

CHAPTER 6

NAUTICAL PUBLICATIONS

INTRODUCTION

600. Publications

The navigator uses many textual information sources to plan and conduct a voyage. These sources include notices to mariners, summary of corrections, sailing directions, light lists, tide tables, sight reduction tables, and almanacs.

While it is still possible to obtain hard-copy or printed nautical publications, increasingly these texts are found online or in other digital formats, including Compact Disc-Read Only Memory (CD-ROM's) or Digital Versatile Disc (DVD's). Digital publications are much less expensive than printed publications to reproduce and distribute, and online publications have no reproduction costs at all for the producer, and only minor costs to the user. Also, one DVD can hold entire libraries of information, making both distribution and on-board storage much easier.

The advantages of electronic publications over hard-copy go beyond cost savings. They can be updated easier and more often, making it possible for mariners to have frequent or even continuous access to a maintained publications database instead of receiving new editions at infrequent intervals and entering hand corrections periodically. Generally, digital publications also provide links and search engines affording quick access to relevant information.

Navigational publications are available from many sources. Military customers automatically receive or requisition most publications. The civilian navigator obtains publications from a publisher's agent. Larger agents representing many publishers can completely

supply a ship's chart and publication library. On-line publications produced by the U.S. government are available on the Web.

601. Maintenance and Carriage Requirements of Navigation Publications

Vessels may maintain the navigation publications required by Title 33 of the Code of Federal Regulations Parts 161.4, 164.33, and 164.72 and SOLAS Chapter V Regulation 27 in electronic format provided that they are derived from the original source, are currently corrected/up-to-date, and are readily accessible on the vessel's bridge by the crew. Adequate independent back-up arrangements shall be provided in case of electronic/technical failure. Such arrangements include: a second computer, CD, or portable mass storage device readily displayable to the navigation watch, or printed paper copies.

Since most required publications are only available in electronic format, the U.S. Coast Guard considers electronic publications of the U.S. Coast Pilots, U.S. Coast Guard *Light Lists*, NGA *Sailing Directions*, NGA *List of Lights*, tide-current and river-current tables, *Local Notice to Mariners*, *Notice to Mariners*, *Notices to Navigation Interests*, and *Vessel Traffic Service Rules* to be an acceptable equivalent means of meeting the publication carriage requirements set forth in Titles 33 and 46 of the Code of Federal Regulations and SOLAS Chapter V Regulation 27.

NAUTICAL TEXTS

602. Sailing Directions

National Geospatial-Intelligence Agency (NGA) *Sailing Directions* consist of 37 *Enroutes* and 5 *Planning Guides*. *Planning Guides* describe general features of ocean basins; *Enroutes* describe detailed coastal and port approach information designed to supplement the largest scale charts produced by the NGA.

The *Sailing Directions (Planning Guides)* are relatively static; however, by contrast, *Sailing Directions (Enroute)* are frequently updated.

603. Sailing Directions (Planning Guide)

Planning Guides assist the navigator in planning an extensive oceanic voyage. Each of the Guides provides useful information about all the countries adjacent to a particular ocean basin. The limits of the *Sailing Directions* in relation to the major ocean basins are shown in Figure 603b.

Planning Guides are a series of five regional volumes, structured in the alphabetical order of countries contained within the region. Information pertaining to



Figure 603a. *Sailing Directions (Planning Guides)*.
https://msi.nga.mil/NGAPortal/MSI.portal?_nfpb=true&_pageLabel=msi_portal_page_62&pubCode=0011

each country includes Buoyage Systems, Currency, Government, Industries, Holidays, Languages, Regulations, Firing Danger Areas, Mined Areas, Pilotage, Search and Rescue, Reporting Systems, Submarine Operating Areas, Time Zone, and the location of the U.S. Embassy.

The entire collection of *Sailing Directions (Planning Guides)* volumes is available online via the National Geospatial-Intelligence Agency's - Maritime Safety Information website.

The link can be found in Figure 603a.

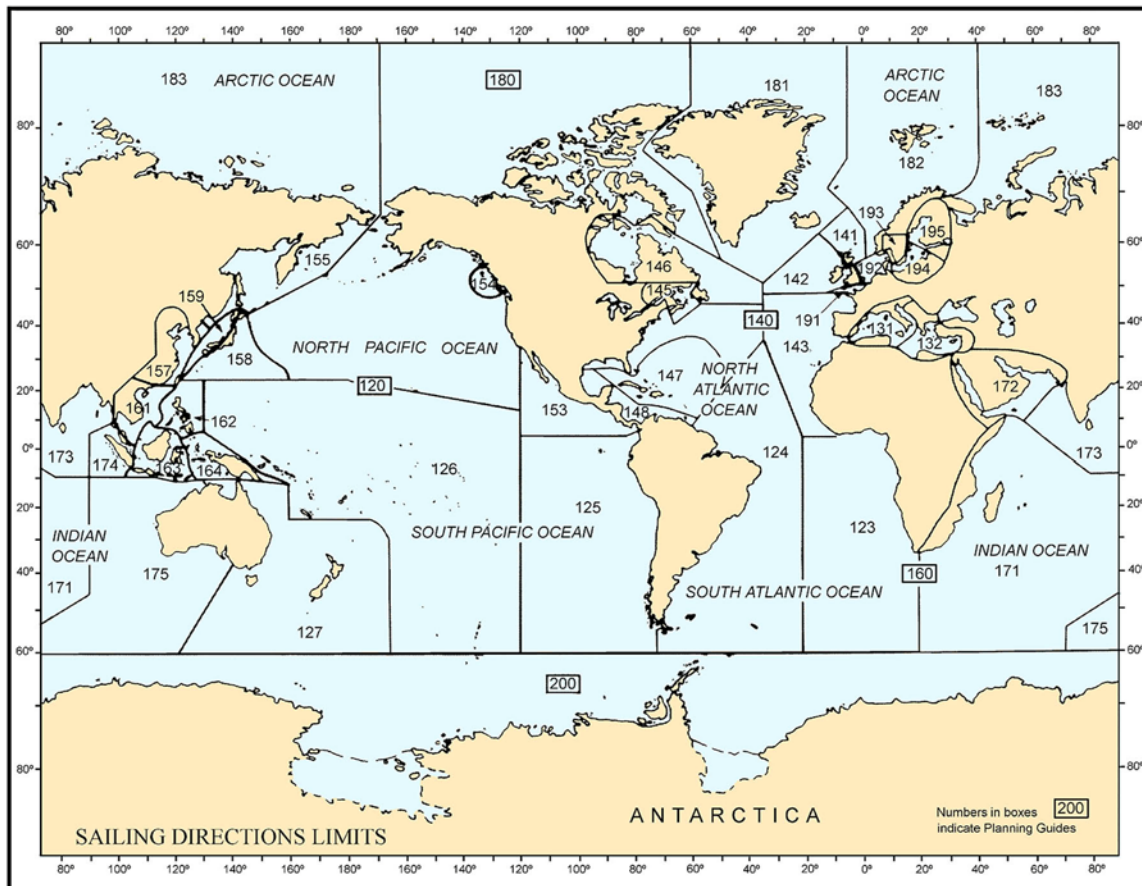


Figure 603b. *Sailing Directions* limits in relation to the major ocean basins.

604. *Sailing Directions (Enroute)*

Sailing Directions (Enroute) publications are a series of 37 volumes organized geographically, and include additional information about coastal and port approach not depicted on nautical charts, including winds, weather, tides, currents, ice, dangers, navigational aids, procedures, regulations, and port facilities. These publications also include some images of navigational aids and port facilities, as well as a graphic key to chart coverage of the region

Each volume of the *Sailing Directions (Enroute)* contains numbered sections along a coast or through a strait. Figure 604a illustrates this division. A preface with infor-

mation about authorities, references, and conventions used in each book precedes the sector discussions. Each sector is sub-divided into paragraphs and discussed in turn. Each book provides conversions between feet, fathoms, and meters. A list of abbreviations that may be found in the text follows the conversion tables.

