

U.S. Department of
Homeland Security

United States
Coast Guard



LIGHT LIST

Volume VII

GREAT LAKES

Great Lakes and the St. Lawrence River
above the St. Regis River

This publication contains a list of lights, sound
signals, buoys, daybeacons, and other aids to navigation.

IMPORTANT
THIS PUBLICATION SHOULD BE CORRECTED
EACH WEEK FROM THE LOCAL NOTICES TO MARINERS
OR NOTICES TO MARINERS AS APPROPRIATE.

2009

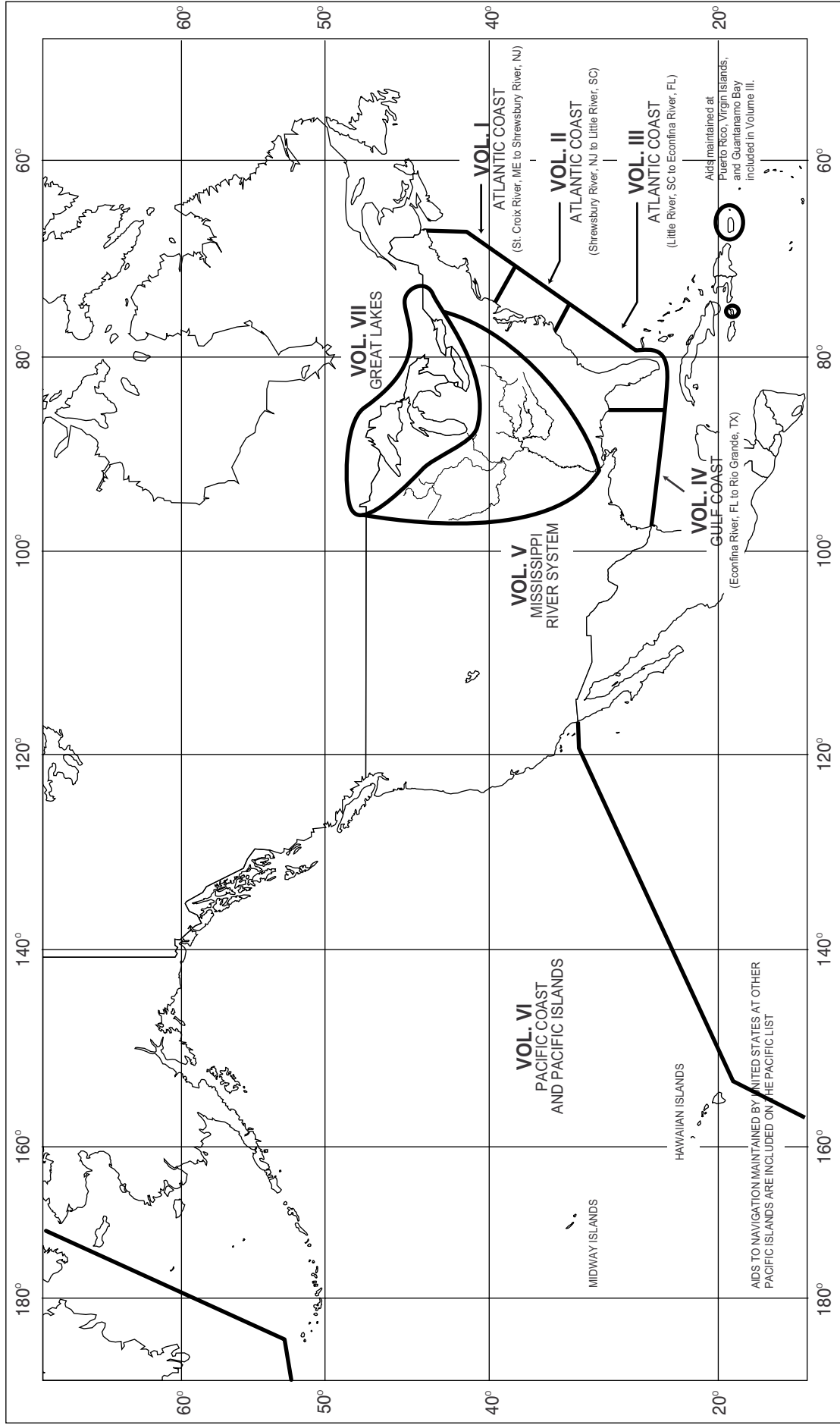
COMDTPUB P16502.7

U.S. GOVERNMENT PRINTING OFFICE
WASHINGTON, DC.

For sale by Superintendent of Documents
U.S. Government Printing Office
Washington, DC 20402

GPO Stock Number: Jamie Pentilie(202)5120310
ISBN: 0-16-075021-0(will change)

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





U.S. AIDS TO NAVIGATION SYSTEM

on navigable waters except Western Rivers

LATERAL SYSTEM AS SEEN ENTERING FROM SEAWARD

<p>PORT SIDE ODD NUMBERED AIDS</p> <p>GREEN LIGHT ONLY FLASHING (2) FLASHING OCCULTING QUICK FLASHING ISO</p>	<p>PREFERRED CHANNEL NO NUMBERS - MAY BE LETTERED</p> <p>PREFERRED CHANNEL TO STARBOARD TOPMOST BAND GREEN</p> <p>GREEN LIGHT ONLY</p> <p>COMPOSITE GROUP FLASHING (2+1)</p>	<p>PREFERRED CHANNEL NO NUMBERS - MAY BE LETTERED</p> <p>PREFERRED CHANNEL TO PORT TOPMOST BAND RED</p> <p>RED LIGHT ONLY</p> <p>COMPOSITE GROUP FLASHING (2+1)</p>	<p>STARBOARD SIDE EVEN NUMBERED AIDS</p> <p>RED LIGHT ONLY FLASHING (2) FLASHING OCCULTING QUICK FLASHING ISO</p>
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AIDS TO NAVIGATION HAVING NO LATERAL SIGNIFICANCE

<p>ISOLATED DANGER NO NUMBERS - MAY BE LETTERED</p> <p>WHITE LIGHT ONLY</p> <p>FI (2) 5s</p>	<p>SAFE WATER NO NUMBERS - MAY BE LETTERED</p> <p>WHITE LIGHT ONLY MORSE CODE</p> <p>Mo (A)</p>
<p>DAYBOARDS - MAY BE LETTERED</p> <p>WHITE LIGHT ONLY</p>	<p>RANGE DAYBOARDS MAY BE LETTERED</p>
<p>SPECIAL MARKS - MAY BE LETTERED</p> <p>YELLOW LIGHT ONLY FIXED FLASHING</p> <p>SHAPE OPTIONAL—BUT SELECTED TO BE APPROPRIATE FOR THE POSITION OF THE MARK IN RELATION TO THE NAVIGABLE WATERWAY AND THE DIRECTION OF BUOYAGE.</p>	

Aids to Navigation marking the Intracoastal Waterway (ICW) display unique yellow symbols to distinguish them from aids marking other waters. Yellow triangles indicate aids should be passed by keeping them on the starboard (right) hand of the vessel. Yellow squares indicate aids should be passed by keeping them on the port (left) hand of the vessel. A yellow horizontal band provides no lateral information, but simply identifies aids as marking the ICW.

TYPICAL INFORMATION AND REGULATORY MARKS

INFORMATION AND REGULATORY MARKERS

WHEN LIGHTED, INFORMATION AND REGULATORY MARKS MAY DISPLAY ANY WHITE LIGHT RHYTHM EXCEPT QUICK FLASHING, Mo(A), AND FLASHING (2)

MOORING BUOY
 WHITE WITH BLUE BAND
 MAY SHOW WHITE REFLECTOR OR LIGHT

SWIM AREA
 EXPLANATION MAY BE PLACED OUTSIDE THE CROSSED DIAMOND SHAPE, SUCH AS DAM, RAPIDS, SWIM AREA, ETC.

BOAT EXCLUSION AREA
 DANGER

ROCK
 THE NATURE OF DANGER MAY BE INDICATED INSIDE THE DIAMOND SHAPE, SUCH AS ROCK, WRECK, SHOAL, DAM, ETC.

CONTROLLED AREA
 TYPE OF CONTROL IS INDICATED IN THE CIRCLE, SUCH AS SLOW, NO WAKE, ANCHORING, ETC.

INFORMATION
 FOR DISPLAYING INFORMATION SUCH AS DIRECTIONS, DISTANCES, LOCATIONS, ETC.

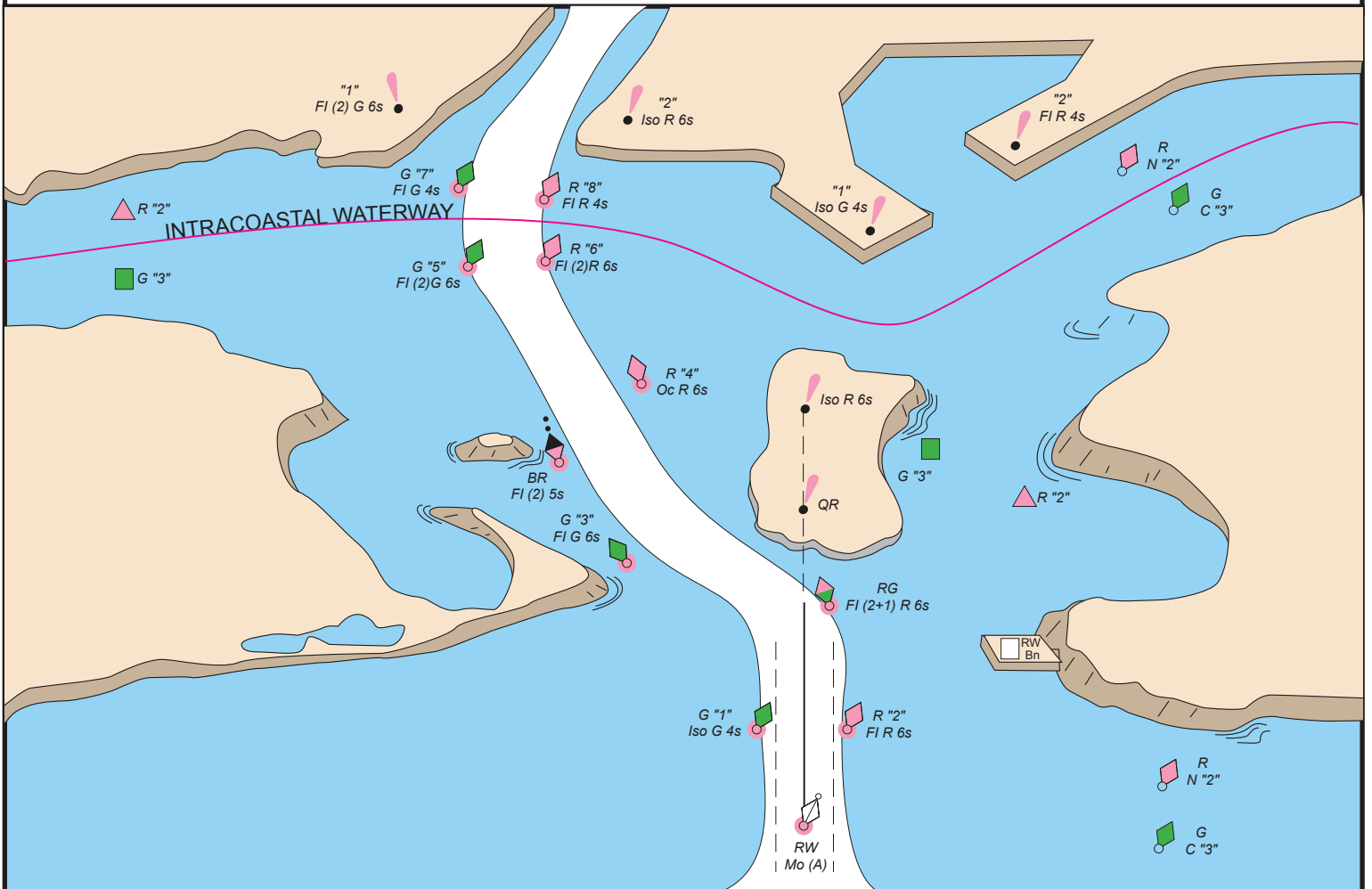
BUOY USED TO DISPLAY REGULATORY MARKERS

DANGER
 MAY SHOW WHITE LIGHT MAY BE LETTERED

5 mph



FICTITIOUS NAUTICAL CHART





U.S. AIDS TO NAVIGATION SYSTEM

on the Western River System

AS SEEN ENTERING FROM SEAWARD

<p>PORT SIDE OR RIGHT DESCENDING BANK</p> <p>GREEN OR WHITE LIGHTS</p> <p>FLASHING ISO</p> <p>LIGHT LIGHTED BUOY CAN</p> <p>SG CNG</p> <p>PASSING DAYBEACON CROSSING DAYBEACON</p> <p>176.9 MILE BOARD</p>	<p>PREFERRED CHANNEL MARK JUNCTIONS AND OBSTRUCTIONS COMPOSITE GROUP FLASHING (2+1)</p> <p>PREFERRED CHANNEL TO STARBOARD TOPMOST BAND GREEN FI (2+1) G</p> <p>PREFERRED CHANNEL TO PORT TOPMOST BAND RED FI (2+1) R</p> <p>JG JR</p> <p>DAYBOARDS HAVING NO LATERAL SIGNIFICANCE</p> <p>MAY BE LETTERED WHITE LIGHT ONLY</p> <p>NB</p> <p>123.5 MILE BOARD</p>	<p>STARBOARD SIDE OR LEFT DESCENDING BANK</p> <p>RED OR WHITE LIGHTS</p> <p>FLASHING (2) ISO</p> <p>LIGHT LIGHTED BUOY NUN</p> <p>MAY BE LIGHTED TR CNR</p> <p>PASSING DAYBEACON CROSSING DAYBEACON</p> <p>123.5 MILE BOARD</p>
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SPECIAL MARKS--MAY BE LETTERED

UNLIGHTED LIGHTED

SHAPE: OPTIONAL--BUT SELECTED TO BE APPROPRIATE FOR THE POSITION OF THE MARK IN RELATION TO THE NAVIGABLE WATERWAY AND THE DIRECTION OF BUOYAGE.

