

*Buku Ajar*

# ILMU PELAYARAN DATAR

Dr. Iskandar, S.H., M.T.



BUKU AJAR  
ILMU PELAYARAN DATAR



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## UU No 28 tahun 2014 tentang Hak Cipta

### Fungsi dan sifat hak cipta Pasal 4

Hak Cipta sebagaimana dimaksud dalam Pasal 3 huruf a merupakan hak eksklusif yang terdiri atas hak moral dan hak ekonomi.

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Ketentuan sebagaimana dimaksud dalam Pasal 23, Pasal 24, dan Pasal 25 tidak berlaku terhadap:

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- iv. Penggunaan untuk kepentingan pendidikan dan pengembangan ilmu pengetahuan yang memungkinkan suatu Ciptaan dan/atau produk Hak Terkait dapat digunakan tanpa izin Pelaku Pertunjukan, Produser Fonogram, atau Lembaga Penyiaran.

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Penulis :  
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## KATA PENGANTAR

Puji syukur kami panjatkan ke hadirat Allah Swt. atas selesainya penyusunan materi ajar Ilmu Pelayaran Datar untuk peserta Diklat Ahli Nautika Tingkat III (ANT-III).

Diharapkan dengan adanya buku ajar ini akan membantu para peserta diklat lebih memahami pengetahuan dan keterampilan dalam menentukan posisi dengan mempergunakan benda-benda bantu navigasi dengan baik dan benar serta memperhatikan aspek keselamatan.

Dalam penyusunan buku ajar edisi pertama ini, penyusun menyadari keterbatasan pengetahuan tentang peraturan-peraturan yang sedikit banyak mendasari tentang *Standar Training Certification and Watchkeeping* (STCW), *International Model Course 7.03*, kurikulum dan silabus serta *Quality Standard System* yang diberlakukan di Indonesia, sehingga memungkinkan masih terdapat kekurangan baik dalam penyajian maupun penggunaan istilah. Untuk itu saran dan pendapat sangat kami harapkan untuk penyempurnaan edisi berikutnya.

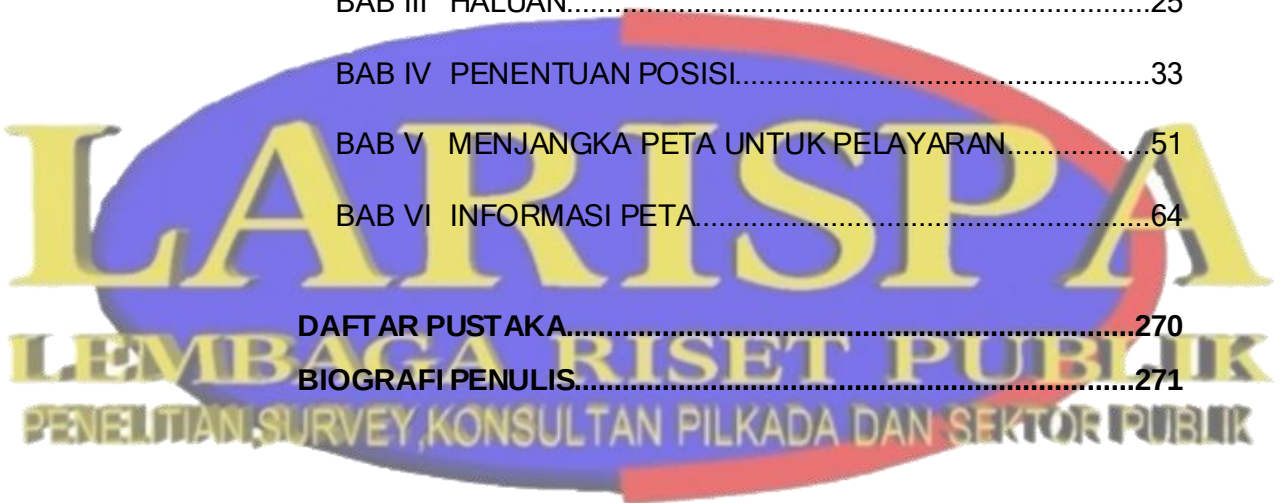
Semoga tujuan dan upaya peningkatan keterampilan bagi pelaut Indonesia dapat tercapai sesuai yang diharapkan.

Sorong, Juli 2020

Dr. Iskandar, S.H., M.T.

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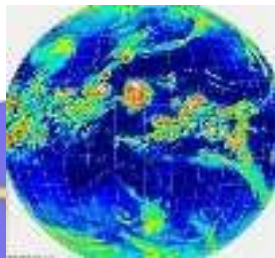
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# BAB I

## DEFINISI-DEFINISI

### **Bola Dunia (Globe)**

Adalah suatu bentuk tiruan bola bumi yang dibuat dalam skala yang kecil untuk dapat lebih memahami bentuk asli planet bumi.

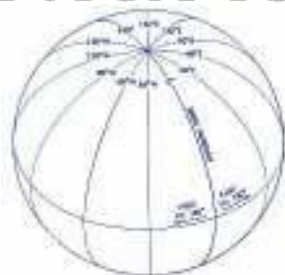


### **Lingkaran Kecil (Small Circle)**

Adalah Lingkaran yang membagi luas bumi dalam dua bagian yang tidak sama besarnya.

### **Lingkaran Besar (Great Circle)**

Adalah Lingkaran yang membagi luas bumi dalam dua bagian yang sama (titik pusatnya selalu berimpit dengan titik pusat bumi)



### **Bujur (Meridian)**

Adalah lingkaran besar di bumi yang melalui kutub utara dan kutub selatan bumi

### **Bujur Nol (Prime Meridian)**

Adalah bujur yang melalui Greenwich (bagian kota London).

### **Khatulistiwa (Ekuator)**

Adalah lingkaran besar di bumi yang titik-titiknya terletak sama jauhnya terhadap kutub Utara dan kutub Selatan (bidangnya terletak tegak lurus pada poros bumi).

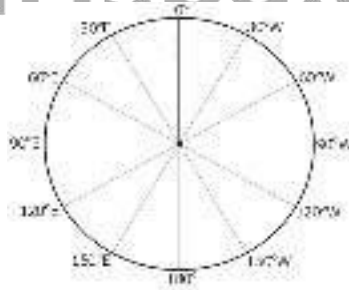
### **Kutub-kutub (Pole)**

Adalah titik-titik potong dari poros bumi dengan permukaan bumi (Kutub Utara dan Kutub Selatan)

**Derajat (Secara Lengkap, Derajat Busur), biasanya disimbolkan dengan °,**

Adalah ukuran sudut yang dapat dibentuk pada sebuah bidang datar, menggambarkan 1/360 dari sebuah putaran penuh.

1 Menit (1") adalah 1/60 bagian dari satu derajat



### **Mil Laut (*Nautical Mile* atau *Sea Mile*)**

Adalah suatu satuan panjang yang digunakan di seluruh dunia untuk keperluan maritim dan navigasi. Satuan ini digunakan juga pada hukum dan perjanjian internasional, terutama menyangkut batas wilayah perairan.

- 1 Mil laut = tepat 1.852 Meter
- 1 cable = 0.1 *Mile*
- Knot adalah satuan kecepatan dengan satuan *mile/hour* (mile/jam)

### **Garis Lintang (*Latitude*)**

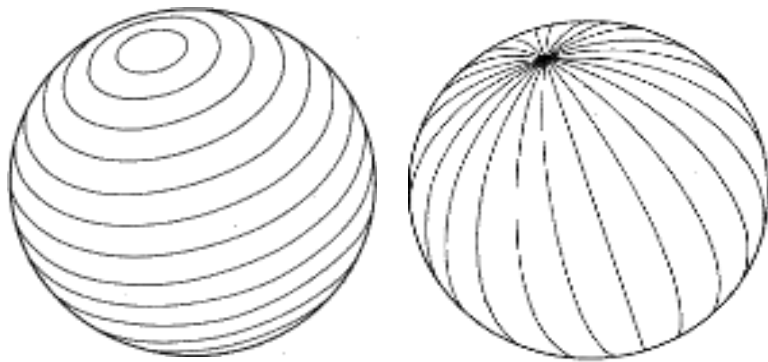
Yaitu garis khayal yang melintang pada permukaan bumi dari arah barat ke timur dan sebaliknya.

Garis khayal di atas permukaan bumi yang sejajar dengan khatulistiwa, untuk mengukur seberapa jauh suatu tempat di utara/selatan dari khatulistiwa

### **Garis Bujur (*Longitude*)**

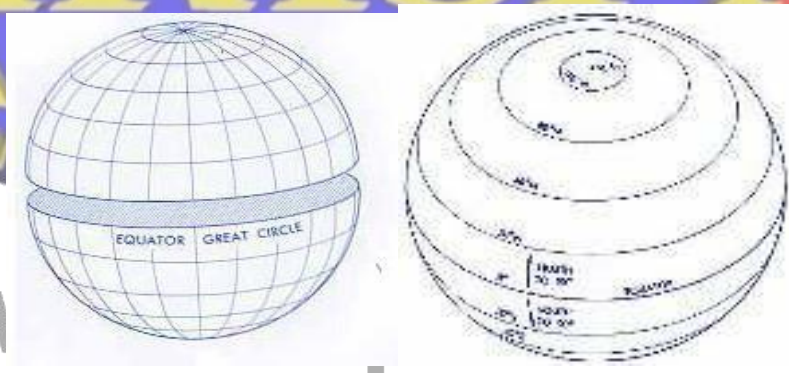
Adalah garis khayal yang menghubungkan kutub utara dan kutub selatan atau sebaliknya yang sama panjang.

Garis khayal yang menghubungkan kutub utara dan kutub selatan, mengukur seberapa jauh suatu tempat dari meridian.



**Garis lintang dibedakan menjadi:**

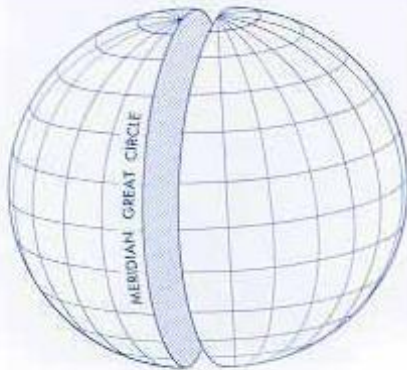
- Lintang Utara (LU) besarnya  $0^{\circ}$  -  $90^{\circ}$  LU berada di utara khatulistiwa
- Lintang Selatan (LS) besarnya  $0^{\circ}$  -  $90^{\circ}$  LS berada di selatan khatulistiwa



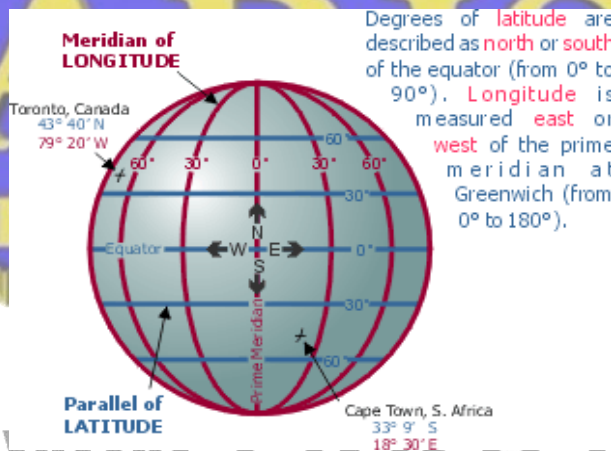
**Garis bujur dibedakan menjadi:**

Bujur Barat (BB) besarnya  $0^{\circ}$  -  $180^{\circ}$  (searah barat)

Bujur Timur (BT) besarnya  $0^{\circ}$  -  $180^{\circ}$  (searah timur)



Cara pembacaan lintang dan bujur (posisi)



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Garis bujur 0 ° melalui kota Greenwich-London, dinyatakan sebagai meridian 0 °.

Sering disebut *Greenwich Mean Times* (GMT) sedangkan Garis Bujur 180 ° membujur di Samudera Pasifik disebut garis penanggalan internasional (*International Date Line*)

Garis Lintang 0 °

Disebut garis khatulistiwa (ekuator) yaitu garis yang membagi bumi menjadi 2 belahan yang sama besar yaitu belahan bumi utara dan selatan.

Garis khatulistiwa merupakan lintang terpanjang mengelilingi bumi dengan panjang 40.000 km.

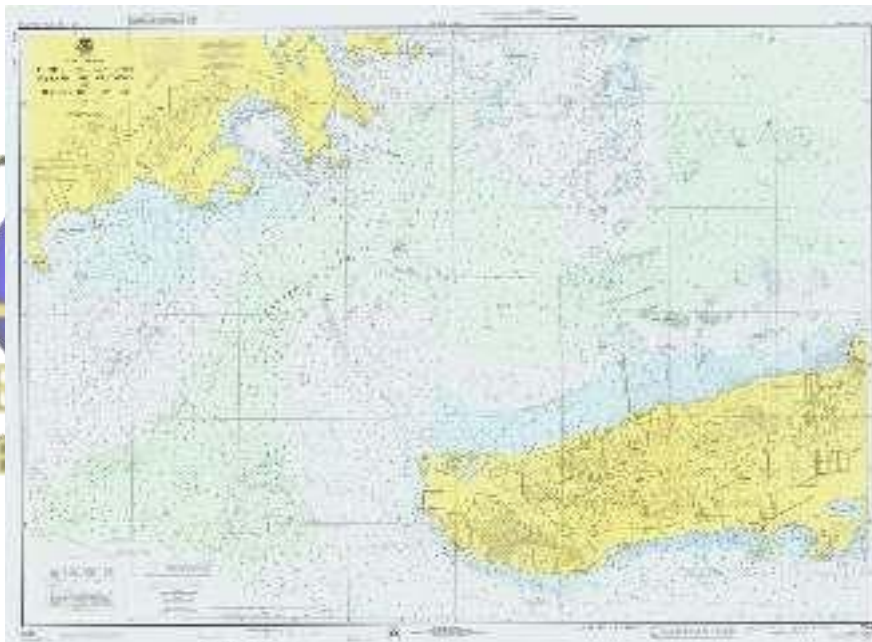


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## BAB II

### PROYEKSI PETA

Peta adalah gambaran seluruh atau sebagian dari permukaan bumi yang dilukiskan ke dalam bidang datar dengan perbandingan tertentu.



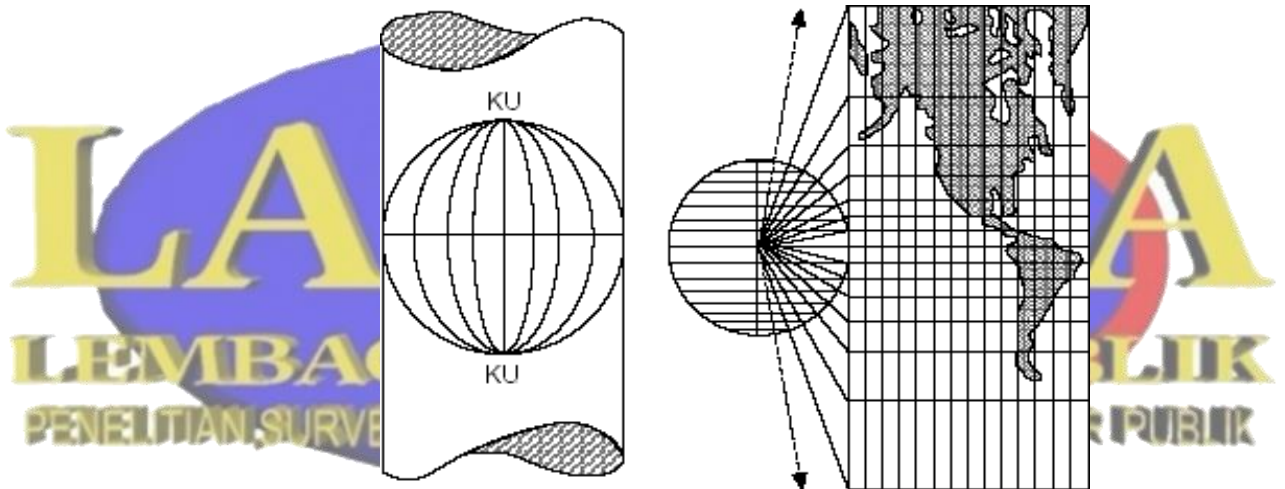
Dari pemindahan bentuk yang melengkung menjadi bentuk yang mendatar menyebabkan tidak ada suatu jenis peta yang dapat memberikan hasil yang sempurna sehingga setiap jenis peta pasti akan terdapat kekurangan-kekurangan. Oleh sebab itu dibuat

bermacam-macam proyeksi peta agar untuk penggunaan-penggunaan tertentu dapat dipilih jenis-jenis peta yang paling sesuai.

### Macam-Macam Proyeksi Peta

#### I. Proyeksi Silinder (*Cylindrical Projection*)

Proyeksi Silinder adalah suatu proyeksi permukaan bola bumi yang bidang proyeksinya berbentuk silinder dan menyinggung bola bumi.

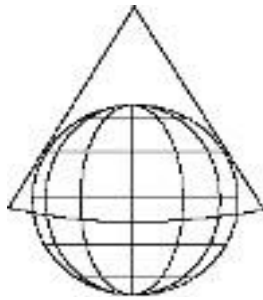


*Skema Proyeksi Silinder*

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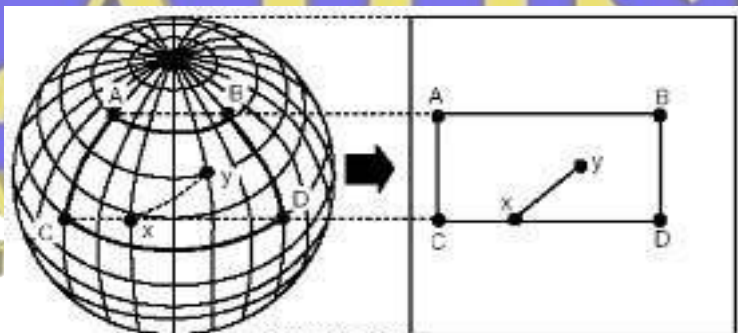
#### II. Proyeksi Kerucut

Pada proyeksi kerucut adalah proyeksi dari kulit bumi pada bidang kerucut yang puncaknya berimpit pada perpanjangan sumbu bumi dan kerucutnya menyinggung salah satu jajar di bumi.