A *Chart Information* graphic and *DNC Library Information* graphic begin each sector. They provide a graphical key for charts (both paper and digital) pertaining to the area. See Figure 604c and Figure 604b. The graduation of the border scale on each of these graphics enable navigators to identify the largest scale chart or DNC library for a particular location, in addition to identifying features listed in the

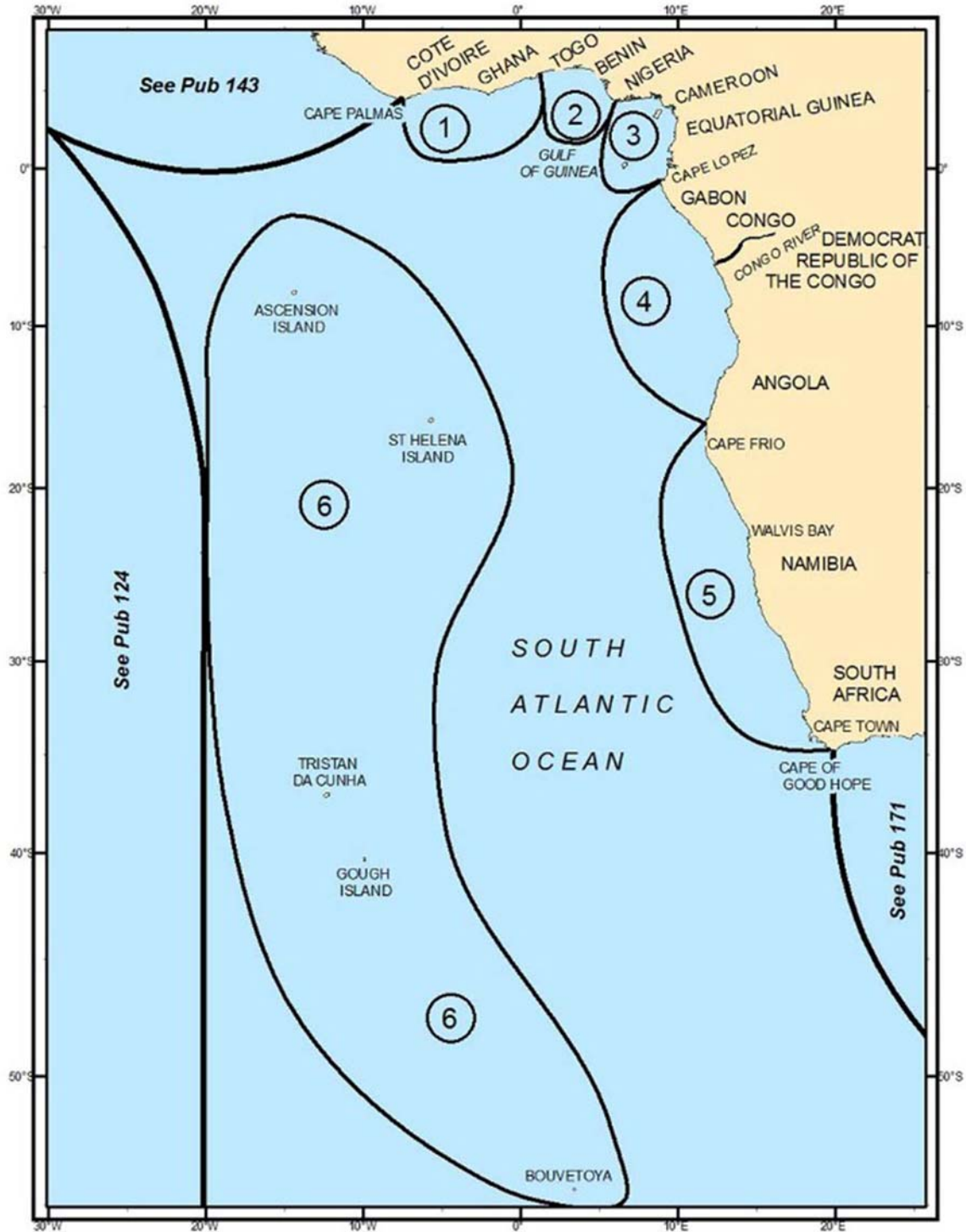


Figure 604a. Example of a typical sector limits graphic.

Index-Gazetteer. These graphics are not maintained by *Notice to Mariners*, therefore, one should refer to the chart catalog for updated chart listings. Other graphics found in the publication may contain special information on anchorages, significant coastal features, and navigation dangers.

A foreign terms glossary and a comprehensive Index-Gazetteer follow the sector discussions. The Index-Gazetteer

is an alphabetical listing of described and charted features. The Index lists each feature by geographic coordinates and sector paragraph number.

U.S. military vessels have access to special files of data reported via official messages known as Port Visit After Action Reports. These reports, written in text form according to a standardized reporting format, give complete

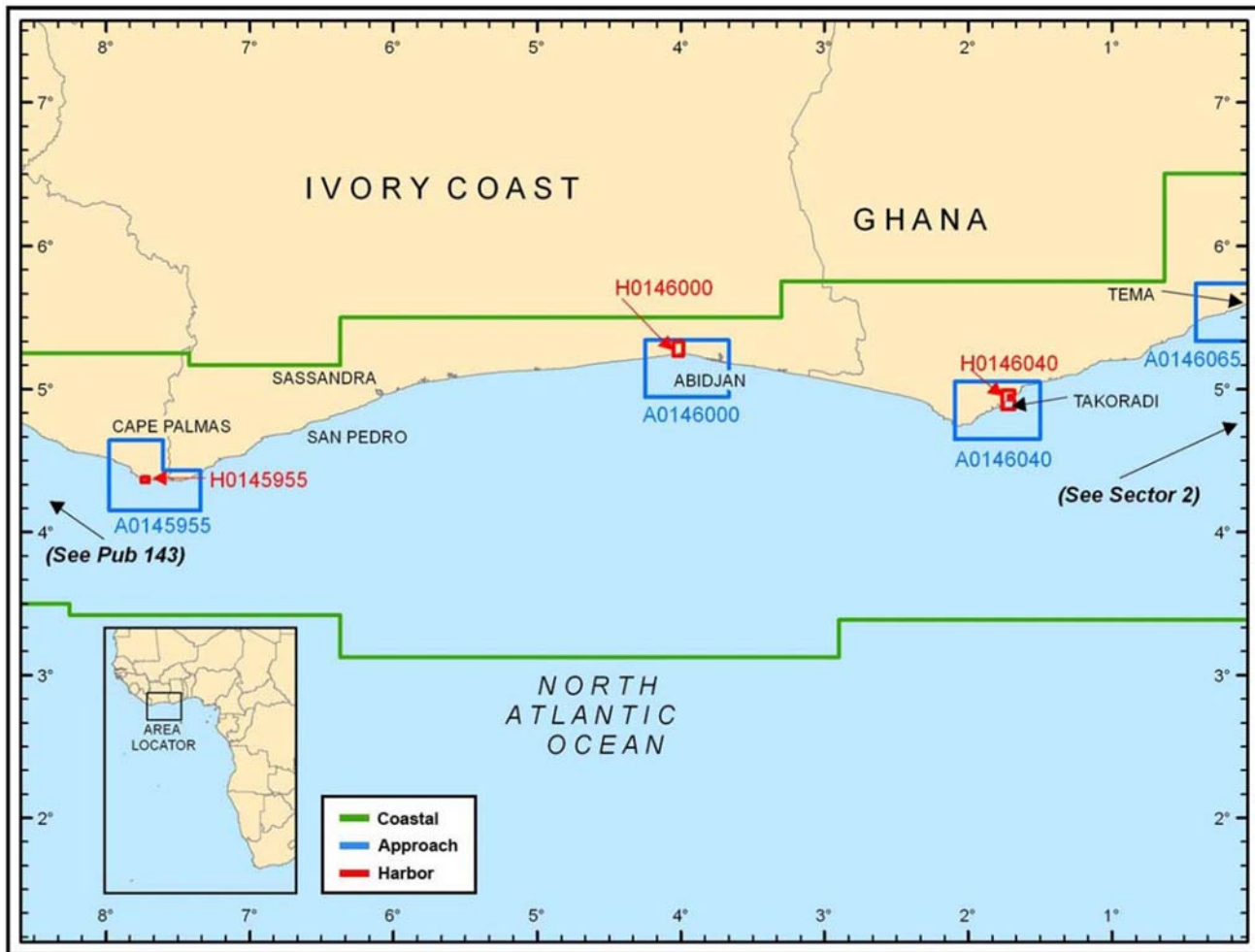


Figure 604b. Library information graphic.

details of recent visits by U.S. military vessels to all foreign ports visited. Virtually every detail regarding navigation, services, supplies, official and unofficial contacts, and other matters are reported in detail, making these documents an extremely useful adjunct to the *Sailing Directions*. These files are available to “.mil” users only, and may be accessed on the Web at: <http://cnsl.spear.navy.mil>, under the “Force Navigator” link. They are also available via DoD’s classified Web.

The entire collection of *Sailing Directions (Enroute)* volumes is available online via the link provided in Figure 604d.

To accommodate customers who experience difficulty accessing the World Wide Web, NGA provides a **Subscription Service** whereby notification of publication updates are delivered via email message to the requesting address. Additionally, subscribers will receive email notification when a publication new edition is released. The **Publication Updates Subscription** page may be accessed via the Publications tab on the Maritime Safety Information website.