YELLOW LIGHT ONLY
FIXED FLASHING

MOORING BUOY
WHITE WITH BLUE BAND
MAY SHOW WHITE REFLECTOR OR LIGHT

TYPICAL INFORMATION AND REGULATORY MARKS

INFORMATION AND REGULATORY MARKERS

WHEN LIGHTED, INFORMATION AND REGULATORY MARKS MAY DISPLAY ANY LIGHT RHYTHM EXCEPT QUICK FLASHING, Mo(a) AND FLASHING (2)

NW WHITE LIGHT ONLY

BOAT EXCLUSION AREA DANGER CONTROLLED AREA

SWIM AREA

EXPLANATION MAY BE PLACED OUTSIDE THE CROSSED DIAMOND SHAPE, SUCH AS DAM, RAPIDS, SWIM AREA, ETC.

THE NATURE OF DANGER MAY BE INDICATED INSIDE THE DIAMOND SHAPE, SUCH AS ROCK, WRECK, SHOAL, DAM, ETC.

TYPE OF CONTROL IS INDICATED IN THE CIRCLE, SUCH AS SLOW, NO WAKE, ANCHORING, ETC.

MULLET LAKE
BLACK RIVER

INFORMATION

FOR DISPLAYING INFORMATION SUCH AS DIRECTIONS, DISTANCES, LOCATIONS, ETC.

BUOY USED TO DISPLAY REGULATORY MARKERS

MAY SHOW WHITE LIGHT
MAY BE LETTERED

STATE WATERS

INLAND (STATE) WATERS OBSTRUCTION MARK
MAY SHOW WHITE REFLECTOR OR QUICK FLASHING WHITE LIGHT

BLACK-STRIPED WHITE BUOY

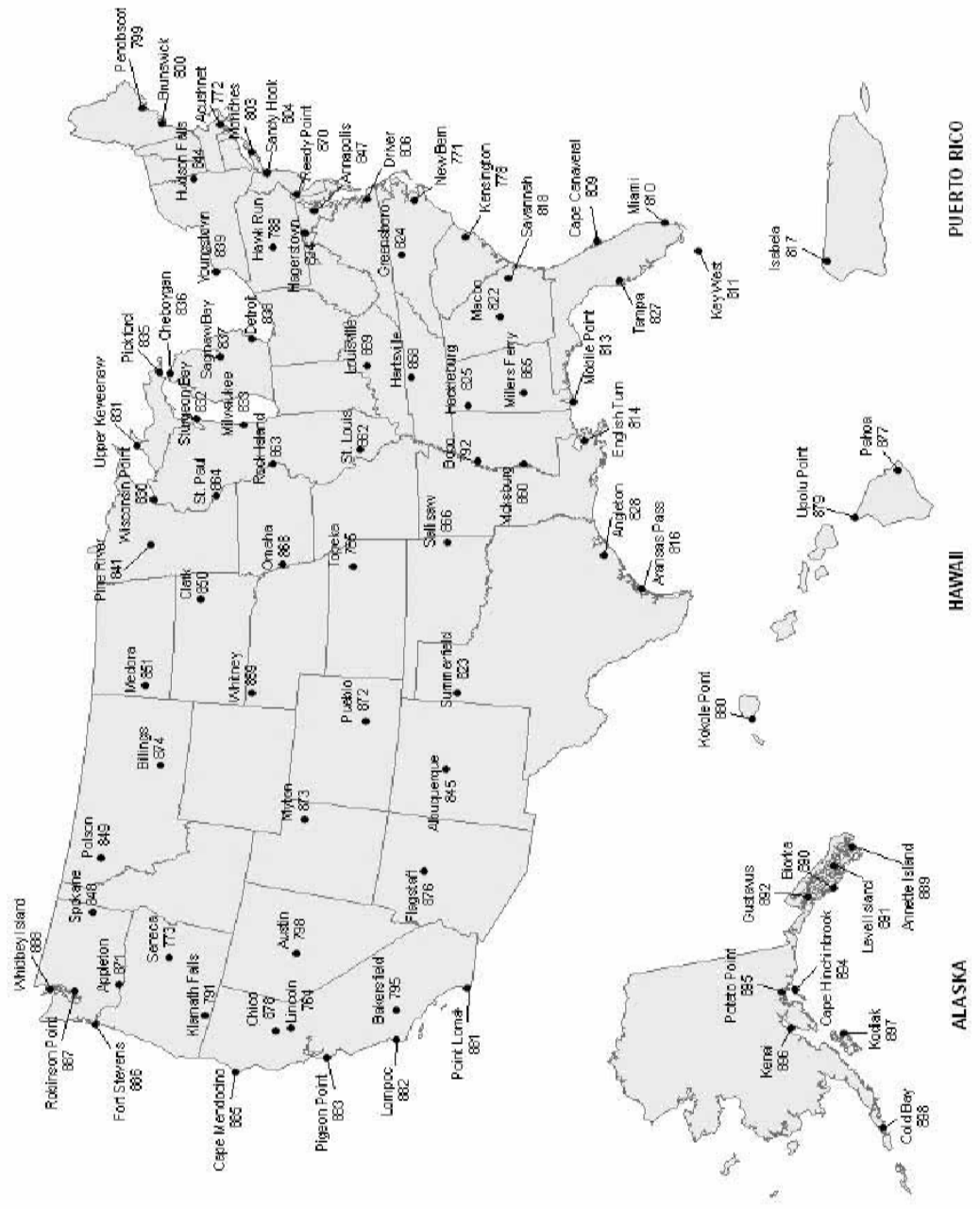
Used to indicate an obstruction to navigation, extends from the nearest shore to the buoy. This means "do not pass between the buoy and the nearest shore." This aid is replacing the red and white striped buoy within the USWMS, but cannot be used until all red and white striped buoys on a waterway have been replaced.

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U.S. DGPS SITES & IDENTIFICATION NUMBERS



COAST GUARD DISTRICT COMMANDERS

DISTRICT	ADDRESS	WATERS OF JURISDICTION
FIRST	408 Atlantic Avenue Boston, MA 02110-3350 Tel: (617) 223-8558 http://www.uscg.mil/d1	Maine, New Hampshire, Massachusetts, Vermont (Lake Champlain), Rhode Island, Connecticut, New York, to Shrewsbury River, New Jersey.
FIFTH	Federal Building 431 Crawford Street Portsmouth, VA 23704-5004 Tel: (757) 398-6486 (757) 398-6231 http://www.uscg.mil/d5	Shrewsbury River, New Jersey to Delaware, Maryland, Virginia, District of Columbia, and North Carolina.
SEVENTH	Brickell Plaza Federal Building 909 SE 1st Avenue; Rm:406 Miami, FL 33131-3050 Tel: (305) 415-6730 (305) 415-6800 http://www.uscg.mil/d7	South Carolina, Georgia, Florida to 83°50'W, and Puerto Rico and adjacent islands of the United States.
EIGHTH	Hale Boggs Federal Building 500 Poydras Street New Orleans, LA 70130-3310 Tel: (504) 589-6277 (504) 589-6225 http://www.uscg.mil/d8	Florida westward from 83°50'W, Alabama, Mississippi, Louisiana, Texas, the Mississippi River System except that portion of the Illinois River north of Joliet, Illinois.
NINTH	1240 East 9th Street Cleveland, OH 44199-2060 Tel: (216) 902-6069 (216) 902-6117 http://www.uscg.mil/d9	Great Lakes and St. Lawrence River above St. Regis River.
ELEVENTH	Coast Guard Island Building 50-6 Alameda, CA 94501-5100 Tel: (510) 437-2976 http://www.uscg.mil/d11	California.
THIRTEENTH	Federal Building 915 Second Avenue Seattle, WA 98174-1067 Tel: (206) 220-7270 (206) 220-7004 http://www.uscg.mil/d13	Oregon, Washington, Idaho, and Montana.
FOURTEENTH	Prince Kalaniana'ole Federal Bldg. 300 Ala Moana Blvd 9th Floor, Room 9-236 Honolulu, HI 96850-4982 Tel: (808) 541-2316 (808) 541-2500 http://www.uscg.mil/d14	Hawaiian, American Samoa, Marshall, Marianas, and Caroline Islands.
SEVENTEENTH	PO Box 25517 Juneau, AK 99802-5517 Tel: (907) 463-2262 (907) 463-2004 http://www.uscg.mil/d17	Alaska.

U. S. COAST GUARD NINTH DISTRICT UNIT LISTING

AIDS TO NAVIGATION TEAMS

ANT BUFFALO
1 Fuhrmann Blvd.
Buffalo, NY 14203-3189
Tel: (716) 843-9551

ANT DETROIT
110 Mt. Elliott Ave
Detroit, MI 48207-4380
Tel: (313) 568-9538/40

ANT DULUTH
1201 Minnesota Ave
Duluth, MN 55802-2492
Tel: (218) 529-3114

STANT TWO RIVERS
1303 East Street
Two Rivers, WI 54241
Tel: (920) 793-1304

STANT KENOSHA
5036 Fourth Ave
Kenosha, WI 53140-2998
Tel: (262) 657-7731

STANT MUSKEGON
1453 Beach St.
Muskegon, MI 49441-1082
Tel: (231) 759-8581

STANT PORTAGE
PO Box 350
22911 Chippewa Trail
Dollar Bay, MI 49922-0350
Tel: (906) 482-1520

STANT SAGINAW RIVER
2405 Weadock Road
Essexville, MI 48732-9602
Tel: (989) 892-0556

STANT ST. IGNANCE
1075 Huron St
St. Ignance, MI 49871-1899
Tel: (906) 643-6402

BUOY TENDERS

USCGC ALDER (WLB-216)
1201 Minnesota Ave
Duluth, MN 55802-2492
Tel: (218) 529-3131

USCGC BRISTOL BAY (WTGB-102)
110 Mt. Elliott Ave
Detroit, MI 48207-4380
Tel: (313) 568-9548

USCGC BUCKTHORN (WLI-642)
337 Water St.
Sault Ste. Marie, MI 49783-9501
Tel: (906) 635-3288/89

USCGC HOLLYHOCK (WLB-214)
2700 Omar St
Port Huron, MI 48060-8519
Tel: (810) 982-2684/86

USCGC MACKINAW (WLBB-30)
632 Coast Guard Dr.
Cheboygan, MI 49721-1299
Tel: (231) 597-2030

USCGC MOBILE BAY (WTGB-103)
P.O. Box 287
Sturgeon Bay, WI 54235-0287
Tel: (920) 743-2646

USCG NAVIGATION CENTER Navigation Information Service (NIS)

The U.S. Coast Guard Navigation Center (NAVCEN) is the official government source of information for civil users of the Global Positioning System (GPS). The Navigation Information Service (NIS) is available 24 hours a day, seven days a week, for all Radio Navigation and maritime related needs via phone, fax or e-mail. The NIS provides users the ability to access real time or archived GPS, NDGPS, DGPS Loran-C, and LNM information at <http://www.navcen.uscg.gov>, as well as subscribe to an automated list service which enables users to receive GPS status messages and Notice to NAVSTAR User (NANU) messages via direct Internet e-mail.