### III. Proyeksi Bidang Datar

Proyeksi bidang datar pada jenis proyeksi ini, permukaan bumi diproyeksikan pada sebuah bidang datar yang disinggung pada bola bumi.



*Prinsip proyeksi berupa pemindahan peta dari bentuk bola (globe) ke bidang datar (peta)*

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#### Macam-Macam Proyeksi Silinder

1. Ekuatorial: yaitu hasil proyeksi apabila silinder menyinggung pada ekuator.
2. Polar: yaitu hasil proyeksi apabila silinder-silinder menyinggung pada meridian atau derajat.

3. Oblique. miring: yaitu hasil proyeksi apabila silinder menyinggung pada selain meridian atau ekuator.

Proyeksi merkator merupakan proyeksi silinder normal konform, di mana seluruh muka bumi dilukiskan pada bidang silinder yang sumbunya berimpit dengan bola bumi, kemudian silindernya dibuka menjadi bidang datar

Berhubungan bentuk bumi yang sebenarnya tidaklah bulat seperti bola, maka proyeksinya tidak dapat memberikan gambaran bumi mendekati yang sebenarnya (tidak sebangun). Kesalahan-kesalahan makin besar di dekat kutub, karena makin ke kutub jari-jari bumi makin kecil jika dibandingkan dengan jari-jari bumi di khatulistiwa. Kemudian peta merkator dibuat berdasarkan perhitungan (matematika) dengan menghitung pertumbuhan jarak ke arah kutub untuk mengimbangi pertumbuhan derajat-derajat di luar khatulistiwa. Oleh karena itu peta tersebut juga terkenal dengan peta lintang bertumbuh.

#### **Sifat- Sifat Proyeksi Merkator**

1. Hasil proyeksi adalah baik dan betul untuk daerah dekat ekuator, tetapi distorsi makin membesar bila makin dekat dengan kutub.
2. Interval jarak antara meridian adalah sama dan pada ekuator pembagian vertikal benar menurut skala.
3. Interval jarak antara paralel tidak sama, makin menjauh dari ekuator, interval jarak makin membesar.
4. Proyeksinya adalah konform.

5. Kutub-kutub tidak dapat digambarkan karena terletak di posisi tak terhingga.

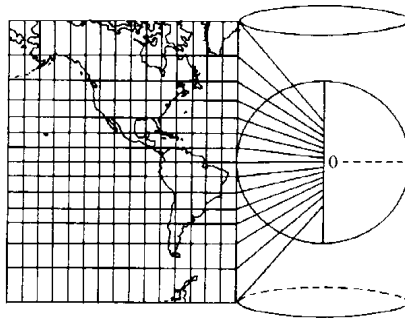


Figure 4-6. The Mercator conformal projection.

### Proyeksi Gnomonic

Titik pusat proyeksi *gnomonic* adalah titik pusat bumi. Salah satu bentuk proyeksi *gnomonic* adalah peta lingkaran besar (*gnomonic chart*).

Contoh:

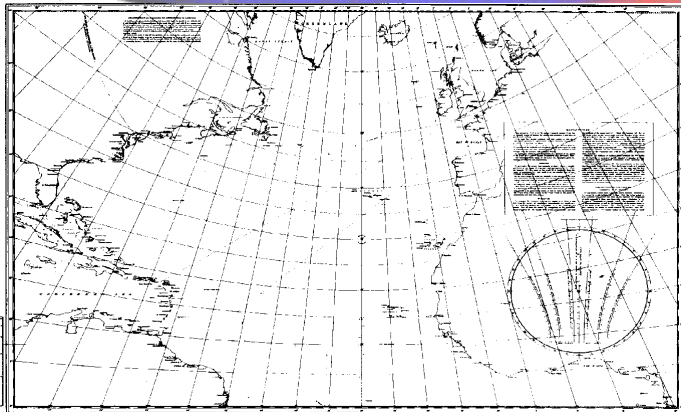


Figure 4-8. An oblique gnomonic of the North Atlantic.

## SKALA PETA

- Skala dari sebuah peta ialah perbandingan dari satu satuan panjang di peta terhadap panjang yang sebenarnya di permukaan bumi.
- Pada dasarnya makin besar skala suatu peta, maka makin detail keterangan dan informasi yang dapat ditunjukkan sehingga keselamatan pelayaran lebih terjamin. Skala pada peta dapat ditemukan di bawah judul peta.

Jenis-jenis Skala peta:

### 1. Skala Natural

Adalah perbandingan 1 satuan panjang di peta sama dengan 100.000 satuan tersebut, pada keadaan yang sebenarnya.

Contoh: Skala 1: 200.000

Artinya garis di peta itu harus dikalikan dengan 200.000 untuk mendapatkan panjang sebenarnya.

### 2. Skala Angka

Adalah perbandingan menggunakan satuan yang sudah jelas.

Contoh: Skala 1cm = 1 km

### 3. Skala Grafik

Adalah skala yang berbentuk garis dalam *mile*, yard, km.

Contoh: Skala mil



## PETA LAUT YANG BAIK

Peta laut yang kita pakai harus “baik”. Sebuah peta laut disebut baik apabila:

1. Survei waktu membuat peta mutakhir.
2. Kedalaman yang ditunjukkan letaknya berdekatan dan merata.
3. Garis-garis batas dalamnya air (*contour lines*) harus ada dan nyata.
4. Garis-garis pantai harus nyata tanpa terputus-putus.
5. Keterangan-keterangan serta tanda-tanda yang dibutuhkan seorang navigator tertera dengan nyata.
6. Berwarna dan jelas.
7. Judul peta juga terdapat dibelakang peta.
8. Tidak terlalu banyak koreksi kecil.
9. Bahan (kertas) peta yang baik atau sangat sedikit pemuaiian dan penyusutannya.
10. Ukurannya normal.

#### KETERANGAN YANG UMUM TERDAPAT DI PETA LAUT

1. Nomor peta (*number of chart*). Dicetak pada sudut kanan bawah dan sudut kiri atas dari peta di luar garis peta. Kadang-kadang di keempat sudut dan kadang - kadang hanya pada satu sudut.
2. Nama peta (*title of chart*). Dicetak di tempat yang paling baik dan nyata dan tidak menutupi keterangan-keterangan penting maupun daerah lalu lintas (rute pelayaran utama) dari peta. Di bawah nama peta terdapat keterangan-keterangan sbb:
  - skala,
  - tahun survei,
  - harga peta,

- penerbit,
  - patokan dalam air (*sounding*),
  - patokan tinggi objek di darat (*height*),
  - muka surutan (*chart datum*),
  - jenis proyeksi,
  - keterangan-keterangan penting (peringatan-peringatan), *caution* atau *warning*,
  - pasang surut.
3. Tahun penerbitan, (*date of publication*). Dicitak di garis batas peta, di bagian bawah ditengah-tengah. Contoh: *published at the admiralty 15<sup>th</sup> Jan 1897.*
  4. Tahun edisi baru (*cate of new edition*). Dicitak disebelah kanan dari tahun penerbitan. Contoh: *New edition 6<sup>th</sup> Juni 1921.* Suatu edisi baru dari suatu peta dikeluarkan apabila untuk peta tersebut diadakan percobaan-percobaan/ pembaharuan-pembaharuan secara umum. Dengan keluarnya peta edisi baru, maka koreksi-koreksi besar dan koreksi-koreksi kecil pada peta yang lama dihilangkan.
  5. Koreksi besar (*large correction*). Dicitak disebelah kanan dari tahun edisi baru atau jika disebelah kanan tahun penerbitan sudah dicetak tahun edisi baru, maka sering kali koreksi besar ini dicetak di bawahnya. Koreksi besar memuat keterangan tentang tanggal, bulan dan tahun pembetulan peta secara besar-besaran. Contohnya: *Large correction 23<sup>rd</sup> August 1946.* Koreksi besar diadakan apabila sudah terlalu banyak keterangan-keterangan koreksi kecil pada peta tersebut. Dengan dikeluarkannya koreksi besar maka koreksi-koreksi kecil pada peta yang lama dihilangkan.

6. Koreksi kecil (*small correction*). Dicitak/ditulis diluar garis peta di sudut kiri bawah. Koreksi ini memuat keterangan tentang tahun, bulan dan dasar pembetulan peta.

Koreksi ini berdasarkan:

- 1) Berita pelaut (*notice to mariners*).
- 2) *Navigation warning*.
- 3) Informasi resmi, dll.

*Navigational warning* dan informasi resmi lainnya diumumkan kembali dalam NTM. Di atas kapal-kapal koreksi ini dilakukan sendiri oleh Perwira Navigasi. Tahun dan nomor NTM atau keterangan yang lain harus ditulis di peta, di sebelah kiri bawah, contoh: *Small correction* 1947-3.18-4.22 1948-2.17. Apabila koreksi-koreksi ini hanya bersifat sementara, pembetulan pada peta dibuat dengan pensil dan di bawah koreksi tersebut ditulis (T) artinya *temporary*. Apabila pembetulan bersifat pendahuluan, berarti akan dipermanenkan atau diubah atau dihapuskan lagi kelak diberi tanda (P) artinya *preliminary*.

7. Tanggal pencetakan (*date of printing*). Dicitak di sudut kanan atas menurut hari atau minggu ke berapa pada tahun yang bersangkutan. Contoh: 45.64 artinya hari yang ke 45 pada tahun 1964 berarti tanggal 14 Februari 1964.
8. Ukuran peta (*dimensions of chart*). Diberikan dalam satuan inci atau mm dan ditunjukkan di sudut kanan kurung dan menunjukkan ukuran peta yang diukur antara garis sebelah (*inner borders*). Keterangan ini berguna apabila kita mencurigai adanya distorsi. Contoh: (25.06 x 18.05).

9. Bahan yang dipakai pencetak peta. Dicitak di bawah ukuran peta. Contoh: Zc 1949 artinya bahan pencetak petanya dari Zinc.
10. Patokan untuk mencetak peta. Dicitak pada keempat sudut peta dengan tanda siku-siku kecil yang berwarna lembayung.
11. Keterangan pasang dan arus pasang (*tide and tidal stream information*). Keterangan pasang untuk beberapa pelabuhan di suatu peta, seringkali dimasukkan juga di peta yang bersangkutan, dan dicetak pada tempat yang baik di atas peta dengan tidak menutupi keterangan-keterangan ataupun lalu lintas pelayaran utama. Keterangan pasang biasanya berbentuk tabel atau tanda seperti belah ketupat dengan abjad atau angka sebagai pengenal, misalnya A atau 29 ataupun dengan keterangan-keterangan atau anak panah yang berarti keterangan tersebut untuk daerah yang mempunyai tanda yang serupa di dalam peta.
12. Dalam laut. Dinyatakan dalam depa (*fathom*) dan kaki (*feet*) atau dalam meter dan desimeter. Di bawah 11 depa selalu diberikan dalam depa dan kaki. contoh: 82 artinya 8 depa 2 kaki. Satuan untuk dalam laut dicetak dengan huruf-huruf yang terang di bawah nama peta. Misalnya: *sounding in fathoms*
13. Muka surutan (*chart datum*). Muka surutan adalah suatu permukaan khayalan dari mana dalam laut diukur. Setiap dalam laut yang tertera di peta dihitung sampai permukaan ini. Maka surutan yang dipakai oleh badan-badan hidrografi di dunia:

- a. Indonesia: duduk terendah rata-rata dalam jangka  $\frac{1}{2}$  tahun.
  - b. Inggris: air rendah purnama rata-rata (*mean LW spring*) ialah rata-rata dari permukaan air pada waktu air rendah purnama.
  - c. Amerika: di Atlantik air rendah rata-rata (*mean LW*) ialah rata-rata dari semua air rendah pada suatu tempat. Di Pasifik air rendah terendah rata-rata (*mean Lower LW*) ialah rata-rata dari letak permukaan air yang terendah pada waktu air surut.
  - d. Belanda: air rendah terendah purnama rata-rata (*mean lower LW spring*) ialah rata-rata dari permukaan-permukaan air terendah pada waktu air rendah purnama.
14. Tinggi-tinggi, dinyatakan dalam kaki (*feet*) atau meter terhadap air tinggi purnama rata-rata (MLWS = *Mean High Water Spring*) ialah rata-rata dari permukaan air pada waktu air tinggi purnama. Tinggi sebuah pulau dinyatakan dengan angka di dalam tanda kurung dekat dengan pulau tersebut atau di pulaunya, agar tidak keliru dengan dalamnya laut. Contoh: (432) artinya tinggi pulau tersebut = 342 m atau 342 ft.
15. Tanda-tanda dan singkatan-singkatan (*symbol and abbreviation*) yang digunakan pada peta laut Inggris (*British Admiralty Charts*) ditunjukkan di dalam peta no. 5011. Pada peta-peta Amerika dan peta-peta Indonesia, maka tanda-tanda serta singkatan-singkatan tersebut ditunjukkan dalam peta no.1. Keterangan-keterangan yang sudah dibatalkan

tidak boleh dihapus, melainkan dicoret dengan tinta ungu yang rapi.

### Chart Number, Title, Marginal Notes



|   |                                                                            |
|---|----------------------------------------------------------------------------|
| 1 | Chart number in national chart series                                      |
| 2 | Identification of a latticed chart (if any). D=Decca; LC=Loran-C; Om=Omega |
| 3 | Chart number in international chart series (if any)                        |
| 4 | Publication note (imprint)                                                 |

|    |                                                                                                                                                                                                                                                                                                                                                     |
|----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 5  | Bar Code                                                                                                                                                                                                                                                                                                                                            |
| 6  | Edition note. (In this example: Seventh edition published in June, 1996)                                                                                                                                                                                                                                                                            |
| 7  | Source data diagram (if any). (For attention to navigators: use caution where surveys are inadequate.)                                                                                                                                                                                                                                              |
| 8  | Dimensions of inner borders                                                                                                                                                                                                                                                                                                                         |
| 9  | Corner coordinates                                                                                                                                                                                                                                                                                                                                  |
| 10 | Chart title                                                                                                                                                                                                                                                                                                                                         |
| 11 | Explanatory notes on chart construction, etc. (to be read before using chart)                                                                                                                                                                                                                                                                       |
| 12 | Seals. In this example, the national and International Hydrographic Organization seals show that this national chart is also an international one. Purely national charts have the national sea only. Reproductions of charts of other nations (facsimile) have the seals of the original producer (left), publisher (center), and the IHO (right). |
| 13 | Projection and scale of chart at stated latitude. (The scale is precisely as stated only at the latitude quoted)                                                                                                                                                                                                                                    |
| 14 | Linear scale on large-scale charts                                                                                                                                                                                                                                                                                                                  |
| 15 | Reference to a larger-scale chart                                                                                                                                                                                                                                                                                                                   |
| 16 | Cautionary notes (if any). Information on particular features (to be read before using chart)                                                                                                                                                                                                                                                       |
| 17 | Reference to an adjoining chart of similar scale                                                                                                                                                                                                                                                                                                    |

## KATALOG

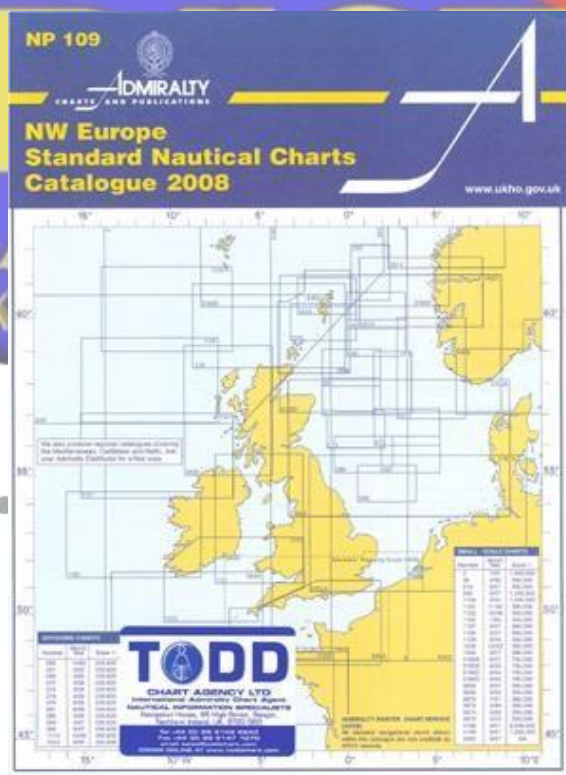
Katalog merupakan suatu buku yang berisi nama, seri nomor, harga dan lain-lain dari segala macam peta, baik *navigational charts*, maupun *non navigational charts* dan juga daftar dari penerbitan-penerbitan navigasi yang berguna bagi navigator.

Khusus mengenai peta laut terdapat *index* peta dari A s.d. W yang meliputi seluruh dunia. *Index* ini akan menunjukkan daerah-daerah di mana kita berada dan setelah kita menemukan daerah yang kita maksudkan, maka kita dapat mencari peta-peta mana

yang kita butuhkan. Katalog peta diterbitkan oleh tiap-tiap negara, sehingga apabila kita akan mencari peta yang kita gunakan untuk pelayaran maka harus menggunakan katalog yang sama dari negara yang menerbitkan

Contoh:

1. Kalau akan memakai Peta Indonesia untuk pelayaran maka dalam menyusun peta juga menggunakan Katalog Peta Indonesia.
2. Kalau akan memakai Peta BA untuk pelayaran maka dalam menyusun peta juga menggunakan BA katalog.



## BERITA PELAUT (*NOTICE TO MARINERS*)

Berita pelaut merupakan suatu buku yang sebenarnya adalah kumpulan dari semua berita-berita dalam satu minggu yang kemudian diterbitkan per minggu. Berita pelaut diberi nomor menurut minggunya di dalam satu tahun (no.1 s.d. 52). Isinya antara lain adalah perubahan-perubahan/tambahan-tambahan/ pengurangan-pengurangan yang ada sangkutpautnya dengan peta laut serta pada publikasi-publikasi navigasi lainnya. Di Indonesia dikenal dengan nama BPI (Berita Pelaut Indonesia), dikeluarkan oleh HIDRAL. Di luar negeri khususnya di Inggris dan Amerika dikenal dengan nama N.T.M. (*Notice to mariners*) dan dikeluarkan oleh Badan Hidrografi negaranya masing-masing. Isinya antara lain adalah:

1. Index
2. Berita pelaut.
3. Koreksi daftar suar, semboyan-semboyan kabut, dan semboyan-semboyan waktu.
4. Amandemen pada NEMEDRI dan daerah-daerah yang berbahaya karena ranjau.
5. Berita-berita keamanan pelayaran (*navigational warnings*).
6. Berita-berita radio resmi pada kapal-kapal niaga Inggris.

