Chief Engineer whereby the agents act as a coordinator between the vessel and the vessel services (e.g. bunkers, provisions, waste collection). Cargo services are normally planned by the terminal in collaboration with the Master or Chief Officer.

Impact on safety, environment and security

Safety

Vessel and cargo service planning also has a strong impact on the crew rest hour planning, which is important for safety. The total impact of all services combined together provided to the ship has a notably significant impact.

Environment

Vessel and cargo service planning dictate normally the port stay time, which has not only a large effect on the local emissions, but also on the emissions at sea due to increased speeds at sea to make up the time lost in port, and the emissions of the next ship coming in, and waiting for the berth to become available.

Security

Knowing who is coming in and out and when is important for security reasons.

Testimonials of operational people involved in the ship-port interface

Waking up crew members when the bunker barge has already arrived results in drowsy crew attending mooring operations and bunker transfers. Timely notification prior to arrival of the relevant service at the ship is needed not only to wake up the crew but also allow them to prepare duties such as having lines or to open the bunker break. Some services are not known to the ship agent as they have been ordered by the ship or ship's superintendent.

Lack of transparency often causes delays on departure, as well as for the service providers. For instance, the bunker break might be occupied by another barge for e.g. waste collection.

Terminals are not always aware of services, which is important as sometimes services need to be approved by the terminal prior to starting time. Also port authorities are not always informed, which may be necessary for clearance (e.g. for MARPOL-related services).

Impact on data owner

The service provider may be impacted due to the fact that crew may not be stand-by on arrival of the service – as an example, a bunker barge may be waiting for crew on deck to tie up the barge.

Service providers may need to invest to exchange this data digitally.

Current quality and availability

This data is often only shared by phone or e-mail, and often only in local language.

Current developments

Today there is no data model available that addresses all operational needs and is maintained by a robust organization.

Submission to IMO FAL (FAL 44/18/2) has been made, which contains a proposal for inclusion of a new output in the agenda of the FAL Committee to develop guidelines for harmonized communication and electronic exchange of operational data for port calls.

A new submission to IMO FAL to define the starting and completion times of services is being drafted in 2020.

Call for action

Oblige parties to share data regarding cargo and vessel services. Learn from best practices of both LNG and cruise line sectors when it comes to planning.

Related operations and/or infrastructure to improve the ship-port interface

Gangway netting is often a reason for delayed boarding of services. Pre-rigged gangway netting would allow a rapid start of operations and less risks for crew involved in the rigging process. However this requires a submission to IMO MSC/SDC and the adoption of national authorities.

10.2. Data definitions

Estimated Time of Start (ETS)

The date and time a service provider estimates a specified service will start

Format: yyyy-mm-ddThh:mm:ssZ

Requested Time of Start (RTS)

The date and time a service provider is requested to start a specified service

Format: yyyy-mm-ddThh:mm:ssZ

Planned Time of Start (PTS)

The date and time a service provider plans to start a specified service

Format: yyyy-mm-ddThh:mm:ssZ

Actual Time of Start (ATS)

The date and time a service provider starts a specified service

Format: yyyy-mm-ddThh:mm:ssZ

Estimated Time of Completion (ETC)

The date and time a service provider estimates a specified service will be completed

Format: yyyy-mm-ddThh:mm:ssZ

Requested Time of Completion (RTC)

The date and time a service provider is requested to complete a specified service

Format: yyyy-mm-ddThh:mm:ssZ

Planned Time of Completion (PTC)

The date and time a service provider plans to complete a specified service

Format: yyyy-mm-ddThh:mm:ssZ

Actual Time of Completion (ATC)

The date and time a service provider completes a specified service

Format: yyyy-mm-ddThh:mm:ssZ

Vessel and cargo service times are normally recorded in logbooks. Typical entries are:

Starting times:

- Container sector: first commercial move – ATS terminal service
- Tanker sector: connecting first hose – ATS terminal service
- Bunker sector: first line of barge, or first hose of truck – ATS bunker service

All starting times are based on when interaction with the ship starts, allowing rest hour planning.

Completion times:

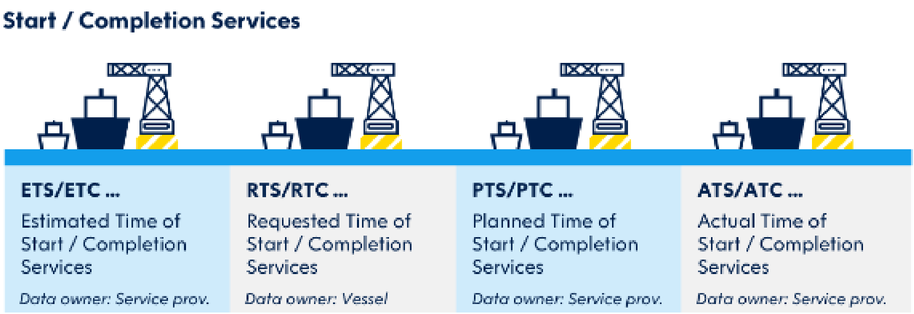
- Container sector: last commercial move or booms up – ATC terminal service.
- Tanker sector: last hose disconnected – ATC terminal service
- Bunker sector: let go last line of barge, or last hose of truck – ATS bunker service

All completion times are based on when interaction with the ship stops, allowing reliable departure planning.