605. U.S. Coast Pilots

The National Oceanic and Atmospheric Administration (NOAA) publishes nine *U.S. Coast Pilots* to supplement nautical charts of U.S. waters. Information comes from field inspections, survey vessels, and various harbor authorities. Maritime officials and pilotage associations provide additional information. *U.S. Coast Pilots* provide more detailed information than *Sailing Directions* because *Sailing Directions* are intended exclusively for the oceangoing mariner. The *Notice to Mariners* updates *U.S. Coast Pilots*.

Each volume contains comprehensive sections on local operational considerations and navigation regulations. Following chapters contain detailed discussions of coastal navigation. An appendix provides information for obtaining additional weather information, communications services, and other data. An index and additional tables complete the volume.

The entire collection of *U.S. Coast Pilots* can be found via the link provided in Figure 605.

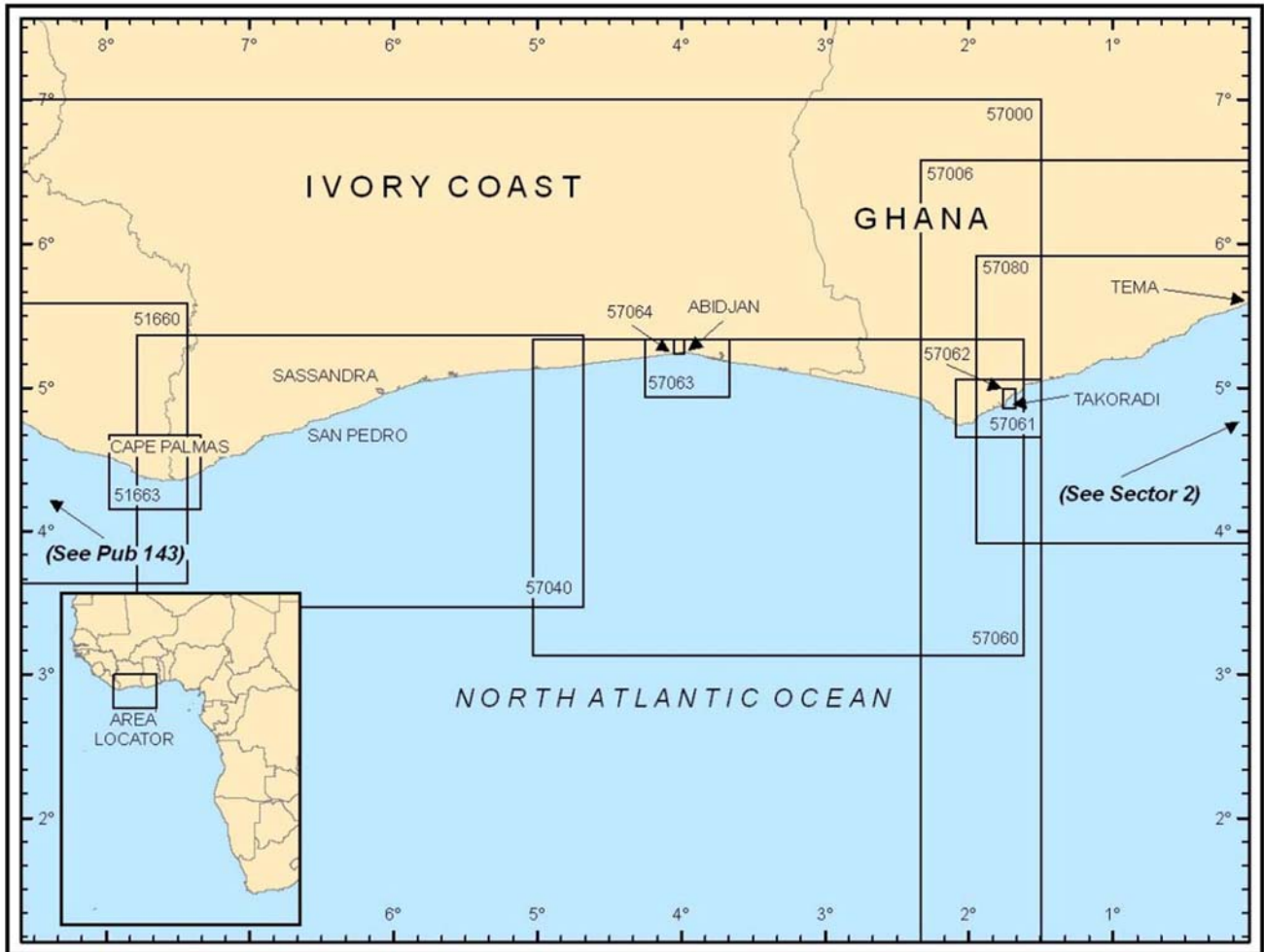


Figure 604c. Chart information graphics depict hardcopy charting boundaries.



Figure 604d. Sailing Directions (Enroute).
https://msi.nga.mil/NGAPortal/MSI.portal?_nfpb=true&_pageLabel=msi_portal_page_62&pubCode=0010



Figure 605. U.S. Coast Pilots.
<https://nauticalcharts.noaa.gov/publications/coast-pilot/index.html>

606. Other Nautical Texts

The federal government publishes several other nautical texts. NGA, for example, publishes *Pub. 1310, Radar Navigation and Maneuvering Board Manual* and *Pub. No. 9, American Practical Navigator*.

The U.S. Coast Guard publishes the *Navigation Rules and Regulations Handbook* for international and inland waters. This publication contains the Inland Navigation Rules enacted in December 1980 and effective on all inland waters of the United States including the Great Lakes, as well as the *International Regulations for the Prevention of Collisions at Sea*, enacted in 1972 (1972 COLREGS). Mariners underway should ensure that they possess the latest updated issue, which can be found on the Coast Guard's Navigation Center website: <http://www.navcen.uscg.gov/>. The Coast Guard also publishes the *Light Lists, Navigation and Vessel Inspection Circulars*; and the *Chemical Data Guide for Bulk Shipment by Water*.

The Government Publishing Office provides several publications on navigation, safety at sea, communications,

weather, and related topics. Additionally, it publishes provisions of the Code of Federal Regulations (CFR) relating to maritime matters. In addition to official U.S. publications, there are a number of private publishers also provide maritime publications not referenced herein.

The International Maritime Organization (IMO), International Hydrographic Organization (IHO), and other governing international organizations publish information on international navigation regulations. Regulations for various Vessel Traffic Services (VTS), canals, lock systems, and other regulated waterways are published by the authorities who operate them. Nautical chart and publication sales agents are a good source of information about publications required for any voyage. Increasingly, many regulations, whether instituted by international or national governments, can be found on-line. This includes regulations for VTS, Traffic Separation Schemes (TSS), special regulations for passage through major canal and lock systems, port and harbor regulations, and other information. A

Web search can often find the textual information the navigator needs.

Vessel Traffic Services (VTS) are discussed in greater detail in Chapter 29 - Navigation Regulations. The U.S. Coast Guard's Navigation Center (NAVCEN) provides access to detailed information websites and/or user manuals regarding Vessel Traffic Services for twelve VTS locations throughout the United States. A link to the NAVCEN website may be found in Figure 606.



Figure 606. U.S. Coast Guard - Navigation Center.
<https://www.navcen.uscg.gov/?pageName=vtsMain>

USING THE LIGHT LISTS

607. Light Lists

The United States publishes two different light lists. The U.S. Coast Guard publishes the *Light List* for lights in U.S. territorial waters; NGA publishes the *List of Lights* for lights in foreign waters.

Light lists furnish detailed information about navigation lights and other navigation aids, supplementing the charts, *Coast Pilots*, and *Sailing Directions*. Consult the chart for the location and light characteristics of all navigation aids; consult the light lists to determine their detailed description.

The *Notice to Mariners* corrects both lists. Corrections which have accumulated since the print date are included in the *Notice to Mariners* as a *Summary of Corrections*. All of these summary corrections, and any corrections published subsequently, should be noted in the "Record of Corrections."

A navigator needs to know both the identity of a light and when s/he can expect to see it; s/he often plans the ship's track to pass within a light's range. If lights are not sighted when predicted, the vessel may be significantly off course and standing into danger.

A circle with a radius equal to the visible range of the light usually defines the area in which a light can be seen. On some bearings, however, obstructions may reduce the range. In this case, the obstructed arc might differ with height of eye and distance. Also, lights of different colors may be seen at different distances. Consider these facts both when identifying a light and predicting the range at which it can be seen.

Atmospheric conditions can have a major effect on a light's range. For example, fog, haze, dust, smoke, or precipitation can obscure a light, or a light may even be extinguished. Always report an extinguished light so

maritime authorities can issue a warning and make repairs.

On a dark, clear night, the visual range is normally only limited by luminous intensity, or curvature of the Earth. However, regardless the height of eye, one cannot see a weak light beyond its luminous range. Assuming that light travels linearly, an observer located below the light's visible horizon cannot see it. The Distance to the Horizon table gives the distance to the horizon for various heights of eye. The light lists contain a condensed version of this table. Abnormal refraction patterns might change this range; therefore, one cannot exactly predict the range at which a light will be seen.