Pada umumnya pengeluaran N.T.M. dimaksudkan agar peta-peta laut, buku-buku kepanduan bahari, daftar-daftar suar, daftar isyarat-isyarat radio dll. Selalu dapat *up to date* mengingat keamanan pelayaran.

### Mengoreksi peta sehubungan dengan berita pelaut

1. Apabila ada beberapa peta yang harus dikoreksi, maka peta dengan skala yang besar harus didahulukan (dalam hal ini koreksi hanya satu, akan tetapi meliputi beberapa peta dengan skala yang berbeda-beda).
2. Dalam memasukkan tambahan-tambahan/koreksi-koreksi pada peta dengan ukuran skala besar maka harus digunakan simbol-simbol serta singkatan-singkatan dari peta laut no.5011 (Inggris) atau peta laut no. 1 (Amerika dan Indonesia).
3. Untuk peta-peta samudera, hanya suar yang mempunyai jarak tampak 15 mil dan lebih yang dimasukkan. Selisih dari jarak tampak, yang perlu lagi hanya warna dan sifatnya.
4. Pelaksanaan dalam mengoreksi peta ada 2 cara:
  - a. Dengan ditulis memakai tinta lembayung (merah).
  - b. Dengan tempelan. Koreksi yang berupa gambar tempelan yang dilampirkan dalam N.T.M. digunting, kemudian ditempelkan pada peta yang bersangkutan sedemikian hingga gambar-gambarnya bersambungan tepat dengan peta yang dikoreksi.

Contoh:

INDEX OF NOTICES AND CHART FOLIOS

| Notice No. | Page | Admiralty Chart Folio                                                  | Notice No. | Page | Admiralty Chart Folio |
|------------|------|------------------------------------------------------------------------|------------|------|-----------------------|
| PL         | 21   | 1, 2, 3, 7, 9, 17, 18, 24, 36, 41, 43, 45, 47, 54, 56, 66, 88, 96, 312 | 2315       | 225  | 47                    |
| 2248*      | 214  | 7                                                                      | 2316       | 225  | 47, 50                |
| 2249*      | 214  | 1                                                                      | 2317       | 226  | 47, 50                |
| 2250       | 219  | 9                                                                      | 2318       | 226  | 50                    |
| 2251       | 219  | 9                                                                      | 2319       | 226  | 52                    |
| 2252       | 222  | 27                                                                     | 2320       | 226  | 50                    |
| 2253       | 225  | 50                                                                     | 2321       | 226  | 50, 53                |
| 2254       | 227  | 55                                                                     | 2322       | 227  | 50                    |
| 2255       | 229  | 63                                                                     | 2323       | 227  | 50                    |
|            |      |                                                                        | 2324       | 227  | 50                    |
|            |      |                                                                        | 2325       | 227  | 50, 53                |

## II

[22/02]

### ADMIRALTY CHARTS AND PUBLICATIONS NOW PUBLISHED AND AVAILABLE

#### NEW ADMIRALTY CHARTS AND PUBLICATIONS

Admiralty Charts published 22 May 2002

| Chart | DATE, NAME AND DATE/NUMBER                                                                                                                                                                                                                                                       | Scale    | Rate | Coverage/page | UK price/US* |
|-------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|------|---------------|--------------|
| 64489 | Walm. - North Coast, Oman: Bay and Approaches.<br>53°11'-00N - 53°14'-00N 54°48'-00E - 55°14'-00E                                                                                                                                                                                | 1:25,000 | 1    | 22            | £15.30       |
|       | Oman<br>53°10' 00N - 53°18' 22N, 5°48' 00E - 5°55' 00E<br>addition to showing chart area, provides improved coverage of Oman Bay and its numerous inlets in the North Oman, to which ruling Chart 4964, the chart includes a large scale plan of the Port of Oman and Oman 2000. | 1:15,000 |      |               |              |

## III

#### NAVIGATIONAL WARNINGS

See N.M. 13-02. Messages printed below are all in force on 22 May 2002. It is recommended that this report should be kept as a file or book should you wish, followed by subsequent weekly messages. Day messages concerned Admiralty Charts is quoted. For those areas originated by other authorities only selected important warnings are reproduced.

(i) Navarea I (NE Atlantic) 22nd Week 2002-02.

NAVAREA I warnings in force 21/5/02, 2002 series: 197 419 473 1001 series: 151 222 252 306 518, 2002 series: 125 128 138 140 163 169 180 186 191 192 193 194 195 199 197.

185 Cancelled: Cancel 182/01.

186 NORTH SEA: Dogger Bank. Chart BA 266. Wind, least depth 15, metres, located 54°31'08N 002°30'12E and marked by East Cardinal Light buoy fitted with Beacon D.

187 Cancelled: Cancel 185/01.

## IV

[22/02]

#### AMENDMENTS TO ADMIRALTY SAILING DIRECTIONS

NP 11 Arctic Pilot Volume II (1996 Edition)

Iceland - Vestmannaeyjar - Heimaey  
Northwards: Restricted area; anchorage  
deleted

79

Paragraph 2.48 Reference chart Replace by:  
Islands Chart 321 (see 1.9)

After Paragraph 2.48 Insert:  
Restricted area

2.48a

1. Anchoring and fishing are prohibited within a submarine cable and pipeline area, shown on the chart, which lies between Heimaey and the mainland NE.

Paragraph 2.49 Replace by:

2. During N and NE winds, anchorage is possible N of the harbour. Attention is drawn to the Restricted area described above, and to a submarine cable shown on Icelandic Chart 321 which has its landing close W of Heimaey (2.47).

## AMENDMENTS TO ADMIRALTY LIST OF LIGHTS AND FOG SIGNALS

Lat. American. Study Editor: Dr. David José May 2007

|      |                          |         |
|------|--------------------------|---------|
| 1600 | cr. stone, Valsesia Zone | 49 13 3 |
|      | Head, Fort Cuneo         | 2 06 3  |
|      | 2nd 10 m. up             |         |

The following International Port Traffic Signals, in use at St. Helier Port Control, are displayed from the tower of the lighthouse and additional flag-flags: Express Light shows from the tower only. The International Port Traffic Signals are displayed in a clockwise direction of rotation from the Main Harbour, Saint Road and La Collette Moles Bays.

## AMENDMENTS TO ADMIRALTY LIST OF RADIO SIGNALS

Weekly Edition No. 28 dated 30 May 2002

Published with SAGE

Last Amendment: Weekly Edition No. 16 dated 9 May 2010

**LAJUR A**  
**LEMBAGA RISET PUBLIK**  
 **PENELITIAN, SURVEY, KONSULTAN PILKADA DAN SEKTOR PUBLIK**

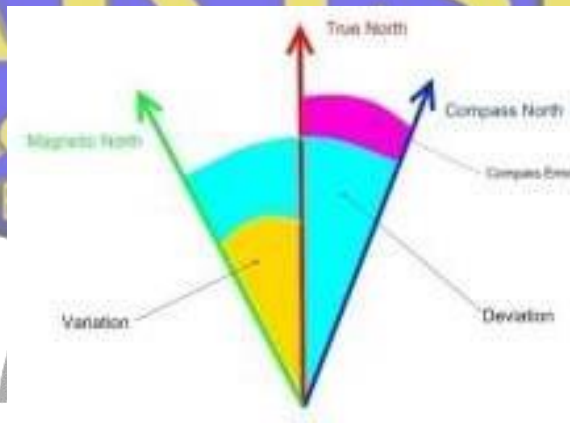
[www.laripa.co.id](http://www.laripa.co.id)

## BAB III

### HALUAN

Definisi:

- Utara sejati (*true north*) adalah arah menuju kutub utara bumi.
- Utara magnet (*magnetic north*) adalah arah menuju kutub utara magnet bumi.
- Utara pedoman (*compass north*) adalah arah utara yang ditunjukkan oleh kompas.
- Haluan adalah sudut yang dibentuk antara garis lunas kapal dengan salah satu arah utara.



#### VARIASI

Variasi adalah sudut yang dibentuk antara Utara sejati (*true north*) dan utara magnet (*manetic north*). Nilai variasi suatu tempat di bumi dapat dicari:

1. Peta laut
2. Peta variasi
3. Buku kepanduan bahari

Besarnya nilai variasi tergantung dari:

1. Tempat
2. Tahun

Perubahan nilai variasi sangat lambat dari tahun ke tahun dan nilai perubahan ini dapat kita lihat pada mawar pedoman di peta:

Varian 15 °W (1970) *decreasing about 10' annually*

Varian 10 °E (1970) *decreasing about 5' annually*

*Decreasing* artinya berkurang dan *increasing* artinya bertambah

Contoh:

Varian 15 °W (1970) *decreasing about 10' annually*. Hitunglah nilai variasi tahun 2008.

Jawab:

$$\text{➤ } 15^\circ \text{W} - \{ (2008-1970) \times 10' \}$$

$$\text{➤ } 15^\circ \text{W} - \{ 38 \times 10' \}$$

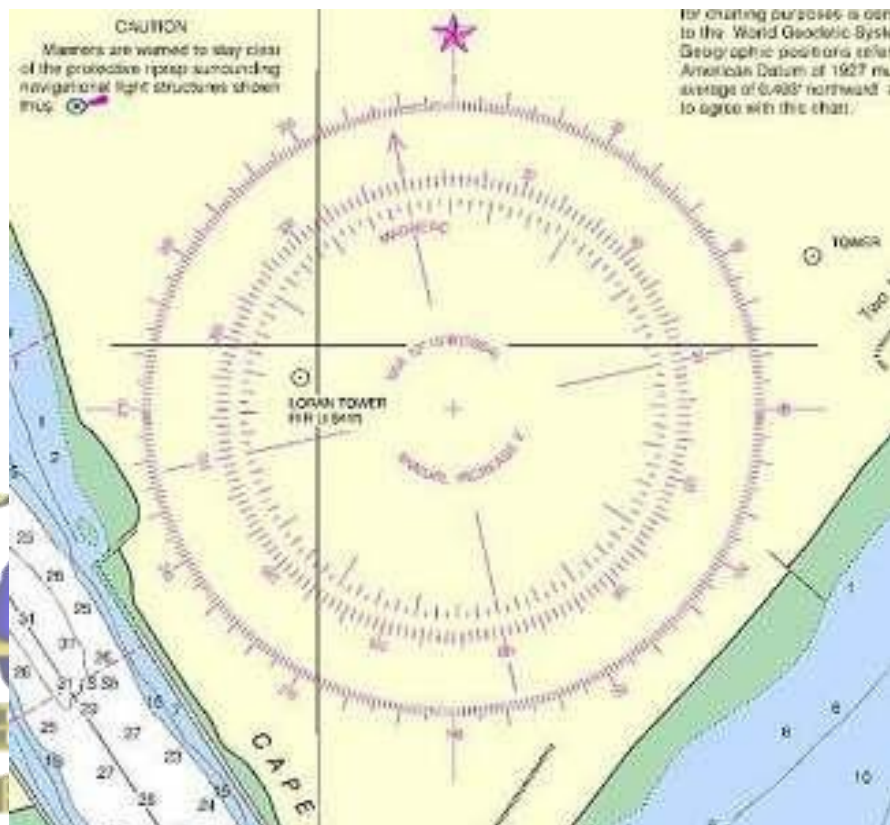
$$\text{➤ } 15^\circ \text{W} - 380'$$

$$\text{➤ } 15^\circ \text{W} - 6^\circ 20''$$

$$\text{➤ } 8^\circ \text{W } 40''$$

[www.larispa.co.id](http://www.larispa.co.id)

Contoh Nilai variasi pada peta laut pada gambar berikut:



Pada mawar pedoman (*compass rose*), di mana terdapat 2 buah lingkaran di dalam mawar pedoman tersebut. Pada lingkaran bagian luar menunjukkan arah utara sejati sedangkan lingkaran bagian dalam menunjukkan utara magnet

Nilai variasi (+)/*east* apabila utara magnet berada disebelah timur dari utara sejati

Nilai variasi (-)/*west* apabila utara magnet berada disebelah barat dari utara sejati

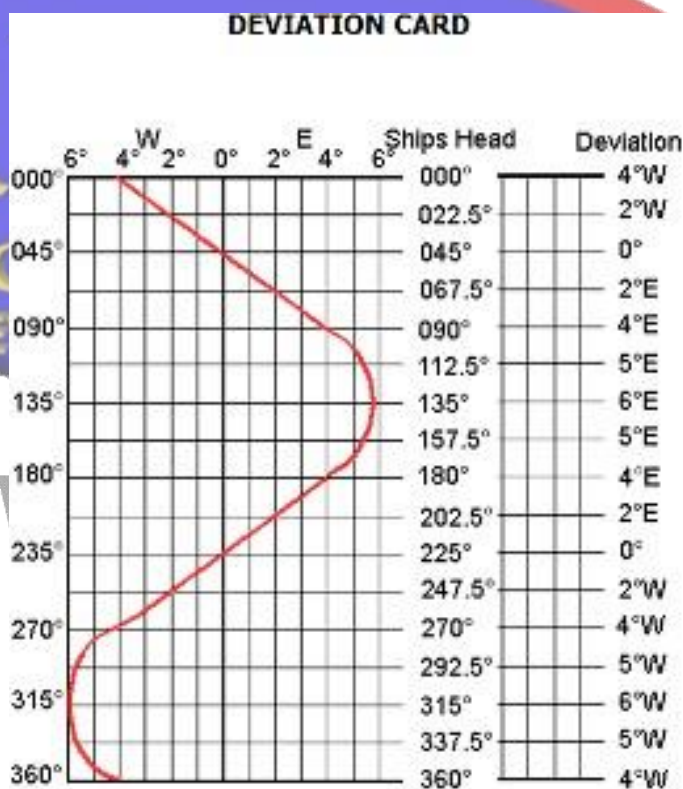
## DEVIASI

Deviasi adalah sudut yang dibentuk antara utara Magnet dan utara pedoman

Besarnya deviasi di peta dipengaruhi oleh besi-besi di atas kapal dan sangat tergantung dari haluan pedoman magnet yang dikemudikan.

Nilai deviasi dapat diperoleh dari daftar deviasi yang ada di atas kapal.

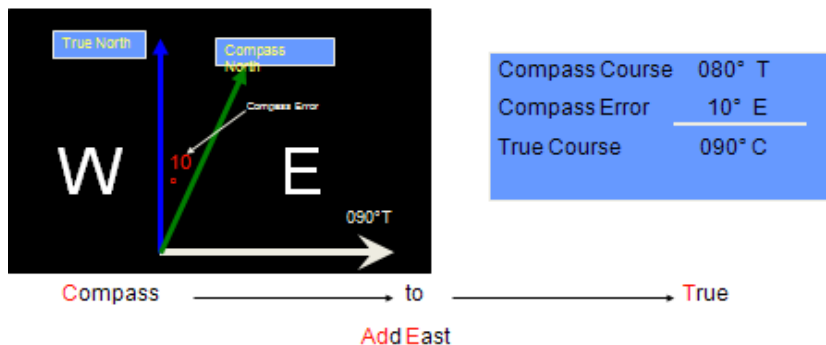
Contoh daftar deviasi:



## COMPASS ERROR = DEVIATION + OR - VARIATION

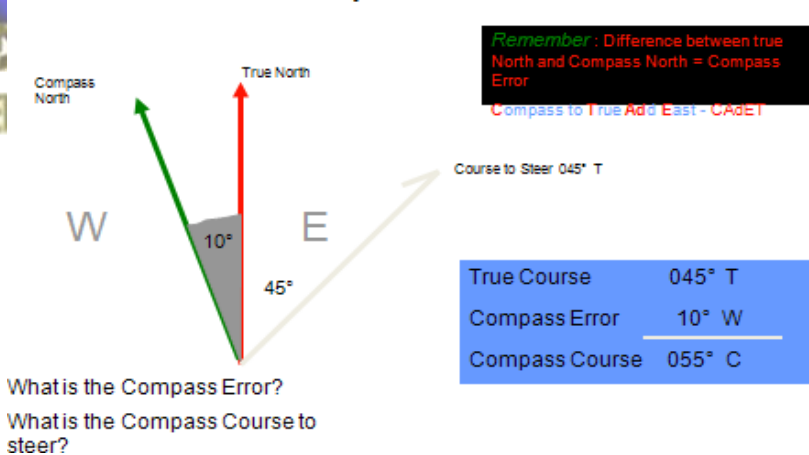
Compass error sering disebut dengan sembir.

### Compass Error



**CADET**

### Compass Error

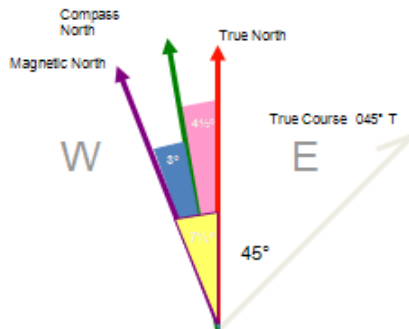


Deviation, Variation, Compass Error  
 Deviation =  $3^{\circ}$  E, Variation =  $7\frac{1}{2}^{\circ}$  W, True Course =  $045^{\circ}$  T

What is compass error?

What is the compass course to steer?

**Remember :** Difference between true North and Magnetic North = **Variation**, and difference between Magnetic North and Compass North = **Deviation**. Difference between Compass North and True North = **Compass Error**.  
 Compass to True **Add East - CAdET**



|                  |                            |
|------------------|----------------------------|
| Variation =      | $7\frac{1}{2}^{\circ}$ W   |
| Deviation =      | $3^{\circ}$ E              |
| Compass Error =  | $4\frac{1}{2}^{\circ}$ W   |
| True Course =    | $045^{\circ}$ T            |
| Compass Error =  | $4\frac{1}{2}^{\circ}$ W   |
| Compass Course = | $049\frac{1}{2}^{\circ}$ C |

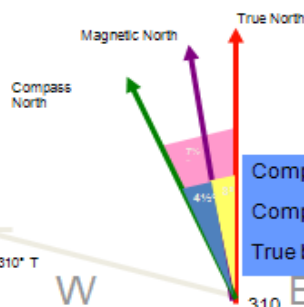
Put it All Together

Deviation =  $4\frac{1}{2}^{\circ}$  W, Variation =  $3^{\circ}$  W True Course =  $310^{\circ}$  T  
 Observed three compass bearings  $035^{\circ}$  C,  $082^{\circ}$  C &  $125^{\circ}$  C @ 1130.