Other logbook entries related to vessel and cargo services, but normally not rendered by a third party:

- Safe Access to Shore open: gangway in position as per applicable regulations (e.g. safety in place)
- Safe Access to Shore closed: gangway not accessible as per applicable regulations (e.g. safety has been removed)

10.3. Visualization of data definitions



Start / completion times servcies

11. ISPS

11.1. Introduction

General

The International Ship and Port Facility Security Code (ISPS Code) applies to the following types of ships engaged on international voyages:

- Passenger ships, including high-speed passenger craft;
- Cargo ships, including high-speed craft, of 500 gross tonnage and upwards; and
- Mobile offshore drilling units.

The ISPS Code also applies to Port facilities serving such ships engaged on international voyages.

All services provided to the vessel must be identified for security reasons. If services arrive over land, most of the time the terminal is also involved, as they need to pass the gate of the terminal. If services arrive over sea or waterways, often only conditions of the vessel security plan are involved, although sometimes also those belonging to the terminal are also included.

Impact on safety, environment and security

Safety

Uncoordinated attendance of ship services may have a large impact on crew rest hour planning.

Environment

If ship services are not able to pass the security of the terminal, the vessel may be delayed resulting in an increased turnaround time, cost and potentially higher speeds to the next port, resulting in more emissions.

Security

If the ISPS code is not correctly applied, vessels and terminals could be exposed to criminal activities.

Testimonials of operational people involved in the ship-port interface

Most ports have a different way of handling visitor attendance to the vessel. Normally the visitors have no information whether clearance has been granted by the vessel and terminal, or whether the visitor list was sent to the correct terminal and only find out at the gate. This is especially frustrating for family visiting crew members or crew members trying to reach the vessel for a crew change as they will not be admitted to the terminal premises and vessel. Also, terminals face a lack of timely available visitor lists, which hinders a smooth clearance process at their gate. Agents cannot provide clearance, as he/she needs to get this from the ship.

Most service providers know days or weeks in advance that they've been contracted to deliver a service to the ship, however they are only advised at the last minute when the service needs to be delivered, forcing them to send a list of all their employees as possible visitors, as they do not know yet who will be on hand to attend the ship.

Impact on data owner

The data owner is the Ship Security Officer (SSO). The ship may face a recorded deficiency of flag state or port state inspectors if the details of the visitors on board are not correct.

Completing all related shore leave passes is again an administrative burden for the SSO.

Current quality and availability

Often the ship agent collects the names of service providers and visitors, and gives permission on behalf of the vessel. The vessel is not always aware of this list. Also, the service providers and visitors are not always informed that clearance has been granted or not, and only find out on arrival at the gate of the terminal.

The Maritime Security Module of IMO's Global Integrated Shipping Information System (GISIS) holds publicly-available information on all ISPS Code certified port facilities around the world. The module also holds contact details for relevant national authorities in each country each of whom are in charge of overseeing the certified ports. The GISIS database contains security information related to about 15.000 port facilities. At the end of 2019, 27% of them required updating of details regarding the Port Facility Security Plans.

Current developments

Today there is no data model available that addresses all operational needs and is maintained by a robust organization..

Submission to IMO FAL (FAL 44/18/2) has been made, which contains a proposal for inclusion of a new output in the agenda of the FAL Committee to develop guidelines for harmonized communication and electronic exchange of operational data for port calls.

A new submission to IMO FAL to define the starting and completion times of services is being drafted in 2020 – which should also identify the person who will visit the ship (keeping in mind relevant data protection laws).

Call for action

Standards for ISPS clearances need to be developed.

Port authorities should be encouraged to keep their information updated in the GISIS database; a user would initially need to register a web account at gisis.imo.org in order to gain access. One or more contacts could be authorized in each country to be able to amend the information. IMO's Secretariat can be contacted at marsec@imo.org

Often the shipping industry is compared to the airline industry. Therefore one could envisage a system of international boarding passes, based on the unique numbers of the ship, the terminal, and the berth.

Related operations and/or infrastructure to improve the ship-port interface

At a minimum of 24 hours in advance, the visitor list must be known to the ship, which can approve it and make it available to the ship agent and terminal.