608. Finding Range and Bearing of a Light at Sighting

A light's **luminous range** is the maximum range at which an observer can see a light under existing visibility conditions. This luminous range ignores the elevation of the light, the observer's height of eye, the curvature of the Earth, and interference from background lighting. It is determined from the known **nominal range** and the existing visibility conditions. The nominal range is the maximum distance at which a light can be seen in weather conditions where the visibility is 10 nautical miles.

The U.S. Coast Guard *Light List* usually lists a light's nominal range. Use the Luminous Range Diagram shown in the *Light List* and Figure 608a to convert this nominal range to luminous range. Remember that the luminous ranges obtained are approximate because of atmospheric or background lighting conditions. To use the Luminous Range Diagram, first estimate the meteorological visibility by the Meteorological Optical Range Table, See Table 608. Next, enter the Luminous Range Diagram with the nominal range on the horizontal nominal range scale. Follow a ver-

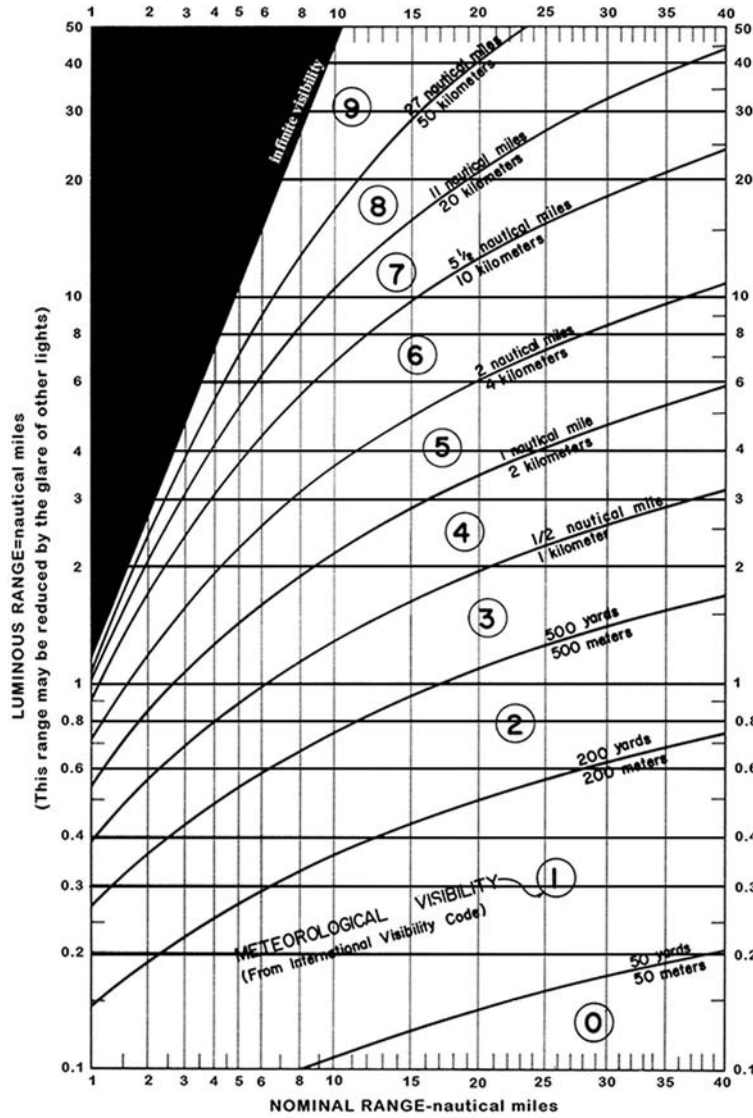


Figure 608a. Luminous Range Diagram.

tical line until it intersects the curve or reaches the region on the diagram representing the meteorological visibility. Finally, follow a horizontal line from this point or region until it intersects the vertical luminous range scale.

Example 1: The nominal range of a light as extracted from the Light List is 15 nautical miles.

Required: The luminous range when the meteorological visibility is (1) 11 nautical miles and (2) 1 nautical mile.

Solution: To find the luminous range when the meteorological visibility is 11 nautical miles, enter the Luminous Range Diagram with nominal range 15 nautical miles on the horizontal nominal range scale; follow a vertical line upward until it intersects the curve on the diagram representing a meteorological visibility of 11 nautical miles; from this point follow a horizontal line to the right

until it intersects the vertical luminous range scale at 16 nautical miles. A similar procedure is followed to find the luminous range when the meteorological visibility is 1 nautical mile.

Answers: (1) 16 nautical miles; (2) 3 nautical miles.

Code No.	Weather	Yards / Nautical Miles
0	Dense fog	Less than 50
1	Thick fog	50-200
2	Moderate fog	200-500
3	Light fog.	500-1000 yards
4	Thin fog	1/2-1
5	Haze	1-2
From the International Visibility Code.		

Figure 608b. Meteorological Optical Range.

Code No.	Weather	Yards / Nautical Miles
6	Light Haze	2-5 1/2
7	Clear	5 1/2-11
8	Very Clear	11.0-27.0.
9	Exceptionally Clear	Over 27.0 miles

From the International Visibility Code.

Figure 608b. *Meteorological Optical Range.*

A light's **geographic range** depends upon the height of both the light and the observer. The sum of the observer's distance to the visible horizon (based on their height of eye) plus the light's distance to the horizon (based on its height) is its geographic range. See Figure 608c. This illustration uses a light 150 feet above the water. Entering Table 13 - *Distance of the Horizon* (in Volume 2), yields a value of 14.3 nautical miles for a height of 150 feet. Within this range, the light, if powerful enough and atmospheric conditions permit, is visible regardless of the height of eye of the observer. Beyond 14.3 nautical miles, the geographic range depends upon the observer's height of eye. Thus, by the Distance of the Horizon table mentioned above, observers with a height of eye of 5 feet can see the light on their horizon if they are 2.6 miles beyond the horizon of the light. The geographic range of the light is therefore 16.9 miles. For a height of 30 feet the distance is 14.3 + 6.4 = 20.7 miles. If the height of eye is 70 feet, the geographic range is 14.3 + 9.8 = 24.1 miles. A height of eye of 15 feet is often assumed when tabulating lights' geographic ranges.

To predict the bearing and range at which a vessel will initially sight a light first determine the light's geographic range. Compare the geographic range with the light's luminous range. The lesser of the two ranges is the range at which the light will first be sighted. Plot a visibility arc cen-

tered on the light and with a radius equal to the lesser of the geographic or luminous ranges. Extend the vessel's track until it intersects the visibility arc. The bearing from the intersection point to the light is the light's predicted bearing at first sighting.

If the extended track crosses the visibility arc at a small angle, a small lateral track error may result in large bearing and time prediction errors. This is particularly apparent if the vessel is farther from the light than predicted; the vessel may pass the light without sighting it. However, not sighting a light when predicted does not always indicate the vessel is farther from the light than expected. It could also mean that atmospheric conditions are affecting visibility.

Example 2: *The nominal range of a navigational light 120 feet above the chart datum is 20 nautical miles. The meteorological visibility is 27 nautical miles.*

Required: *The distance at which an observer at a height of eye of 50 feet can expect to see the light.*

Solution: *The maximum range at which the light may be seen is the lesser of the luminous or geographic ranges. At 120 feet the distance to the horizon, by table or formula, is 12.8 miles. Add 8.3 miles, the distance to the horizon for a height of eye of 50 feet to determine the geographic range. The geographic range, 21.1 miles, is less than the luminous range, 40 miles.*

Answer: *21 nautical miles. Because of various uncertainties, the range is rounded off to the nearest whole mile.*

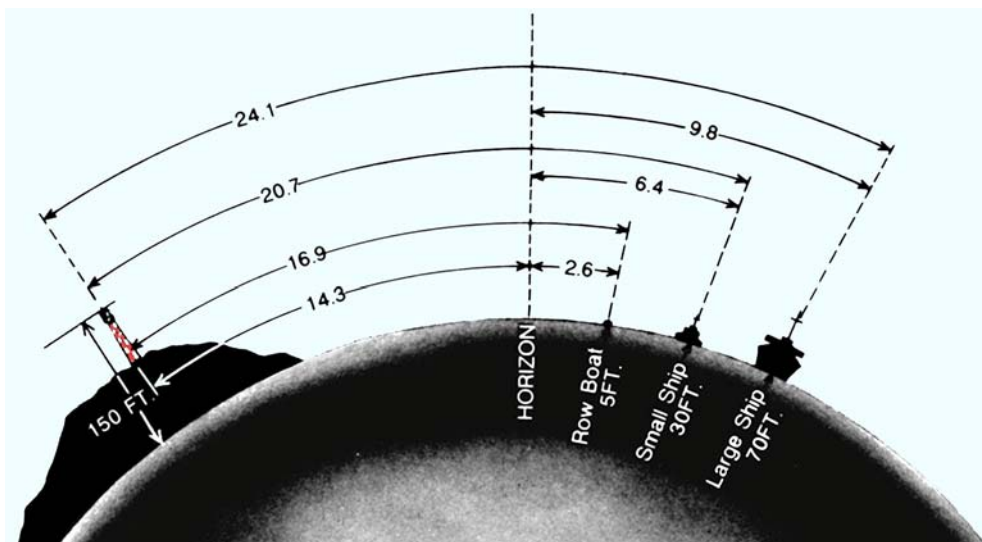


Figure 608c. *Geographic Range of a light.*

When first sighting a light, observers can determine if it is on the horizon by immediately reducing their height of eye. If the light disappears and then reappears when the observer returns to their original height, the light is on the horizon. This process is called **bobbing a light**.