What is the compass error?

What is the compass course?

What are the true bearings to plot?



|                  |                            |
|------------------|----------------------------|
| Variation =      | $3^{\circ}$ W              |
| Deviation =      | $4\frac{1}{2}^{\circ}$ W   |
| Compass Error =  | $7\frac{1}{2}^{\circ}$ W   |
| True Course =    | $310^{\circ}$ T            |
| Compass Error =  | $7\frac{1}{2}^{\circ}$ W   |
| Compass Course = | $317\frac{1}{2}^{\circ}$ C |

|              |                          |                          |                          |
|--------------|--------------------------|--------------------------|--------------------------|
| Compass brgs | $035^{\circ}$            | $082^{\circ}$            | $125^{\circ}$            |
| Compass err  | $7\frac{1}{2}^{\circ}$   | $7\frac{1}{2}^{\circ}$   | $7\frac{1}{2}^{\circ}$ W |
| True brgs    | $027\frac{1}{2}^{\circ}$ | $074\frac{1}{2}^{\circ}$ | $117\frac{1}{2}^{\circ}$ |

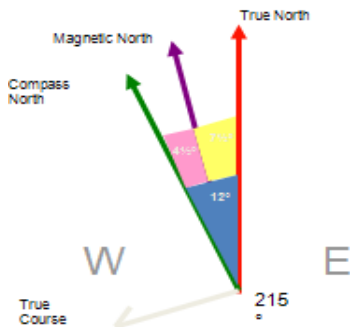
Put It All Together

Compass bearing  $146^{\circ}$  C True bearing  $134^{\circ}$  T True Course =  $215^{\circ}$  T Variation =  $7\frac{1}{2}^{\circ}$  W

What is the compass error?

What is the compass course?

What is the deviation?



|                  |                          |
|------------------|--------------------------|
| Compass brg      | $146^{\circ}$ C          |
| True brg         | $134^{\circ}$ T          |
| Compass Error =  | $12^{\circ}$ W           |
| Variation =      | $7\frac{1}{2}^{\circ}$ W |
| Deviation =      | $4\frac{1}{2}^{\circ}$ W |
| True Course =    | $215^{\circ}$ T          |
| Compass Error =  | $12^{\circ}$ W           |
| Compass Course = | $227^{\circ}$ C          |

Dalam mengemudi haluan kapal pada saat berlayar dapat digunakan kompas magnet ataupun kompas *gyro*. Pada umumnya dalam mengemudi haluan hampir semua kapal menggunakan kompas *gyro* karena:

1. Haluan yang ditunjukkan oleh kompas *gyro* mendekati haluan sejati (kesalahan sangat kecil yaitu kurang dari  $1^{\circ}$ ).
2. Dapat digunakan pada saat kapal berlayar di daerah kutub bumi di mana kompas magnet tidak dapat digunakan.
3. Tidak dipengaruhi oleh besi atau material di sekitarnya.
4. Dapat dikombinasikan dengan peralatan navigasi yang lain seperti: Radar/Arpa, Ecdis, GPS dan lain-lain.

Walaupun kesalahannya (*gyro compass error*) kecil, namun dalam pelayaran harus dilakukan pengecekan sekali setiap jaga. Pengecekan *gyro compass error* dapat dilakukan dengan menggunakan:

1. Azimut benda angkasa (seperti: matahari, bulan, bintang atau planet).
2. *Leading light* pada saat kapal berlayar menggunakan penuntun pada *leading light* tersebut.

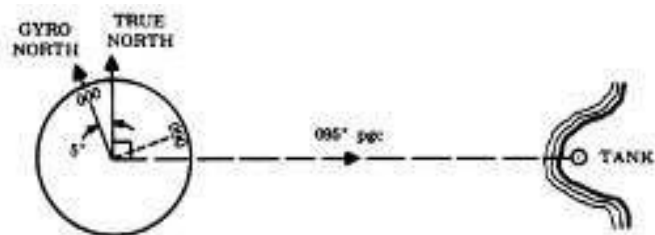


Figure 9-8A. A 5° westerly gyro error illustrated.

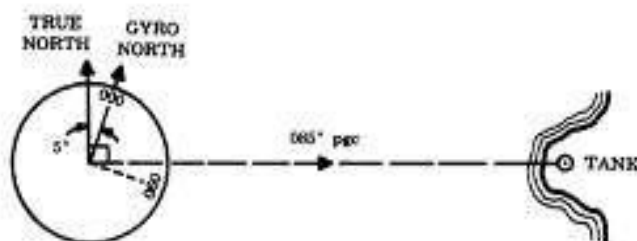


Figure 9-8B. A 5° easterly gyro error illustrated.

### Gyrocompass Error

- To remember how to use the gyro error, two memory aids are commonly used:

1) "Gyro is best, error is west. Gyro is least, error is east."

2)  $\text{Gyro} + \text{East} = \text{True (G.E.T.)}$

## PENENTUAN POSISI

## PERLENGKAPAN MEJA PETA

1. Katalog
2. NTM
3. Mistar jajar (*pararell ruler*)
4. 1 set penggaris segitiga (*triangle ruler/navigational square*)
5. Penggaris panjang (*long strait ruler*)
6. Jangka (*devider*)
7. Pensil
8. *Ballpoint*
9. Penghapus
10. Pemberat peta
11. Kaca pembesar (*magnifying glass*)





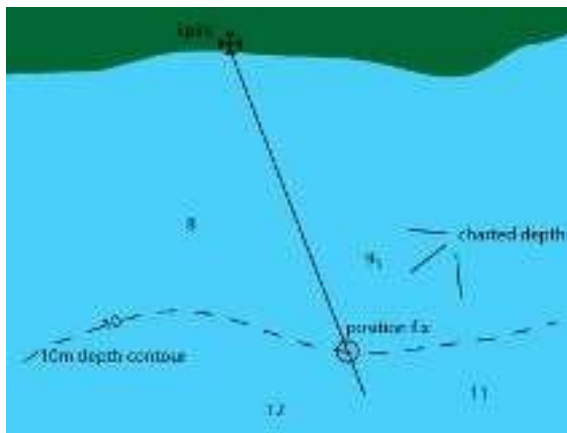
Seorang perwira jaga harus mempunyai kemampuan untuk menentukan posisi kapal secara cepat dan akurat. Tetapi bagaimana melakukannya? Bahwasanya permukaan laut tidak terdapat garis-garis lintang dan bujur. Untuk itu diperlukan peta agar dapat mengetahui keberadaan posisi kapal.

Penentuan posisi kapal dapat dilakukan dengan:

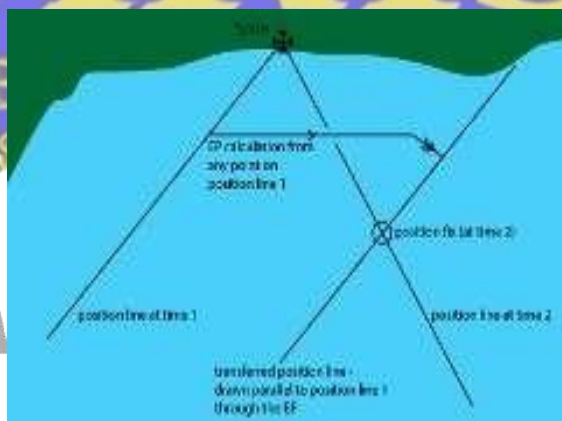
1. Menggunakan satelit navigasi (GPS, SATNAV, LORAN)
2. Menggunakan baringan:
  - a. Baringan benda-benda darat (termasuk benda yang dilaut)
    - 1) Satu benda dibaring sekali:
      - Baringan dengan jarak



- Baringan dengan peruman



- 2) Satu benda dibaring dua kali
- Baringan dengan geseran



- Baringan sudut berganda
- Baringan empat surat
- Baringan istimewa

3) Dua benda dibaring

- Baringan silang



- Baringan silang dengan geseran
- Baringan dengan pengukuran sudut dalam bidang datar

4) Tiga benda dibaring

- Baringan silang dan baringan pemeriksa

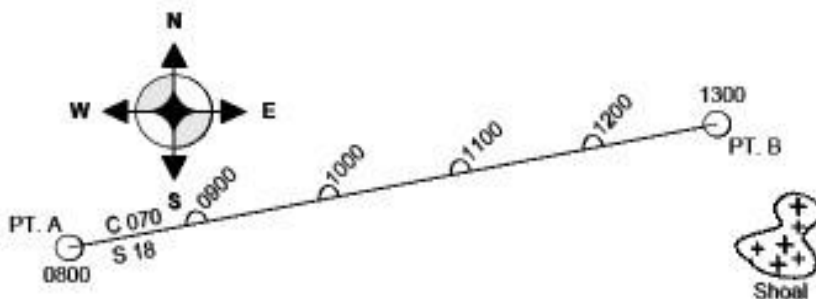
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- b. Baringan benda-benda angkasa
  - Azimut dan arah garis tinggi (agt)

### 3. Posisi Duga

Perhatikanlah gambar di bawah ini :



### PENENTUAN POSISI DENGAN SATELIT NAVIGASI (GPS)

GPS merupakan salah satu satelit navigasi yang dapat memberikan posisi secara akurat. Posisi yang diberikan pada pesawat GPS berupa: *Latitude* (lintang) dan *longitude* (bujur).

**Penentuan posisi di peta berdasarkan lintang (*latitude*) dan bujur (*longitude*):**

1. Menentukan posisi pada peta seperti halnya pada penentuan koordinat pada matematika, hanya saja penentuan posisi pada peta dinyatakan dengan lintang (*latitude*) dan bujur (*longitude*).
2. Y - axis adalah skala lintang yang terletak pada tepi kanan dan kiri peta

Positif adalah Lintang utara

Negatif adalah lintang selatan

Garis lintang adalah garis yang horizontal

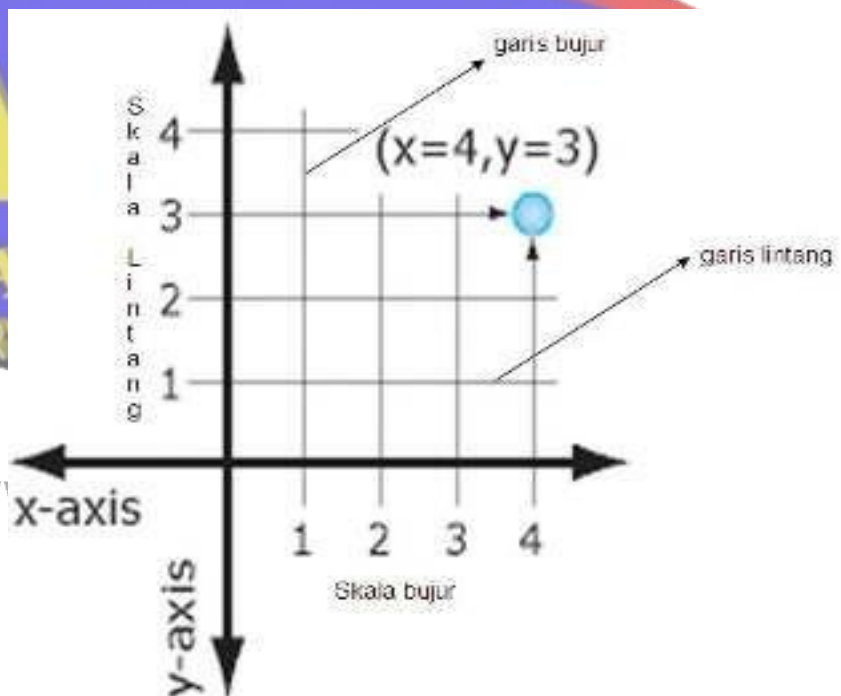
3. X - axis adalah skala bujur yang terletak pada bagian tepi atas bawah peta

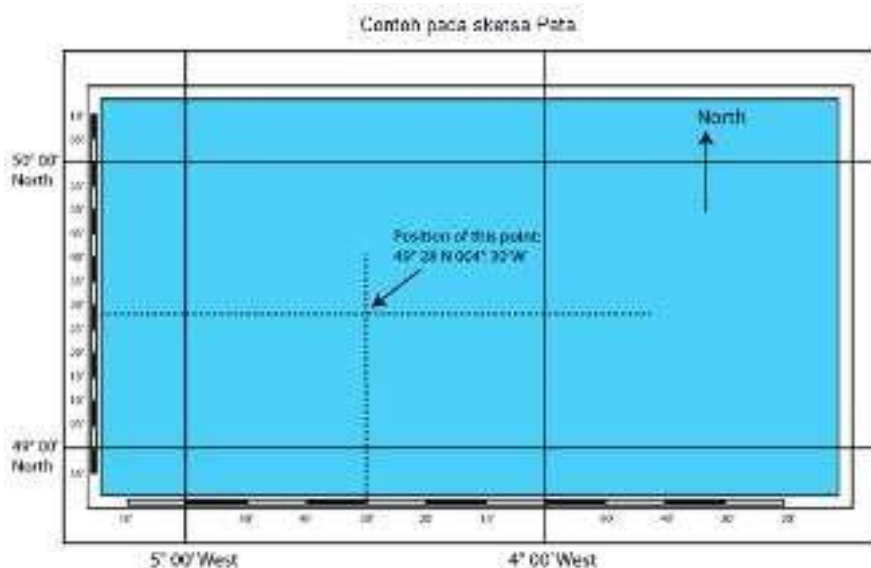
Positif adalah bujur timur

Negatif adalah bujur barat

Garis bujur adalah garis yang vertikal

4. Sumbu horizontal (0) adalah ekuator dan sumbu vertikal (0) Greenwich meridian.





Tahapan-tahapan yang harus dipahami sebelum melakukan penentuan posisi:

1. Dapat mengenali ciri-ciri lintang itu utara atau selatan.
2. Dapat mengenali ciri-ciri bujur itu timur atau barat.
3. Mampu membaca skala peta.
4. Terampil menggunakan peralatan yang akan digunakan untuk menggambar posisi di peta.

#### Mengenali Lintang dan Bujur:

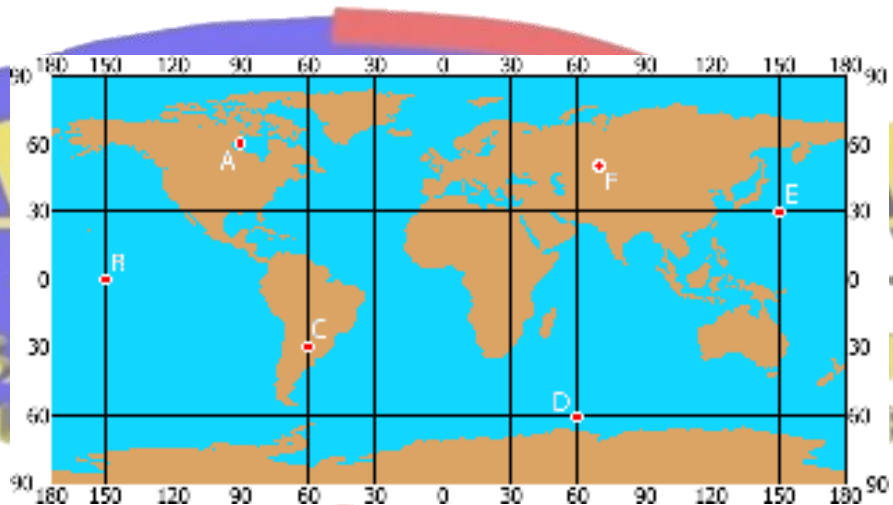
Untuk menentukan lintang apakah utara (*north*) atau selatan (*south*), dapat dilihat pada skala lintang yang berada pada tepi kiri dan kanan peta yaitu:

- Apabila pada skala tersebut nilai derajatnya makin ke atas semakin besar maka lintangnya adalah lintang utara (*north*).

- Apabila pada skala tersebut nilai derajatnya makin ke bawah semakin besar maka lintangnya adalah lintang selatan (*south*).

Untuk menentukan bujur apakah timur (*east*) atau barat (*west*), dapat dilihat pada skala bujur yang berada pada tepi atas dan bawah peta yaitu:

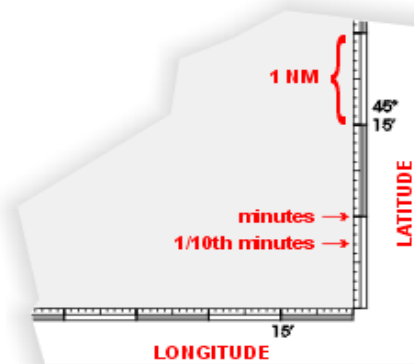
- Apabila pada skala tersebut nilai derajatnya makin ke kanan semakin besar maka bujurnya adalah bujur timur (*east*).
- Apabila pada skala tersebut nilai derajatnya makin ke kiri semakin besar maka bujurnya adalah bujur barat (*west*).



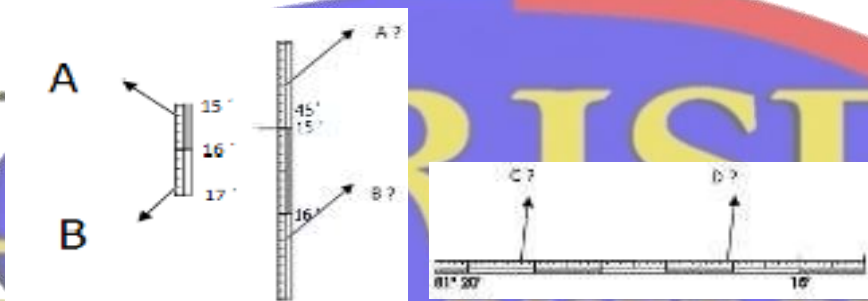
#### Membaca Skala Peta:

Untuk dapat membaca skala peta diperlukan ketelitian dan kemampuan dalam menghitung dari derajat ke menit, dari menit ke detik atau dengan kata lain mempunyai kemampuan untuk mengonversi.