11.2. Data definitions

To be developed.

12. Port planning departure

12.1. Introduction

General

Port planning for a vessel departing it's berth is normally organized by the port authority, based on the completion time of vessel and cargo services, availability of the fairway, nautical services and weather and tide conditions. This is different from port planning on arrival, in which the port planning is dependent on the berth availability and therefore berth planning. This can be different to when a vessel is shifting to another berth; then the port planning is again dependent on the berth planning.

Departure from port normally requires a notification to port authorities, which is related to chapter "Notifications and Declarations".

Impact on safety, environment and security

Safety

The planning of crew rest hours is affected by last minute decisions (such as a delay to the departure). This also impacts the ship safety, due to rushed decisions to depart, not allowing the bridge team to properly prepare a safe port passage.

Environment

The impact of port planning for a departing vessel is directly related to the incoming vessel bound for the same berth. If the vessel alongside is delayed, the incoming vessel cannot optimize it's speed and has therefore an impact on emissions.

Testimonials of operational people involved in the ship-port interface

To be collected.

Impact on data owner

Sharing data about port planning is normally not commercially sensitive, as the port authority is normally a public organization with no commercial interest.

Current quality and availability

Today shipping lines complain that the berth and /or port planning do not allow them to optimize speed.

Current developments

Today there is no data model available that addresses all operational needs and is maintained by a robust organization..

Submission to IMO FAL (FAL 43/7/1) to define the time stamps and locations of ship arrival and departure has been made.

Submission to IMO FAL (FAL 44/18/2) has been made, which contains a proposal for inclusion of a new output in the agenda of the FAL Committee to develop guidelines for harmonized communication and electronic exchange of operational data for port calls.

Call for action

Sufficient notice to the vessel regarding Requested Time of Departure Berth to allow proper rest hour planning and safe port passage.

Related operations and/or infrastructure to improve the ship-port interface

Not every port has a so-called lay-by berth: i.e. a berth to use as plan B in case upon departure the ship is suddenly requested to stay in port (e.g. engine failure, sick crew member or awaiting a critical service).

12.2. Data definitions

Estimated Time of Departure (ETD) Berth

The date and time the ship estimates it departs from a specified location (e.g. specified berth)

Format: yyyy-mm-ddThh:mm:ssZ

Requested Time of Departure (RTD) Berth

The date and time the ship is requested to depart from a specified location (e.g. specified berth)

Format: yyyy-mm-ddThh:mm:ssZ

Planned Time of Departure (PTD) Berth

The date and time the ship plans to depart from a specified location (e.g. specified berth)

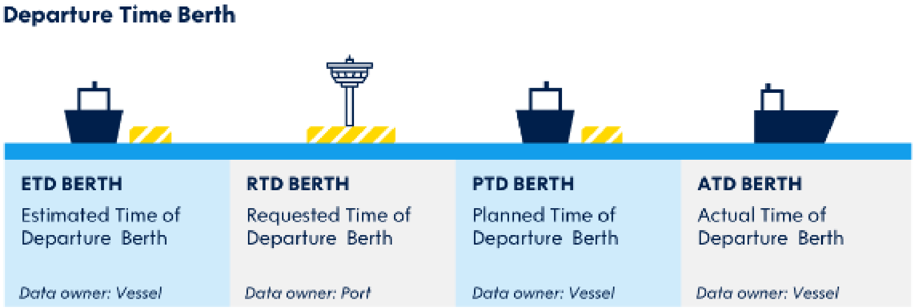
Format: yyyy-mm-ddThh:mm:ssZ

Actual Time of Departure (ATD) Berth

The date and time the ship departs from a specified location (e.g. specified berth) (last line released in ship's logbook)