If a vessel has considerable vertical motion due to rough seas, a light sighted on the horizon may alternately appear and disappear. Wave tops may also obstruct the light periodically. This may cause the characteristic to appear different than expected. The light's true characteristics can be ascertained either by closing the range to the light or by increasing the observer's height of eye.

If a light's range given in a foreign publication approximates the light's geographic range for a 15-foot observer's height of eye, one can assume that the printed range is the light's geographic range. Also assume that publication has listed the lesser of the geographic and nominal ranges. Therefore, if the light's listed range approximates the geographic range for an observer with a height of eye of 15 feet, then assume that the light's limiting range is the geographic range. Then, calculate the light's true geographic range using the actual observer's height of eye, not the assumed height of eye of 15 feet. This calculated true geographic range is the range at which the light will first be sighted.

Example 3: *The range of a light as printed on a foreign chart is 17 miles. The light is 120 feet above chart datum. The meteorological visibility is 10 nautical miles.*

Required: *The distance at which an observer at a height of eye of 50 feet can expect to see the light.*

Solution: *Calculate the geographic range of the light assuming a 15 foot observer's height of eye. At 120 feet the distance to the horizon is 12.8 miles. Add 4.5 miles (the distance to the horizon at a height of 15 feet) to 12.8 miles; this range is 17.3 miles. This approximates the range listed on the chart. Then assuming that the charted range is the geographic range for a 15-foot observer height of eye and that the nominal range is the greater than this charted range, the predicted range is found by calculating the true geographic range with a 50 foot height of eye for the observer.*

Answer: *The predicted range = 12.8 mi. + 8.3 mi. = 21.1 mi. The distance in excess of the charted range depends on the luminous intensity of the light and the meteorological visibility.*

609. USCG Light Lists

The U.S. Coast Guard *Light List* (7 volumes) gives information on lighted navigation aids, unlighted buoys, daybeacons, racons, and the Automatic Identification System (AIS). For a graphical depiction of the limits of each volume, see Figure 609b.



Figure 609a. U.S. Coast Guard - Light Lists.
https://msi.nga.mil/NGAPortal/MSI.portal?_nfpb=true&st=&_pageLabel=msi_portal_page_62&pubCode=0014

Each volume of the *Light List* contains aids to navigation in geographic order from north to south along the Atlantic coast, from east to west along the Gulf coast, and from south to north along the Pacific coast. It lists seacoast aids first, followed by entrance and harbor aids listed from seaward. Intracoastal Waterway aids are listed last in geographic order in the direction from New Jersey to Florida to the Texas/Mexico border.

The listings are preceded by a description of the aids to navigation system in the United States, luminous range diagram, geographic range tables, and other information.

The entire collection of USCG *Light Lists* can be found on NGA's Maritime Safety Information website via the link provided in Figure 609a.

610. NGA List of Lights, Radio Aids, and Fog Signals

The National Geospatial-Intelligence Agency (NGA) publishes the *List of Lights, Radio Aids, and Fog Signals* (usually referred to as the *List of Lights*, not to be confused with the Coast Guard's *Light List*). In addition to information on lighted aids to navigation and sound signals in foreign waters, the NGA *List of Lights* provides information on storm signals, signal stations, racons, radiobeacons, radio direction finder calibration stations located at or near lights, and DGPS stations. For more details on radio navigational aids, consult *Pub. 117, Radio Navigational Aids*.

The NGA *List of Lights* generally does not include information on buoys, although in certain instances, a large offshore buoy with a radio navigational aid may be listed. It does include certain aeronautical lights situated near the coast. However, these lights are not designed for marine navigation and may be subject to unreported changes.

For a graphical depiction of the limits of each of the seven volumes (*Pub. 110* through *Pub. 116*) of NGA's *List of Lights* see Figure 610a.

Foreign notices to mariners are the main correctional information source for the NGA *List of Lights*; other sources, such as ship reports, are also used. Many aids to navigation in less developed countries may not be well maintained; they are also susceptible to damage by storms and vandalism, and repairs may be delayed for long periods.

The entire collection of NGA *List of Lights* can be found via the link in Figure 610b.

LIMITS OF LIGHT LISTS PUBLISHED BY
U.S. COAST GUARD

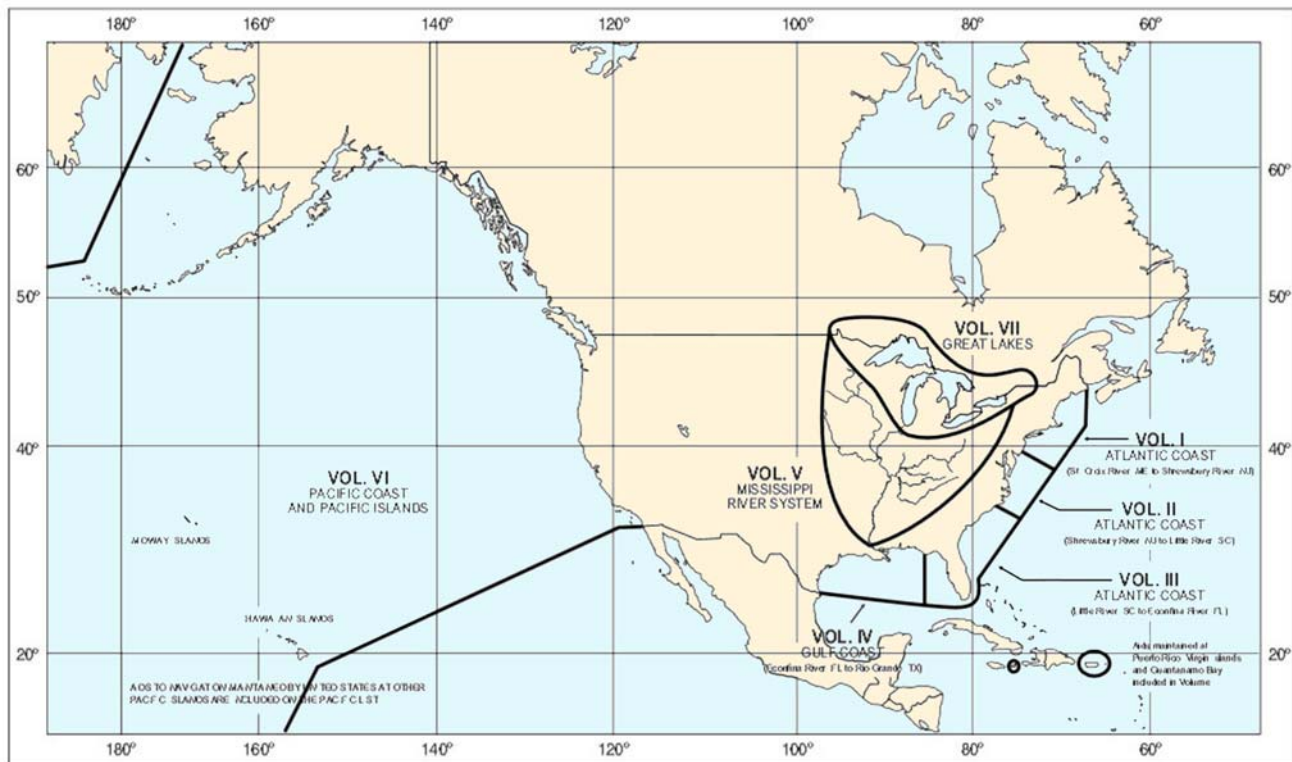


Figure 609b. USCG Light List limits.

MISCELLANEOUS NAUTICAL PUBLICATIONS

611. NGA *Radio Navigational Aids (Pub. No. 117)*

This publication is a selected list of worldwide radio stations which perform services to the mariner. Topics covered include radio direction finder and radar stations, radio time signals, radio navigation warnings, distress and safety communications, medical advice via radio, long-range navigation aids, the AMVER system, and interim procedures for U.S. vessels in the event of an outbreak of hostilities. *Pub. No. 117* is corrected via the *Notice to Mariners* and is updated periodically with a new edition.