The NAVCEN also disseminates GPS, DGPS, and LORAN safety advisory broadcast messages through USCG broadcast stations utilizing VHF-FM voice, HF-SSB voice, and NAVTEX broadcasts. The broadcasts provide the GPS and DGPS user in the marine environment with the current status of the navigation systems, as well as any planned/unplanned system outages that could affect GPS, DGPS, and LORAN navigational accuracy.

To comment on any of these services or ask questions about the service offered, contact the NAVCEN at:

Commanding Officer
U.S. Coast Guard NAVCEN (NIS)
MS 7310
7323 Telegraph Road
Alexandria, VA 20598-7310
Phone: (703) 313-5900
FAX: (703) 313-5920
Internet: <http://www.navcen.uscg.gov>

This Light List is corrected through: Ninth Coast Guard District Local Notice to Mariners No. 53/08
<http://www.navcen.uscg.gov/lnm/d9/default.htm>

and through National Geospatial-Intelligence Agency (NGA) Notice to Mariners No. 51/08

The 2009 print edition supersedes the 2007 print edition.

RECORD OF CORRECTIONS

YEAR 2009					YEAR 2010				
1.....	2.....	3.....	4.....	5.....	1.....	2.....	3.....	4.....	5.....
6.....	7.....	8.....	9.....	10.....	6.....	7.....	8.....	9.....	10.....
11.....	12.....	13.....	14.....	15.....	11.....	12.....	13.....	14.....	15.....
16.....	17.....	18.....	19.....	20.....	16.....	17.....	18.....	19.....	20.....
21.....	22.....	23.....	24.....	25.....	21.....	22.....	23.....	24.....	25.....
26.....	27.....	28.....	29.....	30.....	26.....	27.....	28.....	29.....	30.....
31.....	32.....	33.....	34.....	35.....	31.....	32.....	33.....	34.....	35.....
36.....	37.....	38.....	39.....	40.....	36.....	37.....	38.....	39.....	40.....
41.....	42.....	43.....	44.....	45.....	41.....	42.....	43.....	44.....	45.....
46.....	47.....	48.....	49.....	50.....	46.....	47.....	48.....	49.....	50.....
51.....	52.....				51.....	52.....			

PREFACE

Lights and other marine aids to navigation, maintained by or under authority of the U.S. Coast Guard and located on waters used by general navigation, are described in the Light List. This volume includes aids located on the waters of the Great Lakes.

Included are all Coast Guard aids to navigation used for general navigation such as lights, sound signals, buoys, daybeacons, and other aids to navigation. Not included are some buoys having no lateral significance, such as special purpose, anchorage, fish net, and dredging.

Aids to Navigation Link: <http://www.uscgboating.org/safety/aton/system.htm>

CAUTION: Mariners attempting to pass a buoy close aboard risk collision with a yawing buoy or with the obstruction, which the buoy marks. Mariners must not rely on buoys alone for determining their positions due to factors limiting buoy reliability.

PRIVATE AIDS TO NAVIGATION

Included: Class I aids to navigation on marine structures or other works which the owners are legally obligated to establish, maintain, and operate as prescribed by the Coast Guard.

Included: Class II aids to navigation exclusive of Class I, located in waters used by general navigation.

Not included: Class III aids to navigation exclusive of Class I and Class II, located in waters not ordinarily used by general navigation.

This Light List is published via hardcopy annually and is intended to furnish more complete information concerning aids to navigation than can be conveniently shown on charts. This Light List is not intended to be used in place of charts or Coast Pilots. Charts should be consulted for the location of all aids to navigation. It may be dangerous to use aids to navigation without reference to charts.

This list is corrected to the date of the notices to mariners shown on the title page. Changes to aids to navigation during the year are published in U.S. Coast Guard Local Notices to Mariners and National Geospatial-Intelligence Agency (NGA) Notices to Mariners. Important changes to aids to navigation are also broadcast through Coast Guard or Naval radio stations and NAVTEX. Mariners should keep their Light Lists, charts and other nautical publications corrected from these notices and should consult all notices issued after the date of publication of this Light List.

The electronic version of this publication is updated monthly and is available at:
<http://www.navcen.uscg.gov/pubs/LightLists/LightLists.htm>

IMPORTANT: A summary of corrections for this publication, which includes corrections from the dates shown on the title page to the date of availability, is published in the Local Notice to Mariners and the Notice to Mariners. These corrections must be applied in order to bring the Light List up-to-date. Additionally, this publication should be corrected weekly from the Local Notices to Mariners or the Notices to Mariners, as appropriate.

Mariners and others are requested to bring any apparent errors or omissions in these lists to the attention of:

**Commander (dpw)
Ninth Coast Guard District
1240 East 9th Street
Cleveland, OH 44199-2060**

or **USCG Navigation Center
Charting Branch
MS 7310
7323 Telegraph Road
Alexandria, VA 20598-7310
Email: Tis-pf-Nisws@USCG.mil**

INTRODUCTION

Arrangement. Aids to navigation on the coasts are arranged in geographic order clockwise from north to south along the Atlantic coast, east to west along the Gulf of Mexico, and south to north along the Pacific coast. On the Great Lakes, aids to navigation are arranged from east to west and from north to south, except on Lake Michigan which is arranged from north to south. Seacoast aids to navigation are listed first, followed by entrance and harbor aids to navigation, listed from seaward to the head of navigation.

Names of aids to navigation are printed as follows to help distinguish at a glance the type of aid to navigation listed:

Seacoast/Lake coast Lights and Secondary Lights

RACONS

Sound Signals

RIVER, HARBOR, AND OTHER LIGHTS

Lighted Buoys

Daybeacons and Unlighted Buoys

Light List Numbers are assigned to all Federal aids to navigation and many private aids to navigation for reference in the Light List. Aids to navigation are numbered by fives in accordance with their order of appearance in each volume of the Light List. Other numbers and decimal fractions are assigned where newly established aids to navigation are listed between previously numbered aids to navigation. The Light Lists are renumbered periodically to assign whole numbers to all aids to navigation.

International numbers are assigned to certain aids to navigation in cooperation with the International Hydrographic Organization. They consist of an alphabetic character followed by three or four numeric characters. A cross-reference listing appears after the index.

DESCRIPTION OF COLUMNS

Column (1): Light List number.

Column (2): Name of the aid to navigation.

A dash (–) is used to indicate the bold heading is part of the name of the aid to navigation. When reporting discrepancies or making reference to such aids to navigation in correspondence, the full name of the aid, including the geographic heading, should be given.

Bearings are in degrees true, read clockwise from 000° through 359°.

Bearings on rangelines are given in degrees and tenths.

Column (3): Geographic position of the aid to navigation in latitude and longitude. Positions are approximate and only intended to facilitate locating the aid on a chart.

Column (4): Light characteristic for lighted aid to navigation.

Column (5): Height above water from the focal plane of the fixed light to low water datum, listed in feet.

Column (6): Nominal range of lighted aids to navigation, in statute miles, listed by color for alternating sector and passing lights. Not listed for ranges, directional lights, or private aids to navigation.

Column (7): The structural characteristic of the aid to navigation, including; dayboard (if any), description of fixed structure, color and type of buoy, height of structure above ground for major lights.

Column (8): Aid remarks, including; sound signal characteristic, RACON, light sector arc of visibility, radar reflector, emergency lights, seasonal remarks, and Private AtoN identification.

Abbreviations used in the Light Lists.

Al - Alternating	Y - Yellow
bl - blast	MHz - Megahertz
C - Canadian	Mo - Morse Code
ec - Eclipse	Oc - Occulting
ev - Every	ODAS - Anchored Oceanographic Data Buoy
F - Fixed	Q - Quick (Flashing)
fl - flash	Ra ref - Radar reflector
Fl - Flashing	s - seconds
Fl(2) - Group flashing	si - silent
I - Interrupted	SPM - Single Point Mooring Buoy
Iso - Isophase (Equal interval)	SS - Sound Signal
kHz - Kilohertz	W - White
LFl - Long Flash	
lt - Lighted	

U.S. COAST GUARD LIGHT LISTS

Coast Guard Light Lists are sold by the Superintendent of Documents, U.S. Government Printing Office (GPO) and can be ordered by phone: (202) 512-1800; FAX: (202) 512-2250; Web: <http://bookstore.gpo.gov>; or mail: Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250-7954. Light Lists are also available at GPO Bookstores and from GPO Sales Agents. The Light Lists can also be found online at <http://www.navcen.uscg.gov> under the "Light Lists & Corrections" heading in the center column.

NOTICES TO MARINERS

Broadcast Notices to Mariners are made by the Coast Guard through Coast Guard and Navy radio stations. These broadcast notices, which are broadcast on VHF-FM, NAVTEX, and other maritime frequencies, are navigational warnings that contain information of importance to the safety of navigation. Included are reports of deficiencies and changes to aids to navigation, the positions of ice and derelicts, and other important hydrographic information.

Radio stations broadcasting Notices to Mariners are listed in the National Ocean Service Coast Pilots and in the National Geospatial-Intelligence Agency publication Radio Navigational Aids (CDPUBRA117).

Local Notice to Mariners (U.S. regional coverage) are an-

other means by which the Coast Guard disseminates navigation information for the United States, its territories, and possessions. A Local Notice to Mariners is issued by each Coast Guard district and is used to report changes and discrepancies to aids to navigation maintained by and under the authority of the Coast Guard. Local Notice to Mariners contain other marine information such as channel depths, naval operations, regattas, etc., which may affect vessels and waterways within the jurisdiction of each Coast Guard district. Reports of channel conditions, obstructions, menaces to navigation, danger areas, new chart editions, etc., are also included in the Local Notice to Mariners.

These notices are essential to all navigators for the purposes of keeping charts, Light Lists, Coast Pilots, and other nautical publications up-to-date. These notices are published as often as required, but usually weekly. They may be obtained via the U.S. Coast Guard Navigation Center website at <http://www.navcen.uscg.gov/lnm>. Vessels operating in ports and waterways in several districts will have to obtain the Local Notice to Mariners from each district in order to be fully informed.

Weekly Notice to Mariners are prepared jointly by the National Geospatial-Intelligence Agency, the U.S. Coast Guard, and the National Ocean Service, and are published weekly by National Geospatial-Intelligence Agency.

The Weekly Notice to Mariners advise mariners of important matters affecting navigational safety including new hydrographic discoveries, changes in channels and aids to navigation. Also included are corrections to Light Lists, Coast Pilots, and Sailing Directions. Foreign marine information is also included. This notice is intended for mariners and others who have a need for information related to oceangoing operations. Because it is intended for use by oceangoing vessels, many corrections that affect small craft navigation and associated waters are not included. Information concerning small craft is contained in the Coast Guard Local Notice to Mariners only. The Weekly Notices to Mariners may be obtained free of charge via the World Wide Web (<http://www.nga.mil/portal/site/maritime>) or by email subscription.

NAUTICAL CHARTS AND PUBLICATIONS

Charts and Coast Pilots covering the United States and its territories are published by the National Ocean Service (NOS), Silver Spring, MD 20910, and are for sale by NOS and authorized NOS Sales Agents. A free catalog of available NOS/NOAA products can be obtained by phone: (301) 436-8301/(800) 638-8972; FAX: (301) 436-6829; or mail: FAA, National Aeronautical Charting Office, Distribution Division AVN-530, 10201 Good Luck Rd, Glenn Dale, MD 20769.

Maps for the Mississippi River System are published by the various U.S. Army Corps of Engineer District Engineers.

Tide Tables and Tidal Current Tables are no longer printed or distributed by NOS. Private publishing companies are printing the tables using data provided by NOS. These products may be obtained from local stores that carry ma-

rine publications.

AIDS TO NAVIGATION DISCREPANCIES

The Coast Guard does not keep the tens of thousands of aids to navigation comprising the U.S. Aids to Navigation System under simultaneous and continuous observation. Mariners should realize that it is impossible to maintain every aid to navigation operating properly and on its assigned position at all times. Therefore, for the safety of all mariners, any person who discovers an aid to navigation that is either off station or exhibiting characteristics other than those listed in the Light Lists should promptly notify the nearest Coast Guard unit. Radio messages should be prefixed "COAST GUARD" and transmitted directly to one of the U.S. Government radio stations listed in Chapter 3, Section 300L, Radio Navigational Aids (CDPUBRA117).

Recommendations and requests for aids to navigation and to report aids to navigation that are no longer needed should be mailed to the Coast Guard district concerned (see pg. ii).