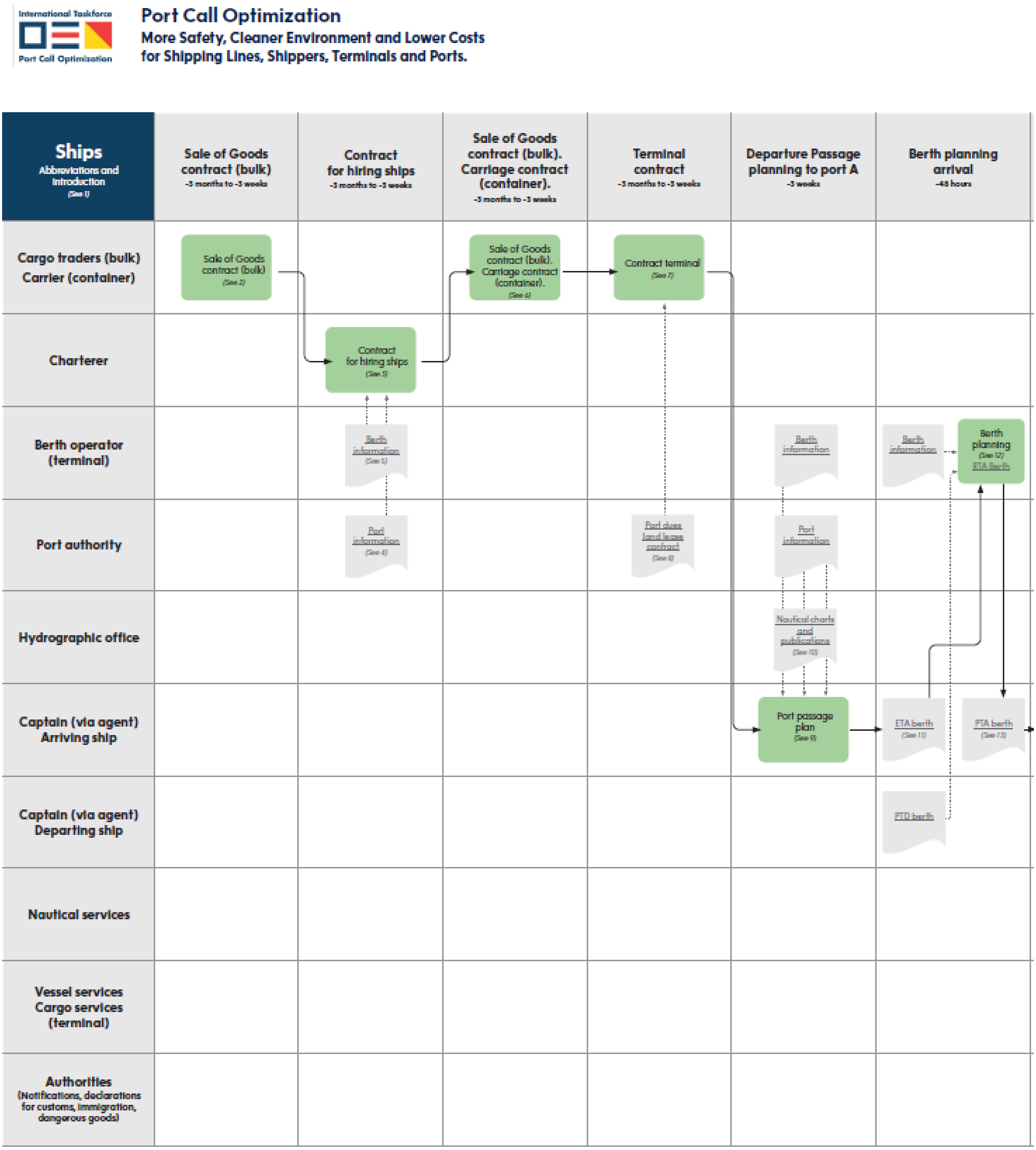
Format: yyyy-mm-ddThh:mm:ssZ

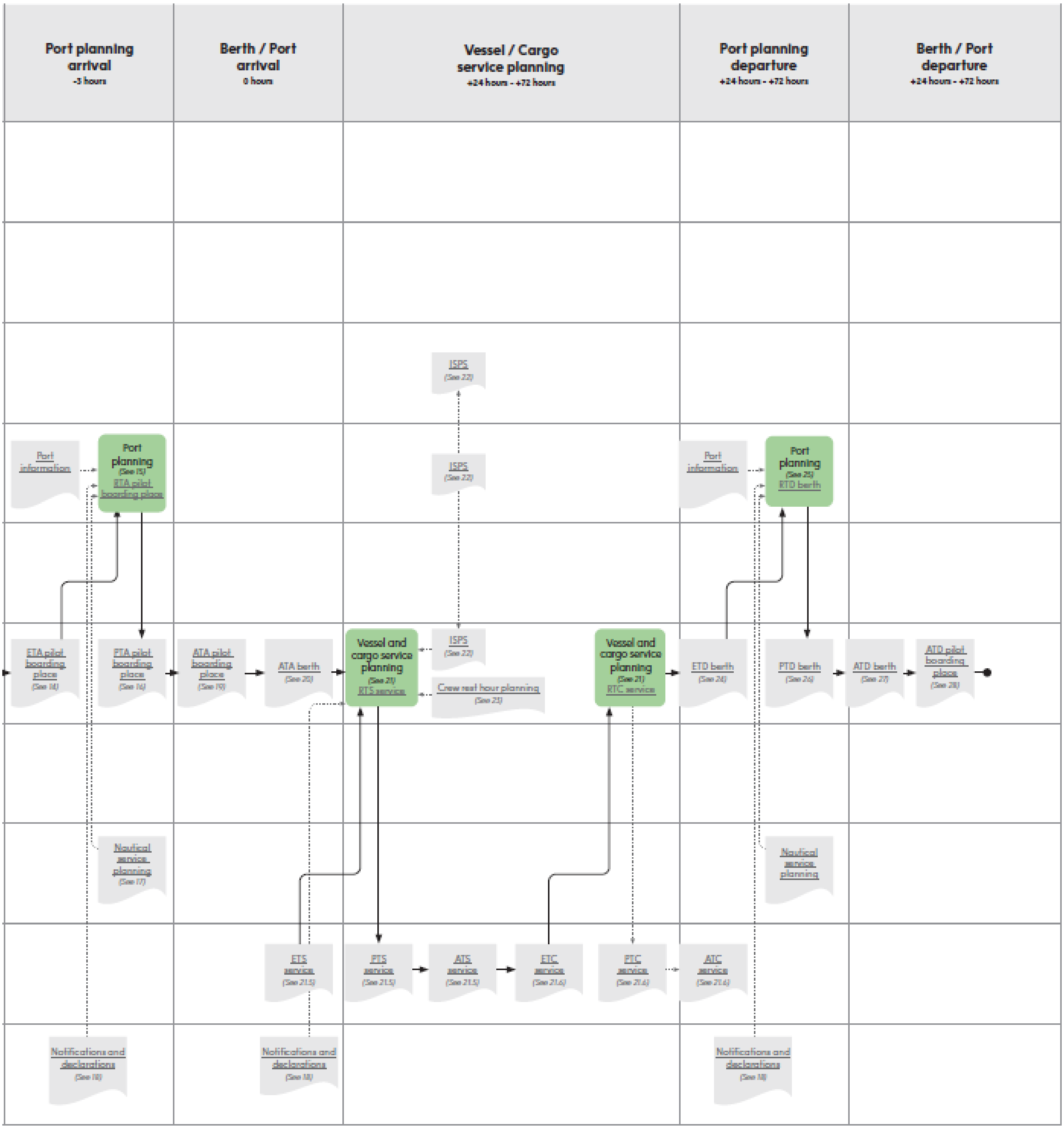
12.3. Visualization of data definitions



Departure time berth

13. Appendix 1 – Business process





Port planning arrival
-3 hours
Berth / Port arrival
0 hours
Vessel / Cargo service planning
+24 hours - +72 hours
Port planning departure
+24 hours - +72 hours
Berth / Port departure
+24 hours - +72 hours
ISPS
(See 22)
ISPS
(See 22)
Port information
Port planning
(See 15)
RTA pilot boarding place
Port information
Port planning
(See 25)
RTD berth
ETA pilot boarding place
(See 14)
PTA pilot boarding place
(See 16)
ATA pilot boarding place
(See 19)
ATA berth
(See 20)
Vessel and cargo service planning
(See 21)
RTS service
ISPS
(See 22)
Crew rest hour planning
(See 23)
Vessel and cargo service planning
(See 21)
RTC service
ETD berth
(See 24)
PTD berth
(See 26)
ATD berth
(See 27)
ATD pilot boarding place
(See 28)
Nautical service planning
(See 17)
Nautical service planning
ETS service
(See 21.5)
PTS service
(See 21.5)
ATS service
(See 21.5)
ETC service
(See 21.6)
PTC service
(See 21.6)
ATC service
(See 21.6)
Notifications and declarations
(See 18)
Notifications and declarations
(See 18)
Notifications and declarations
(See 18)

14. Appendix 2 – Determining standards for ship-port interface data

Standards within ports

For official declarations, notifications and to facilitate international trade, ports use existing global standards (FAL documents, WCO standards, UNCEFACT). However for real time day-to-day operations ports generally use national or local standards, and a migration to common, globally defined standards requires both investment and culture change.

Therefore, together with the wider marine industry stakeholders, including ports, shipping, their agents, standardization bodies (www.portcalloptimization.org) only robust, global, cross industry standards within the shipping industry and beyond (e.g. World Meteorological Office, International Standardization Organization) have been selected, ensuring a sustainable investment of money and hours. That content was then cross checked with numerous international bodies including The International Harbour Master Association (IHMA), International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA), United Kingdom Hydrographic Office (UKHO), International Hydrographic Organization (IHO), BIMCO, Oil Companies International Marine Forum (OCIMF), GS1, International Standardization Organization (ISO).

Because ports act as a node in the supply chain, and their customers need more and more end-to-end visibility, connectivity to supply chain standards is important. Therefore GS1 has been adopted in this publication as the most global and robust standardization body spanning the broader supply chain.

Similarly, as ports are part of a global network for commercial vessels, standardized terms from the nautical domain have been used for master and event data descriptions. IHO and UKHO publications have been referred to as the most global and robust standardization body for nautical standards.

