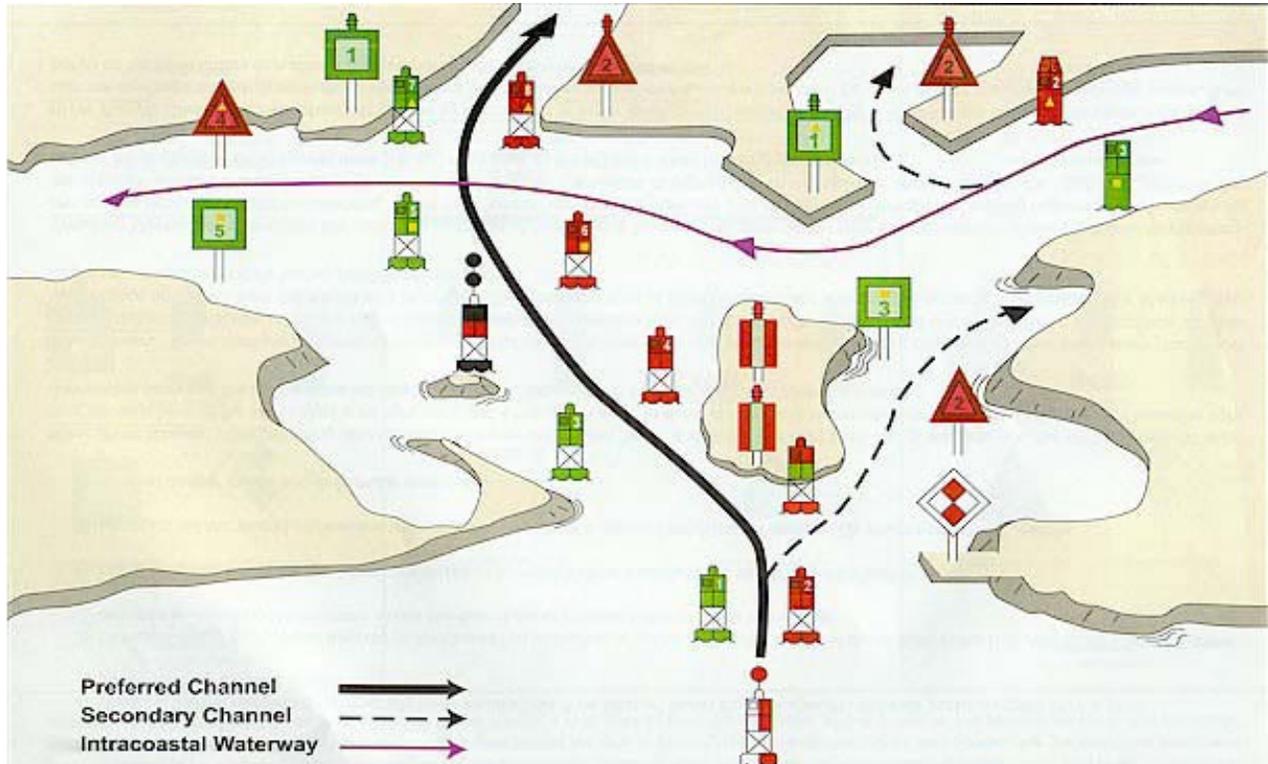


## ***United States Coast Guard Auxiliary*** **First Northern Short Range Aids to Navigation Training Guide**



**“We verify the ATONs and PATONs, check the Bridges, and update the Charts and Small Craft Facilities along the waterways and shores of First Northern”**

Rev B – Prepared by the First Northern Navigation Systems Team – 26 January 2011

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## **Introduction to Aids to Navigation**

### **- ATONs**

One of the primary responsibilities of the Auxiliary Aid to Navigation Program is the reporting of discrepancies observed on Short Range Aids to Navigation (**ATONs** and **PATONs**). The Auxiliary works with the U.S. Coast Guard to accomplish this important mission in a partnership that is focused on assisting the Coast Guard in backwater and remote areas where the Coast Guard doesn't transit in the normal course of daily operations, as well as the more traveled waterways of the country

This "**NS-AN02 Auxiliary Short Range Aid to Navigation Study Guide**" explains the guidelines for checking Aids and for reporting observations of any discrepancies to the local C.G. Units in charge of the maintenance of the aids. Auxiliarists report to the Coast Guard only those discrepancies that they observe on aids. Federal aids found "watching properly" are normally not reported to the Coast Guard. The exception is when a Coast Guard Unit or agency specifically requests that a particular aid or aids be observed. In addition, when directed by the Coast Guard, Auxiliarists are able to take credit in AUXDATA for all of the Aid to Navigation discrepancies reported to the Coast Guard. Review the guidelines for checking a Federal aid on page 30 in this study guide.

Conduct all of your aid to navigation activity in a partnership mode with the local CG ANT, Unit or other agency that is responsible for managing the Federal Aids in your area.

### **Objectives of this Guide**

- To acquire a generalized knowledge of the specifications for a Short Range Aid to Navigation.

**Note:** The specific report routing path for a **NS-AN04 – Aid to Navigation Report** is through your Auxiliary ANT liaison. It is important to not lose sight of the primary purpose of this activity, which is always to get the discrepancy report to the Coast Guard Unit that manages the aid as quickly as possible. Processing ATON reports through multi-levels of Auxiliary hierarchy often defeats this objective.

- To develop a familiarity with all of the potential discrepancies that may be found on a Short Range Aid to Navigation (**ATON** and **PATON**).
- To become familiar with the Auxiliary guidelines for checking a Short Range Aid to Navigation (**ATON** and **PATON**) properly. This includes the guidelines for taking and reporting fixes and depths.
- To provide members with an understanding of the high quality standards necessary for operating any electronic equipment used for taking measurements for the ATON and PATON program.
- To gain an appreciation for the importance of reporting all Navigation Systems (NS) activity to AUXDATA for time and activity credits.

## **Annual National Aids to Navigation**

### **Awards**

Annual NS activity statistics, recorded in AUXDATA as of 12/31 each year, are used to determine the NS Awards that are presented each year. These awards are:

- The Division with the most reported NS Activity.
- The Flotilla with the most reported NS Activity.
- The Auxiliarist with the most reported NS Activity.

NS statistics are developed from NS activity only that was submitted on **7030 Activity Report – Mission – Individual** forms and entered into AUXDATA referencing the following Mission Codes:

**30 – Federal Aid to Navigation** – ATONs – discrepancies and observed watching properly.

**31 – Private Aid to Navigation** – PATONs – discrepancies and watching properly.

**32 – Bridges** – BAP – discrepancies and watching properly.

The PATON and Bridge systems have been upgraded with on-line AUXDATA 7030 Activity reporting. See page 40 for more details about reporting Navigations Systems activity to AUXDATA.

## Tools needed for checking aids to navigation

The following tools are needed for checking an ATON properly. Usually, this equipment is found aboard an operational facility (**OPFAC**). However, many Auxiliarists, who participate in the Navigation System's Programs, often carry a personal *navigation kit* that contains their personal navigation equipment. For a successful aid checking experience, you have to have the right navigational tools, *that are operating accurately*, and are available when needed. By including this equipment as part of your pre-underway equipment check, you are helping to guarantee a successful patrol. Pre-calibrate each electronic navigational instrument to insure that it is operating accurately before you get underway. Make it a standard practice to record the test results on a **NS-AN11 Pre-underway checklist for Navigation Systems Patrols**, which is included in this study guide on page 29. It is also available on the AN Web Page at [www.uscgaan.com](http://www.uscgaan.com). You will need the data later as part of a discrepancy report to the Coast Guard. Links to Aid to Navigation publications and catalogs can be found on the Navigation Systems Division Web Site at [www.uscgann.com](http://www.uscgann.com).



**Binoculars** - Size 7 x 50 are preferred. Binoculars are used to view aids or objects that maybe located in area where it is unsafe to operate an operational facility (**OPFAC**) to order to get a close up view of a potential discrepancies. Many small, inexpensive and powerful binoculars or monoculars are commercially available and will make a perfect addition to your *navigation kit*.

**Time Piece** - A watch or stopwatch is a useful tool for timing the period of an aid's light. Any good wristwatch also satisfies this operational need. *Your GPS set can provide very accurate date and time information.* Report the time when taking fixes and depths alongside aids. Set up a GPS screen to show time, Lat/Lon, and EPE (Estimated Position Error). The screen set up in Figure 1 below is a very handy reference tool for collecting data when locating objects on-scene.



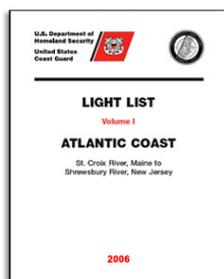
**Figure 1 – Three-line GPS Screen**

Latitude	Longitude
<b>42-36-23.50 N</b>	<b>070-23-30.01 W</b>
<b>12.4 ft EPE</b>	
Time:	<b>14:45</b>

**GPS** - A GPS set with **DGPS** (Differential GPS) or **WAAS** (Wide Area Augmentation System) can provide location data (Fix) that can be accurate to within 8 to 10 feet. WAAS usually comes as a standard feature on new GPS sets. Ten feet is inside the width of the ordinary OPFAC. If you use one of the fine hand-held GPS models that are currently available, be sure to buy a power cable that plugs into your vessel's 12v power. Also, add spare batteries for your GPS to your *navigation kit*. Consider purchasing a hand-held GPS mounting bracket and attaching your hand-held GPS to a plotting board or large clipboard. The clipboard can hold your GPS set while underway and keep your reference documents from blowing away. Good organizational practices speed up the on-scene observations and recording time.



## First Northern Auxiliary Short Range Aid to Navigation Training Guide

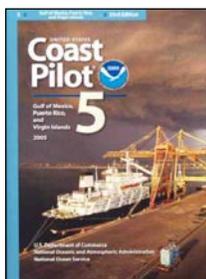


The **Light List** contains a listing and LAT/LONG of most of the aids to navigation in your AOR. Some private aids may not be listed in the Light List. Different Light List volumes are available depending on your geographic location. Links to the Light List are available on the National Navigation Systems Division Web Site at [www.uscgaan.com](http://www.uscgaan.com). Print out only those pages that relate to the area where you operate your boat.

Corrections to Light Lists are published in the LNM-Local Notice to Mariners and are available on the Summary of Corrections. While the Light List is available on line, it is not continuously corrected on line. You must perform corrections using the weekly reported updates.

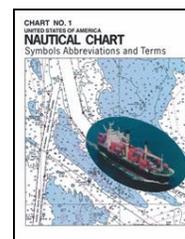
Check every on-scene observation that you perform on an aid to navigation against its entry in the Light List. Also, validate both the observation of the aid and the entry in the Light List to the symbols and abbreviations used to identify the aid on the NOAA chart. Any mismatch is a reportable discrepancy to your CG Unit. Also verify the charted position of an aid to the LAT/LONG in the Light List. Charted errors provide an opportunity for a Chart Update report to NOAA. The assigned position of a charted aid is only changed by NOAA from data reported by the Coast Guard in the I-ATONIS System and, subsequently, published in the Light List. Corrections to charted aids are made concurrently and may be viewed on on-line NOAA charts. Links to these on-line charts are provided on the Navigation Systems Web Site at [www.uscgaan.com](http://www.uscgaan.com).

**LNM – Local Notice to Mariners** - Keep your flotilla charts and other nautical publications updated to the latest Notice to Mariners. The LNM is available on-line on a weekly basis and is published on the Coast Guard's Navigation Center web site. Prudent mariners update their nautical chart(s), Light List and Coast Pilot before every ATON patrol. Links to your LNM are available on the Navigation Systems Division Web Site at [www.uscgaan.com](http://www.uscgaan.com). On-line NOAA charts are updated to data published in the LNM. To repeat, note that the Light Lists and Coast Pilots that are available on-line, are not corrected on-line. They must be corrected manually from the LNM.

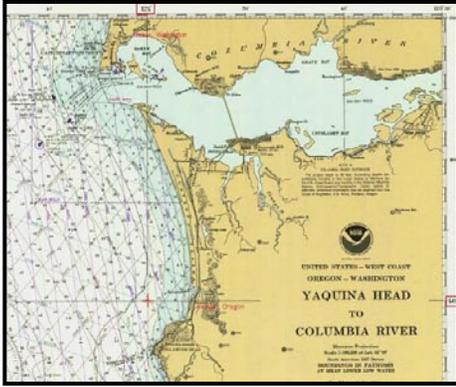


**Coast Pilots** contain information that is not easily included on the nautical chart. Links to this publication are available on-line on the Navigation Systems Division Web Site at [www.uscgaan.com](http://www.uscgaan.com). Print out only those pages that pertain to your area of operation (AOR) and keep them in your *navigation kit*. It is always a good practice to review the Coast Pilot data while you are performing ATON activity and when you are planning a patrol. Submissions of Chart Update and Small Craft Facility reports to NOAA update are used to update Coast Pilots. Reference the “NS-CU02-Chart Updating Study Guide” for specific guidelines for preparing and reporting Coast Pilot corrections.

**Chart No. 1** contains every abbreviation and symbol used on a nautical chart and should be part of the navigation kit of every serious navigator. While this publication is also available on-line, it is better to purchase a hard copy. Every authorized marine chart dealer should stock a copy or you can purchase a copy from the major on-line book dealers. Reference the Navigation Systems Division Web Site at [www.uscgaan.com](http://www.uscgaan.com) for a link to this publication.



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**NOAA Nautical Chart** - Every OPFAC should always carry the latest and largest scale NOAA nautical chart that is updated to the latest Local Notice to Mariners (LNM).

Internet links to on-line NOAA Nautical Charts and Local Notice to Mariners (LNM) corrections for every NOAA nautical chart is available on the Navigation Systems Web Site at [www.uscgaan.com](http://www.uscgaan.com). Keep copies of the largest scale NOAA Nautical Charts in your personal *navigation kit*.

While coxswains and vessel owners are responsible for maintaining up-to-date nautical charts on their OPFACs, FSO-NS Staff officers should offer their chart correcting skills and services to the OPFAC owners in the flotilla and division as a regular part of their job.

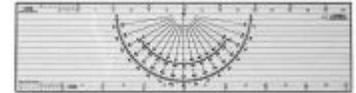
Members who submit acceptable chart update reports to NOAA may order and receive a free replacement chart. Reference the **NS-CU02-Chart Update Study Guide** for the specific guidelines for ordering these NOAA charts. A flotilla's chart updating activity should be managed by the FSO or SO-NS.

The **NS-AN04 7054 Aid to Navigation Report** is available on the [www.uscgaan.com](http://www.uscgaan.com) web site. Print out and use the **NS-AN10 Aid Observation Worksheet** for recording on-scene observations. Keep adequate copies of these forms in your *navigation kit*.



**Pencil** - An automatic pencil using 0.5 HB lead with an eraser is ideal. It is always sharp. Include extra pencils, leads and erasers in your personal navigation kit. If you decide to use regular wooden pencils, add a small pencil sharpener to your kit.

**Plotter** – A paraglide plotter is a practical plotting instrument to use on a small boat. Be sure your plotter has wheels to roll it easily on a chart without losing the course angle. Prudent mariners always plot their intended courses on their nautical chart before they get underway. Modern mariners take the extra step to establish waypoints and routes in their GPS, and schedule their aid verifications and checks along the route. This practice not only speeds up the Navigation Systems patrol but also saves much time and fuel while minimizing risk. It also provides a great opportunity to teach navigation to the crew between planned activity events. This practice also provides an added safety factor for your return trip in the event of deteriorating weather. There are many different plotters available.



**Digital Camera** – A digital camera is a fantastic tool for communicating discrepancies to the Coast Guard and other agencies. Purchase a computer cable with your camera to be able to download your pictures to your PC so that they can be e-mailed to the appropriate C.G. Unit or Agency. One picture of a discrepancy is often worth a thousand words. This phrase may sound trite but it is very true. Clear photos of a discrepancy greatly increase the credibility of your discrepancy reports with the Coast Guard and generate quick action.

Record the number that is assigned to the picture by the camera on your **NS-AN10-Aid Observation Worksheet** as you take the photos. This practice eliminates any confusion about what has been photographed when you are finalizing your report to the Coast Guard or NOAA. Read the guidelines for taking and reporting Digital Photos

# First Northern Auxiliary Short Range Aid to Navigation Training Guide

## Special Developments

Some Auxiliaries have fabricated many unique tools and instruments. Some examples are sounding poles for shallow depths, chain and wire drags, tools for measuring the angle of leaning aids, and plotting boards fitted with mounting devices for hand held GPS sets. Also, there are EXCEL systems developed that calculates the distance an aid is off station using location (Lat/Lon) and almanac data available on your GPS. Check out the **NS-CU07 - Vertical and Horizontal Error Calculator** on the Chart Updating web page on the Navigation Systems Division Web Site. The use of GPS sets with chart plotters and computerized charts facilitate the checking of whether an aid is on station.



**Hand Held Calculator  
with solar pane**

## Calculators

There are many calculations needed when checking and preparing Federal Aid discrepancy reports. Add a good calculator to your *navigation kit*. The ideal unit would have a solar panel and a battery system for nighttime use. You may have to get two units. Do not forget to add spare batteries to your *navigation kit*.

## References:

**USCG Aids to Navigation Manual – Administration COMDTINST M16500.7A**  
**Light List – COMDTPUB P16502.1**  
**The Coast Pilot**  
**Chart No. 1**  
**LNM - Local Notice to Mariners**  
**NOAA Nautical Charts**

## CDB - Conventional Direction of Buoyage

In U.S. waters, the IALA-B system of lateral marks, with few exceptions, is arranged in geographic order known as the conventional direction of buoyage. The memory aid 3R rule of "Red, Right, Returning from the sea" applies. This means keep the red markers to the right hand side of the OPFAC when returning from seaward and when transiting from north to south along the Atlantic Coast, from south to north and east to west along the Gulf Coast, from south to north and east to west along the Pacific Coast, and from east to west in the Great Lakes except for Lake Michigan which is north to south.



Figure 2 – CDB - Conventional Direction of Buoyage Graphic

## The IALA-B System of Aids to Navigation

The U.S. Aids to Navigation System is predominantly a lateral system which is consistent with Region B requirements of the International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA-B) Maritime Buoyage System. Exceptions exist for the U.S. possessions west of the International Date Line and those south of 10 degrees north latitude, which follow the IALA-A Aid to Navigation System.