U.S. AIDS TO NAVIGATION SYSTEM

The navigable waters of the United States are marked to assist navigation using the U.S. Aids to Navigation System, a system consistent with the International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA) Maritime Buoyage System. The IALA Maritime Buoyage System is followed by most of the world's maritime nations and will improve maritime safety by encouraging conformity in buoyage systems worldwide. IALA buoyage is divided into two regions made up of Region A and Region B. All navigable waters of the United States follow IALA Region B, except U.S. possessions west of the International Date Line and south of 10° north latitude, which follow IALA Region A. Lateral aids to navigation in Region A vary from those located within Region B. Non-lateral aids to navigation are the same as those used in Region B. Appropriate nautical charts and publications should be consulted to determine whether the Region A or Region B marking schemes are in effect for a given area.

The U.S. Aids to Navigation System is designed for use with nautical charts. Nautical charts portray the physical features of the marine environment, including soundings and other submarine features, landmarks, and other aids necessary for the proper navigation of a vessel. This crucial information cannot be obtained from other sources, even ones such as topographic maps, aeronautical charts, or atlases. The exact meaning of an aid to navigation may not be clear to the mariner unless the appropriate chart is consulted, as the chart illustrates the relationship of the individual aid to navigation to channel limits, obstructions, hazards to navigation, and to the total aids to navigation system.

The navigator should maintain and consult suitable publications and instruments for navigation depending on the vessel's requirements. This shipboard equipment is separate from the aids to navigation system, but is often essential to its use.

The U.S. Aids to Navigation System is primarily a lateral system which employs a simple arrangement of colors, shapes, numbers, and light characteristics to mark the limits of navigable routes. This lateral system is supplemented by nonlateral aids to navigation where appropriate.

TYPES OF MARKS

Lateral marks are buoys or beacons indicating the port and starboard sides of a route to be followed, and are used in conjunction with a conventional direction of buoyage.

Generally, lateral aids to navigation indicate on which side of a vessel an aid to navigation should be passed when the vessel is proceeding in the conventional direction of buoyage. Normally, the conventional direction of buoyage is the direction in which a vessel enters navigable channels from seaward and proceeds towards the head of navigation. In the absence of a route leading from seaward, the conventional direction of buoyage generally follows a clockwise direction around land masses.

For example, proceeding southerly along the Atlantic Coast, from Florida to Texas along the Gulf Coast, and northerly along the Pacific Coast are considered as proceeding in the conventional direction of buoyage. In some instances, this direction must be arbitrarily assigned. Where doubt exists, the mariner should consult charts and other nautical publications.

Virtually all U.S. lateral marks are located in IALA Region B and follow the traditional 3R rule of red, right, returning. A summary of the port and starboard hand lateral mark characteristics is contained in the following table.

Characteristic	Port Hand	Starboard Hand
Color	Green	Red
Shape (buoys)	Cylindrical (can) or pillar	Conical (nun) or pillar
Dayboard	Green square	Red triangle
Topmark (if fitted)	Cylinder	Cone, point upward
Light Color (if lighted)	Green	Red
Reflector Color	Green	Red
Number	Odd	Even

U.S. lateral aids to navigation at certain Pacific Islands are located within IALA Region A and thus exhibit opposite color significance. Port hand marks are red with square or cylindrical shapes while starboard hand marks are green with triangular or conical shapes.

Preferred channel marks are aids to navigation which mark channel junctions or bifurcations and often mark wrecks or obstructions. Preferred channel marks may normally be passed on either side by a vessel, but indicate to the mariner the preferred channel. Preferred channel marks are colored with red and green bands.

At a point where a channel divides, when proceeding in the conventional direction of buoyage, a preferred channel in IALA Region B may be indicated by a modified port or starboard lateral mark as follows:

Characteristic	Preferred to starboard	Preferred to port
Color	Green with one broad red band	Red with one broad green band
Shape (buoys)	Cylindrical (can) or pillar	Conical (nun) or pillar
Dayboard	Green square, lower half red	Red triangle, lower half green
Topmark (when fitted)	Green square or cylinder	Red triangular cone, point up-
Light Color (if lighted)	Green	Red
Rhythm	Composite group flashing (2+1)	Composite group flashing (2+1)
Reflector color	Green	Red

CAUTION: It may not always be possible to pass on either side of preferred channel aids to navigation. The appropriate nautical chart should always be consulted.

Non-lateral marks have no lateral significance, but may be used to supplement the lateral aids to navigation specified above. Occasionally, daybeacons or minor lights outside of the normal channel will not have lateral significance since they do not define limits to navigable waters. These aids to navigation will utilize diamond-shaped dayboards and are divided into four diamond-shaped sectors. The side sectors of these dayboards are colored white, and the top and bottom sectors are colored black, red, or green as the situation dictates.

Safe water marks are used to mark fairways, midchannels, and offshore approach points, and indicate that there is unobstructed water on all sides. They can also be used by the mariner transiting offshore waters to identify the proximity of intended landfall. Safe water marks are red and white striped and have a red spherical topmark to further aid in identification. If lighted, they display a white light with the characteristic Morse code "A".

Isolated danger marks are erected on, moored over, or placed immediately adjacent to an isolated danger that may be passed on all sides. These marks should not be approached closely without special caution.

Isolated danger marks are colored with black and red bands, and if lighted, display a group flashing (2) white light. A topmark consisting of two black spheres, one above the other is fitted for both lighted and unlighted marks.

Special marks are not primarily intended to assist safe navigation, but to indicate special areas or features referred to on charts or in other nautical publications. The feature should be described in a nautical document such as a chart, Light List, Coast Pilot or Notice to Mariner. Some areas that may be marked by these aids to navigation are spoil areas, pipelines, traffic separation schemes, jetties, or military exercise areas. Special marks are yellow in color and, if lighted, display a yellow light.

Information and regulatory marks are used to alert the

mariner to various warnings or regulatory matters. These marks have orange geometric shapes against a white background. The meanings associated with the orange shapes are as follows:

- 5 1. An open-faced diamond signifies danger.
2. A vertical diamond shape having a cross centered within indicates that vessels are excluded from the marked area.
- 10 3. A circular shape indicates that certain operating restrictions are in effect within the marked area.

Warnings, instructions, or explanations may be shown within the shapes.

15 **BUOYS AND BEACONS**

Aids to navigation are placed on shore or on marine sites to assist navigators in determining their position or safe course. They may mark limits of navigable channels, or warn of dangers or obstructions to navigation. The primary components of the U.S. Aids to Navigation System are beacons and buoys.

25 Buoys are floating aids to navigation used extensively throughout U.S. waters. They are moored to the seabed by sinkers with chain or other moorings of various lengths.

30 Mariners attempting to pass a buoy close aboard risk collision with a yawing buoy or with the obstruction, which the buoy marks. Mariners must not rely on buoys alone for determining their positions due to factors limiting buoy reliability.

35 Prudent mariners will use bearings or angles from beacons or other landmarks, soundings, and various methods of electronic navigation.

40 Buoy positions represented on nautical charts are approximate positions only, due to the practical limitations of positioning and maintaining buoys and their sinkers in precise geographical locations.

45 Buoy moorings vary in length. The mooring lengths define a "watch circle", and buoys can be expected to move within this circle. Actual watch circles do not coincide with the buoy symbols representing them on charts.

50 Buoy positions are normally verified during periodic maintenance visits. Between visits, environmental conditions, including atmospheric and sea conditions, seabed slope and composition, may shift buoys off their charted positions. Also buoys may be dragged off station, sunk, or capsized by a collision with a vessel.

55 Beacons are aids to navigation which are permanently fixed to the earth's surface. They range from large light-houses to small single-pile structures and may be located on land or in the water. Lighted beacons are called lights; unlighted beacons are called daybeacons.

60 Beacons exhibit a daymark. For small structures these are colored geometric shapes which make an aid to navigation

readily visible and easily identifiable against background conditions. Generally, the daymark conveys to the mariner, during daylight hours, the same significance as does the aid's light or reflector at night. The daymark of towers, however, consists of the structure itself. As a result, these daymarks do not infer lateral significance.

70 Vessels should not pass fixed aids to navigation close aboard due to the danger of collision with rip-rap or structure foundations, or with the obstruction or danger being marked.

75 **LIGHTED AIDS TO NAVIGATION**

Most lighted aids to navigation are equipped with controls, which automatically cause the light to operate during darkness and to be extinguished during daylight. These devices are not of equal sensitivity; therefore all lights do not come on or go off at the same time. Mariners should ensure correct identification of aids to navigation during twilight periods when some lighted aids to navigation are lit while others are not.

85 The lighting apparatus is serviced at periodic intervals to assure reliable operation, but there is always the possibility of a light being extinguished or operating improperly.

90 The condition of the atmosphere has a considerable effect upon the distance at which lights can be seen. Sometimes lights are obscured by fog, haze, dust, smoke, or precipitation which may be present at the light, or between the light and the observer, and which is possibly unknown by the observer. Atmospheric refraction may cause a light to be seen farther than under ordinary circumstances.

100 A light of low intensity will be easily obscured by unfavorable conditions of the atmosphere and little dependence can be placed on it being seen. For this reason, the intensity of a light should always be considered when expecting to sight it in thick weather. Haze and distance may reduce the apparent duration of the flash of a light. In some atmospheric conditions, white lights may have a reddish hue. Lights placed at high elevations are more frequently obscured by clouds, mist, and fog than those lights located at or near sea level.

110 In regions where ice conditions prevail in the winter, the lantern panes of lights may become covered with ice or snow, which will greatly reduce the visibility of the lights and may also cause colored lights to appear white.

115 The increasing use of brilliant shore lights for advertising, illuminating bridges, and other purposes, may cause marine navigational lights, particularly those in densely inhabited areas, to be outshone and difficult to distinguish from the background lighting. Mariners are requested to report such cases in order that steps may be taken to improve the conditions.

120 The "loom" (glow) of a powerful light is often seen beyond the limit of visibility of the actual rays of the light. The loom may sometimes appear sufficiently sharp enough to obtain a bearing. At short distances, some flashing lights may

show a faint continuous light between flashes.

The distance of an observer from a light cannot be estimated by its apparent intensity. Always check the characteristics of lights so powerful lights, visible in the distance, are not mistaken for nearby lights (such as those on lighted buoys) showing similar characteristics of low intensity. If lights are not sighted within a reasonable time after prediction, a dangerous situation may exist requiring prompt resolution or action in order to ensure the safety of the vessel.

The apparent characteristic of a complex light may change with the distance of the observer. For example, a light which actually displays a characteristic of fixed white varied by flashes of alternating white and red (the rhythms having a decreasing range of visibility in the order: flashing white, flashing red, fixed white) may, when first sighted in clear weather, show as a simple flashing white light. As the vessel draws nearer, the red flash will become visible and the characteristics will apparently be alternating flashing white and red. Later, the fixed white light will be seen between the flashes and the true characteristic of the light will finally be recognized as fixed white, alternating flashing white and red (F W A I W R).

If a vessel has considerable vertical motion due to pitching in heavy seas, a light sighted on the horizon may alternately appear and disappear. This may lead the unwary to assign a false characteristic and hence, to error in its identification. The true characteristic will be evident after the distance has been sufficiently decreased or by increasing the height of eye of the observer.

Similarly, the effects of wave motion on lighted buoys may produce the appearance of incorrect light phase characteristics when certain flashes occur, but are not viewed by the mariner. In addition, buoy motion can reduce the distance at which buoy lights are detected.

Sectors of colored glass are placed in the lanterns of some lights in order to produce a system of light sectors of different colors. In general, red sectors are used to mark shoals or to warn the mariner of other obstructions to navigation or of nearby land. Such lights provide approximate bearing information, since observers may note the change of color as they cross the boundary between sectors. These boundaries are indicated in the Light List (Col. 8) and by dotted lines on charts. These bearings, as all bearings referring to lights, are given in true degrees from 000° to 359°, as observed from a vessel toward the light.

Altering course on the changing sectors of a light or using the boundaries between light sectors to determine the bearing for any purpose is not recommended. Be guided instead by the correct compass bearing to the light and do not rely on being able to accurately observe the point at which the color changes. This is difficult to determine because the edges of a colored sector cannot be cut off sharply. On either side of the line of demarcation between white, red, or green sectors, there is always a small arc of uncertain color. Moreover, when haze or smoke are present in the intervening atmosphere, a white sector might

have a reddish hue.