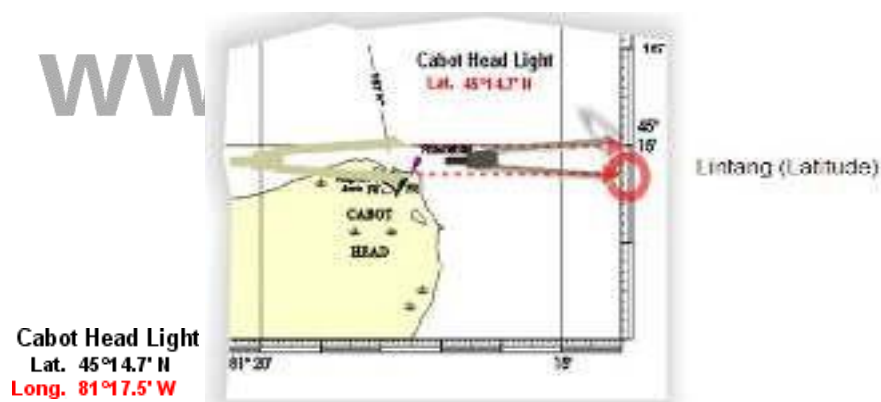
Contoh:

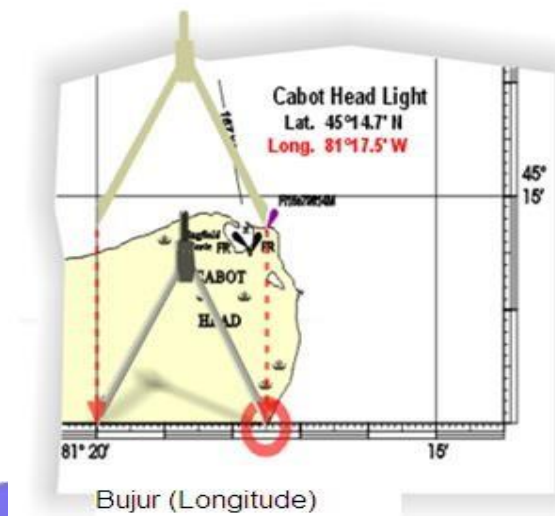


- $1^{\circ} = 60'$
- $1' = 10$  bagian
- Berarti 1 bagian =  $0,1'$



Contoh:





## Menggunakan peralatan menggambar

### 1. Mistar Jajar ( )

Untuk menggambar garis lintang ataupun garis bujur pada peta adalah sebagai berikut:

- Untuk menggambar garis lintang letakkanlah mistar jajar tepat segaris dengan garis bantu mendatar yang terdekat dengan titik posisi kapal.
- Untuk menggambar garis bujur letakkanlah mistar jajar tepat segaris dengan garis bantu tegak yang terdekat dengan titik posisi kapal.
- Geserkan mistar jajar tersebut menuju skala lintang dan bujur.
- Apabila Mistar jajarnya tidak cukup panjang untuk membuat garis perpotongan antara garis lintang dan garis bujur maka perlu menggeserkan dengan cara merapatkan kedua sisinya selama menggeser kesamping kiri dan kanan untuk garis

lintang dan menggeser ke atas dan ke bawah untuk garis bujur.



## 2. Penggaris Segitiga (*Nautical Protactor*)

Selain mistar jajar, sepasang penggaris segitiga dapat juga digunakan untuk menggambar posisi kapal dengan cara yang sama seperti halnya mistar jajar.



Ketika menjajarkan atau menggeserkan mistar-jajar, karena salah memegang mistar-jajar mengakibatkan mistar-jajar tidak lagi sejajar dengan garis bantu bujur atau lintang, maka pekerjaan harus diulangi lagi.

## MEMBARING

Membaring adalah suatu pekerjaan yang dilakukan di atas kapal untuk menentukan kedudukan atau posisi kapal dengan cara menentukan arah/sudut (mulai  $000^{\circ}$  sampai dengan  $359^{\circ}$ ) sesuatu benda yang dibaring terhadap kapal. Benda-benda yang dapat dipakai sebagai benda baringan adalah semua benda, baik yang terdapat di darat maupun yang berada di laut bahkan yang berada di angkasa, dengan satu syarat bahwa semua benda-benda tersebut ada tertera di peta laut.

Benda-benda baringan yang berada di darat (termasuk yang di laut) misalnya □Gunung, pulau, menara suar, □Tanjung, dan benda lain yang terdapat di peta yang dikenali.

Baringan dapat dibedakan menjadi 3 yaitu:

1. Baringan sejati
2. Baringan magnetik
3. Baringan relatif

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### Syarat-syarat dalam membaring:

Syarat-syarat yang harus dipenuhi oleh baringan dapat diformulasikan sebagai berikut:

1. Titik yang dibaring harus merupakan titik yang dikenal.
2. Alat yang dipergunakan harus terpasang baik.

3. Baringan harus dilakukan dengan secermat dan seteliti mungkin.
4. Catat Haluan kapal yang dikemudikan.
5. Jabarkanlah baringan pedoman (Bp) menjadi baringan sejati (Bs).
6. Pilihlah benda-benda baringan sebaik-baiknya:
  - Benda-benda yang terdekat.
  - Urutan membaring, benda I di arah muka atau belakang, jadi yang terdekat dengan garis haluan dan benda II adalah yang melintang kapal.

Prosedur membaring:

1. Pasanglah alat baring pada kompas di kapal.
2. Pilihlah benda-benda yang akan dibaring (usahakan lebih dari satu) dan periksalah apakah benda-benda baringan tadi tertera di atas peta laut atau tidak.
3. Bidiklah terlebih dahulu benda baringan yang berada di arah depan/belakang dari kapal (misalnya tanjung A = Tj. A) dengan cara menempatkan mata kita di belakang dari alat baring kemudian arahkan ke benda baringan. Garis khayal yang menghubungkan mata kita dengan benda baringan akan “memotong” angka pada kompas (angka yang terletak antara titik tengah kompas dengan benda baringan, misalnya 350 °). Angka tersebut adalah **baringan pedoman (Bp)** benda tadi terhadap kapal dan tulislah di buku tersendiri berikut waktunya (pukul berapa dilaksanakan membaring).

4. Kerjakanlah hal yang sama (butir 3 di atas) untuk benda baringan yang kedua, misalnya teluk B dengan Bp Teluk B = 1200 (Teluk B berada di bagian arah melintang kapal).
5. Perpotongan dua atau lebih garis baringan adalah posisi/ kedudukan kapal.

Pekerjaan membaring harus dilaksanakan dengan cepat dan tepat. Waktu yang diperlukan untuk membidik benda baringan yang satu ke benda baringan berikutnya harus cepat (dalam bilangan beberapa detik saja). Hal ini dimaksudkan agar tetap diperoleh sudut-sudut baringan yang faktual saat baringan dilakukan (karena kapal terus berjalan). Apabila ditemui dua atau lebih benda yang akan dibaring, ada beberapa hal yang perlu diperhatikan yaitu:

- a. Baringlah terlebih dahulu benda yang berada didepan/ belakang kapal, baru kemudian benda baringan yang berada di belakang dari arah melintang kapal. Alasan: ketika sedang berlayar, maka sudut benda-benda baringan yang berada di depan dari arah melintang kapal akan lebih cepat berubah kedudukannya terhadap kapal daripada benda - benda yang berada di depan/belakang kapal.
- b. Baringlah terlebih dahulu benda baringan yang terdekat baru kemudian yang lebih jauh kedudukannya dari kapal. Alasan: sudut benda baringan yang terdekat dengan kapal akan lebih cepat berubah bila dibandingkan dengan sudut benda baringan yang letaknya lebih jauh dari kapal (diasumsikan kapal sedang berjalan).
- c. Usahakan untuk tidak memilih benda-benda baringan yang sudutnya satu dengan lainnya membentuk sudut lebih kecil

dari  $10^\circ$  atau hampir mendekati  $180^\circ$  atau pilihlah agar garis-garis baringan membentuk sudut  $+ 90^\circ$ . Alasan: bila dua garis yang berpotongan membentuk sudut hampir membentuk satu garis, maka titik potongnya sulit untuk ditentukan, bandingkanlah jika kedua garis yang berpotongan itu membentuk sudut siku-siku.

## PENENTUAN POSISI DUGA

Pada zaman dahulu kala, ketika para pelaut dengan gagah beraninya mengarungi samudera yang luas dan hanya berbekal pengetahuan ala kadarnya, maka mereka mengembangkan perhitungan untuk mengetahui posisi duga sebagai suatu usaha agar kapalnya tetap pada posisi lintasannya. Perhitungan atau penentuan posisi duga dalam bahasa Inggris dikenal dengan istilah *dead reckoning* yang disingkat DR. Istilah posisi duga diperoleh sebagai suatu kesimpulan atas perhitungan duga, prosesnya adalah dengan menghitung secara ilmu ukur sudut atas kecepatan dan haluannya mulai dari tempat tolak kapal. Meskipun pada era yang sudah modern seperti saat ini, namun istilah posisi duga masih tetap digunakan. Perhitungan posisi duga merupakan pengetahuan yang sangat mendasar dalam menavigasi kapal. Perhitungan posisi duga adalah suatu proses untuk menentukan posisi kapal dengan menggunakan posisi terakhir yang telah ditentukan dengan baik/pasti. Hal ini dimulai dengan mengacu haluan sejati kapal, menghitung jarak yang telah ditempuh (dan hubungannya dengan putaran motor/mesin induk) atau perhitungan atas pengukuran kecepatan dan haluan sejati kapal tanpa

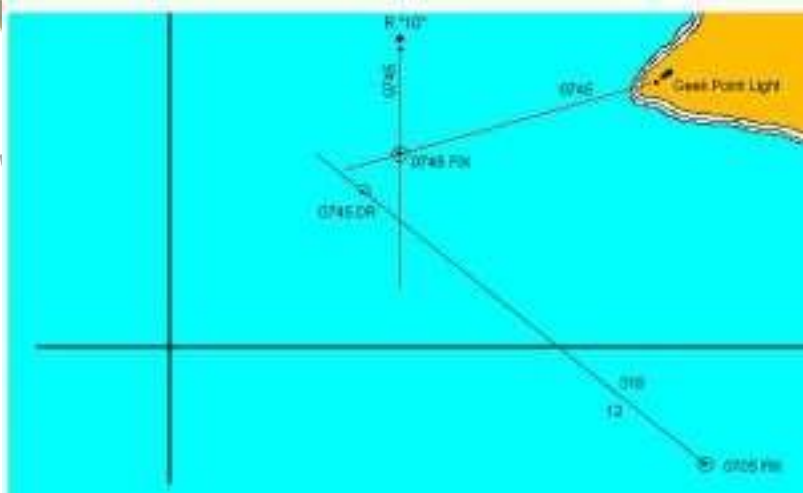
memperhitungkan pengaruh arus; dengan memproyeksikan haluan dan kecepatan kapal berikutnya dari posisi terakhir maka posisi kapal berikutnya dapat diperhitungkan.

### Prosedur Penentuan Posisi Duga

Penentuan posisi duga merupakan suatu proses yang umum dikerjakan di sebuah kapal guna mengetahui perkembangan pelayarannya. Penentuan posisi duga juga dilaksanakan dalam upaya mengembangkan rencana atau memproyeksikan rencana untuk arah pelayaran berikutnya. Unsur penting atau kunci dalam perhitungan posisi duga dapat disimpulkan sebagai berikut:

1. Hanya haluan sejati kapal yang diperhitungkan.
2. Jarak tempuh (jauh) yang diperhitungkan adalah yang sesuai dengan kecepatan putaran mesin induk kapal selama pelayaran berlangsung.
3. Penentuan posisi duga selalu dimulai dari posisi kapal yang terakhir (posisi pastinya atau *fixed position*).
4. Pengaruh arus tidak diperhitungkan. Di tengah laut tidak selalu kita dapat menetapkan secara pasti posisi kapal, hal ini mungkin disebabkan karena faktor cuaca, peralatan yang berfungsi kurang baik dan lain sebagainya. Pada kondisi seperti itu, seorang navigator harus mengandalkan perhitungan posisi duganya untuk menunjukkan keberadaan kapalnya saat itu. Penentuan posisi duga juga harus dilakukan pada keadaan yang ekstrem seperti di perairan yang dangkal atau pada daerah berbahaya lainnya. Jika kapal berlayar dengan haluan serta kecepatan sesuai dengan yang

biasanya dikerjakan di atas peta laut yang sesuai dengan daerah di mana kapal sedang berlayar. Hasil penentuan posisi duga tadi memungkinkan navigator untuk menggambarkan atau memvisualisasikan posisi kapalnya terhadap daratan atau bahaya-bahaya navigasi lain.



Sebagai tambahan atas simbol dan penandaan, ada 6 aturan dasar yang akan menuntun seorang navigator tentang kapan penentuan posisi duga dan pembuatan garis haluan dilakukan, yaitu:

1. Penentuan posisi duga harus dibuatkan jelas kapan waktu dilaksanakannya dalam setiap jam.
2. Penentuan posisi duga harus dibuat setiap perubahan haluan dilakukan.
3. Penentuan posisi duga harus dibuat ketika perubahan kecepatan kapal dilakukan.
4. Penentuan posisi duga harus dibuatkan jelas kapan waktu ditetapkan posisi pasti atau “*running fix*”.
5. Penentuan posisi duga harus dibuatkan jelas kapan waktunya ketika hanya diperoleh satu garis baringan.
6. Suatu garis haluan yang baru harus dibuat dari posisi yang pasti atau “*running fix*” segera setelah diketahui pasti kedudukannya di peta.



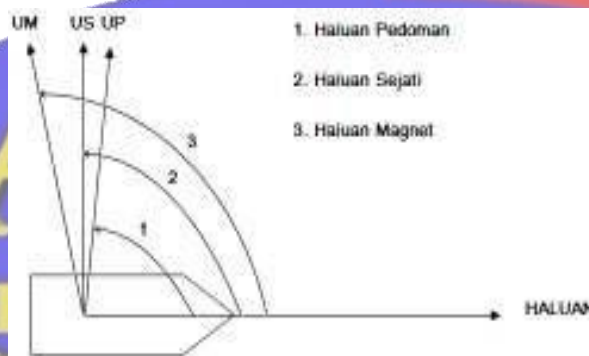
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## BAB V

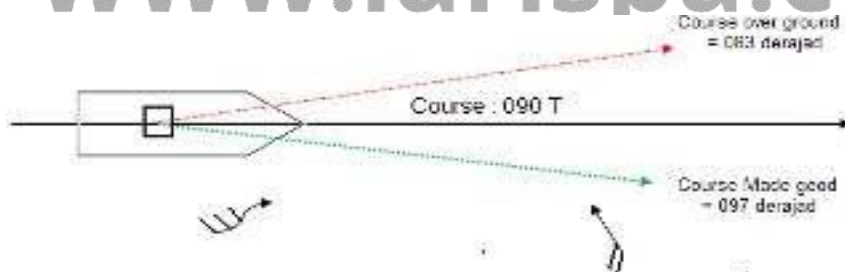
### MENJANGKA PETA UNTUK PELAYARAN

#### Definisi:

- HALUAN (*heading*) adalah sudut yang dibentuk antara garis lunas kapal dengan salah satu dari arah utara.  
Haluan selalu berubah dikarenakan pengaruh angin, ombak arus dan juga kesalahan di dalam mengemudi



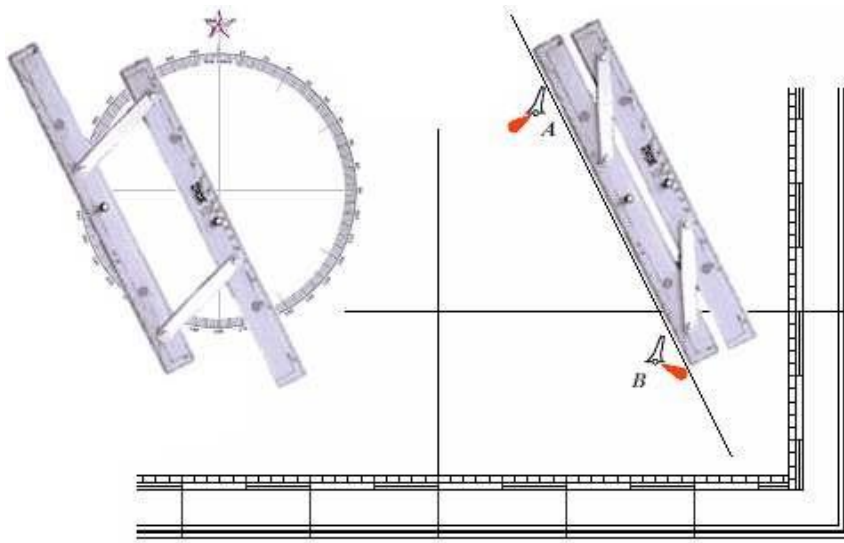
- Course* adalah haluan di peta di mana kapal akan dikemudi yang dinyatakan dalam derajat.



- *Distance* adalah jarak antara dua posisi (tempat) yang dinyatakan dalam satuan panjang, untuk navigasi laut maka satuan panjang yang digunakan adalah *nautical mile* (1 NM = 1852 meter).
- *Speed* adalah jarak yang ditempuh persatuan waktu.  
Contoh: Knot (NM/hours), KM/jam, meter/detik)
- *Speed through the water* adalah kecepatan kapal yang diukur berdasarkan air, di mana pengaruh arus belum diperhitungkan. *Speed through the water* ini dapat diperoleh pada alat pengukur kecepatan seperti: *shaft RPM, impeller log, pilot log, doppler speed log*.
- *Speed over ground* adalah kecepatan kapal yang diukur berdasarkan permukaan dasar laut/bumi. Nilai *speed over ground* dapat diperoleh dari GPS.

**Cara menentukan haluan sejati (*true course*) antara 2 posisi pada peta:**

1. Tariklah garis yang menghubungkan antara 2 posisi tersebut.
2. Ukurlah garis tersebut menggunakan garis mistar jajar atau sepasang penggaris segitiga dengan menggeserkan ke mawar pedoman (*compass rose*) yang terdekat atau menggunakan busur yang berada pada peralatan tersebut pada salah satu garis bujur yang terdekat.