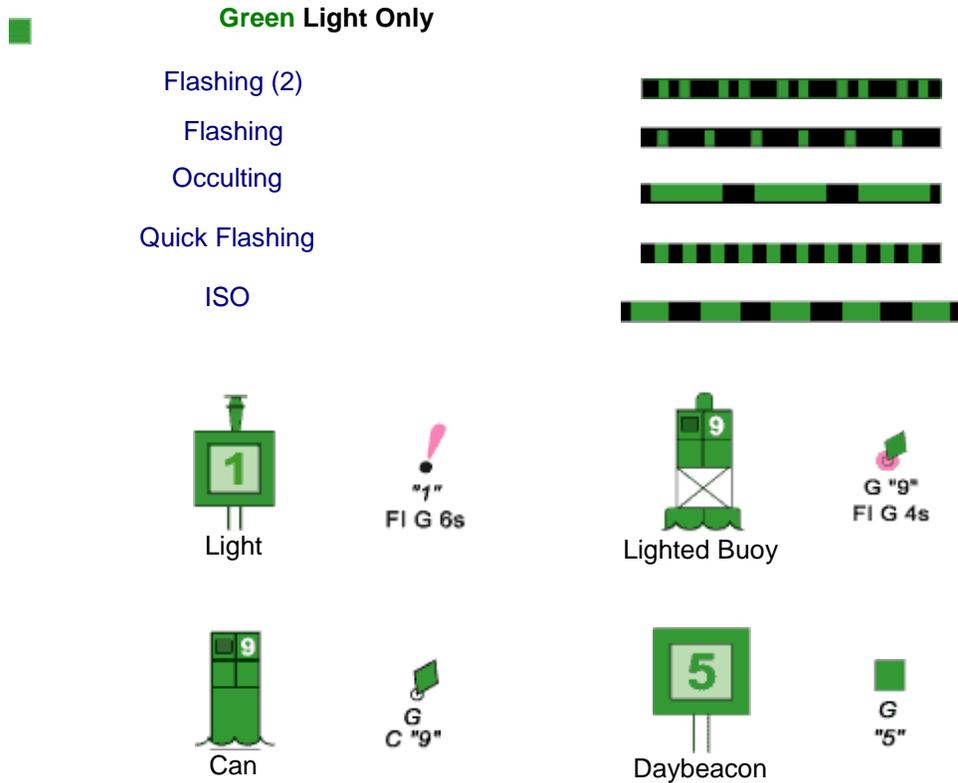
### **THE LATERAL SYSTEM AS SEEN WHEN ENTERING FROM SEAWARD**

**Lateral marks** define the port and starboard sides of a channel or fairway being followed. Their most frequent use is to mark the sides of channels. However, they may be used individually to mark obstructions located outside of clearly defined channels. Lateral marks normally have three criteria that assist the mariner in their quick identification – **shape**, **color**, and **numbering**. Lighted lateral aids use the same light color as the aid color. Lighted aids are often made up by joining a buoy body and a structure on which the light is mounted. While this voids the shape criterion, the light color becomes the third criteria during the nighttime and periods of reduced visibility. Lateral aids are numbered from seaward toward the land, from the mouth of rivers upstream, and clockwise around islands.

Lateral marks include side marks and preferred channel marks. Side marks are not always placed directly on a channel edge and may be positioned outside the channel as indicated on charts and nautical publications.

**Port side marks** indicate the left side of channels when proceeding in the Conventional Directions of Buoyage. They normally show as a square or can in shape, are **green** in color, and have odd numbering. Beacons have green square daymarks while buoys are green cans or pillar buoys. **Green** lights of various rhythms are used on port side marks.

Figure 3 - **Port Side Odd Numbered Aids**



Note that the numbers on daymarks are the color of the aid while the numbers on buoys are white.

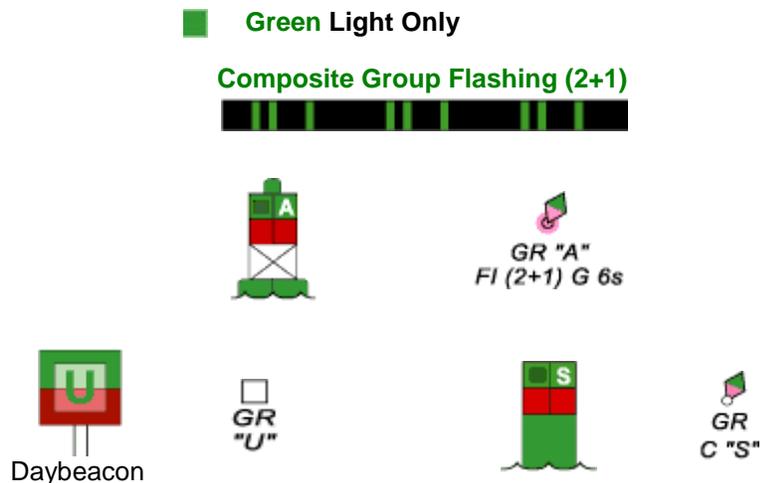
### Preferred Channel Aids

Figure 4 – **Preferred Channel Aids**

**Preferred Channel to Starboard** - have no numbers but may be lettered.

Use as Port Side aids in the Primary Channel; use as Starboard Side aids in the Secondary Channel.

The topmost bands are colored **green**.



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Can

## Preferred Channel to Port - have no numbers but may be lettered.

Use as a Starboard Side aids in the primary channel, used as a Port Side aids in the Secondary Channel.

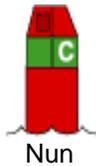
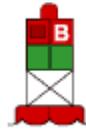
The topmost bands are colored red.

### ■ Red Light Only

#### Composite Group Flashing (2+1)



  
 RG "B"  
 Fl (2+1) R 6s



  
 RG  
 N "C"



  
 RG  
 "G"

**Starboard Side Marks** indicate the right side of channels when proceeding in the conventional directions of buoyage. They normally show as a conical or nun shape, are red in color, and have even numbering. Beacons have triangular red daymarks while buoys are red nuns or pillar buoys. Red lights of various rhythms are used on starboard side marks.

Figure 5 – Starboard Side Even Numbered Aids

### ■ Red Light Only



Note that daymarks have colored numbers.

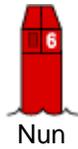
  
 "2"  
 Fl R 6s



Note that buoys have white numbers.

  
 R "8"  
 Fl R 4s

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Note that the numbers on daymarks are the color of the aid while the numbers on buoys are white.

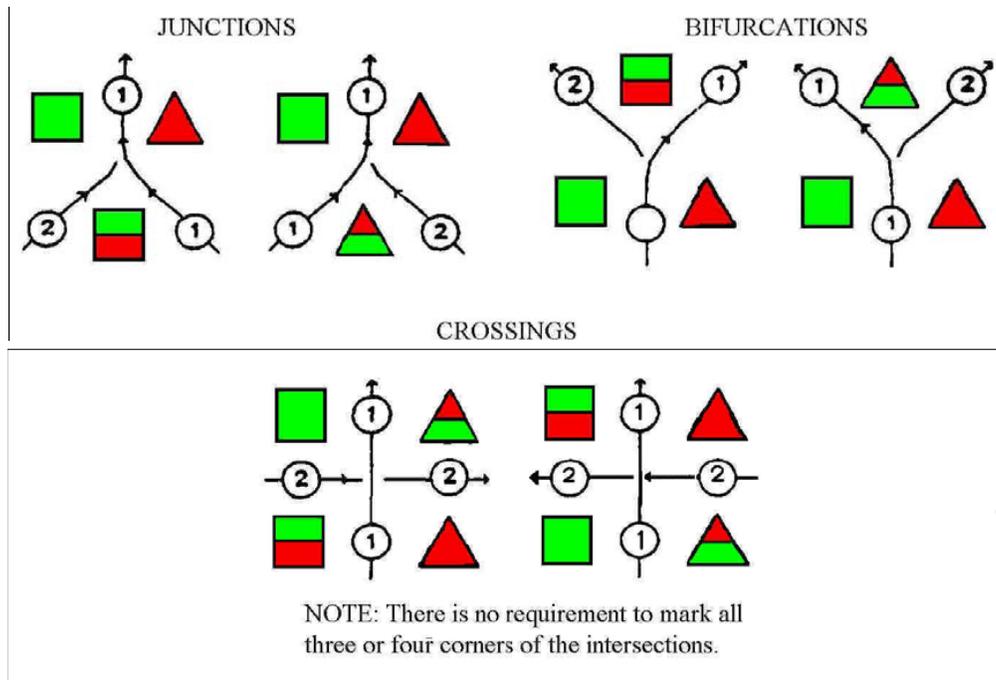
**Junction** – The point where a channel divides when proceeding to seaward. The point where a tributary departs or splits from the main channel

**Bifurcation** – The point where a channel divides when proceeding from seaward--the place where two tributaries meet.

**Crossing** – The point where a main and secondary channel cross each other.

Note the placement of the preferred channel buoys in the three examples below. The main channels are labeled as 1. The secondary channels are labeled as 2.

Figure 6 – **Junctions and Bifurcation Patterns**



Strictly defined, a **Beacon** is any fixed aid to navigation. For our purposes, however, we take beacons to mean all minor lights of relatively low candlepower and daybeacons. Fixed aids provide immobile, stable signals. Floating aids do not. Beacons, therefore, are superior to floating aids in the signal quality that they provide to the mariner. Beacons may be set back from the channel edge to protect them from damage. The utility of a beacon decreases as its distance from the channel edge increases. When beacons must be set back, the distance from the channel edge should remain constant within a waterway.

**Buoyant beacons** appear to be fixed, but in actuality are moored to the bottom by a sinker. They remain afloat through use of a buoyant collar attached below the waterline. Buoyant beacons are deployed only in unusual situations where their high cost is offset by the requirement for a reduced watch circle.

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An **articulated light** is a vertical pipe structure supported by a submerged buoyancy chamber and attached by a universal coupling to a weighted sinker on the seafloor. The light, allowed to move about by the universal coupling, is not as precise as a fixed aid. However, it has a much smaller watch circle than a conventional buoy, because the buoyancy chamber tends to force the pipe back to a vertical position when it heels over under the effects of wind, wave, or current. Articulated lights are primarily designed to mark narrow channels with greater precision than conventional buoys.

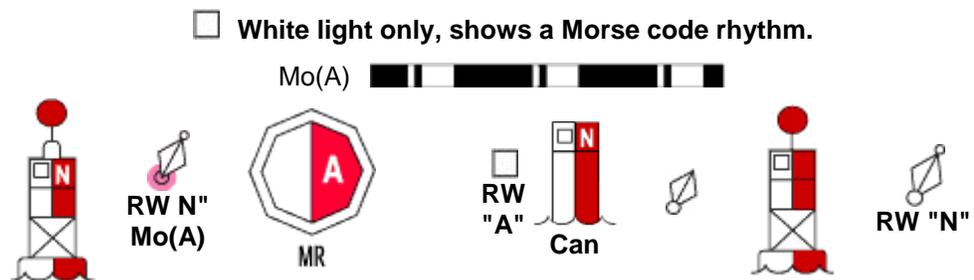
**Buoys** are unmanned, floating aids to navigation moored to the seabed. They may be lighted or unlighted.

### AIDS TO NAVIGATION WITH NO LATERAL SIGNIFICANCE

**Safe Water Marks** indicate that there is navigable water all around the mark. They usually mark fairways, midchannels, and offshore approach points. Safe water marks have red and white vertical stripes, are spherical in shape and are never numbered. When a Safe Water mark is lighted or fitted with a sound signal, its displays a red spherical topmark. Lighted Safe Water marks show a white light with a Morse Code "A" rhythm.



Figure 7 - **Safe Water Marks**  
Have no numbers but may be lettered.



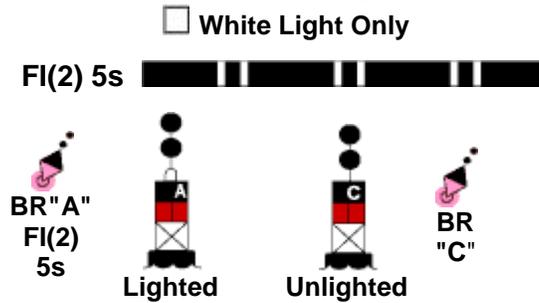
**Isolated Danger marks** are erected on, moored over, or placed immediately adjacent to an isolated danger that may be passed on all sides by mariners. They are black with one or more broad horizontal red bands and are fitted with a top mark of two black

# First Northern Auxiliary Short Range Aid to Navigation Training Guide

spheres, one above the other. When lighted, the aid displays a white light, group flashing (two) with a period of five seconds. These aids should not be approached closely without special caution.

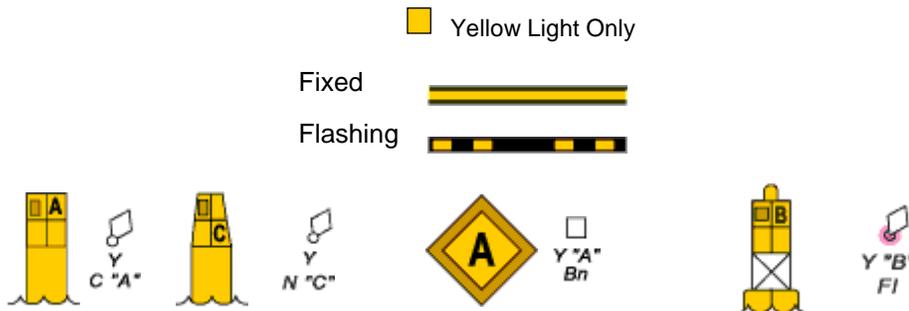
Figure 8 - **Isolated Danger Marks**

Have no numbers but may be lettered.



**Special Marks** are not primarily intended to assist safe navigation, but more to indicate a special area or a feature referenced on charts or in another nautical publication. They may be used, for example, to mark anchorages, cable or pipeline areas, traffic separation schemes, military exercise zones, ocean data acquisitions systems, etc. Special marks are colored a solid yellow and, when lighted, show yellow lights with a slow-flashing rhythm preferred. Special marks may not show a quick-flashing rhythm. Many special marks are often private aids.

Figure 9 - **Special Marks** — May Be Lettered.



**Information and Regulatory Marks** are used to alert the mariner about various conditions or regulatory matters. These marks have orange geometric shapes against a white background. When lighted, these marks show a white light with any rhythm not reserved for other types of aids. The meanings of the orange shapes are:

A vertical **open-faced diamond shape** signifies **danger**. These buoys are often termed, "**Danger Buoys**." The nature of the danger is often indicated inside the diamond shape, such as, Dam, Rock, Shoal, etc.

# First Northern Auxiliary Short Range Aid to Navigation Training Guide

A vertical **diamond shape with a cross centered within the diamond** indicates that vessels are **excluded** from the marked area. These buoys are often called, “**Exclusion Buoys**.” The explanation for the exclusion may be placed outside the crossed diamond shape, such as, Exclusion Area, Dam, Rapids, Falls, etc.

A **circular shape** indicates that certain **operating restrictions** or **controls** are in effect within the marked area. These buoys have various names, such as, **No Wake Buoy**, **Speed Buoy**, **Regulatory Buoy**, **Swim Buoy**, etc. The type of control is shown within the circle. Other restrictions may be placed outside the circle.

A **rectangular shape** is used for displaying information such as **directions**, **locations**, **distances**, etc.

Many Class 3 private aids are regulatory marks. Figure 10 below depicts examples of Information and Regulatory Marks.

**Figure 10 - Information and Regulatory Marks**

When lighted, may display any light rhythm except quick flashing and flashing (2)

NW  White Light Only



**Exclusion Area**



**Restricted Operations**

**Information and Regulatory Marks** are used to alert vessel operators to various warnings or regulatory matters. Examples:

**Boat Exclusion Area**



Explanation may be placed outside the crossed diamond shape.

**Danger**



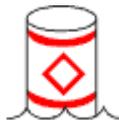
The nature of danger may be indicated inside the diamond shape, such as rock, wreck, shoal, dam, etc.

**Controlled Area**



Type of control is indicated in the circle, such as slow, no wake, anchoring, etc.

**Information**



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Used to display directions, distances, locations, etc.

Buoy used to display dangers.

Buoy used to indicate local boating regulations.

**Mooring Buoys** are white with a blue horizontal band. This distinctive color scheme facilitates identification and helps the mariner distinguish these buoys from regular aids to navigation. When lighted, mooring buoys display a white light with any rhythm not reserved for aids to navigation. Federal mooring buoys and those privately-owner mooring buoys that are permitted as Private Aids to Navigation, and are charted or included in the Light List, shall be listed in I-ATONIS. Ball-shaped mooring buoys are more common.

## **Mooring Buoys**

May show white light or white reflector.



**Major Lights** are lights of moderate to high candlepower and reliability that are exhibited from a fixed structure. They do not fall under the IALA agreement. While their signal characteristics are largely discretionary, they will be marked to provide maximum information while avoiding conflicts with nearby aids displaying IALA markings. The coloration of a light is often unique in order to avoid confusion with any nearby lights. The color of the structure should allow the light tower to clearly stand out from its background.

A major light may or may not have colored sectors with higher intensities. Major lights have an availability standard of 90% and fall into two broad categories:

**Coastal** or **seacoast lights** assist vessels during coastal navigation or when making a landfall. Their operational range should, based on local visibility conditions, supply needed navigation data 90% of the time for the transition of the mariner into waters marked by the short range system.

**Inland major lights** are found in bays, sounds, and coastal approaches. They can serve a variety of functions including use as a leading light, a range light, an obstruction mark, a sector light, or simply a reference mark from which to obtain a needed visual bearing or radar range. They should have sufficient intensity so they are visible over their usable range 90% of the nights of the year when local visibility conditions are considered.

## **Discrepancies on major lights.**

- **Aid is extinguished.** Most major lights are unmanned and therefore should be checked each time they are passed. Many lights operate 24/7 and can be checked during daylight hours.
- **Aid has been vandalized.** Most major lights are located in remote areas and, since they are unmanned, are susceptible to vandalism.

- **Also, check the discrepancies related to lanterns.**

**Directional** or **Sector Lights** are devices that generate two or more defined light regions by displaying different light color characteristics. In practice, directional lights have three sectors, usually have red and green sectors separated by a white sector. They are used to give an indication of a vessel's position with respect to the center of a waterway. Because there is only one light source, the mariner has no indication of how fast a vessel is moving across a given sector nor how far into a sector has a vessel moved. Directional lights are avoided when an aid is needed to initiate a turn and the turn must be started an appropriate distance before the intersection of the channel centerlines.

### **Sector Lights**



**Sector lights** are commonly used to provide mariners with a warning that they are in an area where navigation may be impaired by a shoal, rock, etc. The mariner will have to use other aids or navigational tools to determine position relative to the danger. In practice, sector lights commonly have two sectors (usually red and white).