Though *Pub. No. 117* is essentially a list of radio stations providing vital maritime communication and navigation services, it also contains information which explains the capabilities and limitations of the various systems.

The online version of *NGA Radio Navigational Aids (Pub. No. 117)* can be found via the link in Figure 611.

612. *Chart No. 1*

Chart No. 1 is not actually a chart, but a book containing a key to the symbols, abbreviations, and terms

used on nautical charts. Most countries that produce charts also produce such a document. The U.S. *Chart No. 1* contains a listing of chart symbols in five categories:

- Symbols used on NOAA charts
- Symbols used on NGA charts
- Symbols used on foreign charts reproduced by NGA
- Symbols recommended by the International Hydrographic Organization (INT1 symbols)
- Symbols specified for use in ECDIS to display ENCs

Subjects covered include general features of charts, topography, hydrography, and aids to navigation. Several pages are devoted to explaining unique features of ECDIS displays, including color palettes, simplified and “traditional” symbology, and safety contours. There is also a complete index of abbreviations and an explanation of the IALA buoyage system.

Chart No. 1 can be found online via the link in Figure 612.

613. *NGA World Port Index (Pub. 150)*

The *World Port Index* contains a tabular listing of thousands of ports throughout the world, describing their

**LIST OF LIGHTS LIMITS
NATIONAL GEOSPATIAL-INTELLIGENCE AGENCY**

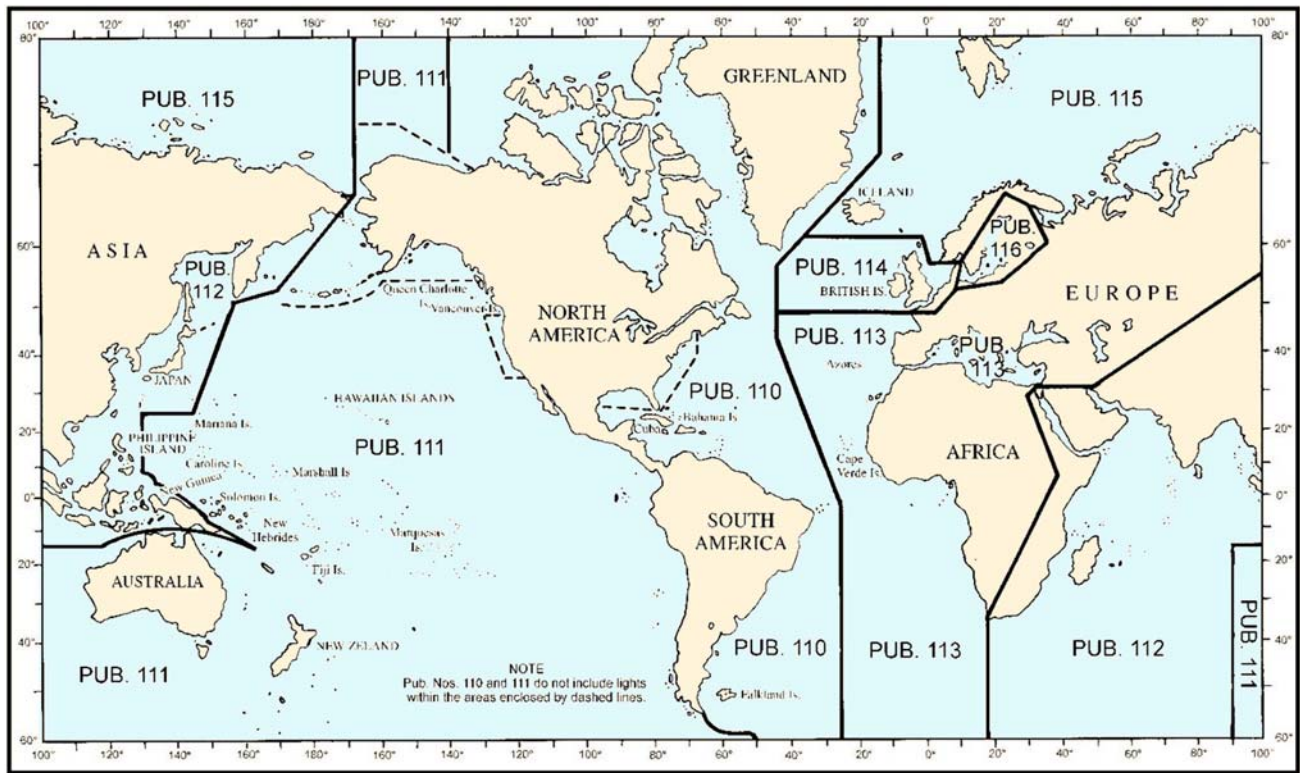


Figure 610a. NGA List of Light limits.



Figure 610b. NGA- List of Lights.

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Figure 612. Chart No. 1.

<https://nauticalcharts.noaa.gov/publications/us-chart-1.html>



Figure 611. NGA- Radio Navigational Aids (Pub. No. 117).
https://msi.nga.mil/NGAPortal/MSI.portal?_nfpb=true&_st=&_pageLabel=msi_portal_page_62&pubCode=0009

locations, characteristics, facilities, and services available. Information is arranged geographically; the index is arranged alphabetically.

Coded information is presented in columns and rows. This information supplements information in the *Sailing Directions*. The applicable volume of *Sailing Directions* and the number of the harbor chart are given in the *World Port Index*. The *Notice to Mariners* corrects this book.

The *World Port Index* can be found online via the link provided in Figure 613.

614. NGA Distances Between Ports (Pub. 151)

This publication lists the distances between major ports. Reciprocal distances between two ports may differ due to different routes chosen because of currents and



Figure 613. Pub. 150 World Port Index.

https://msi.nga.mil/NGAPortal/MSI.portal?_nfpb=true&_st=&_pageLabel=msi_portal_page_62&pubCode=0015

climatic conditions. To reduce the number of listings needed, junction points along major routes are used to consolidate routes converging from different directions.

This book can be most effectively used for voyage planning in conjunction with the proper volume(s) of the *Sailing Directions (Planning Guide)*. It is corrected via the *Notice to Mariners*.

The *Distances Between Ports* can be found online via the link provided in Figure 614.



Figure 614. Pub. 151 Distances Between Ports.

https://msi.nga.mil/NGAPortal/MSI.portal?_nfpb=true&_st=&_pageLabel=msi_portal_page_62&pubCode=0005

615. NOAA Distances Between United States Ports

Distances Between United States Ports contains distances from a port of the United States to other ports in the United States, and from a port in the Great Lakes in the United States to Canadian ports in the Great Lakes and St. Lawrence River.

The 2012 edition of this publication is 56 pages in length and can be found online via the link provided in Figure 615.



Figure 615. NOAA Distances Between US Ports.

<https://nauticalcharts.noaa.gov/>

616. NGA International Code of Signals (Pub. 102)

This book lists the signals to be employed by vessels at sea to communicate a variety of information relating to safety, distress, medical, and operational information. This publication became effective in 1969.

According to this code, each signal has a unique and complete meaning. The signals can be transmitted via Morse code light and sound, flag, radio telegraph and telephone, and semaphore. Since these methods of signaling are internationally recognized, differences in language between sender and receiver are immaterial; the message will be understood when decoded in the language of the receiver, regardless of the language of the sender. The *Notice to Mariners* corrects *Pub. 102*.

The *International Code of Signals (Pub. 102)* can be found online via the link provided in Figure 616.



Figure 616. Pub. 102 - International Code of Signals.

https://msi.nga.mil/NGAPortal/MSI.portal?_nfpb=true&_st=&_pageLabel=msi_portal_page_62&pubCode=0006

617. Almanacs

For celestial sight reduction, the navigator needs an **almanac** for ephemeris data. The *Nautical Almanac*, produced jointly by the Nautical Almanac Office of the United States Naval Observatory in Washington, and Her Majesty's Nautical Almanac Office of the United Kingdom in Taunton, is the most common almanac used for celestial navigation. It also contains information on sunrise, sunset, moonrise, and moonset, as well as compact sight reduction tables. The *Nautical Almanac* is published annually.

The *Air Almanac* contains slightly less accurate ephemeris data for air navigation, but can be used for marine navigation if slightly reduced accuracy is acceptable.

More detailed information on using the *Nautical Almanac* is located in the Celestial Navigation part of this text. See Chapter 17.

618. Sight Reduction Tables for Marine Navigation

Without a calculator or computer programmed for sight reduction, the navigator needs **sight reduction tables** to solve the celestial triangle. Two different sets of tables are commonly used at sea.