The area in which a light can be observed is normally an arc with the light as the center and the range of visibility as the radius. However, on some bearings, the range may be reduced by obstructions. In such cases, the obstructed arc might differ with height of eye and distance. When adjoining land cuts off a light and the arc of visibility is given, the bearing on which the light disappears may vary with the distance of the vessel from which observed and with the height of eye. When the light is cut off by a sloping hill or point of land, the light may be seen over a wider arc by a vessel farther away than by one closer to the light.

The arc drawn on charts around a light is not intended to give information as to the distance at which it can be seen, but solely to indicate, in the case of lights, which do not show equally in all directions, the bearings between which the variation of visibility or obstruction of the light occurs.

PRIVATE AIDS TO NAVIGATION

Included: Class I aids to navigation on marine structures or other works which the owners are legally obligated to establish, maintain, and operate as prescribed by the Coast Guard.

Included: Class II aids to navigation exclusive of Class I, located in waters used by general navigation.

Not included: Class III aids to navigation exclusive of Class I and Class II, located in waters not ordinarily used by general navigation.

OIL WELL STRUCTURES

Oil well structures in navigable waters are not listed in the Light List. The structures are shown on the appropriate nautical charts. Information concerning the location and characteristics of those structures which display lights and sound signals not located in obstruction areas are published in Local and/or Weekly Notices to Mariners.

In general, during the nighttime, a series of white lights are displayed extending from the platform to the top of the derrick when drilling operations are in progress. At other times, structures are usually marked with one or more fixed or quick flashing white or red lights, visible for at least one nautical mile during clear weather. Obstructions, which are a part of the appurtenances to the main structure, such as mooring piles, anchors, and mooring buoys, etc., normally are not lighted. In addition, some of the structures are equipped with sound signals (bell, siren, whistle, or horn). When operating, bells sound one stroke every 15 seconds, while sirens, whistles, or horns sound a single two-second blast every 20 seconds.

CHARACTERISTICS OF AIDS TO NAVIGATION

LIGHT COLORS

Only aids to navigation with green or red lights have lateral significance. When proceeding in the conventional direction of buoyage, the mariner in IALA Region B, may see the fol-

lowing lighted aids to navigation:

Green lights on aids to navigation mark port sides of channels and locations of wrecks or obstructions that must be passed by keeping these lighted aids to navigation on the port hand of a vessel. Green lights are also used on preferred channel marks where the preferred channel is to starboard (i.e., aid to navigation left to port when proceeding in the conventional direction of buoyage). Red lights on aids to navigation mark starboard sides of channels and locations of wrecks or obstructions that must be passed by keeping these lighted aids to navigation on the starboard hand of a vessel. Red lights are also used on preferred channel marks where the preferred channel is to port (i.e., aid to navigation left to starboard when proceeding in the conventional direction of buoyage).

White and yellow lights have no lateral significance. The shapes, colors, letters, and light rhythms may determine the purpose of aids to navigation exhibiting white or yellow lights.

Most aids to navigation are fitted with retro reflective material to increase their visibility in darkness. Red or green retro reflective material is used on lateral aids to navigation that, if lighted, will display lights of the same color.

LIGHT RHYTHMS

Light rhythms have no lateral significance. Aids to navigation with lateral significance exhibit flashing, quick, occulting or isophase light rhythms. Ordinarily, flashing lights (frequency not exceeding 30 flashes per minute) will be used.

Preferred channel marks exhibit a composite group-flashing light rhythm of two flashes followed by a single flash.

Safe water marks show a white Morse code "A" rhythm (a short flash followed by a long flash).

Isolated danger marks show a white flashing (2) rhythm (two flashes repeated regularly).

Special marks show yellow lights and exhibit a flashing or fixed rhythm; however, a flashing rhythm is preferred.

Information and regulatory marks, when lighted, display a white light with any light rhythm except quick flashing, flashing (2) and Morse code "A".

For situations where lights require a distinct cautionary significance, as at sharp turns, sudden channel constrictions, wrecks, or obstructions, a quick flashing light rhythm will be used.

SHAPES

In order to provide easy identification, certain unlighted buoys and dayboards on beacons are differentiated by shape. These shapes are laterally significant only when associated with laterally significant colors.

Cylindrical buoys (referred to as "can buoys") and square dayboards mark the left side of a channel when proceeding from seaward. These aids to navigation are associated with solid green or green and red-banded marks where the topmost band is green.

Conical buoys (referred to as "nun buoys") and triangular dayboards mark the right side of the channel when proceeding from seaward. These aids to navigation are associated with solid red or red and green-banded marks where the topmost band is red.

Unless fitted with topmarks; lighted, sound, pillar, and spar buoys have no shape significance. Their numbers, colors, and light characteristics convey their meanings.

NUMBERS

All solid red and solid green aids to navigation are numbered, with red aids to navigation bearing even numbers and green aids to navigation bearing odd numbers. The numbers for each increase from seaward, proceeding in the conventional direction of buoyage. Numbers are kept in approximate sequence on both sides of the channel by omitting numbers where necessary.

Letters may be used to augment numbers when lateral aids to navigation are added to channels with previously completed numerical sequences. Letters will increase in alphabetical order from seaward, proceeding in the conventional direction of buoyage, and are added to numbers as suffixes.

No other aids to navigation are numbered. Preferred channel, safe water, isolated danger, special marks, and information and regulatory aids to navigation may be lettered, but not numbered.

DAYBOARDS

In order to describe the appearance and purpose of each dayboard used in the U.S. System, standard designations have been formulated. A brief explanation of the designations and of the purpose of each type of dayboard in the system is given below, followed by a verbal description of the appearance of each dayboard type.

Designations:

1. First Letter - Shape or Purpose
C: Crossing (western rivers only) diamond-shaped, used to indicate the points at which the channel crosses the river.

J: Junction (square or triangle) used to mark (preferred channel) junctions or bifurcations in the channel, or wrecks or obstructions which may be passed on either side; color of top band has lateral significance for the preferred channel.

K: Range (rectangular) when both the front and rear range dayboards are aligned on the same bearing, the observer is on the azimuth of the range, usually used to mark the center of the channel.

M: Safe water (octagonal) used to mark the fairway or middle of the channel.

N: No lateral significance (diamond or rectangular-shaped) used for special purpose, warning, distance, or location markers.

S: Square used to mark the port (left) side of channels when proceeding from seaward.

T: Triangle used to mark the starboard (right) side of channels when proceeding from seaward.

2. Second letter - Key color
B - Black, G - Green, R - Red, W - White, Y - Yellow

3. Third letter (color of center stripe; range dayboards only)

4. Additional information after a (-)
-I: Intracoastal Waterway; a yellow reflective horizontal band on a dayboard; indicates the aid to navigation marks the Intracoastal Waterway.

-SY: Intracoastal Waterway; a yellow reflective square on a dayboard; indicates the aid to navigation is a port hand mark for vessels traversing the Intracoastal Waterway. May appear on a triangular daymark where the Intracoastal Waterway coincides with a waterway having opposite conventional direction of buoyage.

-TY: Intracoastal Waterway; a yellow reflective triangle on a dayboard; indicates the aid to navigation is a starboard hand mark for vessels traversing the Intracoastal Waterway. May appear on a square daymark where the Intracoastal Waterway coincides with a waterway having opposite conventional direction of buoyage.

Descriptions:

CNG: Diamond-shaped dayboard divided into four diamond-shaped colored sectors with the sectors at the side corners white and the sectors at the top and bottom corners green, with green reflective diamonds at the top and bottom corners and white reflective diamonds in the side corners.

CNR: Diamond-shaped dayboard divided into four diamond-shaped colored sectors with the sectors at the side corners white and the sectors at the top and bottom corners red, with red reflective diamonds at the top and bottom corners and white reflective diamonds in the side corners.

JG: Dayboard bearing horizontal bands of green and red, green band topmost, with a green reflective border.

JG-I: Square dayboard bearing horizontal bands of green and red, green band topmost, with a green reflective border and a yellow reflective horizontal band.

JG-SY: Square dayboard bearing horizontal bands of green and red, green band topmost, with a green reflective border and a yellow reflective square.

JG-TY: Square dayboard bearing horizontal bands of green and red, green band topmost, with a green reflective border and a yellow reflective triangle.

JR: Dayboard bearing horizontal bands of red and green, red band topmost, with a red reflective border.

JR-I: Triangular dayboard bearing horizontal bands of red and green, red band topmost, with a red reflective border and a yellow horizontal band.

JR-SY: Triangular dayboard bearing horizontal bands of red and green, red band topmost, with a red reflective border and a yellow reflective square.

JR-TY: Triangular dayboard bearing horizontal bands of red and green, red band topmost, with a red reflective border and a yellow reflective triangle.

KBG: Rectangular black dayboard bearing a central green stripe.

KBG-I: Rectangular black dayboard bearing a central green stripe and a yellow reflective horizontal band.

KBR: Rectangular black dayboard bearing a central red stripe.

KBR-I: Rectangular black dayboard bearing a central red stripe and a yellow reflective horizontal band.

KBW: Rectangular black dayboard bearing a central white stripe.

KBW-I: Rectangular black dayboard bearing a central white stripe and a yellow reflective horizontal band.

KGB: Rectangular green dayboard bearing a central black stripe.

KGB-I: Rectangular green dayboard bearing a central black stripe and a yellow reflective horizontal band.

KGR: Rectangular green dayboard bearing a central red stripe.

KGR-I: Rectangular green dayboard bearing a central red stripe and a yellow reflective horizontal band.

KGW: Rectangular green dayboard bearing a central white stripe.

KGW-I: Rectangular green dayboard bearing a central white stripe and a yellow reflective horizontal band.

KRB: Rectangular red dayboard bearing a central black stripe.

KRB-I: Rectangular red dayboard bearing a central black stripe and a yellow reflective horizontal band.

KRG: Rectangular red dayboard bearing a central green stripe.

KRG-I: Rectangular red dayboard bearing a central green stripe and a yellow reflective horizontal band.

KRW: Rectangular red dayboard bearing a central white stripe.

KRW-I: Rectangular red dayboard bearing a central white

stripe and a yellow reflective horizontal band.

KWB: Rectangular white dayboard bearing a central black stripe.

KWB-I: Rectangular white dayboard bearing a central black stripe and a yellow reflective horizontal band.

KWG: Rectangular white dayboard bearing a central green stripe.

KWG-I: Rectangular white dayboard bearing a central green stripe and a yellow reflective horizontal band.

10 KWR: Rectangular white dayboard bearing a central red stripe.

KWR-I: Rectangular white dayboard bearing a central red stripe and a yellow reflective horizontal band.

MR: Octagonal dayboard bearing stripes of white and red, with a white reflective border.

MR-I: Octagonal dayboard bearing stripes of white and red, with a white reflective border and a yellow reflective horizontal band.

NB: Diamond-shaped dayboard divided into four diamond-shaped colored sectors with the sectors at the side corners white and the sectors at the top and bottom corners black, with a white reflective border.

ND: Rectangular white mileage marker with black numerals indicating the mile number (western rivers only).

25 NG: Diamond-shaped dayboard divided into four diamond-shaped colored sectors with the sectors at the side corners white and the sectors at the top and bottom corners green, with a white reflective border.

NL: Rectangular white location marker with an orange reflective border and black letters indicating the location.

NR: Diamond-shaped dayboard divided into four diamond-shaped colored sectors with the sectors at the side corners white and the sectors at the top and bottom corners red, with a white reflective border.

35 NW: Diamond-shaped white dayboard with an orange reflective border and black letters describing the information or regulatory nature of the mark.

NY: Diamond-shaped yellow dayboard with yellow reflective border

40 SG: Square green dayboard with a green reflective border.

SG-I: Square green dayboard with a green reflective border and a yellow reflective horizontal band.

SG-SY: Square green dayboard with a green reflective border and a yellow reflective square.

45 SG-TY: Square green dayboard with a green reflective border and a yellow reflective triangle.

SR: Square red dayboard with a red reflective border. (IALA Region "A")

TG: Triangular green dayboard with a green reflective border. (IALA Region "A")

TR: Triangular red dayboard with a red reflective border.

TR-I: Triangular red dayboard with a red reflective border and a yellow reflective horizontal band.

TR-SY: Triangular red dayboard with a red reflective border and a yellow reflective square.

TR-TY: Triangular red dayboard with a red reflective border and a yellow reflective triangle.

These abbreviated descriptions are used in column (7) and may also be found on the illustration of U.S. Aids to Navigation System.

OTHER SHORT RANGE AIDS TO NAVIGATION

Lighthouses are placed on shore or on marine sites and most often do not show lateral markings. They assist mariners in determining their position or safe course, or warn of obstructions or dangers to navigation. Lighthouses with no lateral significance usually exhibit a white light.