### **Fog Detector**



**Fog Detectors** are very convenient devices for controlling sound signal operation. They are particularly useful where a live watch could be reduced or a radio link to a remote station could be eliminated. Fog signals are usually calibrated to energize the sound signal when the visibility drops below 3 miles.

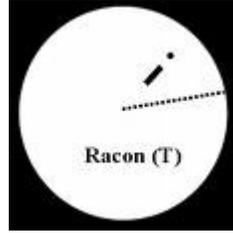
### **Discrepancy on a fog detector.**

- **The fog detector is inoperative.**

**Note on Fog Signals:** Some fog signals are being updated to become “radio activated.” During times of reduced visibility, mariners are requested to tune their VHF-FM radio to a predetermined channel. The mariner can then activate the fog signal for a specified time period (minutes) by keying their VHF radio's microphone, consecutively, a prescribed number of times, while on a specified VHF radio channel. Do not report such signals as “inoperative.” Do not activate these fog signals as a test during periods of clear visibility. Many Fog Signals on bridges will be classified as Class I Private Aids.

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A **RACON** is a radar transponder, which produces a coded response, or radar paint, when triggered by a surface search radar signal. They are normally operated in the frequency ranges of the X-band and S-band marine radars. RACONs provide radar enhancement, help improve aid identification, and help during the transition from ocean to inland navigation. This is accomplished by the placement of a **RACON**:



**RACON**



- On a prominent point of land that allows the mariner to make a positive identification of the point for a landfall.
- On an aid to distinguish the aid from other aids and vessels where many echoes appear on the radar screen.
- Temporarily, on an aid that marks a new danger.

RACONs are coded with *Morse-code* letters that begin with a dash and contain no more than four elements. The code usually reflects letters that are consistent with the name of the location. The letter “D” is reserved for RACONs marking new, uncharted dangers.

### **Discrepancies on a RACON:**

- **The aid’s RACON is off the air.**
- **The aid’s RACON is emitting improper characteristics per the Light List.**
- **RACONs on Bridges** - RACONs are often used to mark the center of the navigable channel on bridges that service large vessels. Often, these aids are Private Aids to Navigation. Three separate discrepancy reports may be required. Make a report as a PATON discrepancy, as a Bridge discrepancy and as a special report to the Sector.

A **Sound Signal** (fog signal) is a device that transmits sound, intended to provide information to mariners during periods of restricted visibility. The term also applies to the sound emitted by the device. Due to the inability of the human ear to accurately judge the direction of a sound source, these signals are limited to only one general use—the signal serves to warn mariners of the proximity of an obstruction.

Although sound signals are valuable, mariners should not implicitly rely on them when navigating. Instead, they should be considered supplements to radar and radio-navigation aids during reduced visibility navigation.

Wave actuated signals are used where environmental conditions permit. When two or more channels are located in the same general area, such as near a junction or bifurcation, a different signal type is used for each waterway to assist in identification. Historically, mid-channels, fairways, and approaches have been marked with whistles. They can also be marked with an electronic horn.

The Coast Guard is discouraging the use of sound signals in lateral situations such as placing gongs to port and bells to starboard and is discouraging mariners from relying implicitly on sound signals.

**Sound  
Fog Signals**



## **Discrepancies on a sound signal:**

- **The sound signal, either a bell, a gong, a horn, or a whistle, is inoperative.** Sound signals may be electrically operated or wave actuated.
- **The tappers on a gong or a bell are missing.**
- **The sounding device is missing.**
- **The fog horn is inoperative**

Other ranges, sector lights, and crossing marks do not fall under the IALA agreement. While their signal characteristics are largely discretionary, these aids are marked to provide maximum information to the mariner while avoiding conflicts with nearby aids displaying IALA markings.

## **The Western River System**

The Western Rivers system differs from the U. S. Aids to Navigation System due to the unstable nature of the river waters and channels. The Coast Guard operates this system on the Mississippi River, its tributaries, South Pass and Southwest Pass to the navigational demarcation lines dividing the high seas from harbors, rivers and other inland waters of the United States. The system is also used on the following rivers and waterways

Port Allen-Morgan City Alternative Route.

That part of the Atchafalaya River above its junction with the Port Allen-Morgan City Alternative Route including Old River and the New River.

The Tennessee-Tombigbee Waterway, Tombigbee River, Black Warrior River, Alabama River, Coosa River, Mobile River above Cochrane Bridge at St. Louis Point, Flint River.

Chattahoochee River, and Apalachicola River above its confluence with the Jackson River.

The Western Rivers marking system differs from the U.S. system in that:

- Buoys are not numbered and shore structures are not numbered laterally.
- Numbers displayed on distance markers suspended on shore structures, or from lateral or crossing day boards, indicate mileage from a designated point established by each District.
- Charts are marked with a magenta line perpendicular to the waterway channel with the statute mileage given every five miles.

Diamond-shaped non-lateral daymarks, red/white or green/white as appropriate, are used instead of triangular or square lateral daymarks where the river channel crosses from one bank to the other.

- The **Conventional Direction of Buoyage for Western Rivers**, for installing the proper aid signals, is upstream. Local terminology, however, refers to the "left" and "right" banks viewed from a vessel proceeding downstream.
- Lights on the right descending bank show single flashing rhythms and may be green or white. Lights on the left descending bank show "group-flashing-two" rhythms and may be red or white.
  - In pooled waters (behind dams), buoys should mark the nine-foot contour for normal pool elevations.

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- In unstable waters (free-flowing rivers), buoys should mark the *project depth* for the prevailing river stage. Buoys may be set in deeper water when a drop in water level is predicted. Buoys should not normally be set, however, in water depths less than the project depth when a rise in water level is predicted. Constantly changing river conditions prevent strict design guidelines. Unit Commanding Officers and Officers-in-Charge must use their best judgment concerning the number and placement of aids. Isolated danger marks are not used.

Figure 11 – Western Rivers - Port Side or Right Descending Bank

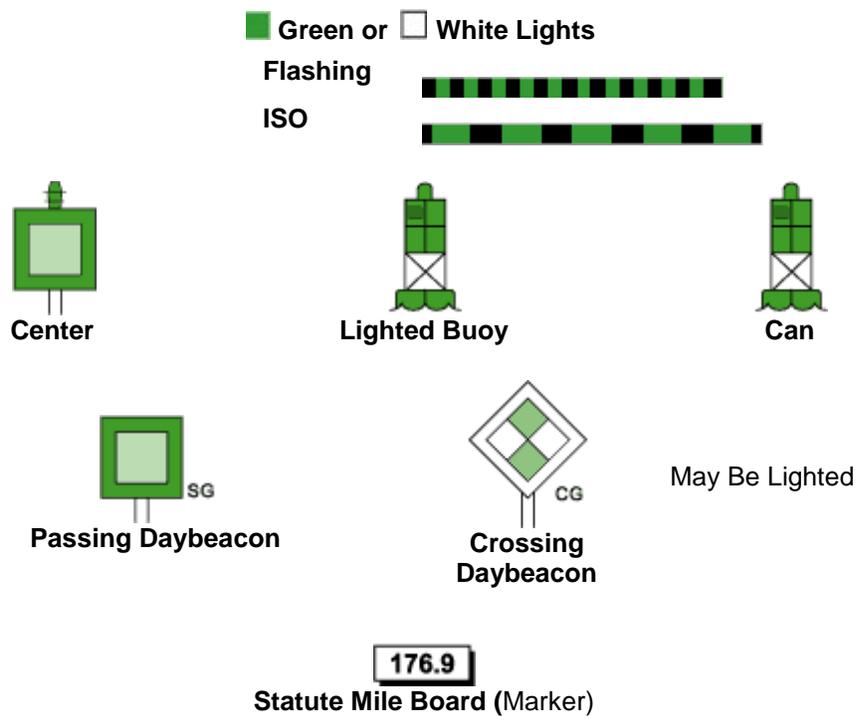


Figure 12 – Western Rivers - Preferred Channel Marks  
 Mark Junctions and Obstructions - Composite Group Flashing (2)

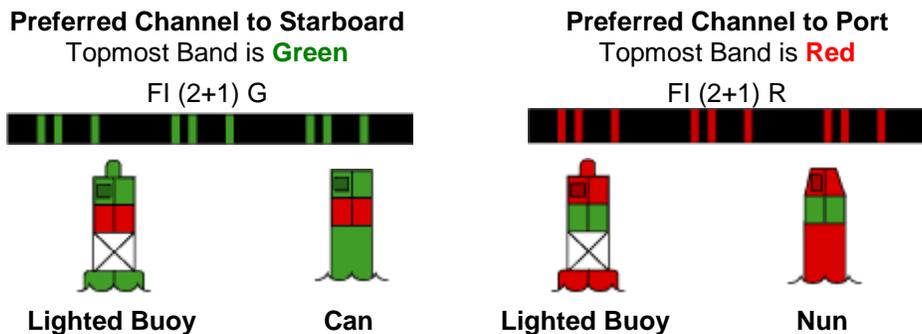
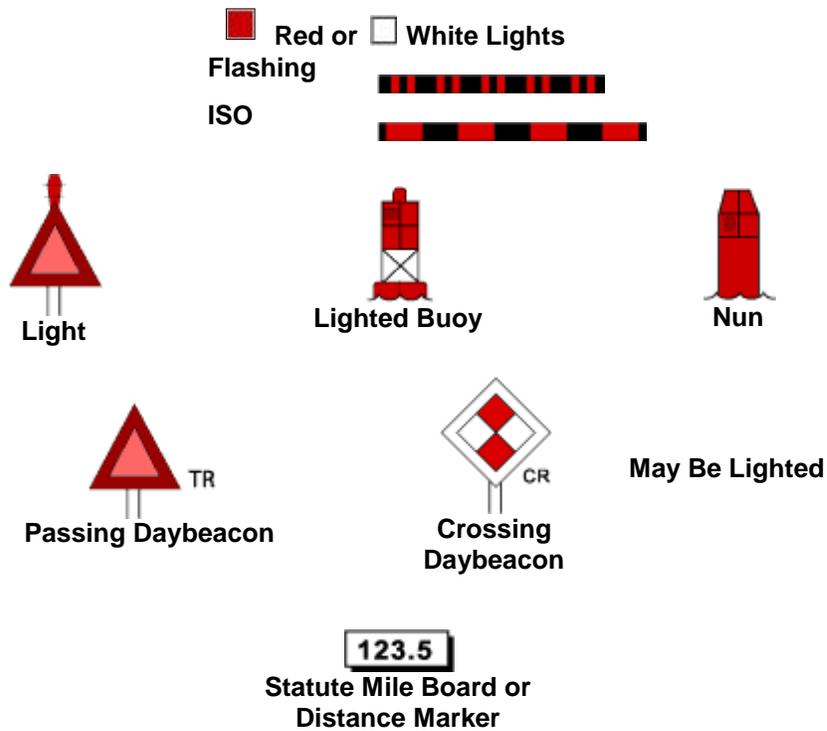




Figure 13 – Western Rivers - Starboard Side or Left Descending Bank



**The Intracoastal Waterway System – ICW**

The ICW variation of the U.S. Marking System is employed along the Atlantic and Gulf Intracoastal Waterways. It differs from the standard U. S. Marking System by displaying distinctive yellow bands, triangles, or squares to signify ICW significance and distinguish them from other aids marking other waters. In addition to the conventional signals, aids marking the ICW differ from the U.S. Aids to Navigation System in that:

- ICW aids display a distinctive yellow symbol according to aid type and function. Distance Markers may be used. The distance indicated is from a designated point established by each district.

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**ICW Markings.** Yellow symbols indicate that an aid marks the Conventional Direction of Buoyage on the Intracoastal Waterway—southerly along the East coast, westerly along the Okeechobee waterway, and westerly along the Gulf coast.

**Yellow Triangles** indicate starboard hand aids when following the ICW's conventional direction of buoyage. Aids with yellow triangles should be passed by keeping them on the starboard (right) side of the vessel.

**Yellow Squares** indicate port hand aids when following the ICW's conventional direction of buoyage. Aids with yellow squares should be passed by keeping them on the port (left) side of the vessel.

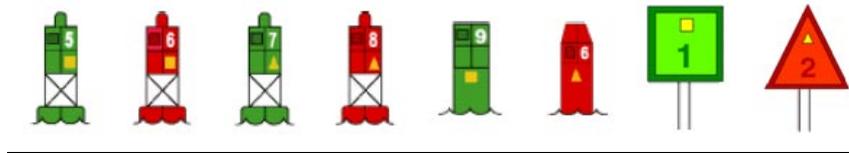
**Yellow Horizontal Bands** are used on non-lateral aids such as:

- **Safe Water Marks.**
- **Isolated Danger Marks.**
- **Front Range boards.** Rear range boards do not display the yellow band because it would be too inconspicuous.
- **Preferred Channel Marks.** At a junction with a federally maintained waterway, the preferred channel mark will display a yellow triangle or square as appropriate for the conventional direction of buoyage of the ICW. Junctions with the ICW and privately maintained waterways are not marked with preferred channel buoys.

The yellow horizontal band has no lateral significance, but simply identifies the aid as marking the ICW.

**Dual Purpose Aids.** When a regular channel is also used as an ICW channel or crosses an ICW channel, the IALA-B System of Aids to Navigation applies for the regular channel, and this role is reversed and marked for ICW transit. In this situation, cans may be marked with yellow triangles and nuns may be marked with yellow squares—therefore, the term Dual Purpose. Vessels transiting the regular channel follow the IALA-B system of Aids to Navigation. Vessels transiting the ICW would observe the yellow ICW markings.

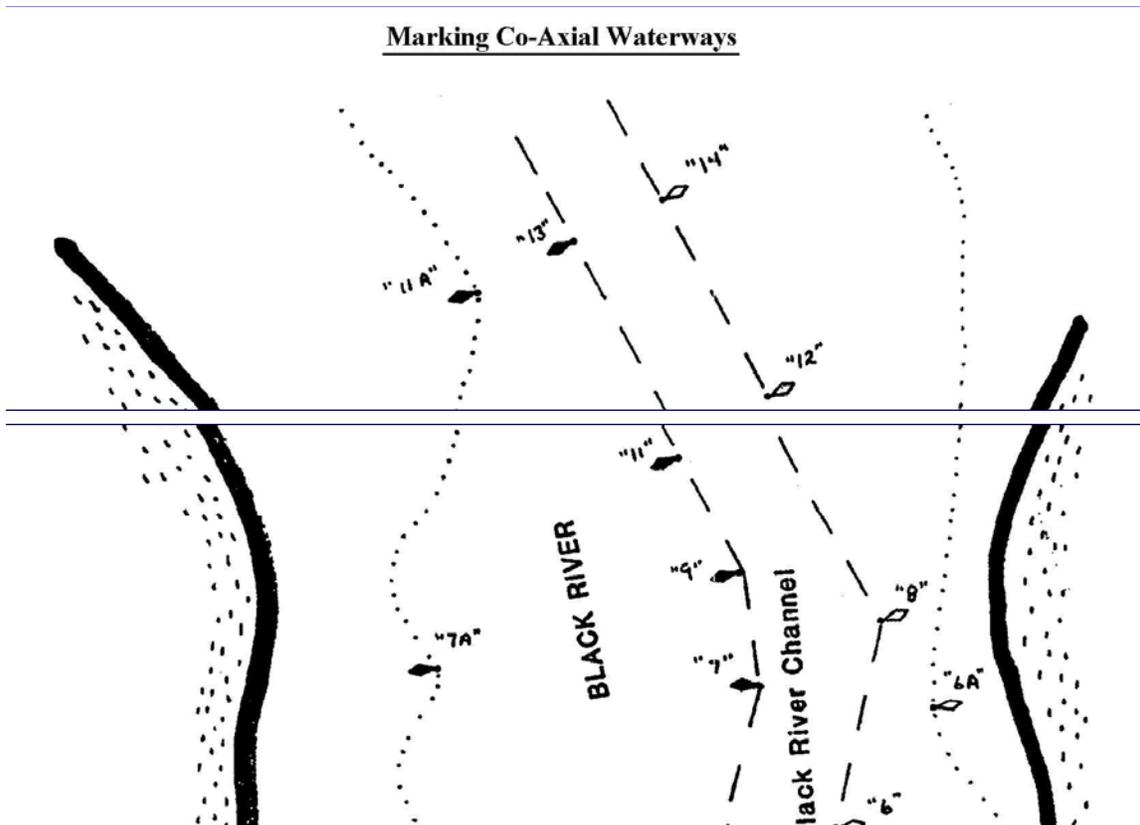
Figure 14 – **Samples of ICW marked Aids**

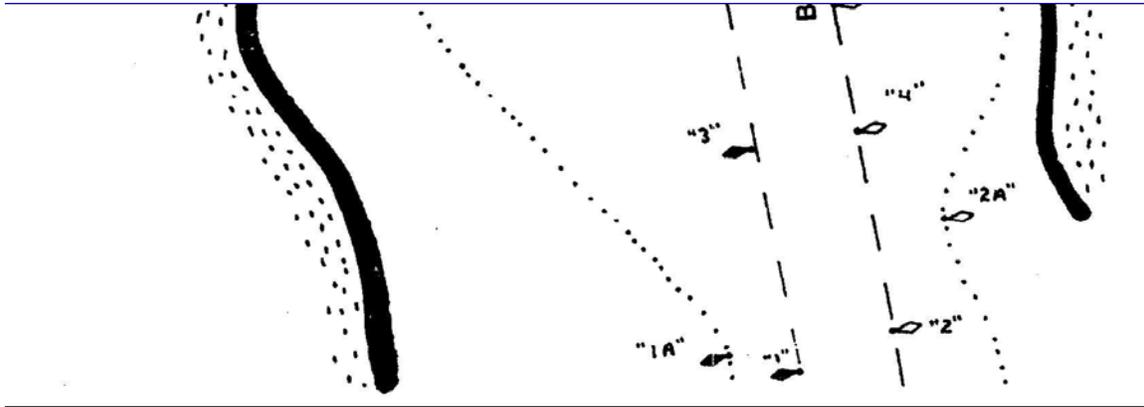


Note: The yellow square or triangle is centered between the top of the reflective character and the reflective border on daymarks.