#### Cara menentukan jarak pada peta:

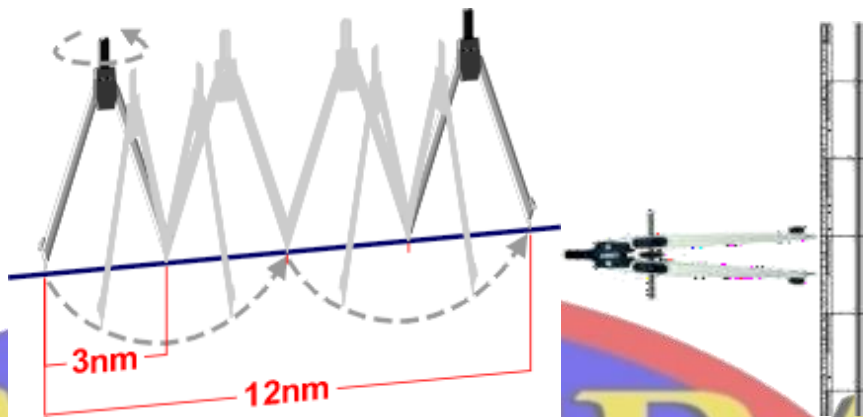
1. Secara manual (menjangka langsung)
2. Dengan perhitungan
  - a. Perhitungan manual
  - b. Menggunakan peralatan Navigasi seperti: GPS, Satnav, Loran

Penentuan jarak dapat juga menggunakan *distance table* (apabila mencari jarak estimasi antara dua pelabuhan/dua tempat

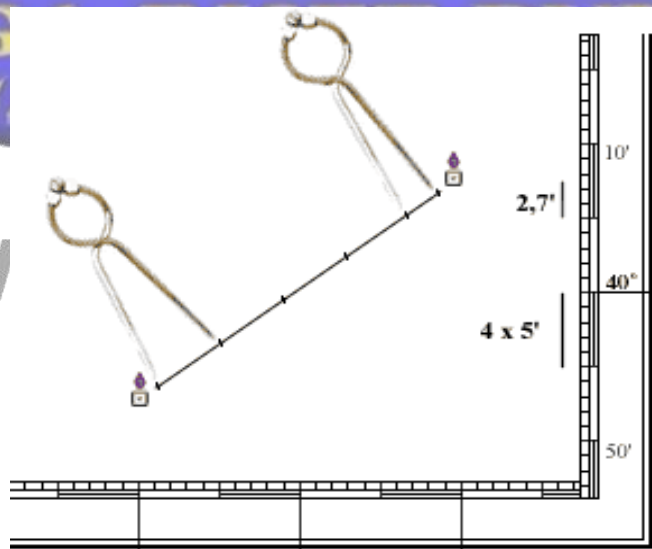
#### Pengukuran Jarak pada peta menggunakan jangka (devider) pada skala lintang

1. Pertama ambil jarak sesuai kebutuhan (misal: 1 mile, 5 mile, 10 mile, 15 mile, 20 mile, dst.) pada lintang menengahnya. (Ingat, hanya skala lintang yang digunakan untuk pengukuran jarak.)

2. Mulai menjangkakan jangka dari titik kesatu ke titik yang lain.
3. Kemudian mengukur sisa jarak pada lintang yang bersangkutan.



Contoh:

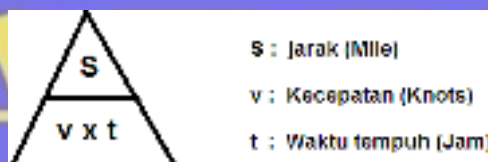


### Cara menentukan kecepatan antara 2 posisi:

Kecepatan merupakan jarak yang ditempuh per satuan waktu, ada beberapa satuan kecepatan yang sering digunakan untuk menyatakan besarnya kecepatan di antaranya:

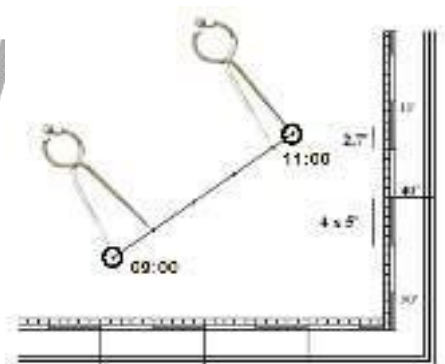
Km/jam, meter/detik, *mile/jam (knots)*, dan lain-lain. Namun satuan kecepatan yang digunakan untuk mengukur kecepatan kapal yang lazim adalah *knots*.

Untuk dapat menghitung besarnya kecepatan kapal maka perlu diketahui jarak yang ditempuh dan waktu yang diperlukan selama pelayaran. Dalam menghitung kecepatan dapat menggunakan rumusan sebagai berikut:



Contoh: Lihat gambar

Kapal berlayar selama 2 jam (09:00 s.d. 11:00) menempuh jarak 22,7 Mile  $\{(4 \times 5'') + 2,7''\}$



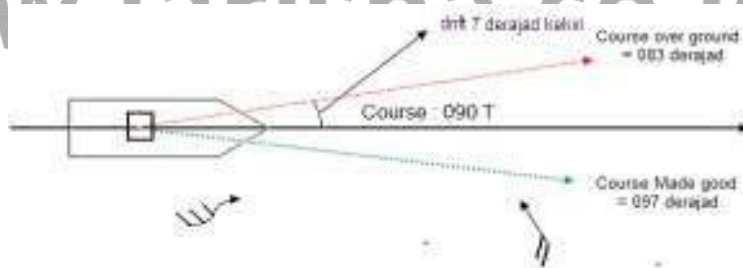
Maka kecepatan kapal tersebut dapat dihitung sebagai berikut:

$$\begin{aligned}v &= S : t \\&= 22,7 \text{ mile} : 2 \text{ jam} \\&= 11.35 \text{ knots}\end{aligned}$$

### Menentukan Haluan yang dikemudikan akibat pengaruh angin dan arus:

Untuk dapat mengemudikan kapal sesuai *track* yang telah ditetapkan harus senantiasa memperhatikan faktor-faktor lingkungan di antaranya angin dan arus. Dalam bernavigasi sering disebutkan istilah *drift*, *course over ground* dan *course made good*. Apakah arti dari istilah tersebut di atas? Untuk lebih jelasnya marilah kita perhatikan penjelasan dan gambar berikut:

- *Drift* adalah penyimpangan arah kapal karena pengaruh arus dan angin.
- *Course over ground* adalah arah yang diikuti kapal karena adanya pengaruh angin dan arus.
- *Course made good* adalah Arah yang harus dikemudikan (untuk mengantisipasi pengaruh angin dan arus) supaya kapal bergerak sesuai haluan di peta (*track*) yang telah ditetapkan.



### Menentukan besar kecilnya arus atau pasang surut dari peta.

Pada sebagian peta dengan skala besar kadang-kadang dijumpai tabel pasang surut untuk area setempat.

Contoh:

4° 30'

25'

Tidal Streams referred to HW at PLYMOUTH

| Hours                                              | Geographical Position                                            | A 50°12'11 N<br>4 30 0W | B 50°17'01 N<br>4 26 6W | C 50°18'31 N<br>4 10 8W | D 50°18'31 N<br>4 07 7W |
|----------------------------------------------------|------------------------------------------------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| Before<br>High Water<br>6<br>5<br>4<br>3<br>2<br>1 | Directions of streams (degrees)                                  | 253 0 5 0 2             | 253 0 8 0 4             | 236 0 7 0 4             | 297 0 8 0 4             |
|                                                    |                                                                  | 261 0 4 0 2             | 270 0 7 0 3             | 264 0 6 0 3             | 306 0 7 0 3             |
|                                                    |                                                                  | 261 0 2 0 1             | 282 0 5 0 2             | 316 0 6 0 3             | 307 0 6 0 3             |
|                                                    |                                                                  | 089 0 1 0 0             | 352 0 3 0 1             | 031 0 5 0 2             | 304 0 3 0 2             |
|                                                    |                                                                  | 089 0 3 0 2             | 040 0 5 0 3             | 047 0 7 0 4             | 098 0 3 0 1             |
|                                                    |                                                                  | 080 0 5 0 2             | 060 0 8 0 4             | 053 1 0 0 5             | 109 0 7 0 3             |
| High Water<br>1<br>2<br>3<br>4<br>5<br>6           | Rates at spring tides (knots)<br><br>Rates at neap tides (knots) | 076 0 5 0 2             | 072 0 9 0 5             | 081 1 0 0 5             | 110 0 9 0 4             |
|                                                    |                                                                  | 068 0 3 0 1             | 064 0 9 0 4             | 111 0 8 0 4             | 111 0 8 0 4             |
|                                                    |                                                                  | 059 0 2 0 1             | 103 0 6 0 3             | 129 0 3 0 2             | 121 0 6 0 3             |
|                                                    |                                                                  | 266 0 1 0 0             | 136 0 4 0 2             | 235 0 3 0 1             | 156 0 3 0 2             |
|                                                    |                                                                  | 247 0 3 0 1             | 207 0 3 0 2             | 242 0 8 0 4             | 265 0 4 0 2             |
|                                                    |                                                                  | 258 0 5 0 2             | 241 0 6 0 3             | 236 0 8 0 4             | 294 0 7 0 4             |
|                                                    |                                                                  | 252 0 5 0 3             | 249 0 8 0 4             | 232 0 9 0 5             | 296 0 8 0 4             |

Pada table di atas yang digunakan untuk referensi perhitungan arus pasang surut adalah Pelabuhan PLYMOUTH

Tanda belah ketupat dengan huruf di dalam berwarna jingga menunjukkan posisi arus pasang surut pada peta.

Besarnya arus pasang surut diberikan 6 jam sebelum HW dan 6 jam setelah HW ditunjukkan dalam *knots* baik pada *spring tide* maupun *neap tide*.

Arah arus pasang surut ditunjukkan dengan angka yang dicetak tebal.

**Contoh:**

*Tidal stream at tidal diamond C (which is marked on the main chart at the position given in the table) four hours after high water at Plymouth (Devonport) on a spring tide: it will be flowing in direction 242 ° (True) at a rate of 0.8 knots.*

*Tidal diamond A shows slack with the tide turning from west-going to east-going between four and three hours before HW, and the next slack (east-going to west-going) somewhere between 2 and 3 hours after HW.*

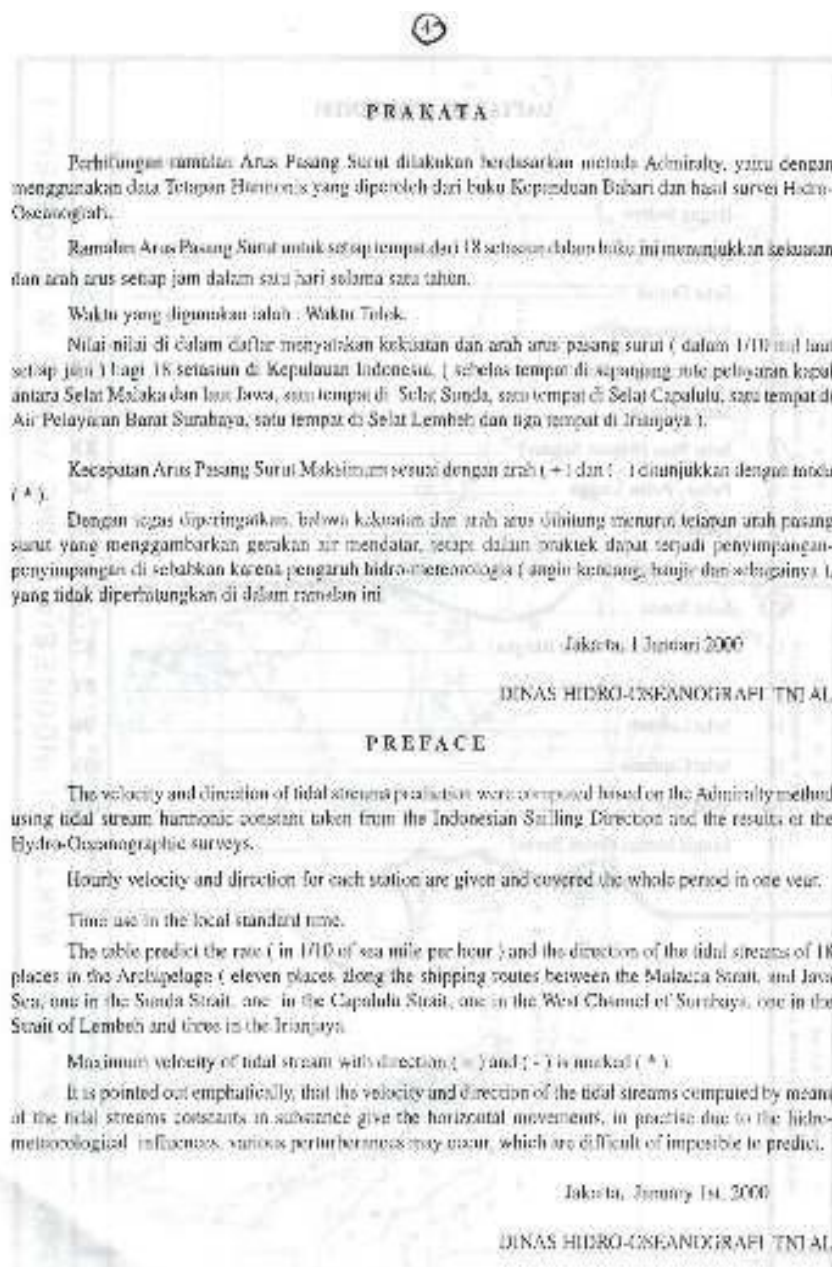
Untuk menghitung pada waktu yang diinginkan maka besarnya arus pasang surut dapat ditentukan dengan cara interpolasi

**Menentukan besar kecilnya arus dari daftar arus pasang surut (*tidal stream tables*).**

Besar kecilnya arus pasang surut dapat dilihat pada daftar arus pasang surut (*tidal stream tables*) untuk masing-masing waktu dan area. Pada umumnya waktu yang diberikan adalah waktu setempat (*standard time*). Untuk itu sebelum menggunakan daftar arus pasang surut terlebih dahulu harus dibaca prakata (*preface*) pada daftar arus pasang surut yang akan digunakan.

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Contoh daftar arus pasang surut:





# SINGAPORE - WESTERN ROADS

| JANUARY 1987 |    | LAT 01°14.0' N LONG 103°45.0' E |      |      |      |      |      |      |      |      |      |                              |      |      |      |      |     | HOURLY TOTAL STREAM |      |      |      |                  |      |      |      |  |
|--------------|----|---------------------------------|------|------|------|------|------|------|------|------|------|------------------------------|------|------|------|------|-----|---------------------|------|------|------|------------------|------|------|------|--|
|              |    | POSITIVE(+) - DIRECT ON 270°    |      |      |      |      |      |      |      |      |      | NEGATIVE(-) - DIRECT ON 270° |      |      |      |      |     |                     |      |      |      | (RATES IN MM/HR) |      |      |      |  |
| DAY          | HR | 00                              | 01   | 02   | 03   | 04   | 05   | 06   | 07   | 08   | 09   | 10                           | 11   | 12   | 13   | 14   | 15  | 16                  | 17   | 18   | 19   | 20               | 21   | 22   | 23   |  |
| 1            |    | -0.1                            | -0.3 | -0.3 | -0.3 | -0.3 | -0.4 | -0.4 | -0.4 | -0.4 | -0.5 | -0.6                         | -0.6 | -0.6 | -0.4 | -0.1 | 0.2 | 0.4                 | 0.6  | 0.7  | 0.8  | 0.8              | 0.7  | 0.7  | 0.7  |  |
| 2            |    | 0.1                             | 0.8  | 0.4  | 0.4  | 0.4  | 0.4  | 0.4  | 0.8  | 0.2  | 0.1  | 0.1                          | 0.1  | -0.2 | -0.2 | -0.1 | 0.1 | 0.3                 | 0.4  | 0.4  | 0.5  | 0.5              | 0.5  | 0.4  | 0.4  |  |
| 3            |    | -0.1                            | -0.4 | -0.5 | -0.5 | -0.5 | -0.5 | -0.4 | -0.3 | -0.1 | 0.1  | 0.3                          | 0.5  | 0.5  | 0.7  | 0.6  | 0.2 | 0.2                 | 0.2  | 0.7  | 0.7  | 0.8              | 0.8  | 0.8  | 0.7  |  |
| 4            |    | -0.2                            | -0.4 | -0.6 | -0.7 | -0.7 | -0.7 | -0.6 | -0.4 | -0.1 | 0.3  | 0.6                          | 0.7  | 0.7  | 0.7  | 0.8  | 0.3 | 0.4                 | 0.8  | 0.2  | 0.1  | -0.1             | -0.1 | -0.1 | -0.1 |  |
| 5            |    | -0.3                            | -0.5 | -0.6 | -0.6 | -0.6 | -0.6 | -0.8 | -0.6 | -0.2 | 0.2  | 0.7                          | 1.1  | 1.1  | 1.2  | 1.1  | 1.0 | 0.7                 | 0.4  | 0.2  | -0.2 | -0.3             | -0.3 | -0.3 | -0.4 |  |
| 6            |    | -0.5                            | -0.7 | -0.7 | -0.9 | -1.2 | -1.1 | -1.1 | -0.9 | -0.5 | 0.0  | 0.6                          | 1.1  | 1.1  | 1.1  | 1.0  | 0.6 | 0.0                 | 0.8  | 0.1  | -0.7 | -0.4             | -0.5 | -0.5 | -0.6 |  |
| 7            |    | -0.6                            | -0.7 | -0.9 | -1.0 | -1.1 | -1.2 | -1.3 | -1.3 | -1.0 | 0.4  | 0.5                          | 1.1  | 1.5  | 1.5  | 1.5  | 1.0 | 0.8                 | 1.4  | 0.8  | 0.1  | -0.3             | -0.5 | -0.6 | -0.6 |  |
| 8            |    | -0.7                            | -0.8 | -1.0 | -1.1 | -1.1 | -1.3 | -1.4 | -1.5 | -1.4 | -0.9 | -0.2                         | 0.3  | 1.3  | 1.3  | 1.1  | 0.3 | 0.2                 | 1.9  | 1.4  | 0.0  | 0.0              | -0.5 | -0.7 | -0.7 |  |
| 9            |    | -0.7                            | -0.8 | -1.0 | -1.1 | -1.2 | -1.3 | -1.4 | -1.5 | -1.7 | -1.4 | -0.8                         | 0.0  | 0.9  | 1.0  | 1.0  | 0.8 | 0.4                 | 2.3  | 1.9  | 1.0  | 0.5              | -0.7 | -0.6 | -0.7 |  |
| 10           |    | -0.7                            | -0.7 | -0.9 | -1.0 | -1.1 | -1.2 | -1.3 | -1.5 | -1.7 | -1.7 | 1.3                          | -0.8 | 0.2  | 1.0  | 1.0  | 0.7 | 0.8                 | 2.4  | 2.2  | 1.7  | 1.0              | 0.8  | 0.2  | 0.3  |  |
| 11           |    | -0.5                            | -0.5 | -0.7 | -0.8 | -1.0 | -1.0 | -1.1 | -1.3 | -1.5 | -1.7 | -1.6                         | -1.1 | -0.4 | -0.4 | 1.1  | 1.6 | 0.9                 | 2.2  | -2.3 | -2.0 | -1.4             | -0.7 | -0.1 | -0.3 |  |
| 12           |    | -0.5                            | -0.5 | -0.6 | -0.7 | -0.8 | -0.8 | -0.9 | -1.0 | -1.2 | -1.4 | -1.6                         | -1.4 | -0.9 | -0.8 | 0.9  | 1.1 | 1.6                 | 1.8  | -2.0 | -1.9 | -1.8             | -1.0 | -0.4 | -0.6 |  |
| 13           |    | -0.4                            | -0.5 | -0.6 | -0.6 | -0.6 | -0.6 | -0.7 | -0.7 | -0.8 | -1.0 | -1.2                         | -1.2 | -1.0 | -0.8 | 0.8  | 0.9 | 1.0                 | 1.3  | -1.5 | -1.6 | -1.5             | -1.1 | -0.3 | -0.5 |  |
| 14           |    | -0.2                            | -0.4 | -0.4 | -0.4 | -0.4 | -0.5 | -0.4 | -0.4 | -0.5 | -0.5 | -0.5                         | -0.5 | -0.3 | -0.7 | -0.3 | 0.1 | 0.5                 | 0.8  | -1.8 | -1.8 | -1.8             | -1.0 | -0.7 | -0.8 |  |
| 15           |    | -0.1                            | -0.3 | -0.4 | -0.4 | -0.4 | -0.4 | -0.3 | -0.2 | -0.2 | -0.2 | -0.3                         | -0.4 | -0.3 | -0.4 | -0.3 | 0.1 | 0.1                 | 0.5  | -0.9 | -0.7 | -0.8             | -0.7 | -0.3 | -0.2 |  |
| 16           |    | 0.0                             | -0.3 | -0.4 | -0.5 | -0.5 | -0.4 | -0.3 | -0.1 | 0.0  | 0.1  | 0.3                          | 0.4  | 0.0  | 0.0  | 0.0  | 0.0 | 0.4                 | 0.1  | 0.8  | 0.4  | 0.4              | 0.3  | 0.0  | 0.0  |  |
| 17           |    | -0.1                            | -0.3 | -0.4 | -0.6 | -0.6 | -0.6 | -0.6 | -0.6 | -0.6 | 0.1  | 0.3                          | 0.5  | 0.5  | 0.5  | 0.5  | 0.4 | 0.5                 | 0.2  | 0.0  | 0.1  | 0.0              | 0.0  | 0.1  | 0.0  |  |
| 18           |    | -0.3                            | -0.4 | -0.6 | -0.6 | -0.7 | -0.8 | -0.7 | -0.4 | 0.1  | 0.3  | 0.6                          | 0.8  | 0.9  | 0.9  | 0.7  | 0.5 | 0.2                 | -0.1 | -0.2 | -0.2 | -0.1             | -0.1 | -0.2 | -0.2 |  |
| 19           |    | -0.4                            | -0.5 | -0.6 | -0.7 | -0.9 | -1.0 | -1.0 | -0.7 | -0.3 | 0.2  | 0.6                          | 1.0  | 1.2  | 1.3  | 1.3  | 1.2 | 0.5                 | 0.5  | -0.1 | -0.2 | -0.3             | -0.5 | -0.4 | -0.5 |  |
| 20           |    | -0.5                            | -0.6 | -0.8 | -0.9 | -1.0 | -1.1 | -1.2 | -1.1 | -0.7 | -0.1 | 0.5                          | 1.0  | 1.3  | 1.5  | 1.6  | 1.5 | 1.3                 | 0.9  | -0.4 | -0.6 | -0.8             | -0.8 | -0.8 | -0.9 |  |
| 21           |    | -0.5                            | -0.6 | -0.8 | -0.9 | -1.1 | -1.2 | -1.3 | -1.3 | -1.1 | -0.5 | 0.1                          | 0.9  | 1.3  | 1.6  | 1.7  | 1.6 | 1.1                 | 1.3  | 0.0  | 0.8  | -0.1             | -0.3 | -0.4 | -0.4 |  |
| 22           |    | -0.4                            | -0.6 | -0.8 | -0.9 | -1.1 | -1.2 | -1.4 | -1.5 | -1.4 | -0.6 | -0.3                         | 0.8  | 1.0  | 1.6  | 1.8  | 1.8 | 1.6                 | 1.4  | -1.1 | 0.6  | 0.1              | -0.2 | -0.3 | -0.4 |  |
| 23           |    | -0.4                            | -0.6 | -0.7 | -0.8 | -1.0 | -1.2 | -1.4 | -1.6 | -1.6 | -1.3 | 0.7                          | 0.9  | 1.1  | 1.8  | 1.9  | 1.9 | 1.7                 | 1.2  | -1.4 | 0.0  | 0.3              | 0.1  | -0.3 | -0.4 |  |
| 24           |    | 0.2                             | 0.4  | 0.5  | 0.7  | 0.9  | 1.1  | 1.3  | 1.5  | 1.6  | 1.5  | 0.7                          | 0.4  | 0.3  | 0.9  | 1.4  | 1.7 | 1.5                 | 1.3  | -1.6 | 1.1  | 0.0              | 0.1  | -0.2 | -0.3 |  |
| 25           |    | -0.2                            | -0.2 | -0.3 | -0.5 | -0.7 | -0.9 | -1.1 | -1.3 | -1.5 | -1.6 | -1.3                         | -0.8 | -0.1 | 0.6  | 1.1  | 1.5 | 1.7                 | 1.7  | -1.6 | 1.5  | 0.7              | 0.7  | -0.1 | -0.3 |  |
| 26           |    | -0.2                            | -0.2 | -0.2 | -0.3 | -0.5 | -0.6 | -0.6 | -0.7 | -1.1 | -1.3 | -1.5                         | -1.4 | -1.0 | -0.4 | 0.5  | 0.8 | 1.2                 | 1.4  | -1.5 | 1.3  | 0.8              | 0.1  | -0.1 | -0.3 |  |
| 27           |    | -0.3                            | -0.1 | -0.1 | -0.2 | -0.3 | -0.4 | -0.5 | -0.7 | -1.0 | -1.2 | -1.3                         | -1.1 | -0.6 | 0.0  | 0.5  | 0.9 | 1.3                 | 1.3  | -1.3 | 1.2  | 0.9              | 0.4  | 0.0  | 0.3  |  |
| 28           |    | -0.3                            | -0.3 | -0.1 | 0.1  | 0.1  | 0.2  | 0.3  | 0.4  | 0.6  | 0.9  | 1.1                          | 1.0  | 0.7  | 0.2  | 0.3  | 0.5 | 0.7                 | 1.0  | -1.1 | 1.2  | 0.8              | 0.4  | 0.0  | 0.3  |  |
| 29           |    | -0.4                            | -0.3 | -0.1 | 0.0  | 0.0  | 0.1  | 0.1  | 0.2  | 0.3  | 0.5  | 0.7                          | 0.8  | -0.7 | -0.4 | 0.1  | 0.4 | 0.5                 | 0.7  | 0.8  | 0.7  | 0.6              | 0.4  | 0.0  | 0.3  |  |
| 30           |    | -0.5                            | -0.4 | -0.3 | -0.1 | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | -0.1 | -0.3                         | -0.4 | -0.4 | -0.5 | 0.0  | 0.5 | 0.4                 | 0.5  | 0.5  | 0.5  | 0.4              | 0.0  | 0.0  | 0.3  |  |
| 31           |    | -0.5                            | -0.6 | -0.4 | -0.3 | -0.1 | 0.0  | 0.0  | 0.2  | 0.3  | 0.3  | 0.3                          | 0.3  | 0.0  | -0.1 | 0.0  | 0.1 | 0.3                 | 0.3  | 0.2  | 0.2  | 0.1              | 0.0  | -0.3 | -0.4 |  |

CURRENT NL

# SINGAPORE STRAIT - KARANG BANTENG (BUFFALO ROCK)

LAT 1° 15' N LONG 103° 16' E

TOTAL STRONG PRECEDING PAGES 10-10000

POS AND IN DEFLECTION FOR NEGATIVE POS IN BOTTOM OF

TIME 2019-2020

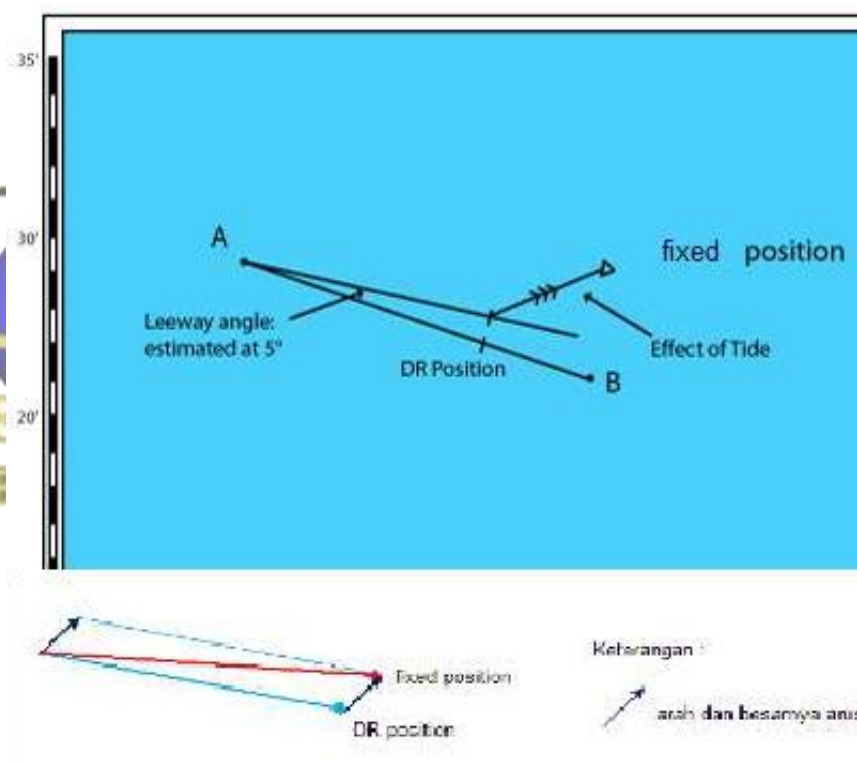
YEAR 1900

| JANUARY |         |      |         | FEBRUARY |         |      |         | MARCH |         |       |         |
|---------|---------|------|---------|----------|---------|------|---------|-------|---------|-------|---------|
| BLACK   | MAXIMUM | TIME | MINIMUM | BLACK    | MAXIMUM | TIME | MINIMUM | BLACK | MAXIMUM | TIME  | MINIMUM |
| 1       | 1.114   | 1.4  | 16      | 1.044    | -0.1    | 16   | 1.012   | 1.012 | 1.012   | 1.012 | 1.012   |
| 2       | 1.044   | 1.4  | 16      | 1.012    | -0.1    | 16   | 1.012   | 1.012 | 1.012   | 1.012 | 1.012   |
| 3       | 1.012   | 1.4  | 16      | 1.012    | -0.1    | 16   | 1.012   | 1.012 | 1.012   | 1.012 | 1.012   |
| 4       | 1.012   | 1.4  | 16      | 1.012    | -0.1    | 16   | 1.012   | 1.012 | 1.012   | 1.012 | 1.012   |
| 5       | 1.012   | 1.4  | 16      | 1.012    | -0.1    | 16   | 1.012   | 1.012 | 1.012   | 1.012 | 1.012   |
| 6       | 1.012   | 1.4  | 16      | 1.012    | -0.1    | 16   | 1.012   | 1.012 | 1.012   | 1.012 | 1.012   |
| 7       | 1.012   | 1.4  | 16      | 1.012    | -0.1    | 16   | 1.012   | 1.012 | 1.012   | 1.012 | 1.012   |
| 8       | 1.012   | 1.4  | 16      | 1.012    | -0.1    | 16   | 1.012   | 1.012 | 1.012   | 1.012 | 1.012   |
| 9       | 1.012   | 1.4  | 16      | 1.012    | -0.1    | 16   | 1.012   | 1.012 | 1.012   | 1.012 | 1.012   |
| 10      | 1.012   | 1.4  | 16      | 1.012    | -0.1    | 16   | 1.012   | 1.012 | 1.012   | 1.012 | 1.012   |
| 11      | 1.012   | 1.4  | 16      | 1.012    | -0.1    | 16   | 1.012   | 1.012 | 1.012   | 1.012 | 1.012   |
| 12      | 1.012   | 1.4  | 16      | 1.012    | -0.1    | 16   | 1.012   | 1.012 | 1.012   | 1.012 | 1.012   |
| 13      | 1.012   | 1.4  | 16      | 1.012    | -0.1    | 16   | 1.012   | 1.012 | 1.012   | 1.012 | 1.012   |
| 14      | 1.012   | 1.4  | 16      | 1.012    | -0.1    | 16   | 1.012   | 1.012 | 1.012   | 1.012 | 1.012   |
| 15      | 1.012   | 1.4  | 16      | 1.012    | -0.1    | 16   | 1.012   | 1.012 | 1.012   | 1.012 | 1.012   |
| 16      | 1.012   | 1.4  | 16      | 1.012    | -0.1    | 16   | 1.012   | 1.012 | 1.012   | 1.012 | 1.012   |
| 17      | 1.012   | 1.4  | 16      | 1.012    | -0.1    | 16   | 1.012   | 1.012 | 1.012   | 1.012 | 1.012   |
| 18      | 1.012   | 1.4  | 16      | 1.012    | -0.1    | 16   | 1.012   | 1.012 | 1.012   | 1.012 | 1.012   |
| 19      | 1.012   | 1.4  | 16      | 1.012    | -0.1    | 16   | 1.012   | 1.012 | 1.012   | 1.012 | 1.012   |
| 20      | 1.012   | 1.4  | 16      | 1.012    | -0.1    | 16   | 1.012   | 1.012 | 1.012   | 1.012 | 1.012   |
| 21      | 1.012   | 1.4  | 16      | 1.012    | -0.1    | 16   | 1.012   | 1.012 | 1.012   | 1.012 | 1.012   |
| 22      | 1.012   | 1.4  | 16      | 1.012    | -0.1    | 16   | 1.012   | 1.012 | 1.012   | 1.012 | 1.012   |
| 23      | 1.012   | 1.4  | 16      | 1.012    | -0.1    | 16   | 1.012   | 1.012 | 1.012   | 1.012 | 1.012   |
| 24      | 1.012   | 1.4  | 16      | 1.012    | -0.1    | 16   | 1.012   | 1.012 | 1.012   | 1.012 | 1.012   |
| 25      | 1.012   | 1.4  | 16      | 1.012    | -0.1    | 16   | 1.012   | 1.012 | 1.012   | 1.012 | 1.012   |
| 26      | 1.012   | 1.4  | 16      | 1.012    | -0.1    | 16   | 1.012   | 1.012 | 1.012   | 1.012 | 1.012   |
| 27      | 1.012   | 1.4  | 16      | 1.012    | -0.1    | 16   | 1.012   | 1.012 | 1.012   | 1.012 | 1.012   |
| 28      | 1.012   | 1.4  | 16      | 1.012    | -0.1    | 16   | 1.012   | 1.012 | 1.012   | 1.012 | 1.012   |
| 29      | 1.012   | 1.4  | 16      | 1.012    | -0.1    | 16   | 1.012   | 1.012 | 1.012   | 1.012 | 1.012   |
| 30      | 1.012   | 1.4  | 16      | 1.012    | -0.1    | 16   | 1.012   | 1.012 | 1.012   | 1.012 | 1.012   |
| 31      | 1.012   | 1.4  | 16      | 1.012    | -0.1    | 16   | 1.012   | 1.012 | 1.012   | 1.012 | 1.012   |

FOR MORE INFORMATION SEE PAGES 10-10000

**Menghitung besar kecil arus dan pasang surut sesungguhnya dari posisi DR dan posisi sejati.**

Selain dari data di peta dan dari tabel, arus pasang surut dapat diketahui dengan observasi posisi duga dan posisi sejati pada peta dengan menjabarkan antara posisi duga dan posisi sejati ke dalam vektor, dengan demikian maka besarnya dan arah arus dapat diprediksikan.