Occasionally, lighthouses use sectored lights to mark shoals or warn mariners of other dangers. Lights so equipped show one color from most directions and a different color or colors over definite arcs of the horizon as indicated on the appropriate nautical chart. These sectors provide approximate bearing information and the observer should note a change of color as the boundary between the sectors is crossed. Since sector bearings are not precise, they should be considered as a warning only, and used in conjunction with a nautical chart.

Seasonal aids to navigation are placed into service, withdrawn, or changed at specified times of the year. The dates shown in the Light List (Col. 8) are approximate and may vary due to adverse weather, ice, or other conditions.

Ranges are non-lateral aids to navigation employing dual beacons which, when the structures appear to be in line, assist the mariner in maintaining a safe course. The appropriate nautical chart must be consulted when using ranges to determine whether the range marks the centerline of the navigable channel and also what section of the range may be safely traversed. Ranges typically display rectangular dayboards of various colors and are generally, but not always lighted. When lighted, ranges may display lights of any color.

Sound signal is a generic term used to describe aids to navigation that produce an audible signal designed to assist the mariner in periods of reduced visibility. These aids to navigation can be activated by several means (e.g., manually, remotely, or fog detector). In cases where a fog detector is in use, there may be a delay in the automatic activation of the signal. Additionally, fog detectors may not be capable of detecting patchy fog conditions. Sound signals are distinguished by their tone and phase characteristics. The devices producing the sound, e.g., diaphones, diaphragm horns, sirens, whistles, bells, and gongs determine tones.

Phase characteristics are defined by the signal's sound pat-

tern, i.e., the number of blasts and silent periods per minute and their durations. Sound signals sounded from fixed structures generally produce a specific number of blasts and silent periods each minute when operating. Buoy sound signals are generally activated by the motion of the sea and therefore do not emit a regular signal characteristic. It is common, in fact, for a buoy to produce no sound signal when seas are calm.

The characteristic of a sound signal can be located in column (8) of the Light List. Unless it is specifically stated that a sound signal "Operates continuously", or the signal is a bell, gong, or whistle on a buoy, it can be assumed that the sound signal only operates during times of fog, reduced visibility, or adverse weather.

An emergency sound signal is sounded at some locations when the main and standby signals are inoperative. If the emergency signal is of a different type or characteristic than the main signal, its characteristic is listed in column (8) of this publication.

CAUTION: Mariners should not rely on sound signals to determine their position. Distance cannot be accurately determined by sound intensity. Occasionally, sound signals may not be heard in areas close to their location. Signals may not sound in cases where fog exists close to, but not at, the location of the sound signal.

VARIATIONS TO THE U.S. SYSTEM

Intracoastal Waterway aids to navigation: The Intracoastal Waterway runs parallel to the Atlantic and Gulf coasts from Manasquan Inlet, New Jersey to the Mexican border. Aids to navigation marking these waters have some portion of them marked with yellow. Otherwise, the coloring and numbering of the aids to navigation follow the same system as that in other U.S. waterways.

In order that vessels may readily follow the Intracoastal Waterway route, special markings are employed. These marks consist of a yellow square and yellow triangle and indicate which side the aid to navigation should be passed when following the conventional direction of buoyage. The yellow square indicates that the aid to navigation should be kept on the left side and the yellow triangle indicates that the aid to navigation should be kept on the right side. A yellow horizontal band provides no lateral information, but simply identifies aids as marking the Intracoastal Waterway.

Western Rivers aids to navigation: The Western Rivers System, a variation of the standard U.S. Aids to Navigation System described in the preceding sections, is employed on the Mississippi River and its tributaries above Baton Rouge, LA and on certain other rivers which flow toward the Gulf of Mexico.

The Western Rivers System varies from the standard U.S. system as follows:

1. Aids to navigation are not numbered.
2. Numbers on aids to navigation do not have lateral

significance, but rather indicate mileage from a fixed point (normally the river mouth).

3. Diamond shaped crossing dayboards, red and white or green and white as appropriate, and are used to indicate where the river channel crosses from one bank to the other.
4. Lights on green aids to navigation show a single-flash characteristic, which may be green or white.
5. Lights on red aids to navigation show a group-flash characteristic, which may be red or white.
6. Isolated danger marks are not used.

BRIDGE MARKINGS

Bridges across navigable waters are generally marked with red, green and/or white lights for nighttime navigation. Red lights mark piers and other parts of the bridge. Red lights are also used on drawbridges to show when they are in the closed position.

Green lights are used on drawbridges to show when they are in the open position. The location of these lights will vary according to the bridge structure. Green lights are also used to mark the centerline of navigable channels through fixed bridges. If there are two or more channels through the bridge, the preferred channel is also marked by three white lights in a vertical line above the green light.

Red and green retroreflective panels may be used to mark bridge piers and may also be used on bridges not required to display lights.

Lateral red and green lights and dayboards may mark main channels through bridges. Adjacent piers should be marked with fixed yellow lights when the main channel is marked with lateral aids to navigation.

Centerlines of channels through fixed bridges may be marked with a safe water mark and an occulting white light when lateral marks are used to mark main channels. The centerline of the navigable channel through the draw span of floating bridges may be marked with a special mark. The mark will be a yellow diamond with yellow retroreflective panels and may exhibit a yellow light that displays a Morse code "B"(-...).

Clearance gauges may be installed to enhance navigation safety. The gauges are located on the right channel pier or pier protective structure facing approaching vessels. They indicate the vertical clearance available under the span.

Drawbridges equipped with radiotelephones display a blue and white sign which indicates what VHF radiotelephone channels should be used to request bridge openings.

ELECTRONIC AIDS TO NAVIGATION

RACONS

Aids to navigation may be enhanced by the use of **RA**dar **bea**CONS (RACONS). RACONS, when triggered by a vessel's radar, will transmit a coded reply to the vessel's radar. This reply serves to identify the RACON station by exhibiting a series of dots and dashes which appear on the radar

display radially from the RACON. This display will represent the approximate range and bearing to the RACON. Although RACONS may be used on both laterally significant and non-laterally significant aids to navigation, the RACON signal itself is for identification purposes only. RACONS are also used as bridge marks to mark the point of best passage. All RACONS operate in the radar X-band from 9,300 to 9,500 MHz. Some RACONS also operate in the 2,900 to 3,000 MHz radar S-band.

RACONS have a typical output of 100 to 300 milliwatts and are considered a short-range aid to navigation. Reception varies from a nominal range of 6 to 8 nautical miles when mounted on a buoy to as much as 17 nautical miles for a RACON with a directional antenna mounted at a height of 50 feet on a fixed structure. It must be understood that these are nominal ranges and are dependent upon many factors.

The beginning of the RACON presentation occurs about 50 yards beyond the RACON position and will persist for a number of revolutions of the radar antenna (depending on its rotation rate). Distance to the RACON can be measured to the point at which the RACON flash begins, but the figure obtained will be greater than the ship's distance from the RACON. This is due to the slight response delay in the RACON apparatus.

Radar operators may notice some broadening or spoking of the RACON presentation when their vessel approaches closely to the source of the RACON. This effect can be minimized by adjustment of the IF gain or sweep gain control of the radar. If desired, the RACON presentation can be virtually eliminated by operation of the FTC (fast time constant) controls of the radar.

Radar Reflectors

Many aids to navigation incorporate special fixtures designed to enhance the reflection of radar energy. These fixtures, called radar reflectors, help radar-equipped vessels to detect buoys and beacons, which are so equipped. They do not however, positively identify a radar target as an aid to navigation.

LORAN-C

LORAN, an acronym for LOnge RAange Navigation, is an electronic aid to navigation consisting of shore-based radio transmitters. The LORAN system enables users equipped with a LORAN receiver to determine their position quickly and accurately, day or night, in practically any weather.

A LORAN-C chain consists of three to six transmitting stations separated by several hundred miles. Within a chain, one station is designated as master (M) while the other stations are designated as secondary. Each secondary station is identified as either Victor (V), Whiskey (W), X-ray (X), Yankee (Y), or Zulu (Z).

The master station is always the first station to transmit. It transmits a series of nine pulses. The secondary stations then follow in turn and transmit eight pulses each at precisely timed intervals. This cycle continuously repeats itself.

The length of the cycle is measured in microseconds and is called a Group Repetition Interval (GRI).

LORAN-C chains are designated by the four most significant digits of their GRI. For example, a chain with a GRI of 89,700 microseconds is referred to as 8970. A different GRI is used for each chain because all LORAN-C stations broadcast in the same 90 to 110 kilohertz frequency band and would otherwise interfere with one another.

The LORAN-C system can be used in either a hyperbolic or range mode. In the widely used hyperbolic mode, a LORAN-C line of position is determined by measuring the time difference between synchronized pulses received from two separate transmitting stations. In the range mode, a line of position is determined by measuring the time required for LORAN-C pulses to travel from a transmitting station to the user's receiver.

A user's position is determined by locating the crossing point of two lines of position on a LORAN-C chart. Many receivers have built-in coordinate converters that automatically display the receiver's latitude and longitude. With a coordinate converter, a position can be determined using a chart that is not overprinted with LORAN-C lines of position.

CAUTION: The latitude/longitude computation in some receivers is based upon an all seawater propagation path. This may lead to error if the LORAN-C signals from the various stations involve appreciable overland propagation paths. These errors may put the mariner at risk in areas requiring precise positioning, if the proper correctors (ASF) are not applied. Therefore, it is recommended that mariners using Coordinate Converters check the manufacturer's operating manual to determine if and how corrections are to be applied to compensate for timing variations caused by the overland paths.

There are two types of LORAN-C accuracy; absolute and repeatable. Absolute accuracy is a measure of the navigator's ability to determine latitude and longitude position from the LORAN-C time differences measured. Repeatable accuracy is a measure of the LORAN-C navigator's ability to return to a position where readings have been taken before.

The absolute accuracy of LORAN-C is 0.25 nautical mile, with 95% confidence within the published coverage area using standard LORAN-C charts and tables. Repeatable accuracy depends on many factors, so measurements must be taken to determine the repeatable accuracy in any given area. Coast Guard surveys have found repeatable accuracy to be between 30 and 170 meters in most ground wave coverage areas.

If the timing or pulse shape of a master-secondary pair deviates from specified tolerances, the first two pulses of secondary station's pulse train will blink on and off. The LORAN-C receiver sees this blinking signal and indicates a warning to the user. This warning will continue until the signals are once again in tolerance. A blinking signal is not exhibited during off-air periods, so a separate receiver

alarm indicates any loss of signal. Never use a blinking secondary signal for navigation.

Although LORAN-C signal availability normally exceeds 99.9% and scheduled off-air periods are broadcast to the mariners, LORAN-C should not be relied upon as the only aid to navigation. A prudent navigator will use radar, a radio direction finder, a Fathometer and any other aid to navigation, in addition to the LORAN-C receiver.

LORAN-C interference

Interference to LORAN-C may result from radio transmissions by public or private sources operating near the LORAN-C band of 90-110kHz. Anyone observing interference to LORAN-C, should promptly report it to the Coast Guard command listed below. Include, in such reports, information regarding the date, time, identifying characteristics, strength of the interfering signals and your vessel's position. These interference reports are very important and cooperation from users of LORAN-C will assist the Coast Guard in improving LORAN-C service.

Commanding Officer
U.S. Coast Guard Navigation Center
MS 7310
7323 Telegraph Road
Alexandria, VA 22310-3998
Phone: (703) 313-5900
FAX: (703) 313-5920
Internet: <http://www.navcen.uscg.gov>

LORAN-C Charts and Publications

Navigational charts overprinted with LORAN-C lines of position are published by the National Ocean Service and the National Geospatial-Intelligence Agency and are sold through National Ocean Service/NOAA. A free catalog of available products can be obtained from NOS by phone: (301) 436-8301/(800) 638-8972; FAX: (301) 436-6829; or mail: FAA, National Aeronautical Charting Office, Distribution Division AVN-530, 10201 Good Luck Rd, Glenn Dale, MD 20769.

GLOBAL POSITIONING SYSTEM (GPS)

The Global Positioning System (GPS) is a satellite-based Radionavigation System providing continuous worldwide coverage. GPS provides navigation, position, and timing information to air, marine, and land users. The GPS System has reached Full Operating Capability (FOC). FOC status signifies that the system meets specific requirements of performance. The GPS is operated and controlled by the Department of Defense (DOD) under U.S. Air Force management.