**Marking of Co-axial Waterways**

Occasionally, it is necessary, in a wider waterway, to mark a deep draft channel along with wider boundaries for a shallow draft channel. In this situation, the aids in the deep draft channel are named and numbered first. The name will include a noun indicating a feature of that route (channel, traffic lane, cut, or canal). The aids that mark the broader expanse of water are numbered next. They would not reference the noun used for the deep draft channel. Also, it may not be numbered in pure numerical sequence with the deep draft channel. Alpha-numerics are often used for the shallow draft channel aids. However, on a wide river, the shallow draft channel could be numbered totally independent from the deep draft channel.

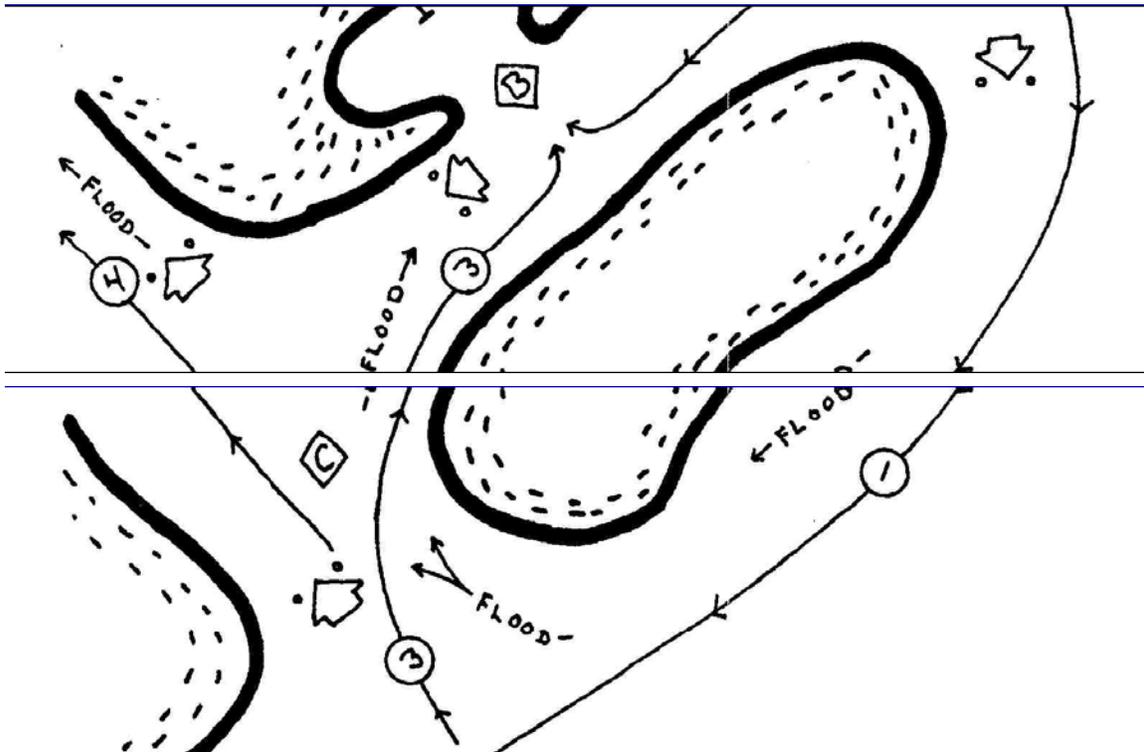


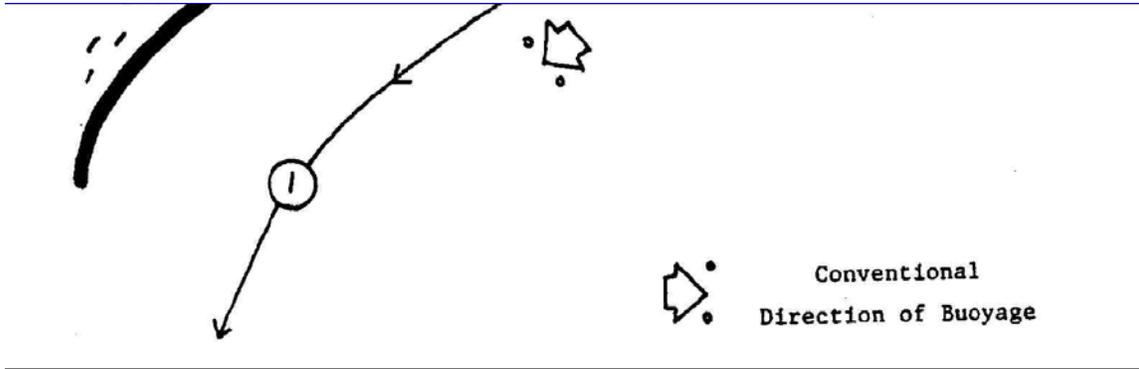


**Figure 15 – Co-axial Waterway Variations on the Conventional Direction of Buoyage**

At times, strict adherence to the use of flood to determine the conventional direction of buoyage can cause confusion and result in an inconsistent marking scheme. This situation is more likely to occur near islands or river mouths. In the figure below, an apparent confusing situation exists between points “B” and “C”. This was eliminated by deviating from the rules and changing the direction of buoyage to go from point “B” to point “C”.

**Figure 16 – Variations on the direction of Conventional Buoyage**





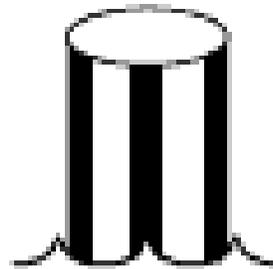
## The Uniform State Waterway Marking System (USWMS)

**Inland Waters Obstruction Mark.** On inland waters, designated by the Commandant as State waters in accordance with **33 CFR66.05-5 (33CFR66.05-100)**, provides the specific listing of navigable waters designated as State waters) and on non-navigable internal waters of a State which have no defined head of navigation, a buoy showing alternate vertical black and white stripes may be used to indicate to a vessel operator that an obstruction to navigation extends from the nearest shore to the buoy. The black and white buoy's meaning is ***do not pass between the buoy and the shore***. The number of white and black stripes is discretionary, provided that the white stripes are twice the width of the black stripes. Reference the National Navigation Systems Division Web Site for links to these CFRs.

### **Inland (State) Waters**

#### **Obstruction Mark**

May show a white reflector or a quick flashing white light.



**Cardinal Marks.** These marks indicate, in the cardinal points of the compass, the direction of good water from the aid. They are not used in the U.S. Marking System but may be encountered in Canadian waters. .

Figure 18 - **Cardinal System Marks** may show a white reflector or a white light.

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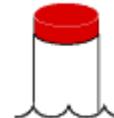
**Red striped  
white buoy**

Do not pass between buoy and  
nearest shore.



**Black topped  
white buoy**

Think that the black top  
represents a northeast storm.  
Pass to north or east of this buoy



**Red topped  
white buoy**

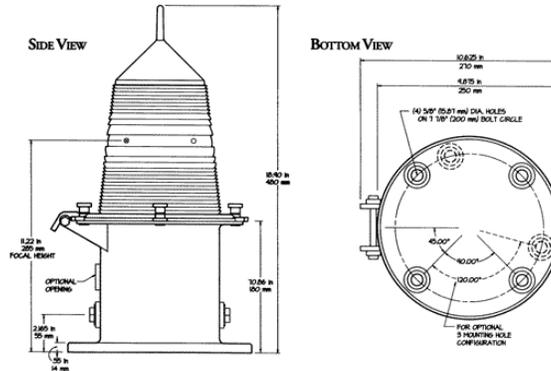
Think that the red top represents heat and  
the hottest area is in the southwest. Pass to  
south or west of this buoy

## Lanterns, Navigational

Figure 19 - The Elements of a Navigational Lanterns



6 Place Lamp changer



155 MM Lanterns





Figure 20 – [Solar LED Lanterns](#)

**Solar LED Lanterns** are self-contained units that eliminate the mechanical problems of previous lanterns such as the lamp changer. Each unit comes equipped with a battery, solar panels, and an LED light. They provide a high level of reliability while expanding the servicing cycle of the aid. Different sizes are available depending on the size of the solar panel required to maintain the light on the aid. While the light color is unalterable, the units provide options for different light characteristics and rhythms. The lights are available with different color lights, and solar panel power production. Solar LED lanterns are currently being deployed throughout the country. Smaller size LED lanterns are available for use on private aids.

## Light Characteristics

An aid's light characteristic consists of its color and rhythm. Authorized colors are red, green, white, and yellow. A light's characteristic is determined by the aid's function. The quick rhythm is the most conspicuous and is used on important lateral aids, such as aids in turns, marking shoals, and marking wrecks. Authorized rhythms are:

**Fixed (F)** – shows a continuous, unblinking light. Not authorized for lateral aids.

**Flashing (FI)** – the duration of light is clearly shorter than the duration of darkness. Frequency not greater than 30 flashes per minute.

**Quick Flashing (Q)** – the light duration is shorter than the duration of darkness. Frequency is at least 60 or more per minute.

**Very Quick Flashing (VQ)** – the light duration is shorter than the duration of darkness. Frequency is at least 100 per minute.

**Interrupted Quick Flashing (IQ)** – is similar to quick flashing but has a brief, extended darkness period.

**Group Flashing (Gp FI (x+x))** – Combination of two patterns in one period, i.e. 2 flashes followed by three flashes would appear as **Gp FI (2 + 3)**. The darkness in between the groups is clearly longer than the darkness between flashes.

**Long Flashing (LFL)** – One long flash in a lighted period of at least 2 seconds.

**Slow Flashing** – less than 30 flashes per minute. The adjective 'slow' is usually omitted.

**Isophase (Iso)** – Light has equal duration between light and darkness. Period consists of both light and dark interval. Also called **Equal Interval (E Int)**.

**Occulting (Occ)** – is the opposite of flashing – the light is on more than it is off.

**Alternating (AL)** – an alternating light changes color. It is used as a special purpose light for situations requiring significant caution.

**Morse (Mo)** – groups flashes (long and short) to form Morse code characters. Example: Morse code "U" shows two short flashes followed by one prolonged flash then a period of darkness.

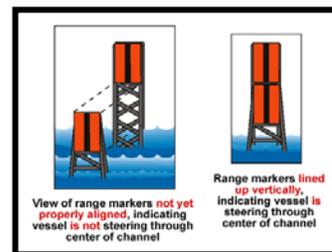
## Discrepancies on lights:

- **The light signal is showing improper characteristics or rhythm.** Must be observed during periods of darkness.
- **The light signal is obscured.** Explain the circumstances in the comment section on your report.
- **The light signal is extinguished.** Must be observed during periods of darkness.
- **The lantern is damaged.** This is always a good photo opportunity.
- **The light is burning dim or showing reduced intensity.** Verify by close examination that the "burning dim" or "reduced intensity" condition is not being caused by smoke, by some other atmospheric conditions, by smoke, or by the viewing angle.
- **The aid's light is partially obscured by dayboards.**
- **The battery box is missing or damaged.** Note that many lighted aids are being equipped with Solar LED Lanterns which do not need a battery box. The LED lights are self-contained fixtures—LED light, battery and solar panel.
- **The vent valve on a lighted buoy is missing.** Aids with Solar LED Light fixtures do not need vent valves. When the aid has an old type hull, even though fitted with a LED lantern fixture, always check the vent valve for integrity.
- **The vent tube(s) on a lighted buoy is broken.** Aids with Solar LED Light fixtures do not need vent valves. When the aid has an old type hull, even though fitted with a LED lantern fixture, always check the vent tubes for integrity.
- **Bird nests are obscuring the light.**
- **The solar panel is damaged or is not oriented correctly.** Usually does not apply to Solar LED fixtures. However, do check for damage or vandalism.

**RANGES** are an aligned pairs of beacons placed to define a line down the center of a navigable channel. They are usually, but need not be, lighted. Criteria for range site selection are:

- Use of existing structures such as lights, or daybeacons whenever possible.
- Shoal areas where shallow water depths will decrease structure construction costs are utilized.
- Access to available commercial power is preferred.

Figure 21 - RANGES



The Front Range (**FR**) panel or light is usually lower than the rear range (**RR**) panel or light. Each range provides a mariner with a given lateral sensitivity at a given distance from the near end of the channel. Lateral sensitivity is expressed as Cross-Track Factor and lends a more physical feel to the performance of the range.

- The ***cross-track factor*** is a measure of effectiveness for finding and maintaining track on the range axis. A cross-track factor of 25% means that a mariner may be as far as 25% of the distance from the channel centerline to the edge of the channel before determining the vessel is off the centerline.
- **Distances of less than two miles** are usually marked with dayboards and using standard omnidirectional lanterns for nighttime operation.
- **Distances of over four miles** are commonly marked with daytime light markers provided there is an operational requirement to mark the entire channel.

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- Distances between 2 and 4 miles are marked as operationally required or as economical as possible.

### **Discrepancies on ranges:**

- **Range is not marking the center of the navigable channel.** See the CU02-Chart Updating Study Guide for instructions for the proper reporting of this discrepancy to the Coast Guard and NOAA.
- **Range Panels have faded.** Since fading is such a subjective opinion, use the criterion, “Can the range panel colors be interpreted as the wrong color, such as, red for orange or yellow, green for yellow, etc. Then, report the panel as faded. Photos are good backup evidence for this type of discrepancy.
- **Range panels are missing.** Note that many ranges that are lighted 24/7 may not have range panels. Recent efficiency improvements in optics combined with solar power has allowed the Coast Guard to expand the use of daytime lighted ranges even when commercial power is not available.
- **Range panels are obstructed by brush or new construction.** Good photo opportunity.
- **Range supporting structure is deteriorated, rotting, or eroding.** Good photo opportunity
- **Range lights are extinguished.**

### **Extra Pre-underway electronic measuring equipment checks are necessary before an Aid to Navigation Patrol**

Navigation Systems activity and patrols require a very precise use of navigational equipment. Unfortunately, you may find that some of the equipment found on an OPFAC does not meet the accuracy and quality standards needed for taking on scene fixes and depths for the Navigation Systems ATON program. Do not embarrass yourself by submitting low quality data or by not being able to make proper measurements due to equipment breakdowns or failure. *Always be prepared.* The two major problematic items are GPS sets and echo sounders.

A handheld GPS that is equipped with WAAS is a great adjunct to a *navigation kit*. Verify that the GPS is operating accurately during the pre-underway check by verifying its read outs against the OPFAC’s GPS or against a known charted position. Always indicate how your GPS was calibrated on your pre-underway checklist. Mount the hand-held GPS to a large clipboard to keep it available throughout the patrol. Purchase a power cord for your handheld GPS that can plug into the OPFAC’s cigarette receptacle to save your GPS batteries. Keep the power cord in your personal Navigation Kit along with spare batteries.

As part of the OPFAC’s pre-underway check, verify that the vessel’s GPS is set up correctly. “**Figure 22 – NS-AN11 - Pre-Underway Check List for Navigation Systems Patrols**” on page 29 lists special items that are tailored for the NS volunteer. Here are a few key items can have a serious effect on the accuracy of your reports.

- **Horizontal Datum – (Area)** Does it match the NOAA nautical chart that you are using? If not, correct the horizontal datum in the GPS set to match the nautical chart. New GPS sets usually come preset to WGS84 and most NOAA charts have WGS84 datum references. Note that you should only use NOAA charts with NAD83 or WGS84 for checking or verifying aids to navigation.

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- **Vertical Datum** – (**Depth**) Does the unit of measure on the echo sounder match the depth showing in the General Information Block on the NOAA chart that you will be using? When they do not match, correct the depth unit of measure on your echo sounder before you get underway.
- **Nautical miles vs. statute miles** – (**Length**) New GPS sets usually come set to statute miles. Ensure that the GPS set you use is reading out in nautical miles.
- **GPS headings and bearings** – (**Direction**) Check whether the read out on the GPS set and the compass match--True or Magnetic. Be sure that you understand how your electronic equipment is reading before you use it.
- **Check that the compass is operating correctly** – Validate that the OPFAC’s compass is operating accurately. If your boat is moored to a finger float, check the reading that should be constant. Otherwise, use a known range. Electronic compasses are equipped with deviation error compensation features and procedures for correcting for variation error.
- **Have you entered your patrol’s planned route into the GPS?**
- **Have you pre-calibrated the echo sounder?** This can be accomplished with a lead line or a sounding pole.
- **Is the OPFAC’s nautical chart current and updated to the latest LNM.** To be safe, carry the latest nautical charts in your navigation kit.

Figure 22

### **NS-AN11 - Pre-Underway Checklist for ATON/CU Patrols**

<b>Boat Name</b>		<b>Length</b>	<b>OPFAC Number</b>	<b>State Reg. Number</b>		
<b>Item</b>	<b>Process</b>	<b>Status</b>	<b>Item</b>	<b>Process</b>	<b>Status</b>	

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<b>Engine</b>	Fuel - Indicate amt of fuel in tank.		<b>Boat Gear</b>	Are there sufficient Anchors (2 required)?	
	Oil - Checked reservoir			What is length of the Anchor Rode?	ft
	Is there spare oil on board?			Are the heaving lines available on deck?	
	Is the Tool kit readably available?			Are there mooring lines?	
	Is the Backfire Flame arrestor mounted?			Are there sufficient Fenders?	
	Belts – good condition? – spare belt?			Is there a Horn?	
	Batteries – charged and covered.?			Is there a Bell?	
	Fuel shut offs – where located?			Is a Boot Hook available on deck?	
	Transmission fluid – checked?			Radio is operating?	
	Engine Coolant – checked?			Working channel:	CH
	Fire Extinguisher System operational?			Alternative channel:	CH
	Pollution Placard mounted?			Are the mooring cleats backed?	
	Ventilation? Bilge Blower – checked?			Are the towing cleats backed?	
	Bilge pumps – Fore and Aft?			Is there an alternative means of bailing?	
<b>Nav Gear</b>	Are the NOAA Charts of AOR on board?		Is a MSD installed?		
	Is the Navigation Kit on board?		Is there a Swim Platform or		
	Are the Binoculars on board?		Is there a Boarding Ladder?		
	Was the compass pre-calibrated?		Is there a spotlight on board?		
	Read out is (True or Magnetic)?		Are there flash lights on board?		
	Is a Deviation Table available?		Is there a Capacity Plate?		
	Is a RPM Table available on board?		Is there a Certificate of compliance?		
	Is there a Timepiece on board?		Is there a galley trash disposal card?		
	How was Echo Sounder pre-calibrated?		Knife (min. 3" inches)		
	Correction for transducer location:		Are navigation lights operating properly?		
	Does the Vert. Datum match the chart?		Is the anchor light operating properly?		
	Is the Light List on board?		Are there spare bulbs on board?		
	Is the Coast Pilot on board?		Electrical System condition?		
	Is the Tide Tables on board?		Are there spare fuses on board.?		
Is the Nav Rules on board?		Is the National Ensign installed?			
Forms, pencils, and paper on board?		Are there Fire extinguishers plus 2?			
<b>GPS</b>	How was the GPS calibrated?		Is there a First Aid Kit on board?		
	Is the Hor. Datum the same as chart?		Are Blankets (2) available?		
	Does GPS Distance = Nautical Miles?		Are PFDs (wearable) plus 2 available?		
	Heading (True or Magnetic)?		Are PFDs (throwable) available on deck?		
	Vertical Datum (Feet, Fathoms)?		Are VDS available on deck?		
<b>SAR</b>	Is there a Portable Pump on board?		Is Auxiliary Ensign on board?		
	Is Towing Harness on board?		<b>SAR</b>	Are SAR Accident Reports on board?	
	Is Towing Line faked out on deck?		Are Patrol Orders on board?		
	Are Bridles available on deck?		7030 - Activity Report Mission on board?		
	Are Spring Lines available on deck?		Are extra Fenders available on deck?		
	Are Sign Boards installed?		Are Wire Cutters available on deck?		
	Is Kicker Hook available on deck?		Is SAR Plotting Guide on board?		