NGA *Pub. No. 229, Sight Reduction Tables for Marine Navigation*, consists of six volumes of tables designed for

use with the *Nautical Almanac* for solution of the celestial triangle by the **Marcq Saint Hilaire** or **intercept** method. The tabular data are the solutions of the navigational triangle of which two sides and the included angle are known and it is necessary to find the third side and adjacent angle.

Each volume of *Pub. No. 229* includes two 8° degree zones, comprising 15° degree bands from 0° to 90° degrees, with a 1° degree overlap between volumes. *Pub. No. 229* is a joint publication produced by the National Geospatial-Intelligence Agency, the U.S. Naval Observatory, and the Royal Greenwich Observatory.

The complete set of *Pub. No. 229* volumes can be found online via the link in Figure 618.



Figure 618. *Pub. No. 229 - Sight Reduction Tables for Marine Navigation.*

https://msi.nga.mil/NGAPortal/MSI.portal?_nfpb=true&_st=&_pageLabel=msi_portal_page_62&pubCode=0013

619. *Sight Reduction Tables for Air Navigation*

Sight Reduction Tables for Air Navigation, Pub. No. 249, is a joint production effort between the Nautical Almanac Office of the U.S. Naval Observatory and Her Majesty's Nautical Almanac Office. It is issued in three volumes. The title to Volume 1 changed in 2012 to *Rapid Sight Reduction Tables for Navigation*.

Volume 1 contains, for any given position and time, the best selection of seven stars available for observation and, for these seven stars, data for presetting before observation and for accurate reduction of the sights after observation. Volume 1 is updated every five years and may be used without reference to an almanac.

Volumes 2 and 3, primarily used by the air navigator, cover latitudes 0°-40° and 39°-89° respectively and are permanent tables for integral degrees of declination. They provide sight reduction for bodies with declinations within 30° north or south of the equator, which includes the Sun, the Moon, the navigational planets and many navigational stars.

Pub. No. 249 - Volumes 2 and 3 are available online at the link provided in Figure 619.

620. Catalogs

Military and U.S. Government customers can place orders for NGA products with the Defense Logistics



Figure 619. *Pub. No. 249 - Sight Reduction Tables for Air Navigation.*

https://msi.nga.mil/NGAPortal/MSI.portal?_nfpb=true&_st=&_pageLabel=msi_portal_page_62&pubCode=0012

Agency. Ordering information is available on the Defense Supply Center Richmond website.

NGA Hydrographic Products are no longer offered for sale to civilian customers by the National Aeronautical Charting Office (NACO) or the U.S. Government Publishing Office (GPO); however, authorized reproductions of these products can still be purchased from commercial vendors. A list of vendors is available on NGA's Maritime Safety Information website under the Product Catalog tab. See Figure 620a for the link.



Figure 620a. *NGA Products - Vendors List.*

https://msi.nga.mil/NGAPortal/MSI.portal?_nfpb=true&_st=&_pageLabel=msi_portal_page_68

When navigating in U.S. territorial waters civilian mariners should be using products produced by the National Oceanic and Atmospheric Administration (NOAA) which can be found on the Nautical Charts & Publications website (see Figure 620b for the link). Details for where to buy and download charts and publications are found here. Chart data is distributed every week with the latest updates. The site also offers other products and services including online chart viewers and an interactive nautical chart catalog.



Figure 620b. *NOAA - Office of Coast Survey Charts & Publications website.*

<https://nauticalcharts.noaa.gov/>

MARITIME SAFETY INFORMATION

621. *Notice to Mariners*

The *Notice to Mariners* is published weekly by the National Geospatial-Intelligence Agency (NGA), prepared jointly with the National Oceanic and Atmospheric Administration (NOAA) and the U.S. Coast Guard. It advises mariners of important matters affecting navigational safety, including dangers to navigation, new hydrographic information, changes in shipping channels and aids to navigation, and other important data. The information in the *Notice to Mariners* is formatted to simplify the correction of paper charts, sailing directions, light lists, and other publications produced by NGA, NOAA, and the U.S. Coast Guard.

It is the responsibility of users to decide which of their charts and publications require correction. Suitable records of *Notice to Mariners* should be maintained to facilitate the updating of charts and publications prior to use.

Information for the *Notice to Mariners* is contributed by: NGA (Department of Defense) for waters outside the territorial limits of the United States; National Ocean Service (National Oceanic and Atmospheric Administration, Department of Commerce), which is charged with surveying and charting the coasts and harbors of the United States and its territories; the U.S. Coast Guard (Department of Homeland Security) which is responsible for, among other things, the safety of life at sea and the establishment and operation of aids to navigation; and the Army Corps of Engineers (Department of Defense), which is charged with the improvement of rivers and harbors of the United States. In addition, important contributions are made by foreign hydrographic offices and cooperating observers of all nationalities.

Of the more than 60 countries that produce nautical charts also produce a notice to mariners. About one third of these are weekly, another third are bi-monthly or monthly, and the rest irregularly issued according to need. Much of the data in the U.S. *Notice to Mariners* is obtained from these foreign notices.

U.S. charts must be corrected only with a U.S. *Notice to Mariners* and U.S. *Local Notice to Mariners*. Similarly, correct foreign charts using the foreign notice because chart datums often vary according to region and geographic positions are not the same for different datums.

The *Notice to Mariners* consists of a page of **Hydrograms** listing important items in the notice, a chart correction section organized by ascending chart number, a publications correction section, and a summary of broadcast navigation warnings and miscellaneous information.

Mariners are requested to cooperate in the correction of charts and publications by reporting all discrepancies between published information and conditions actually

observed and by recommending appropriate improvements. A convenient reporting form is provided in the back of each *Notice to Mariners*.

Notice to Mariners No. 1 of each year contains important information on a variety of subjects which supplements information not usually found on charts and in navigational publications. This information is published as **Special Notice to Mariners Paragraphs**. Additional items considered of interest to the mariner are also included in this *Notice*.

U.S. *Notice to Mariners* can be found via the link provided in Figure 621.



Figure 621. U.S. *Notice to Mariners*.
https://msi.nga.mil/NGAPortal/MSI.portal?_nfpb=true&_st=&_pageLabel=msi_portal_page_61

622. *Local Notice to Mariners*

The *Local Notice to Mariners* is issued by each U.S. Coast Guard District to disseminate important information affecting navigational safety within that District. This Notice reports changes and deficiencies in aids to navigation maintained by the Coast Guard. Other marine information such as new charts, channel depths, naval operations, and regattas is included. Because these announcements are normally temporary and of short duration they are not included in the NGA *Notice to Mariners*, therefore the *Local Notice to Mariners* may be the only source for that information.

The *Local Notice to Mariners* may be viewed on the Coast Guard Navigation Center website. Mariners can register on the Coast Guard Navigation Center website for a list server subscription where they will be notified when new editions of the *Local Notice to Mariners* are available. Vessels operating in ports and waterways in several districts must separately obtain the *Local Notice to Mariners* from each district. See Figure 622a and Table 622a for a map and complete listing of U.S. Coast Guard Districts.

Local Notice to Mariners can be obtained online via the link provided in Figure 622b.

623. *Summary of Corrections*

A close companion to the *Notice to Mariners* is the **Summary of Corrections**. The *Summary* is published in five volumes. Each volume covers a major portion of the Earth including several chart regions and their subregions. Volume 5



Figure 622a. U.S. Coast Guard Districts.

COMMANDER, FIRST COAST GUARD DISTRICT
 408 ATLANTIC AVENUE
 BOSTON, MA 02110-3350
 PHONE: DAY 617-223-8356, NIGHT 617-223-8555

COMMANDER, NINTH COAST GUARD DISTRICT
 1240 EAST 9TH STREET
 CLEVELAND, OH 44199-2001
 PHONE: DAY 216-909-6060, NIGHT 216-902-6117

COMMANDER, FIFTH COAST GUARD DISTRICT
 FEDERAL BUILDING
 431 CRAWFORD STREET
 PORTSMOUTH, VA 23704-5004
 PHONE: DAY 757-398-6229, NIGHT 757-398-6390

COMMANDER, ELEVENTH COAST GUARD DISTRICT
 COAST GUARD ISLAND
 BUILDING 52.
 ALAMEDA, CA 94501-5100
 PHONE: DAY 510-437-2980, NIGHT 510-437-3701

COMMANDER, SEVENTH COAST GUARD DISTRICT
 BRICKELL PLAZA FEDERAL BUILDING
 909 SE 1ST AVENUE
 MIAMI, FL 33131-3050
 PHONE: DAY/NIGHT 305-415-6800

COMMANDER, THIRTEENTH COAST GUARD DISTRICT
 FEDERAL BUILDING
 915 SECOND AVENUE
 SEATTLE, WA 98174-1067
 PHONE: DAY 206-220-7280, NIGHT 206-220-7004

COMMANDER, SEVENTH COAST GUARD DISTRICT
 BRICKELL PLAZA FEDERAL BUILDING
 909 SE 1ST AVENUE, RM: 406
 MIAMI, FL 33131-3050
 PHONE: DAY 305-536-5621, NIGHT 305-536-5611

COMMANDER, FOURTEENTH COAST GUARD DISTRICT
 PRINCE KALANIANAOLE FEDERAL BLDG. 9TH FL 9-204
 ALA MOANA BLVD.
 HONOLULU, HI 96850-4982
 PHONE: DAY 808-535-3409, NIGHT 808-535-3333

Table 622a. U.S. Coast Guard Districts.