GPS consists of a constellation of 24 satellites, orbiting Earth in six planes of 4 satellites each, at an altitude of 10,900 nautical miles. The orbit period of each satellite is 12 hours. Mariners can expect 7-9 satellites available for use with unrestricted view of the sky. Fewer satellites will be available in areas where portions of the sky are blocked by mountains, buildings, or vegetation. At least three satellites are required for a two-dimensional solution. On May 1, 2000, the United States stopped the intentional degrada-

tion of GPS Signals known as "Selective Availability" and users can now expect accuracy to within 10 meters. The GPS system does not provide integrity information and mariners should exercise extreme caution when using GPS in restricted waterways.

Although originally intended for military use only, Federal radionavigation policy has established that GPS will be available for civil use. Whenever possible, advance notice of when the GPS satellites should not be used will be provided by the DOD and made available by the U.S. Coast Guard. GPS status messages are available at <http://www.navcen.uscg.gov>.

DIFFERENTIAL GPS (DGPS)

The Coast Guard has implemented a system for marine navigation called Differential GPS (DGPS). As the newest electronic system of navigation, DGPS transmitters provide offshore coverage and an all-weather electronic aid to navigation capability. The Coast Guard DGPS transmitting sites provide coverage to the Great Lakes, and coastal areas of the continental United States as well as selected portions of Alaska and the inland river system.

The Coast Guard's DGPS system achieved Full Operational Capability (FOC) on March 15, 1999. The network now meets the high standards of accuracy, integrity, reliability, availability and coverage required for the Harbor Entrance and Approach phase of navigation. As of November 2000, 56 sites were providing differential correction.

The Department of Transportation (DOT) has recognized the benefit of an augmented GPS signal for other public safety applications. In DOT's effort to expand the maritime DGPS signals into a Nationwide DGPS (NDGPS) network, an additional 10 sites are currently transmitting DGPS corrections. Some of these sites provide wide coverage to navigable waters with the same performance criteria as the Maritime DGPS signal. Where available, these signals are also use-able for maritime navigation. The NDGPS network will not be completed for several years.

DGPS is an augmentation to the GPS signals. Each site corrects for small variations in the signals from each satellite that is in view at that time. Satellite signals can vary due to small changes in the satellite's circuitry and orbit and from changes caused by local weather conditions. Satellite corrections are transmitted to users via radio signals in the medium frequency band (285-325 kHz) previously used for marine radiobeacons. DGPS corrections and integrity information are transmitted using Minimum Shift Keying (MSK) modulation; the modulation data rate is usually 100 or 200 bits per second (bps) but can also be 50 bps. The range of DGPS transmissions is from 40 to 300 nautical miles.

DGPS is the first federal radionavigation system capable of providing the 10-meter navigation service required for the harbor entrance and approach phase of maritime navigation. DGPS provides integrity messages for signals from the GPS satellites as well as DGPS position corrections and provides absolute position accuracy of 1-5 meters.

Each DGPS site has two reference stations (which calculate the differential corrections), two integrity monitors (which ensure the differential corrections are accurate), a transmitter and communications equipment to communicate status information to and receive control commands from the control station. Each transmitter and reference station has a unique ID number that permits users to determine which site/equipment is providing their differential corrections. As distance from the transmitting site increases, the small error in the differential corrections increases; best accuracy is achieved when using the DGPS site closest to the user.

Information regarding the location of DGPS transmitters is given on page xvi. Users can access additional information and DGPS system status, submit questions, and provide comments via the Navigation Information Service website or by calling the Coast Guard Navigation Center watchstander (see below).

NAVIGATION INFORMATION SERVICE (NIS)

The Coast Guard is the government interface for civil users of GPS and has established a Navigation Information Service (NIS) to meet the information needs of the civil user. The NIS is a Coast Guard facility that is manned 24 hours a day, 7 days a week, and is located at the Navigation Center (NAVCEN) in Alexandria, VA. It provides voice broadcasts, data broadcasts, facsimile, and on-line computer-based information services, which are all available 24 hours a day. The information provided includes present or future satellite outages and constellation changes, user instructions and tutorials, lists of service and receiver provider/users, and other GPS, DGPS, and LORAN related information.

NAVIGATION CENTER Internet Service (www)

Users with access to the World Wide Web (www) can access real time or archived GPS, NDGPS, DGPS Loran-C, and LNM information at <http://www.navcen.uscg.gov> as well as subscribe to a list server that enables users to receive GPS status messages and Notice to NAVSTAR User (NANU) messages via direct Internet e-mail.

The NAVCEN 24 hour voice recording is a 3-line telephone answering machine. Up to 3 callers can listen to the 90 second recording at the same time.

The NAVCEN also disseminates GPS and DGPS safety advisory broadcast messages through USCG broadcast stations utilizing VHF-FM voice, HF-SSB voice, and NAVTEX broadcasts. The broadcasts provide the GPS and DGPS user in the marine environment with the current status of the navigation systems, as well as any planned/unplanned system outages that could affect GPS, DGPS, and LORAN navigational accuracy.

To comment on any of these services or ask questions about the service offered, contact the NAVCEN at:

Commanding Officer
U.S. Coast Guard Navigation Center
MS 7310
7323 Telegraph Road
Alexandria, VA 22310-3998
Phone: (703) 313-5900
FAX: (703) 313-5920
Internet: <http://www.navcen.uscg.gov>

GLOSSARY OF AIDS TO NAVIGATION TERMS

- Adrift:** Afloat and unattached in any way to the shore or seabed.
- Aid to Navigation:** Any device external to a vessel or aircraft specifically intended to assist navigators in determining their position or safe course, or to warn them of dangers or obstructions to navigation.
- Alternating Lights:** A rhythmic light showing light of alternating colors.
- Arc of Visibility:** The portion of the horizon over which a lighted aid to navigation is visible from seaward.
- Articulated Beacon:** A beacon-like buoyant structure, tethered directly to the seabed and having no watch circle. Called articulated light or articulated daybeacon, as appropriate.
- Assigned Position:** The latitude and longitude position for an aid to navigation.
- Beacon:** A lighted or unlighted fixed aid to navigation attached directly to the earth's surface. (Lights and daybeacons both constitute beacons.
- Bearing:** The horizontal direction of a line of sight between two objects on the surface of the earth.
- Bell:** A sound signal producing bell tones by means of a hammer actuated by electricity on fixed aids and by sea motion on buoys.
- Bifurcation:** The point where a channel divides when proceeding from seaward. The place where two tributaries meet.
- Broadcast Notice to Mariners:** A radio broadcast designed to provide important marine information.
- Buoy:** A floating object of defined shape and color, which is anchored at a given position and serves as an aid to navigation.
- Characteristic:** The audible, visual, or electronic signal displayed by an aid to navigation to assist in the identification of an aid to navigation. Characteristic refers to lights, sound signals, RACONS, and daybeacons.
- Commissioned:** The action of placing a previously discontinued aid to navigation back in service.
- Composite Group Flashing Light:** A group flashing light in which the flashes are combined in successive groups of different numbers of flashes.
- Composite Group-Occulting Light:** A light similar to a group occulting light except that the successive groups in a period have different numbers of eclipses.
- Conventional Direction of Buoyage:** The general direction taken by the mariner when approaching a harbor, river, estuary, or other waterway from seaward, or proceeding upstream or in a direction of the main stream of flood tide, or in the direction indicated in appropriate nautical documents (normally, following a clockwise direction around land masses).
- Daybeacon:** An unlighted fixed structure which is equipped with a dayboard for daytime identification.
- Dayboard:** The daytime identifier of an aid to navigation presenting one of several standard shapes (square, triangle, rectangle) and colors (red, green, white, orange, yellow, or black).
- Daymark:** The daytime identifier of an aid to navigation. (See column 7 of the Light List)
- Diaphone:** A sound signal which produces sound by means of a slotted piston moved back and forth by compressed air. A "two-tone" diaphone produces two sequential tones with a second tone of lower pitch.
- Directional Light:** A light illuminating a sector or very narrow angle and intended to mark a direction to be followed.
- Discontinued:** To remove from operation (permanently or temporarily) a previously authorized aid to navigation.
- Discrepancy:** Failure of an aid to navigation to maintain its position or function as prescribed in the Light List.
- Discrepancy Buoy:** An easily transportable buoy used to temporarily replace an aid to navigation not watching properly.
- Dolphin:** A minor aid to navigation structure consisting of a number of piles driven into the seabed or riverbed in a circular pattern and drawn together with rope.
- Eclipse:** AN interval of darkness between appearances of a light.
- Emergency Light:** A light of reduced intensity displayed by certain aids to navigation when the main light is extinguished.
- Establish:** To place an authorized aid to navigation in operation for the first time.
- Extinguished:** A lighted aid to navigation which fails to show a light characteristic.
- Fixed Light:** A light showing continuously and steady, as opposed to a rhythmic light. (Do not confuse with "fixed" as used to differentiate from "floating".)
- Flash:** A relatively brief appearance of a light, in comparison with the longest interval of darkness in the same characteristic.
- Flash tube:** An electronically controlled high-intensity discharge lamp with a very brief flash duration.

GLOSSARY OF AIDS TO NAVIGATION TERMS

Flashing Light: A light in which the total duration of the light in each period is clearly shorter than the total duration of the darkness and in which the flashes of light are all of equal duration. (Commonly used for a single-flashing light which exhibits only single flashes which are repeated at regular intervals.)

Floating Aid to Navigation: A buoy, secured in its assigned position by a mooring.

Fog Detector: An electronic device used to automatically determine conditions of visibility which warrant the activation of a sound signal or additional light signals.

Fog Signal: See sound signal.

Geographic Range: The greatest distance the curvature of the earth permits an object of a given height to be seen from a particular height of eye without regard to luminous intensity or visibility conditions.

Global Positioning System (GPS): A satellite based radio-navigation system providing continuous worldwide coverage. It provides navigation, position, and timing information to air, marine, and land users.

Gong: A wave actuated sound signal on buoys which uses a group of saucer-shaped bells to produce different tones.

Group Flashing Light: A flashing light in which a group of flashes, specified in number, is regularly repeated.

Group Occulting Light: An occulting light in which a group of eclipses, specified in number, regularly repeated.

Horn: A sound signal which uses electricity or compressed air to vibrate a disc diaphragm.

Inoperative: Sound signal or electronic aid to navigation out of service due to a malfunction.

Interrupted Quick Flash: A quick flashing light in which the rapid alternations are interrupted at regular intervals by eclipses of long duration.

Isolated Danger Mark: A mark erected on, or moored above or very near, an isolated danger which has navigable water all around it.

Isophase Light: A rhythmic light in which all durations of light and darkness are equal.

Junction: The point where a channel divides when proceeding seaward. The place where a distributary departs from the main stream.

Lateral System: A system of aids to navigation in which characteristics of buoys and beacons indicate the sides of a channel or route relative to a Conventional Direction of Buoyage (usually upstream).

Light: The signal emitted by a lighted aid to navigation. The illuminating apparatus used to emit the light signal. A lighted aid to navigation on a fixed structure.

Light Sector: The arc over which a light is visible, described in degrees true, as observed from seaward towards the light. May be used to define distinctive color difference of two adjoining sectors, or an obscured sector.

Lighted Ice Buoy (LIB): A lighted buoy without a sound signal, and designed to withstand the forces of shifting and flowing ice. Used to replace a conventional buoy when that aid to navigation is endangered by ice.

Lighthouse: A lighted beacon of major importance.

Local Notice to Mariners: A written document issued by each U.S. Coast Guard district to disseminate important information affecting aids to navigation, dredging, marine construction, special marine activities, and bridge construction on waterways within that district.

LORAN: An acronym for Long Range Navigation, is an electronic aid to navigation consisting of shore-based radio transmitters. The LORAN system enables users equipped with a LORAN receiver to determine their position quickly and accurately, day or night, in practically any weather.

Luminous Range: The greatest distance a light can be expected to be seen given its nominal range and the prevailing meteorological visibility.

Mark: A visual aid to navigation. Often called navigational mark, including floating marks (buoys) and fixed marks (beacons).

Meteorological Visibility: The greatest distance at which a black object of suitable dimension could be seen and recognized against the horizon sky by day, or in case of night observations, could be seen and recognized if the general illumination were raised to the daylight level.

Mileage Number: A number assigned to aids to navigation which gives the distance in sailing miles along the river from a reference point to the aid to navigation. The number is used principally in the Mississippi River System.

Nominal Range: The maximum distance a light can be seen in clear weather (meteorological visibility of 10 nautical miles). Listed for all lighted aids to navigation except range lights, directional lights, and private aids to navigation.