Make copies of the checklist and keep them available in your navigation kit. Fill out this checklist before every ATON/CU patrol. You will need data from this checklist when preparing a discrepancy or verification report.

## Guidelines for Checking a Federal Aid.

It is always a good practice to advise the local C.G. Unit or agency in charge of the Aids to Navigation in your area when you will be conducting an ATON-CU Patrol. Follow your District policy for making this contact. There may be some specific items that need to be checked. Here are a series of suggestions for the proper checking of a Federal Aid. Use the ***NS-AN10-Aid Observation Worksheet*** as a reference guide to

# First Northern Auxiliary Short Range Aid to Navigation Training Guide

potential discrepancies and for recording your on-scene observations and equipment check data. Do not report a Federal Aid that is observed as “watching properly” unless expressly asked to do so by the Coast Guard.

**CAUTION - Auxiliarists are advised to always stay in the navigable channel while taking fixes and depths alongside an aid to navigation, and to exercise extra caution when approaching fixed aids, being alert for riprap or other protection materials often located at the base of these aids.**

1. **Confirm the following conditions about each Federal Aid that you check.** Report any inconsistency as a Federal ATON discrepancy.

a. **Check your on-scene observation of the aid against the aid’s characteristics in the Light List.** From the aid’s name in the Light List, you should be able to discern the aid type, the aid color, the aid’s number or letters, the latitude and longitude, deployment schedule, whether it is a Federal or Private aid, electronic equipment, sounding devices, fog signals, signal characteristics, light, light color, light characteristics, RACON, light height, etc

b. **Compare your on-scene observation of the aid against the charted symbols and chart abbreviations on the NOAA chart?** Verify that the charted symbol color and the light characteristic abbreviations are correct? Confirm that the charted symbols and abbreviations match those listed for the aid in the Light List. Report any erroneous charted abbreviations, symbol, and color discrepancies to NOAA as a chart updating corrections. Use *Chart No. 1* as a reference guide.

c. **For all lateral aids, verify that your observation of the aid’s characteristics—shape, color, light, and numbering or lettering—comply with the IALA-B Aid to Navigation System standards.**

2. **Check the location (LAT/LONG Fix) of the aid.** See the Guideline for taking and reporting a fix (Location) to the Coast Guard on page 32 of this guide.

**Terminology update** – The Coast Guard “positions” aids, the Auxiliary “locates” aids using GPS fixes. There are major technological differences between these two procedures, and it is important that we do not confuse anyone in the Coast Guard as to the technological capabilities of the Auxiliary.

**Auxiliary Restriction** - All floating aids are connected to the seabed with a harness and an anchor. The Auxiliary is never allowed to pull an aid to short stay in order to determine its exact position, so an aid may be observed anywhere within its watch circle. Since the aid’s harness length is unknown, the aid’s watch circle can only be estimated. The location of the aid within the watch circle is affected by the direction and force of the wind and the set of the current. The *NS-CU07 Horizontal and Vertical Error Calculator* available on the CU Web Page at [www.uscgaa.com](http://www.uscgaa.com) provides a means to calculate the distance an aid may be off station and also can calculate and estimated watch circle radius for the aid.

Therefore, the only valid judgment that an Auxiliarist can make is a comparison between the aid’s assigned position and the fix taken by the member alongside the aid. Auxiliarists must realize that a change of tide or a shift in the wind can change the location of the aid while the assigned position of the aid, as identified by its anchor position, remains the same. **Caution:** Don’t assume that the aid’s assigned position is always correct, especially for Private Aids..

While underway, keep aware whether the GPS is reading in 3D mode. Be prepared to record the EPE or HDOP, and the date and time for every LAT/LONG fix that you take. Always think quality!

**Caveat on reporting Federal Aids as “off station”** – Whenever a Federal Aid is reported to be off station, the Coast Guard Unit or ANT may have to dispatch a unit to verify the aid’s position and, if necessary, reset it. Be sure of your estimates and calculations before you submit an off-station report. Include the calculation details (as described in the guidelines below) with your report so that the C.G. Unit or agency can make a proper assessment of your report. Also indicate the type of GPS used to determine the fix, the name and model number of the GPS, and the method used to prove the accuracy

## First Northern Auxiliary Short Range Aid to Navigation Training Guide

of your GPS set at the time that the fix was taken, either the EPE or HDOP. Your accuracy and professionalism will increase your credibility in the eyes of the Coast Guard.

**Never report minor location (Lat/Long) errors.** When an aid is found to be a considerable distance off station, always check the Local Notice to Mariners or the on-line NOAA charts for any recent changes to the aids assigned position before making a formal report. Most aids now show an “assigned position” (LAT/LONG) in the Light List. Extract the LAT/LONG for the aid from a nautical chart and compare it to the observed location. The reverse is also true. Use the *NS-CU07 Vertical and Horizontal Error Calculator* available on the CU-Chart Updating Web Page to calculate an estimated distance that the aid is off station

When you discover an obvious problem, it is a prudent practice to communicate directly with the C.G. Unit or agency to discuss the problem. If agreement that a problem exists is concluded, follow up the conversation with the formal discrepancy report. Hard-copy follow up reports may not be required in some districts or with some ANTs.

3. **Take the depth alongside the aid while in the navigation channel.** Follow the guidelines for taking and reporting a depth, as explained on page 33 of this training guide.
4. **Scan the Federal Aid for discrepancies.** Reference the Federal Aid Discrepancy section below for the reportable details. Record your observations on an *NS-AN10 – Aid Observation Worksheet* while on-scene.
5. **Double check your recorded observations for completeness and accuracy before you leave the scene.** It is best to prepare your discrepancy report while still on scene at the aid. This practice helps avoid missing required data and saves time by not having to return to the scene in order to collect the missing data. Using the *NS-AN10 – Aid Observation Worksheet* as a reference guide will minimize this problem.

## Guidelines for taking and reporting a Fix to a Federal Agency

Fixes taken for floating and fixed *lateral* aids need to be highly accurate. These guidelines support this objective. Use an *NS-AN10 – Aid Observation Worksheet* as a reference guide for recording on-scene observations and equipment checks.

1. **Perform a pre-underway check of the GPS on the OPFAC:**

## First Northern Auxiliary Short Range Aid to Navigation Training Guide

- Verify that the ***DGPS*** or ***WAAS*** feature is activated in the GPS set.
  - Confirm that the **horizontal datum**, that is set up in the GPS set, matches the horizontal datum printed on the NOAA chart that you plan to use during the patrol. Your NOAA chart must have a WGS84 or NAD83 horizontal datum to be useful for Navigation System Program activity.
  - Check that the **distance unit of measurement** on the GPS is set to **NM** - nautical miles.
  - Be sure that the **unit of measure for bearing or a heading** in the GPS set matches the unit of measure read out capability of the compass that you plan to use. If the compass reads magnetic, you may need a copy of the vessel's **Deviation Table** to convert bearings to true on your reports.
  - Set the **Latitude / Longitude** in the GPS to **degrees, minutes, and seconds**. This is the standard LAT/LON expression in the Coast Guard. It reflects the LAT/LONG used in the Light List.
2. **Explain how the fix alongside the aid was determined and calculated.**
- A GPS set using ***WAAS***, or a ***dGPS*** set are the recommended tools for taking a fix. Hand held GPS sets with ***WAAS*** can produce LAT/LONG (Fixes) within 8 to 12 feet of the actual position of the aid on the earth's surface. That is inside the head of a pinhole on a chart.
  - Horizontal sextant angles and bearings using a hand-held compass are not considered sufficiently accurate for use in the Navigation System's program for taking a fix.
3. **Take the Fix when close aboard lateral aids while remaining in the navigable channel.**
- Fixes should be taken after the vessel stops alongside the aid. Recording fixes while a vessel is in motion can cause erroneous fixes, producing inaccurate reports.
  - Fixes taken for floating aids should be taken upstream and upwind of the aid in order to minimize the effect the aid's watch circle. The deeper the water, the greater the potential for a larger watch circle especially at lower tide levels. Since Auxiliarists are never allowed to pull an aid's harness up to short stay, this practice minimizes the fix error. **Note that the position of an aid is actually the location of the aid's anchor in the seabed.** The floating buoy moves around on its harness over this anchor when affected by tidal current and wind. This movement is called its **watch circle**.
  - It is recommended that you plot each fix on a NOAA chart as a further sanity check. It may generate a chart update report due to a charted error.
4. **Record supporting quality control data for each fix that is taken.**
- This practice significantly improves the quality level of your report.
  - Include an "**Accuracy Statement**" on each report.
  - Always show the EPE—Estimated Position Error or HDOP—Horizontal Dilution of Position for every fix taken.
  - Include the date and time when each fix is taken.
  - Also, indicate whether the GPS is operating in 3D or 3D Differential for each fix taken.
  - Reference the make and model of the GPS equipment that you used to determine the fix.

### Guidelines for taking and reporting a Depth reading:

Random reporting of depth readings from echo sounders produces incomplete data. Besides the need to control the quality of the instrument, from a practical use, depths must relate to charted depths or depths recorded in the aid specification record. Otherwise, depths reported in areas affected by the tide are no better than random numbers. This difference becomes more significant in areas within the higher latitudes where tidal ranges vary

## First Northern Auxiliary Short Range Aid to Navigation Training Guide

10 to 12 feet or more. Record your on-scene observations and equipment checks on a *NS-AN10 – Aid Observation Worksheet*.

1. **During the pre-underway check of the OPFACs echo sounder.**
  - a. Check that the vertical datum shown in the “*General Information Block*” on a NOAA chart reflects the depth UOM—unit of measure that is set up on your echo sounder—feet, meters or fathoms.
  - b. When your echo sounder is integrated to your GPS set, verify that the depth datum’s unit of measure on the NOAA chart, on the echo sounder, and on the GPS are matching.
  - c. Use a lead line, a sounding pole or a hand-held depth sounder to determine the water depth.
  - d. Calculate the distance from the waterline to the position of the transducer on the vessel so you can correct depth readings. (Echo sounder reading minus the depth reading.)
  - e. Check that the echo sounder is reading accurately. Compare the depth of water taken with a lead line or sounding pole to the echo sounders read out plus the correction for location of the transducer on the vessel. Or, calculate the estimated depth by comparing the echo sounder’s read out plus the correction for the transducer on the vessel minus the height of tide. Compare the result to previously estimated depths taken at your mooring area.
  - f. Carry a lead line in your *navigation kit* as backup so, if the vessel’s depth sounder fails, you can continue to record accurate depths during the patrol.
2. **List the equipment used for taking the depth alongside the aid.** List the equipment that you use—echo sounder, lead line or sounding pole on a *NS-AN11 Pre-underway Checklist for Navigation System Patrols*. When an echo sounder is used, also show the manufacturer’s name and model number on your report.
3. **When an echo sounder is used, list the distance from the transducer to the water line on a NS-AN11 Pre-underway Checklist for Navigation System Patrols.**
4. **Always record and report the date and time when a depth is taken.**
5. **When you operate in a tidal zone area, record and report the height of tide for the time when the depth is taken.** Height of tide can be read from the almanac screen on a GPS or on-line from <http://tidesonline.nos.noaa.gov>.
6. **Maneuver the OPFAC so that it upstream and upwind of a floating aid.** This technique minimizes the “*Watch Circle*” error and provides more exact data alongside the aid.
7. **Compare the observed depth reading at datum to the charted datum.** The formula for an echo sounder is: ((*Observed Depth* plus *Distance from transducer to the water line*) minus the *Height of Tide* = *Estimated Depth at Datum*). The formula for a sounding pole or a lead line is: (*Observed Depth* minus the *Height of Tide*). Large depth discrepancies can be an indication that an aid may not be on station. In this case, you will need to take multiple readings to prove your case.
8. **Include a Accuracy Statement on every report.**

### Using a “**ACCURACY STATEMENT.**”

1. A statement similar to the example provided below enhances the professionalism and credibility of your reports. You will be recognized as a professional by the Coast Guard. It is quick and easy to prepare this statement when you follow the example shown below.
  - Prepare a “*copy and paste*” entry on your desktop similar to the following:

#### **ACCURACY STATEMENT:**

**The fix was taken by a GPS 76 by Garmin with WAAS enabled that was pre-**

calibrated to a known location at the dock. GPS was operating in 3D Differential. EPE was 8.5 ft. Depth was taken with a Wide 100 by Hummingbird echo sounder that was checked for accuracy with a lead line. Transducer correction is 0.8 ft. and a 7.5 ft. HOT-Height of Tide at Substation NEPONSET RIVER on BOSTON.

- The fields highlighted in blue have to be set only once or when ever to use a different OPFAC on a patrol..
- Only the fields highlighted in yellow need to be changed for each verification.
- Update your Accuracy Statement, copy it from your Desktop and paste it on your report.
- Paste your Accuracy Statement after any special comments on your report.

**If you are not following these guidelines, you may not be doing a complete and accurate job of checking a Federal Aid for the Coast Guard.**

### **Suggested boat crew assignments for an ATON-CU Patrol:**

A Navigation Systems Patrol provides a good opportunity to delegate various aid checking assignments among your boat crew and to expose the crew to different navigational experiences. Make your patrol a team effort. You will be able to teach members new navigation techniques, keep your crew members involved with the patrol, cause time to pass quickly, and have a lot more fun while underway.

- ✓ **Data Recorder** – writes down the data as it is called out by other crewmembers and completes the ***NS-AN10 Aid Observation Worksheet*** before leaving the scene.
- ✓ **Document Checker** – references copies of the Light List, NOAA chart and Coast Pilot to verify that the observations of the aid match published data for the aid.
- ✓ **Instrument Reader(s)** – Reads the echo sounder and/or the GPS when the OPFAC is close aboard the aid. Use the GPS' almanac screen to determine the Height of Tide and check the Substation. Compare the observed depth at the charted datum to the charted depth for the aid. Also, provide the fix data (LAT/LON) and the quality readings of either an EPE or HDOP.
- ✓ **Navigator** – Reviews the data on the nautical chart against the observations taken on scene at the aid. Verifies that the charted abbreviations for the aid match the data published in the Light List.
- ✓ **Observer** – Checks whether the Federal Aid conforms to the IALA-B Aid to Navigation System standards. This crewmember can also be assigned the duty to photograph the aid and advise the Data Recorder of the photo number assigned by the camera.

### **Short Range Aid Discrepancies**

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A discrepancy to an aid to navigation is defined as a defect on the unit, which, therefore, is not watching properly. Always reference the Light List and the latest LNM to check whether the discrepancy on the aid has been reported previously. Discrepancies to Federal Aids are divided into many categories.

## **Location Discrepancies**

The numbers for these critical discrepancies correspond to the numbers on the **NS-AN04 Aid to Navigation Report** and **NS-AN10 - Aid Observation Worksheet**.

1. **The aid is off station.** Be sure you are right before making this report.
2. **The buoy is adrift.** In this situation, you can see the buoy. Radio or call for instructions from your OPFAC. You may be instructed to take it under tow or tie it off to another aid. If possible, provide the Coast Guard with the buoy's serial numbers that are welded on the hull. This data helps identify the assigned position for the buoy.
3. **The aid is missing.** Enter the LAT/LON of the buoy as a waypoint on your GPS and use the "GO TO" command on your GPS to try to locate the aid. *Be sure to stay in the navigable channel during this procedure.*
4. **Aid is not marking the best water.** When you feel the aid is not placed correctly, explain the reason in the Comments.

## **CONDITION DISCREPANCIES**

1. **The buoy is sinking.** Double check before reporting. Return to the scene after an elapse of time to check whether the buoy is actually sinking or is just an aid that floats low in the water.
2. **The buoy is stranded.** *Use extra caution when transiting in the area.*
3. **The buoy has capsized.** This is a great photo opportunity.
4. **The aid is damaged by vessel collision.**
5. **Extensive bird fowling on aid.**
6. **Peeling and rust is obscuring color.** This is a good photo opportunity.
7. **Numbers are missing on a lateral aid.** This is a good photo opportunity.
8. **Numbers or letters damaged on the aid.** This is a good photo opportunity.
9. **Retro-reflective material problem.** This is a good photo opportunity.
10. **Fixed aid is leaning more than 15 degrees.** This is a good photo opportunity.
11. **Extensive deterioration and/or rotting members on a structure.** This is a good photo opportunity.

## **LIGHTING DISCREPANCIES**

1. **Improper light characteristics on a lighted aid.** Define the characteristic in the Comments.
2. **Light is obscured or extinguished.**
3. **Light is burning dim.**
4. **Light is obscured by a dayboard.** This is a good photo opportunity.
5. **Lantern is damaged.** This is a good photo opportunity.
6. **Battery Pack is missing or damaged.** Explain in Comments – good photo opportunity.
7. **Solar Panel is damaged.** This is a good photo opportunity.
8. **Solar Panel is oriented incorrectly.** Explain in Comments.
9. **Missing or damaged vent valve.** This is a good photo opportunity.
10. **Lamp is the wrong color.** Explain in the Comments.
11. **Lantern is missing.** Explain in the Comments and a good photo opportunity.

## **DAYBOARD DISCREPANCIES:**

1. **Dayboards are missing.** Explain on the Comments section. This is a good photo opportunity.