Long-term maintenance of standards is as critical as the selection of the individual standards themselves, and, having learnt from other industries that robust maintenance from the outset by a robust organization saves time and money, ISO standards have been selected as a framework where possible. Maintenance of some standards might be delegated to related organizations such as GS1 or UNCEFACT.

Due to the crucial need for the common interpretation of the information by different actors is crucial, the focus of development was first on the functional definitions to ensure adoption of common semantics. For real time data exchange the overall requirement is for interoperability, so a data format has been proposed, based on existing supply chain standards. Interfaces are possible, although the number of interfaces is ideally limited.

Direct or indirect references

This publication makes the distinction between locations determined directly (positions and names) and indirectly (unique numbers). Indirect references have the advantage over direct references as they do not change after updates of infrastructure or ownership. Generally direct references are referenced to a particular datum and are used in navigational charts and other publications.

Standards for indirect location references

Many indirect references for ports exist. UNLOCODE[11] is an existing ISO standard (ISO 3166), and is used today in many documents such as the Bill of Lading. It is not perfect and is undergoing a process of revision currently, but is the best combination of global footprint and level of detail available to the stakeholder community.

For indirect refences of port areas and lines, waypoints and sections the Global Location Number (GLN) is an existing ISO standard (ISO/IEC 6523), which receives global governance from GS1. It is the only guaranteed globally secure, unique location number and can be used in combination with local identification numbers. GLNs are purchased through a national GS1 office, which is available in every country. GLNs can be assigned by the port authority so the number does not change after change of owner ship of the berth (like the IMO number of the vessel).

Other identifiers within port areas also exist and have been evaluated. The Inland ECDIS ISRS number has not been selected as these are specific to inland waters only. ISPS numbers have not been used as they are specific to the terminal only, and only for terminals with ISPS. Similarly UN/LOCODE's with SMDG extension have not been used, as they only apply to the container and roro terminals. They also do not apply to berths. These codes are only unique if used together with the UN/LOCODE, and change after change of ownership. Local numbers (e.g. shore site numbers) used in e.g. Marine Resource Numbers may have multiple numbers per berth and may be assigned by multiple parties per UN/LOCODE area and therefore not per se unique.

Standards for direct location references

Direct references are almost always defined as positions in relation to some kind of defined global, local or regional datum. Decimal degrees is preferred with a negative value signifying (by convention) a hemisphere of South and West. There is a distinction between the storage of direct location references and their representation in digital systems. Use of the representation format for display avoids any ambiguity and, although not as user friendly as traditional display formats such as degrees, minutes and seconds, can mitigate any risks of conversion. IHO standards for positioning within electronic charts use decimal degrees (although navigation systems such as ECDIS may have different display formats

[11] UNLOCODE – United Nations Code for Trade and Transport locations from United Nations Economic Commission for Europe https://www.unece.org/cefact/locode/service/location.html

for positions). IHO S-57 and IHO S-100 both use a fixed level of precision (usually 7 decimal places) for direct position references in charts.

It is left to the data producer to establish an appropriate number of decimal places for positional representation and to establish and publicise appropriate information concerning positional accuracy. IHO S-57, S-4 and S-32 define terms associated with these concepts and accepted custom and practice in this area. Other standards bodies such as ISO have similar mechanisms for representing positions and use decimal numbers to represent coordinates within a fixed coordinate reference system (CRS). The ISO19100 provides a comprehensive framework for the representation of all geospatial data and is the common ancestor of the IHO standards.

Horizontal datum

Positions should always be referenced with respect to a defined horizontal and vertical geodetic datum as part of a defined Coordinate Reference System (CRS). For horizontal datums WGS 84 is preferred as it is the mandated standard for positions within electronic navigational charts[12], replacing the variety of datums used in global paper charts prior to the standardisation of navigational materials. A large series of datums is defined within the global geospatial community, the most notable of which are the EPSG codes defined by the International Association of Oil and Gas Producers[13]. ISO19111[14] (Geographic Referencing by Spatial Coordinates) uses EPSG codes. WGS84 is represented as EPSG:4326 and many legacy CRSs can (and should) be transformed to WGS84 for harmonised portrayal and planning. Future adoption of the International Terrestrial Reference Frame (ITRF[15] which differs from WGS84 by only a few centimeters) within the IHO community may be proposed in the future as the basis of a global reference frame.

Vertical datum

Similar to Horizontal Datums, standardisation of vertical datums for direct location references are important and used for specification of both heights (elevation) and depths. Used on navigational charts the choice of vertical datum is referred to as Chart Datum (IHO S-32). These are largely based on tidal datums such as Lowest Astronomical tide or Low Water. IHO defines many terms relating to tidal height and tidal reference surfaces and makes recommendations as to best practice for vertical datum standards to be followed by marine stakeholders. While the exact choice of vertical datum used for soundings, drying heights and heights/elevations is made by the data producer, the IHO specifies best practice for elevations as a High Water datum and a Low Water datum for depths. The exact choice is a local one, however, due to seasonal and hydrological considerations. In areas of negligible tidal variation Mean Sea Level (MSL) is generally used as a vertical datum.