Occulting Light: A light in which the total duration of light in each period is clearly longer than the total duration of the darkness and in which the intervals of darkness (occultations) are all of equal duration. Commonly used for single occulting light which exhibits only single occultations which are repeated at regular intervals.

Ocean Data Acquisition System (ODAS): Certain very large buoys in deep water for the collection of oceanographic data.

GLOSSARY OF AIDS TO NAVIGATION TERMS

graphic and meteorological information. All ODAS buoys are yellow in color and display a yellow light.

Off Shore Tower: Monitored light stations built on exposed marine sites to replace lightships.

Off Station: A floating aid to navigation that is not on its assigned position.

Passing Light: A low intensity light which may be mounted on the structure of another light to enable the mariner to keep the latter light in sight when passing out of its beam during transit.

Period: The interval of time between the commencement of two identical successive cycles of the characteristic of the light or sound signal.

Pile: A long, heavy timber driven into the seabed or riverbed to serve as a support for an aid to navigation.

Port Hand Mark: A buoy or beacon which is left to the port hand when proceeding in the "Conventional Direction of Buoyage".

Preferred Channel Mark: A lateral mark indicating a channel junction or bifurcation, or a wreck or other obstruction which after consulting a chart, may be passed on either side.

Primary Aid to Navigation: An aid to navigation established for the purpose of making landfalls and coastwise passages from headland to headland.

Quick Light: A light exhibiting very rapid regular alternations of light and darkness, normally 60 flashes per minute.

RACON: A radar beacon which produces a coded response or radar paint, when triggered by a radar signal.

Radar: An electronic system designed to transmit radio signals and receive reflected images of those signals from a "target" in order to determine the bearing and distance to the "target".

Radar Reflector: A special fixture fitted to or incorporated into the design of certain aids to navigation to enhance their ability to reflect radar energy. In general, these fixtures will materially improve the aid to navigation for use by vessels with radar.

Range: A line formed by the extension of a line connecting two charted points.

Range lights: Two lights associated to form a range which often, but not necessarily, indicates the channel centerline. The front range light is the lower of the two, and nearer to the mariner using the range. The rear light is higher and further from the mariner.

Rebuilt: A fixed aid to navigation, previously destroyed, which has been restored as an aid to navigation.

Regulatory Marks: A white and orange aid to navigation with no lateral significance. Used to indicate a special meaning to the mariner, such as danger, restricted operations, or exclusion area.

Relighted: An extinguished aid to navigation returned to its advertised light characteristics.

Replaced: An aid to navigation previously off station, adrift, or missing, restored by another aid to navigation of the same type and characteristics.

Replaced (temporarily): An aid to navigation previously off station, adrift, or missing restored by another aid to navigation of a different type and/or characteristic.

Reset: A floating aid to navigation previously off station, adrift or missing, returned to its assigned position (station).

Rhythmic Light: A light showing intermittently with a regular periodicity.

Sector: See light sector.

Setting a Buoy: The act of placing a buoy on assigned position in the water.

Siren: A sound signal which uses electricity or compressed air to actuate either a disc or a cup shaped rotor.

Skeleton Tower: A tower, usually of steel, constructed of heavy corner members and various horizontal and diagonal bracing members.

Sound Signal: A device which transmits sound, intended to provide information to mariners during periods of restricted visibility and foul weather.

Starboard Hand Mark: A buoy or beacon which is left to the starboard hand when proceeding in the Conventional Direction of Buoyage.

Topmark: One or more relatively small objects of characteristic shape and color placed on aid to identify its purpose.

Traffic Separation Scheme: Shipping corridors marked by buoys which separate incoming from outgoing vessels. Improperly called SEA LANES.

Watching Properly: An aid to navigation on its assigned position exhibiting the advertised characteristics in all respects.

Whistle: A wave actuated sound signal on buoys which produces sound by emitting compressed air through a circumferential slot into a cylindrical bell chamber.

Winter Marker: An unlighted buoy without a sound signal, used to replace a conventional buoy when an aid to navigation is endangered by ice.

GLOSSARY OF AIDS TO NAVIGATION TERMS

Winter Light: A light which is maintained during those winter months when the regular light is extinguished. It is of lower candlepower than the regular light, but usually the same characteristic.

5

Withdrawn: The discontinuance of an aid to navigation or equipment on an aid to navigation during severe ice conditions or for the winter season.

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ABBREVIATIONS USED IN BROADCAST NOTICE TO MARINERS

Light Characteristics

Alternating	AL
Characteristic	CHAR
Composite Group-Flashing	FL(2+1)
5 Composite Group-Occulting	OC(2+1)
Continuous Quick-Flashing	Q
Fixed and Flashing	FFL
Fixed	F
Group-Flashing	FL(3)
10 Group-Occulting	OC(2)
Interrupted Quick-Flashing	IQ
Isophase	ISO
Morse Code	MO(A)
Occulting	OC
15 Single-Flashing	FL

Colors*

Black	B
Blue	BU
20 Green	G
Orange	OR
Red	R
White	W
Yellow	Y
25 *NOTE: Color refers to characteristics of aids to navigation only.	

Aids to Navigation

Aeronautical Radiobeacon	AERO RBN
30 Destroyed	DESTR
Differential GPS	DGPS
Discontinued	DISCONTD
Established	ESTAB
Exposed Location Buoy	ELB
35 Fog Signal Station	FOG SIG
Light List Number	LLNR
Light	LT
Lighted Bell Buoy	LBB
Lighted Buoy	LB
40 Lighted Gong Buoy	LGB
Lighted Horn Buoy	LHB
Lighted Whistle Buoy	LWB
Ocean Data Acquisition System	ODAS
Privately Maintained	PRIV MAINTD
45 Radar Reflector	RA REF
Radar Responder Beacon	RACON
Temporarily Replaced by Lighted Buoy	TRLB
Temporarily Replaced by Unlighted Buoy	TRUB
Whistle	WHIS

Organizations

Commander, Coast Guard District	CCGD(#)
Coast Guard	CG
Corps of Engineers	COE
55 National Geospatial-Intelligence Agency	NGA
National Ocean Service	NOS
National Weather Service	NWS

Vessels

60 Aircraft	A/C
Fishing Vessel	F/V
Liquefied Natural Gas Carrier	LNG

Motor Vessel (includes Steam Ship,
Container Ship, Cargo Vessel, Tanker etc)

M/V
P/C
R/V
S/V

Compass Directions

70 North	N
South	S
East	E
West	W
Northeast	NE
75 Northwest	NW
Southeast	SE
Southwest	SW

Months

80 January	JAN
February	FEB
March	MAR
April	APR
May	MAY
85 June	JUN
July	JUL
August	AUG
September	SEP
October	OCT
90 November	NOV
December	DEC

Days of the Week

Monday	MON
95 Tuesday	TUE
Wednesday	WED
Thursday	THU
Friday	FRI
Saturday	SAT
100 Sunday	SUN

Various

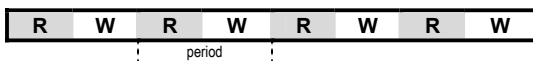
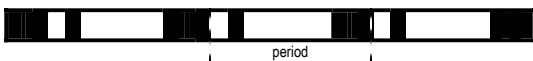
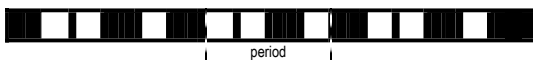
Anchorage	ANCH
Anchorage Prohibited	ANCH PROHIB
105 Approximate	APPROX
Atlantic	ATL
Authorized	AUTH
Average	AVG
Bearing	BRG
110 Breakwater	BKW
Broadcast Notice to Mariners	BNM
Channel	CHAN
Code of Federal Regulations	CFR
Continue	CONT
115 Degrees (temp, geo, pos)	DEG
Diameter	DIA
Edition	ED
Effect/Effective	EFF
Entrance	ENTR
120 Explosive Anchorage	EXPLOS ANCH
Fathom(s)	FM(S)
Foot/Feet	FT
Harbor	HBR
Height	HT

ABBREVIATIONS USED IN BROADCAST NOTICE TO MARINERS

Hertz	HZ	California	CA
Horizontal Clearance	HOR CL	Canada	CN
Hour	HR	Colorado	CO
International Regulations for 5 Preventing Collisions at Sea	COLREGS	Connecticut	CT
Kilohertz	KHZ	60 Delaware	DE
Kilometer	KM	District of Columbia	DC
Knot(s)	KT(S)	Florida	FL
Minute (time, geo, pos)	MIN	Georgia	GA
10 Moderate	MOD	Guam	GU
Mountain, Mount	MT	65 Hawaii	HI
Nautical Mile(s)	NM	Idaho	ID
Notice to Mariners	NTM	Illinois	IL
Obstruction	OBSTR	Indiana	IN
15 Occasion/Occasionally	OCCASION	Iowa	IA
Operating Area	OPAREA	70 Kansas	KS
Pacific	PAC	Kentucky	KY
Point(s)	PT(S)	Louisiana	LA
Position	POS	Maine	ME
20 Position Approximate	PA	Maryland	MD
Pressure	PRES	75 Marshall Islands	MH
Private, Privately	PRIV	Massachusetts	MA
Prohibited	PROHIB	Missouri	MO
Publication	PUB	Mississippi	MS
25 Range	RGE	Mexico	MX
Reported	REP	80 Michigan	MI
Restricted	RESTR	Minnesota	MN
Rock	RK	Montana	MT
Saint	ST	Nebraska	NE
30 Second (time, geo, pos)	SEC	Nevada	NV
Signal Station	SIG STA	85 New Hampshire	NH
Station	STA	New Jersey	NJ
Statute Mile(s)	SM	New Mexico	NM
Storm Signal Station	S SIG STA	New York	NY
35 Temporary	TEMP	North Carolina	NC
Thunderstorm	TSTORM	90 North Dakota	ND
Through	THRU	Northern Marianas	MP
True	T	Ohio	OH
Uncovers, Dries	UNCOV	Oklahoma	OK
40 Universal Coordinate Time	UTC	Oregon	OR
Urgent Marine Information Broadcast	UMIB	95 Pennsylvania	PA
Velocity	VEL	Puerto Rico	PR
Vertical Clearance	VERT CL	Rhode Island	RI
Visibility	VIS	South Carolina	SC
45 Yard(s)	YD	South Dakota	SD
Warning	WARN	100 Tennessee	TN
Weather	WX	Texas	TX
Wreck	WK	United States	US
		Utah	UT
		Vermont	VT
50 <u>Countries and States</u>		105 Virgin Islands	VI
Alabama	AL	Washington	WA
Alaska	AK	West Virginia	WV
American Samoa	AS	Wisconsin	WI
Arizona	AZ	Wyoming	WY
55 Arkansas	AR	110	

CHARACTERISTICS OF LIGHTS

Illustration



Type Description

1. FIXED.
A light showing continuously and steadily.
2. OCCULTING.
A light in which the total duration of light in a period is longer than the total duration of darkness and the intervals of darkness (eclipses) are usually of equal duration.
 - 2.1 Single-occulting.
An occulting light in which an eclipse is regularly repeated.
 - 2.2 Group-occulting.
An occulting light in which a group of eclipses, specified in numbers, is regularly repeated.
 - 2.3 Composite group-occulting.
A light, similar to a group-occulting light, except that successive groups in a period have different numbers of eclipses.
3. ISOPHASE.
A light in which all durations of light and darkness are equal.
4. FLASHING.
A light in which the total duration of light in a period is shorter than the total duration of darkness and the appearances of light (flashes) are usually of equal duration.
 - 4.1 Single-flashing.
A flashing light in which a flash is regularly repeated (frequency not exceeding 30 flashes per minute).
 - 4.2 Group-flashing.
A flashing light in which a group of flashes, specified in number, is regularly repeated.
 - 4.3 Composite group-flashing.
A light similar to a group flashing light except that successive groups in the period have different numbers of
5. QUICK.
A light in which flashes are produced at a rate of 60 flashes per minute.
 - 5.1 Continuous quick.
A quick light in which a flash is regularly repeated.
 - 5.2 Interrupted quick.
A quick light in which the sequence of flashes is interrupted by regularly repeated eclipses of constant and long duration.
6. MORSE CODE.
A light in which appearances of light of two clearly different durations (dots and dashes) are grouped to represent a character or characters in the Morse code.
7. FIXED AND FLASHING.
A light in which a fixed light is combined with a flashing light of higher luminous intensity.
8. ALTERNATING.
A light showing different colors alternately

Abbreviation

- F
- Oc
- Oc (2)
- Oc (2+1)
- Iso
- FI
- FI (2)
- FI (2+1)
- Q
- IQ
- Mo (A)
- F FI
- AI RW