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2. **Dayboard(s) is damaged.** Explain in the Comments section. This is a good photo opportunity.
3. **Dayboards(s) is faded so color is comprised.** This is a good photo opportunity.
4. **Dayboard is delaminating.** This is a good photo opportunity.
5. **Dayboard(s) is obscured by foliage or brush.** This is a good photo opportunity.
6. **Improper dayboard displayed per aid specification.**

### **OTHER DISCREPANCIES:**

1. **Sound Signal Discrepancies.**
2. **Radio beacon is off the air.**
3. **Radio beacon is emitting the wrong signal.**
4. **RACON is not operating.**

### **DOCUMENTATION AND SPECIFICATION CHECKS**

1. **Observed aid does not match the entry for this aid in the Light List.** Explain in Comments.
2. **Observed aid does not match the symbols and abbreviations for this appearing on the NOAA Chart.**
3. **Observed lateral aid does not comply with the IALA-B Aid to Navigation System.** Explain in Comments.
4. **Observed aid does not comply with the data shown in the Coast Pilot.** Explain in Comments.

### **Important Points to Remember**

- Whenever a discrepancy on an aid to navigation is reported via radio, telephone or government mail and followed-up with an ***NS-AN04 Aid to Navigation Report*** and the ***Notice to Mariners*** has been broadcast by the Coast Guard or the USCG District Local Notice to Mariners has been published, no further Auxiliary reporting about the Federal Aid is necessary.
- When you discover a discrepancy on an Aid to Navigation and it is not listed in the LNM, assume you are the first to discover it and report the discrepancy to the Coast Guard.
  - NS Staff Officers when forwarding Aid to Navigation discrepancy reports that have been previously communicated directly to the C.G. Unit or agency should assure that they are not duplicated by completing the ***Coast Guard Notification*** section on their report.
- **Every Auxiliary member should be checking for and reporting discrepancies to the Coast Guard observed on every Aid to Navigation that they pass whenever they are underway on a ATON-CU or multi-mission patrol.** Keep extra copies of the ***NS-AN10 – Aid Observation Worksheet*** on board your OPFAC for this purpose.
- While Federal Aids found watching properly while on a patrol are normally not reported to the Coast Guard, and credit for this activity should not be reported to AUXDATA. On a ***7030 Activity Report – Mission – Individual*** form, only include both Federal Aids found observed with discrepancies.
- Checking a Federal Aid for a discrepancy cannot be properly accomplished with a so-called drive-by cursory look. At a minimum, in order to examine an aid properly, the time on scene is estimated to take **5 to 8 minutes**. Besides observing that the aid complies with IALA-B characteristics, a proper Federal Aid check involves determining the aid's assigned position against the observed LAT/LON (Fix); measuring the depth, correcting it to vertical datum with height of tide data and comparing it to charted depth; reviewing the Light List and checking the abbreviations and symbols on the nautical against the observations of the aid; checking that the light is displaying the correct characteristics; verifying the light's color; checking for lantern and solar panel damage; observing the condition of the paint condition on the aid; checking structures for rot, viewing the battery, vent tubes and valves for damage, etc.

In effect, all the information presented in this study guide comes into play during the checking process. This means that the number of aids to navigation that a member could check each hour is limited to about

## First Northern Auxiliary Short Range Aid to Navigation Training Guide

five aids allowing for time of travel between the aids. The total will be less when a bridge is encountered and checked, or when a chart update is discovered. This time estimate includes the time to prepare the reports. Reporting and observing productivity increases when the team checking approach is used and as the boat crew is trained. Allotting the total aids checked during the patrol among the crewmembers will also cut down the per capita report counts.

Based on these new guidelines, it will become obvious to everyone when a member uses the old drive-by approach for this task, and reports large quantities of verifications within a short time interval. The new guidelines in this training guide should insure that the Coast Guard receives high quality ATON discrepancy reports and increases the overall credibility of the Auxiliary while encouraging members to participate in the ATON program.

## First District Guide for Reporting Navigation Systems Activity to AuxData



While reporting your observations of a PATON or Bridge to the Coast Guard is a top priority of the Navigation Systems' programs, reporting your time and activity to AuxData also is a priority. Recognition for your hard work and for District awards, Navigation Systems activity and time spent supporting the Sector or CG ANT are all derived from your AuxData System statistics.

A key point to remember when reporting time to AuxData is:

- **Section I Type of Resource** fields on the **7030 Report (Boat or Individual)** determines whether a specific 7030 type is used to record crew underway time, an aid discrepancy or verification activity.
- The boat's **7030 Boat** is used to report the crew's underway time to AUXdata for an authorized patrol. (Navigation System discrepancy and verification fields cannot be accessed on this version of the 7030 form.)
- A separate **7030 Individual** is used to report the Navigation System activity (discrepancy or verification information) to AuxData. The discrepancy and verification fields only appear on the 7030 form when you select Navigation Systems Missions 30, 31 and 32 on a **7030 Individual**.

### Recording your time underway on a patrol.

The patrol's coxswain or vessel owner reports the underway crew time when they submit their patrol mission report via POMS (the Patrol Orders Management System) or via a **7030 Boat** report sent directly to their FSO-IS. All crew hours underway are reported to AuxData for a specific **time window**. This report includes all crew aboard the facility, including any AVs who are not boat crew qualified.

When you complete a patrol dedicated to PATON, ATON or Bridge activity, suggest to the coxswain to use Mission Code 03 (Navigation Systems Patrol). However, much Navigation Systems activity is often performed as part of multi-mission patrols.

### Recording your Navigation Systems activity.

Report Aid or Bridge discrepancies and verifications on a **7030 Individual**, regardless whether the aid was observed on an ordered patrol or casually observed while on a recreational trip.

# First Northern Auxiliary Short Range Aid to Navigation Training Guide

The guiding principles are:

1. Every individual Auxiliarist submits their own **7030 Individual** report(s) to AuxData for discrepancies and verifications that they report to the Coast Guard. This holds true for aids observed while on patrol as well as observed when not on patrol. For each discrepancy/verification reported to the Coast Guard, corresponding Navigation Systems activity should be reported to AuxData.
2. Multiple Auxiliarists, working as a team, cannot take credit for the same activity – i.e., no double dipping. The total number of PATONs verified, Bridges surveyed and ATON discrepancies reported to the Coast Guard must equal the total number of PATONs verified, Bridges surveyed or ATON discrepancies that are reported to AuxData, no matter how many AVs are involved in the observing process.

When the Navigation Systems activity is performed as part of an authorized patrol, your underway time is reported by the coxswain, so only show 15 minutes for each mission type reported on a **7030 Individual** report. You may also show any time over and beyond the patrol time (e.g., time to fill out reports). Use a time period outside of the *time window* used for reporting the patrol to AUXdata.

If the aid activity did not occur on an authorized patrol, take full credit for all your time on your **7030 Individual** report.

## Mission Codes for reporting Navigation Systems activity.

When reporting discrepancies or verifications to AuxData, the following mission codes are used on the AUXDATA **7030 Individual** report. Selection of these mission code cause the Navigation Systems activity fields to appear on the 7030 report.

**Mission Code 30** – Use this mission code to record activity related to *Federal Aids to Navigation* (ATONs).

- Only take credit for activity related to *discrepancies observed* on Federal Aids that are *actually reported* to the Coast Guard.
- Federal Aids observed as “Watching Properly” are *never reported* to the Coast Guard unless the Auxiliarist is specifically requested by the Coast Guard to check these aids. Make note of this special authorization in the comments section of your report. Therefore, there should be very limited “Watching Properly” reports made to AuxData for Federal Aids.

**Mission Code 31** – Use this mission code to record activity reported to the Coast Guard related to *Private Aids to Navigation* (PATONs).

- Any Auxiliarist may report PATON discrepancies, however, only AV-Aid Verifier qualified Auxiliarists may perform PATON verifications.
- AV qualified Auxiliarists may report both “Aids Watching Properly” and “Aid Discrepancies” when performing annual PATON verifications.

**Mission Code 32** – Use this mission code to record activity reported to the Coast Guard about *Bridges*.

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- The Bridge Reporting System is now designed for on-line generation of a Bridge Report to the Coast Guard and an on-line AUXDATA 7030 Report to your SO-IS.
- After you prepare your Bridge Report, click on the “Submit 7030” at the top left hand side of your screen.



- The 7030 Screen will appear. Fill or change the data. Note that the system looks up your FSO-IS, SO-IS and your E-mail address from your

**District 1 Northern Region  
Aids to Navigation Team  
7030 Submission**

7030 Form Data	
Date of Mission:	12 JAN 2011
Time Start: *	00:01 (format: 16:01)
Time End: *	00:07 (format: 16:07)
Bridge Discrepancies:	2
Bridges Watching Properly:	3
ANT:	ANT Boston
Location:	Boston Harbor
Trainee ID:	
Trainee Name:	
Remarks:	
Log Number:	11-001
Send 7030 to:	
<input checked="" type="checkbox"/> FSO-IS:	MARILYN BERG
<input checked="" type="checkbox"/> SO-IS:	DEBRA HIBERT
<input checked="" type="checkbox"/> Self:	frankjlarkin@verizon.net
<input type="button" value="Submit 7030 Form Now"/>	

Below is a sample copy of the report that is sent to the IS Staff officer that you selected. The system looks up the e-mail address of your SO-IS for you. Send a copy to yourself for your records.

```
From: frankjarkin@verizon.net
To: frankjarkin@verizon.net
CC: ""
Subj: USCG Aux 7030 Submission From FRANK J LARKIN

Submitted by: FRANK J LARKIN
Division-Flotilla: 10-07
Resource Type: Unit/Individual
OPCON: 01-41949
Time & Mission: 12 .... Jan 2011
+---+-----+
|TIME|MISSION|
+---+-----+
|0001|32     |
+---+-----+
|0007|FINISH |
+---+-----+
Location: Boston Harbor
Elapsed Time: 0.1

ATON Information
Bridge Discrepancies: 2
Bridges Watching Properly: 3
Crew Assignments:
+---+-----+-----+
|ID      |NAME                |      |
+---+-----+-----+
|1143884|LARKIN, F           |LEAD  |
+---+-----+-----+

REMARKS:
Report Date: 12JAN2011
Log number: 11-001
```

- AVs may report both “Bridges Watching Properly” and “Bridge Discrepancies” when performing annual bridge surveys.

# First Northern Auxiliary Short Range Aid to Navigation Training Guide

<b>NS-AN10 AID OBSERVATION WORKSHEET</b> UNITED STATES COAST GUARD AUXILIARY, FIRST NORTHERN						NOTES and COMMENTS		
Use when on-scene for recording your observations of the aid.								
PREPARED BY: _____			DATE OF INVESTIGATION [DDMMYY] _____					
<b>1 - AID OWNERSHIP AND IDENTIFICATION</b>								
AID OWNERSHIP - check one: <input type="checkbox"/> COAST GUARD <input type="checkbox"/> STATE <input type="checkbox"/> PRIVATE <input type="checkbox"/> USACE <input type="checkbox"/> NOAA								
LINE/PAYOR NUMBER _____	OFFICIAL NAME OF AID BEING REPORTED [Reference the Light List for data.] _____				CHART NO. _____	ED _____	CHART DATE _____	DATUM _____
<b>2 - HORIZONTAL AND VERTICAL LOCATIONS</b>								
FOLLOW THE GUIDELINES IN THE FEDERAL SHORT RANGE AID TO NAVIGATION STUDY GUIDE								
LATITUDE [DD-HH-SS.SS] _____	LONGITUDE [DD-HH-SS.SS] _____	GPS DATUM _____	METHOD USED TO TAKE FIX _____	QC CHECK _____	QC READING _____	U/M _____	TIME WHEN TAKEN _____	
OFFICIAL NAME OF LOCATION _____		GPS MANUFACTURER AND MODEL NUMBER _____		GPS OPERATION _____	CNT. DEPTH _____	U/M _____	DEPTH DIFFERENCE _____	
METHOD USED FOR DEPTH _____	MANUFACTURER AND MODEL NUMBER _____	OBSERVED DEPTH _____	CORR. FOR TRANSDUCER _____	HEIGHT OF TIDE _____	CORR. DEPTH _____	TIME OF OBSERVATION _____		
<b>3 - AID TO NAVIGATION CHARACTERISTICS</b>								
CHECK OFF EACH CHARACTERISTIC THAT DESCRIBES THE AID.								
<b>TYPE OF AID</b> <input type="checkbox"/> Floating <input type="checkbox"/> Fixed <input type="checkbox"/> Lighted <input type="checkbox"/> Sound capability <input type="checkbox"/> Electronic distress <input type="checkbox"/> Radar reflector								
<b>BOY MATERIAL</b> <input type="checkbox"/> Wood <input type="checkbox"/> Metal <input type="checkbox"/> Foam <input type="checkbox"/> Plastic <input type="checkbox"/> Other, see Comments.								
<b>TYRE MATERIAL</b> <input type="checkbox"/> Wood <input type="checkbox"/> Metal <input type="checkbox"/> Single Pile <input type="checkbox"/> Dolphin <input type="checkbox"/> Taper <input type="checkbox"/> Other, see Comments.								
<b>LIGHT COLOR</b> <input type="checkbox"/> Red <input type="checkbox"/> Green <input type="checkbox"/> White <input type="checkbox"/> Yellow <input type="checkbox"/> Other, see Comments.								
<b>SOUND</b> <input type="checkbox"/> Bell <input type="checkbox"/> Gong <input type="checkbox"/> Horn <input type="checkbox"/> Whistle <input type="checkbox"/> Other, see Comments.								
<b>ELECTRONIC</b> <input type="checkbox"/> RACON <input type="checkbox"/> Fog Distaler <input type="checkbox"/> Wind Generator <input type="checkbox"/> Electrical Transformer Sta. <input type="checkbox"/> Meteorological Station <input type="checkbox"/> Wind Measuring Mast								
<b>4 - DISCREPANCIES OBSERVED ON AID TO NAVIGATION</b>								
CHECK OFF EACH DISCREPANCY THAT YOU OBSERVE ON THE AID.								
<b>LOCATION DISCREPANCIES</b>		<b>LIGHTING DISCREPANCIES</b>		<b>DAYBOARD DISCREPANCIES</b>				
1 <input type="checkbox"/> Aid is off station. Explain in Comments.	1 <input type="checkbox"/> Improper light characteristics on a lighted aid. (Explain)	1 <input type="checkbox"/> Dayboard is missing. (Photo)						
2 <input type="checkbox"/> Aid is adrift. Explain action taken.	2 <input type="checkbox"/> Light is obscured or extinguished.	2 <input type="checkbox"/> Dayboard is damaged. (Photo)						
3 <input type="checkbox"/> Aid is missing.	3 <input type="checkbox"/> Light is burning dim.	3 <input type="checkbox"/> Dayboard is faded or color is compromised. (Photo)						
4 <input type="checkbox"/> Aid is not marking the best water.	4 <input type="checkbox"/> Light is obscured by a dayboard.	4 <input type="checkbox"/> Dayboard is delaminating. (Photo)						
<b>CONDITION DISCREPANCIES</b>		5 <input type="checkbox"/> Lantern is damaged. (Photo) (Photo)		5 <input type="checkbox"/> Dayboard is obscured by foliage or brush. (Photo)				
1 <input type="checkbox"/> Aid is sinking. (Photo)	6 <input type="checkbox"/> Battery pack is missing or damaged. (Photo) (Photo)		6 <input type="checkbox"/> Improper dayboard displayed per aid specification.					
2 <input type="checkbox"/> Aid is stranded. (Photo)	7 <input type="checkbox"/> Salar Panel is damaged. (Photo) (Photo)		<b>OTHER DISCREPANCIES</b>					
3 <input type="checkbox"/> Aid is capsize-d. (Photo)	8 <input type="checkbox"/> Salar Panel is oriented incorrectly. (Photo)		1 <input type="checkbox"/> Sound signal discrepancy.					
4 <input type="checkbox"/> Aid is damaged by vessel collision.	9 <input type="checkbox"/> Missing or damaged vent valve. (Photo) (Photo)		2 <input type="checkbox"/> Radio beacon is off the air.					
5 <input type="checkbox"/> Extensive bird fouling an aid. (Photo)	10 <input type="checkbox"/> Lamp is the wrong color. (Explain) (Photo)		3 <input type="checkbox"/> Radio beacon is emitting the wrong signal.					
6 <input type="checkbox"/> Foliage or rust is obscuring color.	11 <input type="checkbox"/> Lantern is missing. (Photo and Explanation) (Photo)		4 <input type="checkbox"/> RACON is off the air.					
7 <input type="checkbox"/> Numbers are missing on a lateral aid.	<b>DOCUMENTATION AND SPECIFICATION CHECKS</b>							
8 <input type="checkbox"/> Number or letters damaged on aid.	Check your observations against the Light List and, if charted, against the abbreviations and symbols on the NOAA chart.							
9 <input type="checkbox"/> Retro-reflective material problem.	<input type="checkbox"/> Observed aid does not match the entry for this aid in the Light List. Explain in comments.							
10 <input type="checkbox"/> Fixed aid is leaning more than 15°	<input type="checkbox"/> Observed aid does not match the symbol and abbreviations for this aid on the NOAA chart. Explain in Comments.							
11 <input type="checkbox"/> Extensive deterioration and/or rotting members on a structure. (Photo)	<input type="checkbox"/> Observed lateral aid does not comply with the IALA-B Aid to Navigation System. Explain in Comments and provide a photo.							
						<input type="checkbox"/> Observed aid does not comply with data shown in the Chart Pilot.		
<b>5 - NON-PERMITTED AIDS TO NAVIGATION DATA</b>								
Enter the following information for Non-permitted Aids to Navigation Properties.								
OWNER'S NAME _____		OWNER'S TELEPHONE NUMBER _____		OWNER'S E-MAIL ADDRESS _____				
OWNER'S ADDRESS _____			CITY _____	ST _____	PERSON OF CONTACT / E-MAIL ADDRESS _____			
LOCAL WATERWAY ADMINISTRATOR / HARBORMASTER _____			TELEPHONE NUMBER _____		E-MAIL ADDRESS _____			

**NS-AN10-Aid Observation Worksheet** – Make copies and keep them available in your *navigation kit* for recording discrepancies observed on federal and private aids to navigations.

# PRIVATE AIDS TO NAVIGATION

## Introduction

One of the primary responsibilities of the Auxiliary Private Aid to Navigation Program is the reporting of discrepancies observed on Private Aids to Navigation (PATONs). The Auxiliary works with the U.S. Coast Guard to accomplish this important mission in a partnership that is focused on assisting the Coast Guard in backwater and remote areas where the most of the private aids are normally deployed.

This Aid to Navigation Training Guide” explains the Federal Regulations for private aids and for reporting observations of any discrepancies to the local C.G. Units.