COMMANDER, EIGHTH COAST GUARD DISTRICT
HALE BOGGS FEDERAL BUILDING
500 POYDRAS STREET
NEW ORLEANS, LA 70130-3330
PHONE: DAY 504-671-2118, NIGHT 504-589-6225

COMMANDER, SEVENTEENTH COAST GUARD DISTRICT
P.O. BOX 25517
JUNEAU, AK 99802-5517
PHONE: DAY 907-463-2269, NIGHT 907-463-2000

Table 622a. U.S. Coast Guard Districts.



Figure 622b. Local Notice to Mariners.

<https://www.navcen.uscg.gov/?pageName=lnmMain>

also includes special charts and publications corrected by the *Notice to Mariners*. Since the *Summaries* contain cumulative corrections, any chart, regardless of its print date, can be corrected with the proper volume of the *Summary* and all subsequent *Notice to Mariners*.

The *Summary of Corrections* is available via the link provided in Figure 623.



Figure 623. Summary of Corrections.

<https://msi.nga.mil/MSISiteContent/StaticFiles/SOCDownloadPage.htm>

624. The Maritime Safety Information Website

The NGA Maritime Safety Information website provides worldwide remote query access to extensive menus of maritime safety information 24 hours a day. The Maritime Safety Information website can be accessed via the NGA Homepage under Mission > Products & Services > Maritime Safety Products and Services > <http://msi.nga.mil/NGAPortal/MSI.portal>.

Databases made available for access, query and download include Chart Corrections, Publication Corrections, Chart and Publication Reference Data (current edition number, dates, title, scale), NGA *List of Lights*, U.S. Coast Guard *Light Lists*, World Wide Navigational Warning Service (WWNWS) Broadcast Warnings, Maritime Administration (MARAD) Advisories, Department of State Special Warnings, Mobile Offshore Drilling Units

(MODUs), Anti-Shipping Activity Messages (ASAMs), *World Port Index*, and *Radio Navigational Aids*. Publications that are also made available as Portable Document Format (PDF) files include the U.S. *Notice to Mariners*, U.S. *Chart No. 1*, *The American Practical Navigator*, *International Code of Signals*, *Radio Navigational Aids*, *World Port Index*, *Distances Between Ports*, *Sight Reduction Tables for Marine Navigation*, *Sight Reduction Tables for Air Navigation*, and the *Radar Navigation and Maneuvering Board Manual*.

Access to the Maritime Safety Information website is available free to the general public via the internet. Users can provide suggestions, changes, corrections or comments on any of NGA's Maritime Safety Information products and services by submitting the appropriate online reporting form.

Questions concerning the Maritime Safety Information website may be directed to NGA's Maritime Safety Office, MS N64 SFH, National Geospatial-Intelligence Agency, 7500 GEOINT Drive, Springfield, VA, 22150. Email address: Webmaster_NSS@nga.mil.

625. International Convention for the Safety of Life at Sea (SOLAS), 1974

The SOLAS Convention is generally regarded as the most important of all international treaties concerning the safety of merchant ships. The main objective of the SOLAS Convention is to specify minimum standards for the construction, equipment and operation of ships, compatible with their safety. A general breakdown of convention chapters are provided in Table 625.

The IMO publishes the SOLAS (Consolidated Edition, 2014), which is an easy reference to all SOLAS requirements.

The Centre for International Law website provides an unofficial text of the SOLAS treaty. See Figure 625 for a link to this document.

626. Standards of Training, Certification and Watchkeeping (STCW)

The 1978 STCW Convention was the first to establish basic requirements on training, certification and watchkeeping for seafarers on an international level. Previously the standards of training, certification and

Chapter I - General Provisions	Surveying the various types of ships and certifying that they meet the requirements of the convention.
Chapter II-1 - Construction - Subdivision and stability, machinery and electrical installations.	The subdivision of passenger ships into watertight compartments so that after damage to its hull, a vessel will remain afloat and stable.
Chapter II-2 - Fire protection, fire detection and fire extinction	Fire safety provisions for all ships with detailed measures for passenger ships, cargo ships and tankers.
Chapter III - Life-saving appliances and arrangements	Life-saving appliances and arrangements, including requirements for life boats, rescue boats and life jackets according to type of ship.
Chapter IV - Radiocommunications	The Global Maritime Distress Safety System (GMDSS) requires passenger and cargo ships on international voyages to carry radio equipment, including satellite Emergency Position Indicating Radio Beacons (EPIRBs) and Search and Rescue Transponders (SARTs).
Chapter V - Safety of navigation	As it relates to manning, voyage planning, dangers, weather, tides and the obligation to assist those in distress
Chapter VI - Carriage of cargoes	Requirements for the stowage and securing of all types of cargo and cargo containers except liquids and gases in bulk
Chapter VII - Carriage of dangerous goods	Requires the carriage of all kinds of dangerous goods to be in compliance with the International Maritime Dangerous Goods Code (IMDG Code).
Chapter VIII - Nuclear ships	Nuclear powered ships are required, particularly concerning radiation hazards, to conform to the Code of Safety for Nuclear Merchant Ships
Chapter IX - Management for the Safe Operation of Ships	Requires every ship owner and any person or company that has assumed responsibility for a ship to comply with the International Safety Management Code (ISM).
Chapter X - Safety measures for high-speed craft	Makes mandatory the International Code of Safety for High-speed craft (HSC Code).
Chapter XI-1 - Special measures to enhance maritime safety	Requirements relating to organizations responsible for carrying out surveys and inspections, enhanced surveys, the ship identification number scheme, and operational requirements.
Chapter XI-2 - Special measures to enhance maritime security	International Ship and Port Facility Security Code (ISPS Code), the role of the Master in maintaining the security of the ship is not, and cannot be, constrained by the Company, the charterer or any other person; Port facilities security assessments and security plans; Delay, detention, restriction, or expulsion of a ship from a port; and ship security alert system requirements.
Chapter XII - Additional safety measures for bulk carriers	Specific structural requirements for bulk carriers over 150 meters in length.
Chapter XIII - Verification of compliance.	Makes mandatory from 1 January 2016 the IMO Member State Audit Scheme.
Chapter XIV - Safety measures for ships operating in polar waters.	Float-free, automatically activated EPIRB. Detectable by Inmarsat geostationary satellite.

Table 625. SOLAS Convention outline.



Figure 625. SOLAS Convention. <https://cil.nus.edu.sg/>

watchkeeping of officers and ratings were established by individual governments, usually without reference to practices in other countries. As a result standards and procedures varied widely, even though shipping is the most international of all industries.

The convention prescribes minimum standards relating to training, certification and watchkeeping for seafarers which countries are obliged to meet or exceed. The STCW Convention is arranged by the following chapter outline:

1. General Provisions
2. Master and Deck Department
3. Engine Department
4. Radio Communications and Radio Personnel
5. Special Training Requirements for Personnel on Certain Types of Ships
6. Emergency, Occupational Safety, Medical Care and Survival Functions
7. Alternative Certification
8. Watchkeeping

The Federal Register outlines in detail the Implementation of the Amendments to the International Convention on Standards of Training, Certification and Watchkeeping (STCW) for Seafarers, 1978, and Changes to National Endorsements. The document is available via the link provided in Figure 626.



Figure 626. STCW Convention.
<https://www.federalregister.gov/articles/2013/12/24/2013-28032/implementation-of-the-amendments-to-the-international-convention-on-standards-of-training>

627. International Convention for the Prevention of Pollution from Ships (MARPOL)

The International Convention for the Prevention of Pollution from Ships (MARPOL) is the main international convention covering prevention of pollution of the marine environment by ships from operational or accidental causes. The convention includes regulations aimed at preventing and minimizing pollution from ships and currently includes six technical Annexes according to various categories of pollutants, each of which deals with the regulation of a particular group of ship emissions. Special Areas with strict controls on operational discharges are included in most Annexes.

A copy of the MARPOL convention can be found at the Centre for Marine Technology and Ocean Engineering website via the link provided in Figure 627.



Figure 627. MARPOL Convention.
<http://www.mar.ist.utl.pt/mventura/Projecto-Navios-I/IMO-Conventions%20%28copies%29/MARPOL.pdf>