---

[12] IHO S-57 (http://www.iho.int) standard defines WGS84 as the horizontal datum for ENC charts
[13] EPSG codes are defined at http://www.epsg.org/
[14] https://www.iso.org/standard/41126.html
[15] Maintained by the International Earth rotation and Reference Systems service https://www.iers.org/IERS/EN/Home/home_node.html

Times

Representations of times are derived from IMO FAL, BIMCO Statement Of Facts (SOF) forms, Logbooks, and clauses of charter parties. The format "Year-month-day-hours-minutes-second Zulu" is from ISO standard (ISO 8601), already widely used in the supply chain industry. Various time dependent definition sources are listed below:

ETA: Aligned with the IMO FAL definition, enhanced by adding the "specified location" for more accuracy. This is calculated based on current speed to next waypoint and planned speed for the remaining route including speed limitations and other known parameters, such as wind, current, waves.

RTA: Aligned with the IMO FAL definition. Currently used within ports with "Just In Time" procedures to maximize protection of anchorages and to optimize lock and speed planning. This is now being implemented in contract clauses to enable Just In Time arrivals. The requested time is received on ship from either port (for Pilot Boarding Place) or terminal (for Berth).

PTA: Aligned with the IMO FAL definition. Is used today in some Electronic Display Information Systems (ECDIS) and is often the arrival time agreed in contract, according to a timetable or based on a time received from port. Normally shared by ship in route plan. Planned Time of Arrival (PTA) does not change, as propulsion is subsequently adjusted to meet this time, based on Speed To Maintain (STM). The STM is calculated based on a defined Distance To Go (DTG) and hours to go to the Planned Time of Arrival and is expressed as a Speed Over Ground (SOG).

ATA: In current use in the maritime industry. The time stamp is set when a waypoint is reached.

ETD: Aligned with the IMO FAL definition, enhanced by adding the "specified location" for more accuracy. ETD is calculated based on current speed to next waypoint, planned speed on the remaining route including speed limitations and other known parameters. The estimate can also be based on calculation of the estimated time of completion of cargo or vessel services (e.g. bunkers) or other non-navigational matters.

RTD: Aligned with the IMO FAL definition. Also used today in ports with "Just In Time" procedures. Now being implemented in clauses of contracts to enable Just In Time arrivals. The requested time is received on ship usually from ports (for Berth)

PTD: Aligned with the IMO FAL definition. Is used today in some Electronic Display Information Systems (ECDIS) and is often the departure time agreed in contract, according to a timetable or based on a time received from port.

ATD: Used today in the maritime industry. A time stamp is defined after departing from a specified location.

Relationships between arrival times and departure times versus service times (e.g. actual time of arrival berth is first line ashore, actual time of departure berth is last line released) has been aligned with the definition within The International Regulations for Preventing Collisions at Sea (1972), Rule 3 – General definitions – paragraph (i)

Formats for times

The overall definitions and unique identifiers of locations are the most important elements of data to be agreed upon. The encoding format of the data is a second priority, as interfaces are possible between different encodings as required.

EPCIS is encapsulated in an existing ISO standard (ISO/IEC 19987:2017) and is a global GS1 standard which has been used for over a decade in global supply chains for representation of events. Events may be recorded for any location and any object or entity. EPCIS uses non-significant ID keys where available insulating against future changes to attributes. Ports may use any EPCIS element as needed, with no obligation to use irrelevant elements. EPCIS has a rich pre-existing vocabulary with extensions possible for mode, sector or trade specifics.

15. Appendix 3 - Technical documentation for event data

The description below is based on the use of the EPCIS standard (ISO/IEC 19987:2017).

EPCIS provides a lean and yet very powerful way to exchange event data among large numbers of disparate stakeholders in the end-to-end Supply Chain.

Standard

The EPCIS standard already exists for more than 15 years. Identification keys used in the EPCIS context are scanned about 10 billion times per day all over the world. About 2 million companies worldwide use these identification keys and associated standards. GS1 maintains these standards and are present in over 150 countries all over the globe. GS1 is a neutral and non-profit organisation that has been developing and maintaining standards (as well as supporting implementations) for over 40 years.