## Verification vs Checking an Aid

**Observing** is the process of reviewing an aid to navigation for potential discrepancies. Every Auxiliarist, while underway on an OPFAC, is encouraged to observe every aid to navigation (both Federal and Private) that they pass and report only observed discrepancies to the Coast Guard.

**Verification** of a private aid is reserved for currently certified and qualified AV—Aid Verifiers who perform verifications at the request of the Coast Guard. A verification report is always submitted to the Coast Guard, even when the aid is found “watching properly.”

## 33 CFR, PART 66--PRIVATE AIDS TO NAVIGATION

This is great background material to help you understand the rules and regulations associated with the Private Aid to Navigation program. Read it carefully.

---

### **66.01-1 Basic Provisions for PATONs**

Unless otherwise noted, no person, public body or instrumentality not under the control of the Commandant, exclusive of the Armed Forces, shall establish and maintain, discontinue, change or transfer ownership of any aid to maritime navigation, without first obtaining permission to do so from the Commandant of the Coast Guard.

For purposes of clarification, the term “private aids to navigation” includes all marine aids to navigation operated in the navigable waters of the United States other than those operated by the Federal Government or those operated in State waters as private aids to navigation.

Coast Guard authorization of a private aid to navigation does not authorize any invasion of private rights, nor grant exclusive privileges, nor does it obviate the necessity of complying with any other Federal, State or local laws or regulations.

With the exception of radar beacons (RACONS) and shore based radar stations, operation of electronic aids of navigation as private aids will not be authorized.

### **66.01-3 PATON authority is delegated to the District Commander.**

The Commandant of the Coast Guard delegates to the District Commanders within the confines of their respective districts the authority to grant permission to establish and maintain, discontinue, change or transfer ownership of private aids to maritime navigation and to administer the requirements of this program.

The decisions of the District Commander may be appealed within 30 days from the date of the decision. The decision of the Commandant in any case is final.

### **66.01-5 PATON Application Procedure**

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Application to establish and maintain, discontinue, change or transfer ownership to a private aid to navigation shall be made to the Commander of the Coast Guard District in which the private aid is or will be located. Application form (CG-2554) will be provided upon request. The applicant shall complete all parts of the form applicable to the aid to navigation concerned, and shall forward the application in triplicate to the District Commander.

The following information is required:

- (a) The proposed position of the aid to navigation by two or more horizontal angle, or bearings and distance from charted landmarks. A section of chart or sketch showing the proposed location of the aid to navigation shall be included.
- (b) The name and address of the person at whose expense the aid will be maintained.
- (c) The name and address of the person who will maintain the aid to navigation.
- (d) The time and dates which it is proposed to operate the aid.
- (e) The necessity for the aid.
- (f) For lights: The color, characteristic, height above water, and description of illuminating apparatus.
- (g) For fog signals: Type (whistle, horn, bell, etc.) and characteristic.
- (h) For buoys or daybeacons: Shape, color, number, or letter, depth of water in which located or height above water.
- (i) For RACONS: Manufacturer and model number of RACON, height above water of desired installation, and requested coding characteristic. Equipment must have FCC authorization.

### **66.01-10 Lights Characteristics of Private Aids**

The light characteristics of a private aid to navigation shall conform to the United States Aid to Navigation System, except that only tungsten-incandescent light shall be approved for electric lights.

### **66.01-15 Processing of Applications by the Coast Guard**

The District Commander receiving the PATON application shall review it for completeness and will assign the aid one of the following classifications:

**Class 1** – Aid to navigation on marine structures or other works which the owner(s) are legally obligated to establish, maintain and operate by the Coast Guard.

**Class II** – Aids to navigation, exclusive of Class I, located in waters used by general navigation.

**Class III** – Aids to Navigation exclusive of Class I, located in waters not ordinarily used by general navigation.

Upon approval by the District Commander, a signed copy of the application will be returned to the applicant. Approval for the operation of radar beacons (RACONS) will be affective for an initial two year period, then subject to annual review without submission required of the owner,

### **66.01-20 Inspection of Private Aids**

All classes of private aids to navigation shall be maintained in proper operating condition. They are subject to inspection by the Coast Guard at any time and without prior notice.

### **66.01-25 Discontinuance and removal of Private Aids.**

No person, public body or instrumentality shall change, move or discontinue any authorized private aid to navigation required by statute or regulation without first obtaining permission to do so from the District Commander.

Any authorized private aid to navigation not required by statute or regulation (Classes II and III) may be discontinued and removed by the owner after 30 days' notice to the District Commander to whom the original request for authorization for establishment of the aid was submitted.

Private aids to navigation which have been authorized by the District Commander shall be discontinued and removed without expense to the United States by the person, public body or instrumentality establishing or maintaining such aids when so directed by the District Commander.

**66.01-30 Corps of Engineers approval required for fixed aids.**

Before any private aid to navigation consisting of a fixed structure is placed in the navigable waters of the United States, authorization to erect such structure shall first be obtained from the District Engineer, U.S. Army Corps of Engineers in whose district the aid will be located.

The application to establish any private aid to navigation consisting of a fixed structure shall show evidence that the required permit has been issued by the Corps of Engineers.

**66.01-40 Exemptions.**

Nothing in the preceding sections shall be construed to interfere with, or nullify the requirements of existing laws and regulations pertaining to the marking of structures, vessels and other obstructions sunken in waters subject to the jurisdiction of the United States, the marking of artificial islands and structures which are erected on or over the seabed and subsoil of the Outer Continental Shelf, or the lighting of bridges over navigable waters of the United States.

**66.01-45 Penalties for establishment without a CG Permit.**

Any person, public body or instrumentality, excluding the armed forces, who shall establish, erect or maintain any aid to maritime navigation without first obtaining authority to do so from the Coast Guard, or who shall violate the regulations relative thereto issued in this part, is subject to the provisions of 14 U.S.C. 83.

**66.01-50 Protection afforded to owners of private aids to navigation.**

Private aids to navigation lawfully maintained under these regulations are entitled to the same protection against interference or obstruction as is afforded by law to Coast Guard aids to navigation. If interference or obstruction occurs, a prompt report containing all the evidence available should be made to the Commander of the Coast Guard District in which the aids are located.

**66.01-55 Transfer of PATON ownership.**

When any private aid to navigation authorized by the District Commander, or the essential real estate or facility with which the aid is associated, is sold or transferred, both parties to the transaction shall submit application to the Commander of the Coast Guard District in which the aid is located requesting authority to transfer responsibility for maintenance of the aid.

The party relinquishing responsibility for maintenance of the private aid to navigation shall indicate on the application form (CG-2554) both the discontinuance and the change of ownership of the aid sold or transferred.

The party accepting responsibility for maintenance of the private aid to navigation shall indicate on the application form (CG-2554) both the establishment and the change of ownership of the aid sold or transferred.

In the event the new owner of the essential real estate or facility with which the aid is associated refuses to accept responsibility for maintenance of the aid, the former owner shall be required to remove the aid without expense to the United States. This requirement shall not apply in the case of any authorized private aid to navigation required by statute or regulation (Class I) which shall be maintained by the new owner until the conditions which made the aid necessary have been eliminated.

**State Aids to Navigation**

**66.05-1 Purpose.**

The purpose of the regulations in this subpart is to prescribe the conditions under which state governments may regulate aids to navigation owned by state or local governments, or private parties. Aids to navigation must be in accordance with the United States Aids to Navigation System.

**66.05-5 Definitions.**

The term State waters for private aids to navigation means those navigable waters of the United States which the Commandant, upon request of a State Administrator, has designated as waters within which a State government may regulate the establishment, operation, and

## First Northern Auxiliary Short Range Aid to Navigation Training Guide

maintenance of marine aids to navigation, including regulatory markers. The Commandant will entertain requests to make such designations with respect to navigable waters of the United States not marked by the Federal government. These designations when approved will be set forth in separate sections by States in this subpart and will briefly describe or identify waters so designated.

The term **Uniform State Waterway Marking System** (USWMS) means the system of private aids to navigation which may be operated in State waters.

The term **State Administrator** means the official of a State having power under the law of the State to regulate, establish, operate or maintain maritime aids to navigation on waters over which the State has jurisdiction.

The term **State aids to navigation** means all private marine aids to navigation operated in State waters for private aids to navigation, whether owned by a State, political subdivisions thereof or by individuals, corporations, or organizations.

The term **regulate State maritime aids to navigation** means to control the establishment, disestablishment, operation and maintenance of State aids to navigation.

### **66.05-10 State waters for private aids to navigation; designations; revisions, and revocations.**

A State Administrator who desires to regulate State maritime aids to navigation in the navigable waters of the United States not marked by the Federal Government, shall request the Commandant to designate the specific bodies of water involved as State waters for private aids to navigation.

The request shall be forwarded to the District Commander in whose district the bodies of water are located. The request shall give the name and description of the waterway; the extent of use being made of the waterway for marine navigation, in general terms; an appropriate chart or sketch of the area; and a general outline of the nature and extent of the State aids to navigation

which the Administrator plans to establish in the waterway.

The District Commander shall review the request and consult with the State Administrator concerning the terms of an initial agreement to be entered into under specific provisions. When they have arrived at terms of an agreement satisfactory to both, the District Commander shall forward the request to the Commandant with his recommendations and the terms of agreement mutually settled upon. If they cannot reach such agreement, the District Commander shall forward the request with his recommendations and a statement of the points agreed upon and the points remaining at issue.

Upon receipt of the request, the Commandant will determine whether or not approval of the request is in the public interest and will inform the State Administrator and the District Commander of the Coast Guard's decision. If the request is approved, the designation by the Commandant of the waters in question as State waters for private aids to navigation will be also defined and described in this subpart.

The Commandant may, upon his own initiative or upon request, revoke or revise any designations of State waters for private aids to navigation previously made by him. Written notice shall be given the State Administrator of the action contemplated by the Commandant. The State Administrator will be afforded a period of not less than 30 days from the date of the notice in which to inform the Commandant of the State's views in the matter before final action is completed to revoke or revise such designation.

### **66.05-20 - Coast Guard-State agreements.**

The District Commander in whose District a waterway is located may enter into agreements with State Administrators permitting a State to regulate aids to navigation, including regulatory markers, in State waters for private aids to navigation, as, in the opinion of the District Commander, the State is able to do in a manner to improve the safety of navigation. When a waterway is located within the area of jurisdiction of more than one Coast Guard

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District, the District Commander in whose District the State capital is located shall execute the agreement in behalf of the Coast Guard. All such agreements shall reserve to the District Commander the right to inspect the State aids to navigation without prior notice to the State. They shall stipulate that State aids to navigation will conform to the Uniform State Waterway marking System or to the U.S. Aids to Navigation System and that the State Administrator will modify or remove State aids to navigation without expense to the United States when so directed by the District Commander, subject to the right of appeal on the part of the State Administrator to the Commandant.

A Coast Guard-State agreement shall become effective when both parties have signed the agreements. In lieu of the procedure prescribed in Sec. 66.01-5, the agreement shall constitute blanket approval by the Commandant, of the State aids to navigation, including regulatory markers, established or to be established in State waters for private aids to navigation designated or to be designated by the Commandant.

In addition to the matters set forth in the first paragraph of this section, Coast Guard-State agreements shall cover the following points, together with such other matters as the parties find it desirable to include:

(1) A description, in sufficient detail for publication in Notices to Mariners, of all aids to navigations under State jurisdiction in navigable waters of the United States in existence prior to the effective date of the agreement which have not been previously approved under procedures of Sec. 66.01-5.

(2) Procedures for use by the State administrator to notify the District Commander of changes made in State aids to navigation, as required by Sec. 66.05-25.

(3) If prior to December 21, 2003, specification of the marking system to be used, whether the U.S. Aids to Navigation System or the Uniform State Waterway Marking System.

(4) Specification of standards as to minimum size and shape of markers, the use of identifying letters, the use of reflectors or retroreflective materials, and any other similar standards so as

to enable Coast Guard inspectors to determine compliance with Statewide standards.

### **66.05-25 Change and modification of State aids to navigation.**

Wherever a State Administrator shall determine the need for change in State aids to navigation, he shall inform the District Commander of the nature and extent of the changes as soon as possible, preferably not less than 30 days in advance of making the changes.

### **66.05-30 Notice to Mariners.**

The District Commander may publish information concerning State aids to navigation, including regulatory markers, in the Coast Guard Local Notices to Mariners as he deems necessary in the interest of public safety.

Notices to Mariners which concern the establishment, disestablishment, or change of State aids to navigation, including regulatory markers, may be published whenever the aids to navigation concerned are covered by navigational charts or maps issued by the National Ocean Service or the U.S. Army Corps of Engineers.

### **66.05-35 Private aids to navigation other than State owned.**

No person, public body or other instrumentality not under control of the Commandant or the State Administrator, exclusive of the Armed Forces of the United States, shall establish, erect or maintain in State waters for private aids to navigation any aid to navigation without first obtaining permission to do so from the State Administrator. Discontinuance of any State aids to navigation may be effected by order of the State Administrator.

### **66.05-40 Corps of Engineers' approval.**

In each instance where a regulatory marker is to be established in navigable waters of the United States which have been designated by the Commandant as State waters for private aids to navigation, the State Administrator is responsible for obtaining prior permission from the District Engineer, U.S. Army Corps of Engineers concerned, authorizing the State to regulate the

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water area involved, or a statement that there is no objection to the proposed regulation of the water area. A copy of the Corps of Engineers permit or letter of authority shall be provided by the Administrator to the District Commander upon request.

Similarly, where an aid to navigation is to be placed on a fixed structure or a mooring buoy is to be established in State waters for private aids to navigation, the State Administrator shall assure that prior permission or a statement of no objection to the structures or mooring buoys proposed is obtained from the District Engineer concerned. A copy of the permit or letter is not required by the District Commander.

### **66.05-100 Designation of navigable waters as State waters for private aids to navigation.**

In accordance with the procedures contained in Sec. 66.05-10(d), the following navigable waters listed by the State in which they are located, are designated as State waters for private aids to navigation:

- (a) Arizona. The portion of Lake Havasu within the State, except that portion within Havasu Lake National Wildlife Refuge.
- (b) Louisiana. The portion of Toledo Bend Reservoir within the State.
- (c) Missouri. Teach water within the State except the:
  - (1) Mississippi River; and
  - (2) Missouri River.
- (d) Montana. The portion of Missouri River between the U.S. Highway 287 bridge near Townsend and Great Falls including the following impoundments:
  - (1) Black Eagle Dam Reservoir.
  - (2) Canyon Ferry Reservoir.
  - (3) Hauser Lake.
  - (4) Holter Lake.
  - (5) Rainbow Dam Reservoir.
- (e) North Carolina. Each navigable water within the State not marked with Coast Guard aids to navigation on June 1, 1973.
- (f) Pennsylvania. The portion of Youghiogheny River Reservoir within the State.
- (f-1) South Carolina.

- (1) The portion of Lake Wylie within the State;
- (2) Lake Marion;
- (3) Lake Moultrie; and (4) Lake Murray.
- (g) Texas. The portion of Toledo Bend Reservoir within the State.
- (h) Virginia.
  - (1) Claytor Lake, on the New River in Pulaski County.
  - (2) Leesville Lake, on the Roanoke River below Smith Mountain Dam.
  - (3) The portions of the following reservoirs within the State:
    - (i) Gaston.
    - (ii) Holston.
    - (iii) John H. Kerr.
    - (iv) Philpott.
- (i) Wisconsin. Navigable waters within the State not marked with Coast Guard aids to navigation as of May 1, 1996.

### **Uniform State Waterway Marking System**

#### **Sec. 66.10-1 General.**

Until December 31, 2003, the Uniform State Waterway Marking System's (USWMS) aids to navigation provisions for marking channels and obstructions may be used in those navigable waters of the U.S. that have been designated as state waters for private aids to navigation and in those internal waters that are non-navigable waters of the U.S. All other provisions for the use of regulatory markers and other aids to navigation shall be in accordance with United States Aid to Navigation System.

The USATONS may be used in all U.S. waters under state jurisdiction, including non-navigable state waters.

#### **66.10-15 Aids to navigation.**

USWMS aids to navigation may have lateral or cardinal meaning.

On a well defined channel including a river or other relatively narrow natural or improved waterway, an aid to navigation shall normally be a solid colored buoy. A buoy which marks the left side of the channel viewed looking upstream or toward the head of navigation shall be colored

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all black. A buoy which marks the right side of the channel viewed looking upstream or toward the head of a navigation shall be colored all red. On a well defined channel, solid colored buoys shall be established in pairs, one on each side of the navigable channel which they mark, and opposite each other to inform the user that the channel lies between the buoys and that he should pass between the buoys.

On an irregularly defined channel, solid colored buoys may be used singly in staggered fashion on alternate sides of the channel provided they are spaced at sufficiently close intervals to inform the user that the channel lies between the buoys and that he should pass between the buoys.

Where there is no well-defined channel or when a body of water is obstructed by objects whose nature or location is such that the obstruction can be approached by a vessel from more than one direction, supplemental aids to navigation having cardinal meaning (i.e., pertaining to the cardinal points of the compass, north, east, south, and west) may be used. The use of an aid to navigation having cardinal meaning is discretionary provided that the use of such a marker is limited to wholly State owned waters and the State waters for private aids to navigation as defined and described in this part

Aids to navigation conforming to the cardinal system shall consist of three distinctly colored buoys.

(1) A white buoy with a red top may be used to indicate to a vessel operator that he must pass to the south or west of the buoy.

(2) A white buoy with a black top may be used to indicate to a vessel operator that he must pass to the north or east of the buoy.

(3) In addition, a buoy showing alternate vertical red and white stripes may be used to indicate to a vessel operator that an obstruction to navigation extends from the nearest shore to the buoy and that he must not pass between the buoy and shore. The number of white and red stripes is discretionary, provided that the white stripes are twice the width of the red stripes.

### **66.10-35 Navigation lights.**

A red light shall only be used on a solid colored red buoy. A green light shall only be used on a solid colored black or a solid colored green buoy. White lights shall be used for all other buoys. When a light is used on a cardinal system buoy or a vertically striped white and red buoy, it shall always be quick flashing.

## **Fish Farms, Fish Traps and Fish Stakes**

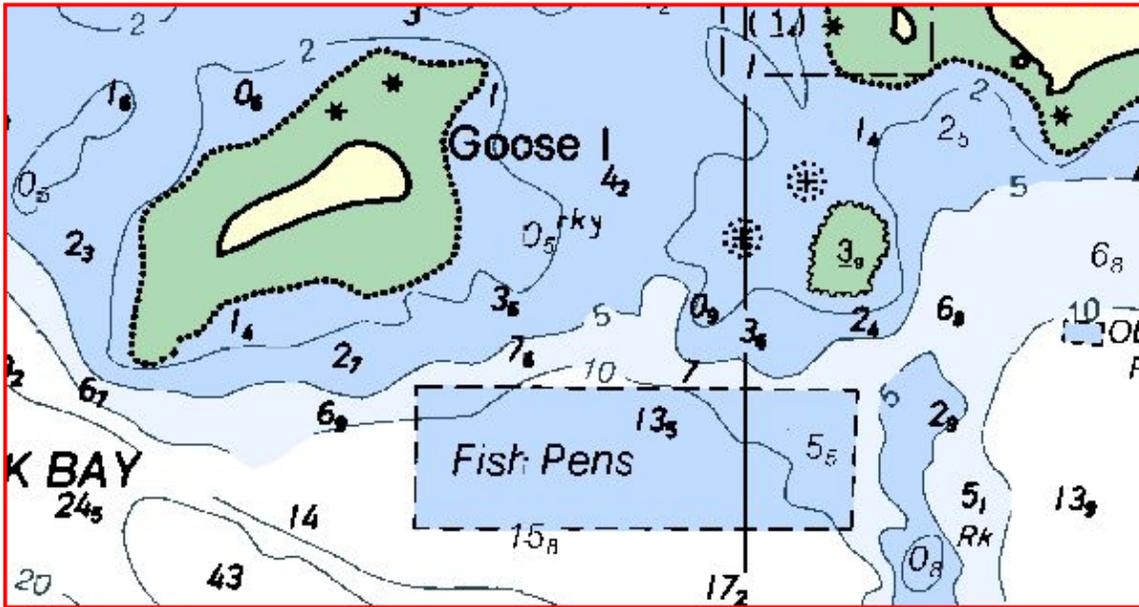
As you will read below, fish farms not only have special marking requirements but also have NOAA charting rules. As part of your verification, AVs will be required to perform the following checks. Since each fish farm must be permitted by the USACE, it should be charted. Verify the four the four corners of the fish farm with fixes. Compare these locations to the four corner positions plotted on the NOAA chart. Include these fixes as part of your report. Show them in the comments section of your report. Any geographical discrepancies should also be reported to NOAA as a Chart Update Report. Also report when the fish farm is not documented correctly.

The four corners of the fish farm should be marked by Special Purpose aids. These aids should be permitted and be included in the PATON System database. Each lighted aid should be listed and should be verified as individual private aids. Provide photos of these aids.

In some cases, unlighted special purpose aids may be grouped under one PATONS System listing as a number in brackets (2). Sometimes this grouping may show (8 or more). In this situation, obtain fixes for the corners of the fish farm area and just list the number of unlighted private aids marking the farm. When unlighted aid mark the corners of the farm, document them as individual private aids and show the data in the comments section of your report. Photographs the aids marking the corners.

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Below is an extract from a NOAA Chart showing the boundaries of a Fish Pen. There are no private aids showing on the chart.



However, the PATON System is calling for 4 lights as is shown below.

1009.00	4078	<a href="#">Goose Island Aquaculture Lights (4)</a>	44-54-41.000N	067-02-20.000W
---------	------	---	---------------	----------------

The assumption is that these lights are marking the four corners. In this case, you would verify each of these lighted aids. If they are not marking the four corners of the fish farm, you would also document each corner and check the fix against the charted positions.

<h3 style="margin: 0;">Fish Farms</h3> 	<p>Report the boundaries of fish farms as well as any special lighting. Report light type, color, characteristics, and height. Fish farms are often lighted with private aids to navigation. These aids are usually <b>special purpose aids</b>, colored yellow and, if lighted, show <b>yellow</b> lights depending on location of the fish pens. Any aid that is lighted must be permitted, be charted and listed in Light List. Ideally, the four corners of the pen area should be marked. If the pen area is close by a federal channel, the outer two aids near the channel should be lighted. If the owner chooses not to mark the four corners of the fish pen, then they need to permit each and every marker in the area.</p>
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NOTE: Fish farms follow the same permitting rules as Fish Havens and are not permitted to private interests. For liability reasons, they are permitted to municipalities by the USACE-Corp of Engineers. The boundaries are established by the USACE (Army Corps of Engineers) who reports them to NOAA for charting purposes.

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### Fish Stakes



Report visible and submerged stakes located outside of its charted trap area.

### Submerged Stakes



Take fixes to define the extent of the fish stake area. Plot the area on a nautical chart.

Indicate whether and how the area is lighted. Provide the light color and characteristics with your report.

Also, report your observations to the local C.G. Unit.

If you suspect submerged fish stakes, survey the area at low tide from a navigable channel or deep water area. ***Operate with extreme caution near the fish stake areas.***

### Fish Havens

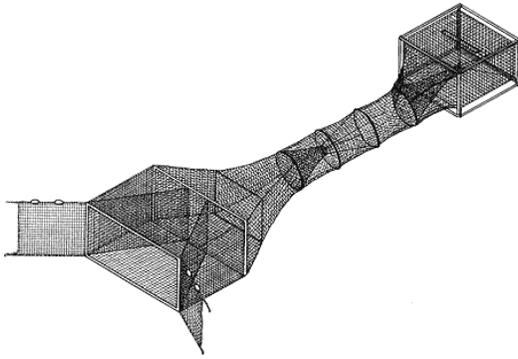


Report obstructions, lights, fixes of boundary locations of the area blocked or covered by the fish haven. The picture shows a buoy marking a boundary position for the fish haven. Many of these buoys will be private aids. Check the light list for their light's assigned positions or take the LAT/LONG from a nautical chart. Also, submit a report to the local C.G. Unit. Report light colors, characteristics, and rhythms. Fish havens are usually marked with **special purpose aids** and, if lighted, **yellow** lights.

Fish havens are not "permitted" to private interests. For liability reasons, the USACE-Corp of Engineers permits them to municipalities. Usually, fish havens are designed to simulate natural reefs and wrecks that attract fish. The reefs are constructed by intentional placement of assorted secondary-use materials and designated fishery habitat, ranging from old trolley cars and barges to scrap building material in areas which may be of very small extent or may stretch a considerable distance along a depth curve; old automobile bodies are a commonly used material. The Corps of Engineers must issue a permit, specifying the location and depth over the reef, before such a reef may be built. However, the reef builders' adherence to permit specifications can be checked only with a wire drag. Fish havens are outlined and labeled on the charts and show the minimum authorized depth when known.

On a chart, fish havens are tinted blue if they have a minimum authorized depth of 11 fathoms (66 feet) or less or if the minimum authorized depth is unknown and they are in depths greater than 11 fathoms but still considered a danger to navigation.

***Be cautious about passing over fish havens or anchoring in their vicinity.***



### **Fish Trap Areas**

Show the limits of the area covered by the fish trap with fixes. Plot them on a nautical chart. Report the light colors and characteristics. Also, report your observations to the local C.G. Unit. If the trap is observable above water, submit photos to prove your report

Fish trap areas are areas established by the U.S. Army Corps of Engineers, or State or local authority, in which traps may be built and maintained according to established regulations. The fish stakes, which may exist in these areas, are obstructions to navigation and may be dangerous. **The limits of fish trap areas and a cautionary note are found on the chart.**

Most fish trap areas will be marked with lighted private aids (PATONs). These aids will usually be Class II and be charted. Fish trap areas are marked with special purpose aids and, if lighted, with yellow lights. Corrections to the position of these PATONs are made through the LNM-Local Notice to Mariners to NOAA.

## **How to Take and Report Quality Photographs as Evidence**

A picture says a thousand words, and pictures of discrepancies can be really great evidence for the Coast Guard of exactly what you have observed in the field. Here are some hints on how to take good shots of ATONs PATONs and Bridges.

1. Verify the aid or survey the bridge before taking the picture. The verification and survey process may expose specific discrepancies where close up photos will be needed.
2. Find the best angle, side and lighting. If it is not sunny, use a flash. Darkened photos are hard to read and often do not clearly show the problem that you are trying to display. They are not professional. Take multiple photos and view them as you take to be sure you have a photo that clearly show the problem you are reporting.
3. Mark or record each photo carefully so they can be readily identified later on.
4. Use a color digital camera.
5. Include all identifying markings on the aid.
6. If needed, use a photo shop program or draw on the photo to highlight hard to see details.

**Identify your aid photos as follows:**

**1. Federal and Permitted Private Aids in the Light List.**

- a. Identify the photo with the two-digit Division number where they are located, followed by a dash (-), followed by the LLNR for the aid, or if none, followed by the Aid Number.
- b. All Federal Aids are listed in the Light List.
- c. For Example: 03-22345.01 represents LLNR 22345.01 in Division 3. You may also add a brief description of the aid.

**2. Permitted Private Aids not in the Light List:**

- a. Treat Private Aids that are listed in the Light List as described in (1) above.
- b. Identify the photo with the two-digit Division number where they are located, followed by a dash (-), followed by the Aid Number.
- c. For example: 02-100134556009 represents Aid Number 100134556009 in Division 2. You may also add a brief description of the aid.

**3. Non-Permitted Aids:**

- a. Identify the photo with the two-digit Division number where they are located, followed by a dash (-), followed a brief description of the aid.
- b. Use this same description on the Non-Permitted PATON Report that you submit to the CG ANT Auxiliary Liaison. It is a good practice to attach a copy of the photo to your report.
- c. Clear black and white photos are acceptable. The Auxiliary Liaison may also want a copy of the digital photo by e-mail.

**4. Bridge Photos for Bridge Database:**

- a. Identify the photo with the two-digit Division Number where they are located, followed by a dash (-), followed by a 4-digit Bridge Number (left zero filled).
- b. Bridge Number 52 in Division 1 would be identified as 01-0052.
- c. E-mail these photos to Frank Larkin at [FrankJLarkin@verizon.net](mailto:FrankJLarkin@verizon.net)

**5. Bridge Discrepancy Photos.** E-mail these photos to Frank Larkin at [FrankJLarkin@verizon.net](mailto:FrankJLarkin@verizon.net) immediately following making your Bridge Survey ir Discrepancy Report on the Bridge Database System. Your report and photos will be screen and forwarded to the Coast Guard Bridge Branch by the DSO-NS 013.

**It has been our continuous experience upon receipt of good photos as evidence of a reported discrepancy, the Coast Guard usually responds very quickly to resolve the problem. This has been true of both the CG ANTs and the Bridge Branch.**

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## LIST OF ACRONYMS and TERMS

**AAPS** - Automated Aid Positioning System

**ADRIFT** – Afloat and unattached in any way to the shore or seabed.

**ADSO** - Assistant District Staff Officer.

**AID TO NAVIGATION** – any device external to a vessel intended to assist navigators in determining their position or safe course, or to warn them of dangers or obstructions to navigation

**AN** - Aids to Navigation – used when referencing all of the programs in the program or the department.

**ANT** – Aid to Navigation Team.

**ANSC** - Auxiliary National Supply Center. Usually is a prefix to a code or number.

**ASSIGNED POSITION** – the latitude and longitude position of record for an aid to navigation.

**ATON** - Aid to Navigation – reference is directed specifically for a Federal aid to navigation.

**AUXDATA** – Auxiliary Data System.

**AUXILIARY LIAISON** – An Auxiliarist assigned as the Auxiliary Contact person with a CG ANT or Sector.

**AV** - Aid Verifier.

**AVC** - Aid Verifier Candidate.

**AVQ** - Aid Verifier Qualifier.

**BAP** – Bridge Administration Program

**BC-MNC** - National Branch Chief, Aids to Navigation. Cartographic.

**BC-MNP** - National Branch Chief, Aids to Navigation-Private & Federal.

**BC-MNB** - National Branch Chief, Aids to Navigation, Bridge Administration.

**BIFURCATION** – The point where a channel divides when proceeding from seaward. The place where two tributaries meet or join to form one waterway..

**BM** - Boatswain Mate. The number suffix indicates the class of Petty Officer. BMs are the Coast Guards operational personnel for vessels.

**BROADCAST NOTICE TO MARINERS** – A radio broadcast designed to provide important marine information.

**C&GS** - Charting and Geodetic Services.

**CDB** – Conventional Direction of Buoyage

**CFR** - Code of Federal Regulations.

**COMMISSIONED** – The action of placing a previously discontinued aid to navigation back on station.

**CU** - Chart Updating Program.

**dGPS** - Differential Global Positioning System.

**DIRAUX** - Director of Auxiliary.

**DISCONTINUE** – 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 proscribed in the Light List.

**DMAHTC** - Defense Mapping Agency Hydrographic/Topographic Center.

**DOP** - Dilution of Position.

**DSO**- District Staff Officer.

**DVC-MN** - National Division Chief, Navigation Systems Division.

**EPE** - Estimated Position Error – GPS.

**ESTABLISH** – To place an aid to navigation for the first time.

**EXPOSED LOCATION** – An offshore area which is not sheltered by adjacent land and , therefore, may be exposed to extreme weather and sea condition.

**EXTINGUISHED** – A lighted aid to navigation which fails to show a light characteristic.

**FOG DETECTOR** – An electronic device used to automatically determine conditions of visibility which warrant the activation of a sound signal or additional light signals.

**FSO** - Flotilla Staff Officer.

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**GPS** - Global Positioning System.

**IALA** - International Association of Lighthouse Authorities.

**I-ATONIS** – The Coast Guard Integrated Aids to Navigation Information System.

**INOPERATIVE** – Sound signal or electronic aid to navigation that is out of service due to a malfunction.

**JUNCTION** – The point where a channel divides when proceeding seaward or the place where a tributary departs (splits off) from a main channel.

**KNOTS (KTS)** - Nautical Miles Per Hour.

**LNМ** - 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 the district.

**LOP** - Line of Position.

**LUMINOUS RANGE** – The distance at which a light is visible based on the visibility of an area.

**MARK** – An artificial or natural object of easily recognizable shape and color, situated in such a position that it may be identified on a chart. AN aid to navigation.

**MPH** - Statute Miles Per Hour.

**NOAA** - National Oceanic and Atmospheric Administration

**NOMINAL RANGE** - .The Nominal Range is the luminous range of a light when the meteorological visibility is 10 nautical miles, and a threshold of luminance of 0.67 sea-mile candela is used.

**NOS** - National Ocean Service.

**NS** – Navigation Systems

**OFF STATION** – A floating aid to navigation not on its assigned position.

**OINC or OIC**- Officer in charge.

**OPCON** – Operating Facility Number assigned to a CG Command.

**OPERATIONAL RANGE** – The distance at which a light is required to be seen to meet the user requirements.

**OPFAC** – Operation Operational Facility

**OTO** - Assistant Director of Auxiliary, Operations and Training Officer.

**PA** – Patrol Area. A natural AOR that can be commonly covered by a single Auxiliary patrol.

**PAC** – Patrol Area Coordinator – An experienced, currently qualified and certified AV who is assigned to manage the verification of Private Aids and Bridges within a PA-Patrol Area.

**PATON** - Aid to Navigation – reference is specifically directed to a Private Aid to Navigation..

**PROTECTED LOCATION** – Inshore areas that are not exposed to extremes of weather and sea condition.

**QM** - Quarter Master. The number suffix indicates the class of Petty Officer. QMs are the Coast Guard’s navigation and signaling personnel.

**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 different type and/or characteristics.

**RESET** – A floating aid to navigation previously off station, adrift, or missing, returned to its assigned position (station).

**SAR** - Search and Rescue.

**SCF** – Small Craft Facility.

**SEMI-EXPOSED LOCATION** – Offshore or inshore areas that may be sheltered by adjacent land and are exposed to lesser extremes of weather and sea conditions.

**SO**- Division Staff Officer.

**SOUND SIGNAL** – A device which transmits sound intended to provide information to mariners during periods of restricted visibility and foul weather.

**USC** - United States Code.

**WAAS** - Wide Area Augmentation System.

**WAMS** - Waterway Analysis Management System.

**WATCHING PROPERLY** – An aid to navigation on its assigned position exhibiting the advertised characteristics in all respects.

**WATERWAY** – A water area providing a means of transportation from one place to another, principally a water area providing a regular route for water

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traffic, such as a bay, channel, passage, river, or the regularly traveled parts of the open sea.

**WITHDRAWN** – The discontinuance of a floating aid to navigation during severe ice conditions or for the winter season.

**XPO** - Executive Petty Officer.

**XTE** - Cross Track Error.

# LAT/LONG Conversion Table

[Decimal minutes to seconds]

The Coast Guard required that all latitude and longitude expressions include Degrees, Minutes, and Seconds. Use this table to make your conversions. A simpler method is to adjust your GPS to read out in Degrees, Minutes, and Seconds. This is a quick and simple operation. Check your GPS Operating Manual for the proper procedure.

Decimal Minutes		Decimal Minutes		Decimal Minutes	
	Seconds		Seconds		Seconds
.017	<b>01</b>	.350	<b>21</b>	.683	<b>41</b>
.033	<b>02</b>	.367	<b>22</b>	.700	<b>42</b>
.050	<b>03</b>	.383	<b>23</b>	.717	<b>43</b>
.067	<b>04</b>	.400	<b>24</b>	.733	<b>44</b>
.083	<b>05</b>	.417	<b>25</b>	.750	<b>45</b>
.100	<b>06</b>	.433	<b>26</b>	.767	<b>46</b>
.117	<b>07</b>	.450	<b>27</b>	.783	<b>47</b>
.133	<b>08</b>	.467	<b>28</b>	.800	<b>48</b>
.150	<b>09</b>	.483	<b>29</b>	.817	<b>49</b>
.167	<b>10</b>	.500	<b>30</b>	.833	<b>50</b>
.183	<b>11</b>	.517	<b>31</b>	.850	<b>51</b>
.200	<b>12</b>	.533	<b>32</b>	.867	<b>52</b>
.217	<b>13</b>	.550	<b>33</b>	.883	<b>53</b>
.233	<b>14</b>	.567	<b>34</b>	.900	<b>54</b>
.250	<b>15</b>	.583	<b>35</b>	.917	<b>55</b>
.267	<b>16</b>	.600	<b>36</b>	.933	<b>56</b>
.283	<b>17</b>	.617	<b>37</b>	.950	<b>57</b>
.300	<b>18</b>	.633	<b>38</b>	.967	<b>58</b>
.317	<b>19</b>	.650	<b>39</b>	.983	<b>59</b>
.333	<b>20</b>	.667	<b>40</b>	1.000	<b>60</b>

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