For information as to how EPCIS leads to decentralized and authorized data, please view: https://www.youtube.com/watch?reload=9&v=2aIAV88U6F4

An EPCIS event data exchange (or message for short) is always structured based on the following five main building blocks:

- Action: Restricted list; within the context of this PIM the only relevant one is “OBSERVE”.
- What: An object or entity identified using a globally unique unambiguous ID Key. The standard currently recognises a number of ID Keys from various standardisation organisations such as IMO, BIC and GS1.
- Where: Physical business location identified using a globally unique unambiguous identifier. Currently restricted to Global Location Number, ISO / IEC 6523
- When: Date and time stamp compliant with ISO 8601
- Why: structured data/information regarding the business context of the EPCIS event. To be aligned with IMO FAL standards

Technical note:

The EPCIS standard supports a number of Event types. For the context of this manual, the only relevant event type is the ObjectEvent.

Example:

Vessel departing from a berth at a given date and time.

- Action: "OBSERVE".
- What: IMO vessel number (the 7-digit numerical part)
- Where: Global Location Number for the berth
- When: 9th May 2019 at 7:13 PM UTC (Coordinated Universal Time)
- Why: Departing from berth (in line with definitions and standards in this PIM)

The building blocks expressed in technical (XML) terms compliant with the EPCIS standard:

- Action: OBSERVE
- What: urn:epc:id:imovn:9176187
- Where: <bizlocation><id>urn:epc:id:sgln: 87193310.14014.0</id></bizlocation>
- When: 2019-05-09T19:13:47:00Z
- Why: <bizstep>urn:epcglobal:cbv:bizstep:departing</bizstep>

Common business steps such as "arrival", "departing", "loading", "unloading" and "in transit" are part of the EPCIS standards set more specifically the Core Business Vocabulary (CBV).

The TDS (Tag Data Standard) describes how each of the above data elements are to be encoded technically within the EPCIS messages.

The EPCIS currently supports all ATA and ATD events that meet the following criteria:

1. The object that the event relates to must be identifiable using an ID Key recognised in the EPCIS standards. The above example shows events related to vessels with IMO numbers can be exchanged using EPCIS
2. The business location related to the event must be identifiable with a Global Location Number (GLN). This manual indicates a number of business locations to which GLN may be applied

Note: Global Locations Numbers (GLN) are used worldwide for a very wide range of location types (see also paragraph 12.4). GLN may be linked to a geo-position (a single point), a line or a closed geographical area as needed for the type of business location that is related to the event.

Relation to ships

Ships use the Electronic Chart Display Information System (ECDIS) to navigate. Time stamps should be formatted identically from port to port to allow the ECDIS to receive the information regarding Requested Time of Arrival Pilot Boarding Place or Berth to allow the ship to arrive Just In Time.

Therefore, timestamps exchanged with ECDIS systems (both sent and received from them) should comply with ISO 8601. If available, the IMO vessel number should be part of the timestamp information exchanges.

If available, the timestamp information exchange should also include the Global Location Number for the business location related to the event/timestamp.

Relation to terminals

Terminals need same format of time stamps to allow an accurate berth planning, ensuring berth occupancy and efficient planning of labour.

To ensure unambiguous interpretation of the timestamp information exchanged, all stakeholders should comply with these two basic rules:

1. Use the ISO 8601 standard to format the timestamp.
2. Use the definitions and standards described in this PIM to determine the exact value (date and time) that needs to be included in the timestamp exchange.

If available, the business location (terminal, berth or berth-position) should be included in the timestamp exchange using the appropriate Global Location Number.

Relation to hinterland

Planners of hinterland modalities need very similar updates to enable choosing the right options for hinterland modality (e.g. barge, train or truck) for onward transportation to the next destination after the port or all the way to the final delivery location. They would also need these updates for planning the onward transport movements and resource planning in locations such as warehouses, distribution centers, manufacturing sites and so on.

Here too, we need unambiguous and consistent interpretation of the timestamps exchange. Therefore, the timestamp format must be compliant with ISO 8601. Where applicable, the definitions for timestamps in this PIM should also be used for the hinterland operations. It may be necessary to develop additional guidelines for hinterland operations and locations for unambiguous definitions and agreement on hinterland timestamps.

If available, a Global Location Number must be used to identify the business location.

Future developments

The current version of EPCIS has been developed for the exchange of events (timestamps) that have actually occurred such as the ATA and ATD at any business location anywhere in the world (also in the hinterland).

There is currently no standard way in EPCIS to exchange timestamps that will occur at some moment in the future ("future timestamps"). In the context of this manual this is related to the Estimated, Requested and Planned timestamps.

Work is ongoing within the GS1 community (also involving hinterland carriers and beneficial cargo owners) to determine how these "future timestamps" may be exchanged using global standards.

Maritime and port stakeholders are welcome to join those development efforts.

Results of these efforts will be available to all stakeholders (including beneficial cargo owners) across all transport modalities and may be included in future version of this manual.