## BAB VI

### INFORMASI PETA



Seorang mualim harus mempunyai kemampuan untuk membaca keterangan dan simbol-simbol yang terdapat di dalam peta. Untuk membantu memahami keterangan maupun simbol yang terdapat di dalam peta maka dapat digunakan:

1. International *symbol and abbreviations* (chart 5011)
2. Peta No.1 (untuk Indonesia dan Amerika)

Berikut ini lampiran simbol dan keterangan *chart* 5011

## Areas, Limits

### General

**NOS** National Ocean Service (US)

**NIMA** National Imagery and Mapping Agency (US)

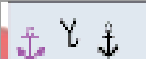
**IHO** International Hydrographic Organization

| NOS/NIMA |                                                                       | IHO/Foreign NIMA Charts |
|----------|-----------------------------------------------------------------------|-------------------------|
|          | Maritime limit in general, usually implying permanent obstructions    |                         |
|          | Maritime limit in general, usually implying NO permanent obstructions |                         |
|          | Limit of restricted area                                              |                         |
|          | Limit of prohibited area (no unauthorized entry)                      |                         |

## Anchorage, Anchorage Areas

|             |                                          |
|-------------|------------------------------------------|
| <b>NOS</b>  | National Ocean Service (US)              |
| <b>NIMA</b> | National Imagery and Mapping Agency (US) |
| <b>IHO</b>  | International Hydrographic Organization  |

| NOS | NIMA |                                                                  | IHO | Foreign NIMA Charts |
|-----|------|------------------------------------------------------------------|-----|---------------------|
|     |      | Anchorage (large vessels)                                        |     |                     |
|     |      | Anchorage (small vessels)                                        |     |                     |
|     |      | Anchor berths                                                    |     |                     |
|     |      | Anchor berths (swinging circle may be shown)                     |     |                     |
|     |      | Anchorage area in general                                        |     |                     |
|     |      | Numbered anchorage area                                          |     |                     |
|     |      | Named anchorage area                                             |     |                     |
|     |      | Deep Water Anchorage area, Anchorage area for Deep Draft Vessels |     |                     |
|     |      | Tanker anchorage area                                            |     |                     |
|     |      | Anchorage for periods up to 24 hours                             |     |                     |

| NOS                                                                                                                   | NIMA                                                                              |                           | IHO                                                                               | Foreign NIMA Charts                                                                |
|-----------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|---------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
|                                      |                                                                                   | Explosives anchorage area |  |                                                                                    |
|                                      |  | Quarantine anchorage area |  |  |
|                                                                                                                       |                                                                                   | Reserved anchorage        |  |  |
| Note: Anchors as part of the limit symbol are not shown for small areas. Other types of anchorage areas may be shown. |                                                                                   |                           |                                                                                   |                                                                                    |
|                                                                                                                       |                                                                                   | Sea-plane landing area    |  |  |
|                                                                                                                       |                                                                                   | Anchorage for sea-planes  |  |  |



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## Restricted Areas

|             |                                          |
|-------------|------------------------------------------|
| <b>NOS</b>  | National Ocean Service (US)              |
| <b>NIMA</b> | National Imagery and Mapping Agency (US) |
| <b>IHO</b>  | International Hydrographic Organization  |

| NOS | NIMA |                                                                                             | IHO | Foreign NIMA Charts |
|-----|------|---------------------------------------------------------------------------------------------|-----|---------------------|
|     |      | Anchoring prohibited                                                                        |     |                     |
|     |      | Fishing prohibited                                                                          |     |                     |
|     |      | Limit of reserve:<br>Nature reserve,<br>Bird sanctuary,<br>Game preserve,<br>Seal sanctuary |     |                     |
|     |      | Explosives dumping ground                                                                   |     |                     |
|     |      | Explosives dumping ground (disused)<br>Foul (explosives)                                    |     |                     |
|     |      | Dumping ground for chemical waste                                                           |     |                     |
|     |      | Degaussing range                                                                            |     |                     |
|     |      | Degaussing range                                                                            |     |                     |

## Military Practice Areas

**NOS** National Ocean Service (US)

**NIMA** National Imagery and Mapping Agency (US)

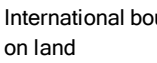
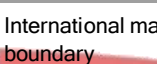
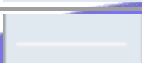
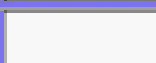
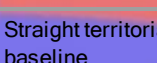
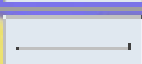
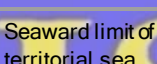
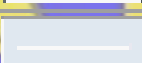
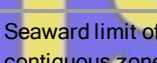
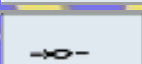
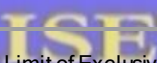
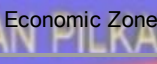
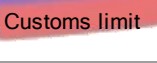
**IHO** International Hydrographic Organization

| NOS                                                                               | NIMA                                                                              |                                          | IHO                                                                                | Foreign NIMA Charts |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------|------------------------------------------------------------------------------------|---------------------|
|                                                                                   |                                                                                   | Firing danger area                       |   |                     |
|  |  | Military area, entry prohibited          |   |                     |
|                                                                                   |                                                                                   | Mine-laying practice area                |   |                     |
|                                                                                   |                                                                                   | Submarine transit lane and exercise area |   |                     |
|                                                                                   |                                                                                   | Mine field                               |  |                     |

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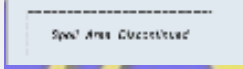
## International Boundaries and National Limits

**NOS** National Ocean Service (US)  
**NIMA** National Imagery and Mapping Agency (US)  
**IHO** International Hydrographic Organization

| NOS                                                                                 | NIMA                                                                                |                                   | IHO                                                                                 | Foreign NIMA Charts                                                                 |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-----------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|    |    | International boundary on land    |    |                                                                                     |
|    |    | International maritime boundary   |    |                                                                                     |
|    |    | Straight territorial sea baseline |    |                                                                                     |
|    |    | Seaward limit of territorial sea  |    |                                                                                     |
|    |    | Seaward limit of contiguous zone  |    |                                                                                     |
|    |    | Limits of fishery zones           |    |                                                                                     |
|  |  | Limit of Exclusive Economic Zone  |  |                                                                                     |
|                                                                                     |                                                                                     | Customs limit                     |  |  |
|                                                                                     |  | Harbor limit                      |  |  |

## Various Limits

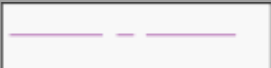
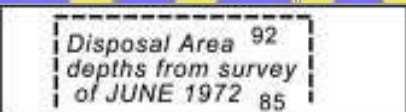
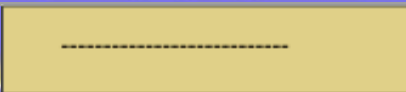
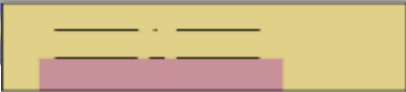
|             |                                          |
|-------------|------------------------------------------|
| <b>NOS</b>  | National Ocean Service (US)              |
| <b>NIMA</b> | National Imagery and Mapping Agency (US) |
| <b>IHO</b>  | International Hydrographic Organization  |

| NOS/NIMA                                                                          |                                      | IHO                                                                                 | Foreign NIMA Charts                                                                |
|-----------------------------------------------------------------------------------|--------------------------------------|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
|  | Limit of fast ice, ice front         |    |                                                                                    |
|                                                                                   | Limit of sea ice (pack ice)-seasonal |    |                                                                                    |
|  | Log pond                             |    |  |
|  | Spoil ground                         |    |  |
|  | Spoil ground (disused)               |    |                                                                                    |
|                                                                                   | Dredging area                        |   |                                                                                    |
|                                                                                   | Cargo transshipment area             |  |                                                                                    |
|                                                                                   | Incineration area                    |  |                                                                                    |

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## Supplementary National Simbols

|             |                                          |
|-------------|------------------------------------------|
| <b>NOS</b>  | National Ocean Service (US)              |
| <b>NIMA</b> | National Imagery and Mapping Agency (US) |
| <b>IHO</b>  | International Hydrographic Organization  |

| NOS                                                                                 | NIMA |                                          |
|-------------------------------------------------------------------------------------|------|------------------------------------------|
|    |      | COLREGS demarcation line                 |
|    |      | Limit of fishing areas (fish trap areas) |
|    |      | Dumping ground                           |
|    |      | Disposal area (Dump Site)                |
|   |      | Limit of airport                         |
|  |      | Reservation line (Options)               |
|  |      | Dump Site                                |

# Buoys, Beacons

## Characteristics Common to Buoys and Beacons

|      |                                          |
|------|------------------------------------------|
| NOS  | National Ocean Service (US)              |
| NIMA | National Imagery and Mapping Agency (US) |
| IHO  | International Hydrographic Organization  |

| NOS                                                                                                                                                                                | NIMA |                                                                                   | IHO |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-----------------------------------------------------------------------------------|-----|
|                                                                                                                                                                                    |      | Position of buoy                                                                  |     |
| <b>Colors of Buoys and Beacon Topmarks</b>                                                                                                                                         |      |                                                                                   |     |
|                                                                                                                                                                                    |      | Green and black                                                                   |     |
|                                                                                                                                                                                    |      | Single colors other than green and black                                          |     |
|                                                                                                                                                                                    |      | Multiple colors in horizontal bands. The color sequence is from top to bottom.    |     |
|                                                                                                                                                                                    |      | Multiple colors in vertical or diagonal stripes. The darker color is given first. |     |
| <i>Note: Retroreflecting material may be fitted to some unit marks. Charts do not usually show it. Under IALA Recommendations, black bands will appear blue under a spotlight.</i> |      |                                                                                   |     |
| <b>Lighted Marks</b>                                                                                                                                                               |      |                                                                                   |     |
|                                                                                                                                                                                    |      | Lighted marks on standard charts.                                                 |     |
|                                                                                                                                                                                    |      | Lighted marks on multicolored charts.                                             |     |
| <b>Topmarks and Radar Reflectors</b>                                                                                                                                               |      |                                                                                   |     |
|                                                                                                                                                                                    |      | IALA System buoy topmarks (beacon topmarks shown upright)                         |     |

| NOS                                                                                                                                                                 | NIMA                                                                                   |                                                             | IHO                                                                                     |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|-------------------------------------------------------------|-----------------------------------------------------------------------------------------|
|                                                                                                                                                                     |  No 2 | Beacon with topmark, color, radar reflector and designation |  No 2 |
|   |  No 3 | Buoy with topmark, color, radar reflector and designation   |  No 3 |
| <i>Note: Radar reflectors on floating marks are usually not charted.</i>                                                                                            |                                                                                        |                                                             |                                                                                         |

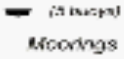


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## Buoy Shapes and Types

|             |                                          |
|-------------|------------------------------------------|
| <b>NOS</b>  | National Ocean Service (US)              |
| <b>NIMA</b> | National Imagery and Mapping Agency (US) |
| <b>IHO</b>  | International Hydrographic Organization  |

| NOS                                                                                 | NIMA                                                                                |                                                            | IHO                                                                                 | Foreign NIMA Charts                                                                 |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|    |    | Conical buoy, nun buoy                                     |    |                                                                                     |
|    |    | Can or cylindrical buoy                                    |    |                                                                                     |
|    |    | Spherical buoy                                             |    |                                                                                     |
|    |    | Pillar buoy                                                |    |                                                                                     |
|    |    | Spar buoy, spingle buoy                                    |    |                                                                                     |
|   |   | Barrel buoy                                                |   |                                                                                     |
|  |  | Super buoy                                                 |  |                                                                                     |
| <b>Light Floats</b>                                                                 |                                                                                     |                                                            |                                                                                     |                                                                                     |
|  |  | Light float (unmanned light-vessel) as part of IALA System |  |  |
|                                                                                     |  | Light float not part of IALA System                        |  |                                                                                     |
| <b>Mooring Buoys</b>                                                                |                                                                                     |                                                            |                                                                                     |                                                                                     |
|  |                                                                                     | Mooring buoys                                              |  |                                                                                     |

| NOS                                                                               | NIMA                                                                              |                                                          | IHO                                                                                | Foreign NIMA Charts |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|----------------------------------------------------------|------------------------------------------------------------------------------------|---------------------|
|  |  | Lighted mooring buoy (example)                           |   |                     |
|                                                                                   |                                                                                   | Trot, mooring buoys with ground tackle and berth numbers |  |                     |
|                                                                                   |  | Mooring buoy with telegraphic communication              |   |                     |
|                                                                                   |  | Mooring buoy with telephonic communication               |   |                     |
|                                                                                   |  | Numerous moorings (example)                              |  |                     |



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## Special Purpose Buoys, Seasonal Buoys

**NOS** National Ocean Service (US)  
**NIMA** National Imagery and Mapping Agency (US)  
**IHO** International Hydrographic Organization

| NOS                                                                                 | NIMA                                                |                                                                                   | IHO/Foreign NIMA Charts                                                                        |
|-------------------------------------------------------------------------------------|-----------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|
|                                                                                     |                                                     | Firing danger area (Danger Zone) buoy                                             |  US           |
|                                                                                     |                                                     | Target                                                                            |  Light        |
|                                                                                     |                                                     | Marker Ship                                                                       |  Ship         |
|                                                                                     |                                                     | Barge                                                                             |  Barge        |
|                                                                                     |                                                     | Degaussing Range buoy                                                             |  Degaussing   |
|    |                                                     | Cable buoy                                                                        |  Cable        |
|   |                                                     | Spoil ground buoy                                                                 |  Spoil       |
|  |                                                     | Buoy marking outfall                                                              |  Outfall    |
|  |                                                     | ODAS (Ocean Data Acquisition System) buoy; Data-collecting buoy of superbuoy size |  ODAS       |
|  |                                                     | Special purpose buoys                                                             |                                                                                                |
|                                                                                     |                                                     | Wave recorder, current meter                                                      |  Wave       |
|  |                                                     | Seaplane anchorage buoy                                                           |                                                                                                |
|                                                                                     |                                                     | Buoy marking recreation zone                                                      |  Recreation |
| <b>Seasonal Buoys</b>                                                               |                                                     |                                                                                   |                                                                                                |
|  | (maintained by private interests, use with caution) | Buoy privately maintained (example)                                               |  Priv       |
|                                                                                     |                                                     | Seasonal buoy (example)                                                           |  (Aer-Gol)  |

## IALA Maritime Buoyage System

**IALA**            International Association of Lighthouse Authorities

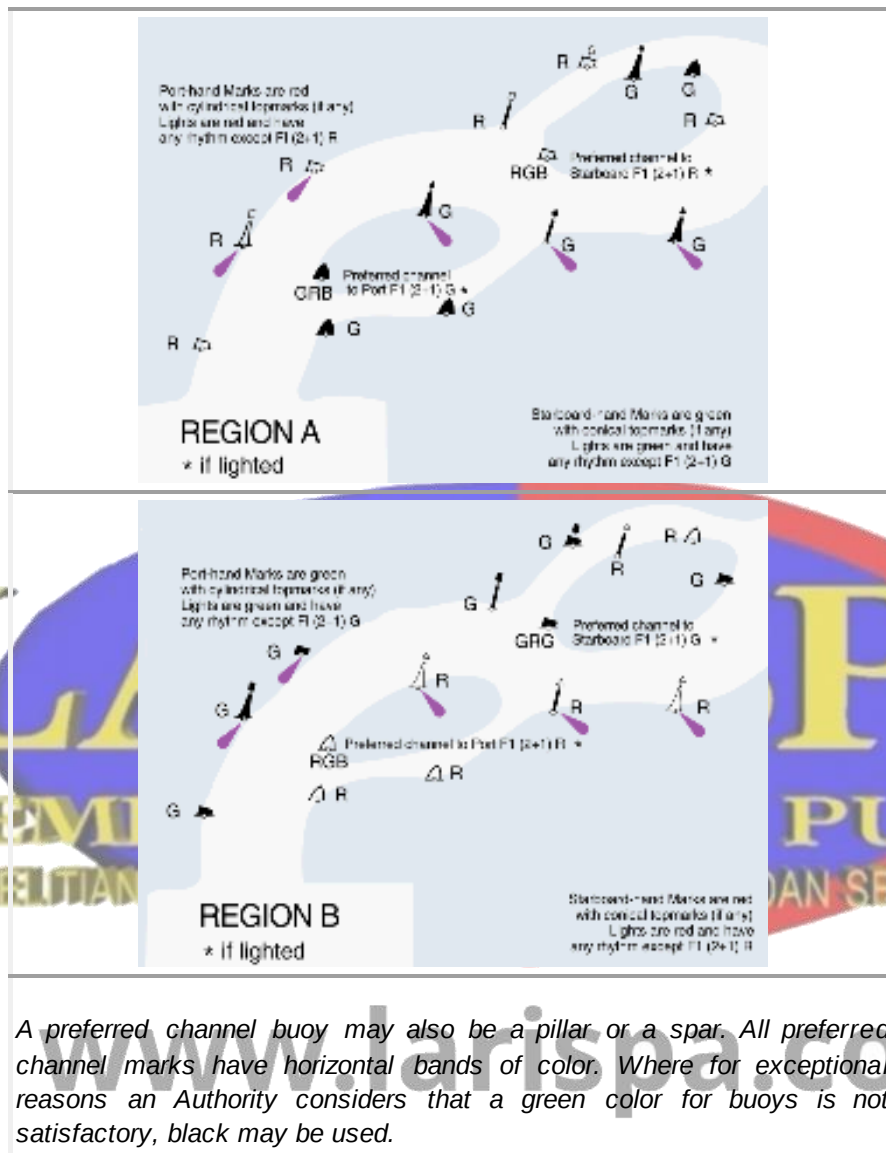
Where in force, the IALA System applies to all fixed and floating marks except lighthouses, sector lights, leading lights and leading marks, light-vessels and lanterns. The standard buoy shapes are cylindrical (can), conical, spherical, pillar and spar. Variations may occur; for example, light-floats. (See Buoy Shapes and Types for examples.) In the illustrations below, only the standard buoy shapes are used. In the case of fixed beacons (lit or unlit), only the shape of the topmark is of navigational significance.

**Lateral Marks** are generally for well-defined channels. There are two international Buoyage Regions, A and B, where Lateral marks differ.

**IALA Buoyage Regions A and B**



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A preferred channel buoy may also be a pillar or a spar. All preferred channel marks have horizontal bands of color. Where for exceptional reasons an Authority considers that a green color for buoys is not satisfactory, black may be used.

### Direction of Buoyage

The direction of buoyage is that taken when approaching a harbor from seaward or along coasts, the direction determined by buoyage authorities (normally clockwise around land masses).

|                                                                                   |                                                             |
|-----------------------------------------------------------------------------------|-------------------------------------------------------------|
|  | Simbol showing direction of buoyage where not obvious.      |
|  | Simbol showing direction of buoyage on multicolored charts. |



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## IALA Maritime Buoyage System (continued)

**IALA** International Association of Lighthouse Authorities

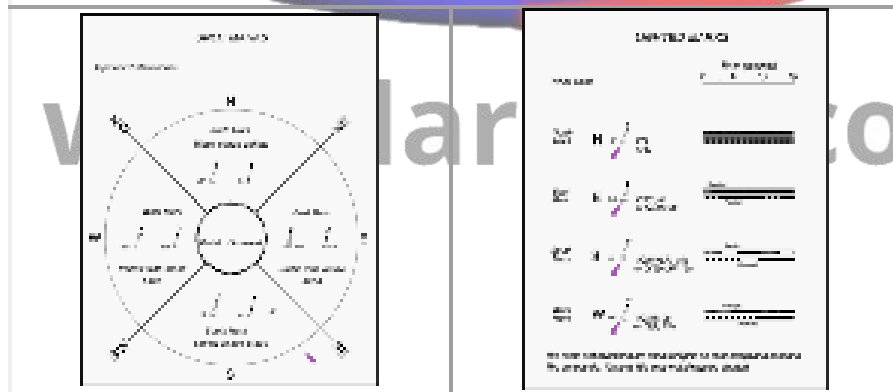
Where in force, the IALA System applies to all fixed and floating marks except lighthouses, sector lights, leading lights and leading marks, light-vessels and lanterns. The standard buoy shapes are cylindrical (can), conical, spherical, pillar and spar. Variations may occur; for example, light-floats. (See Buoy Shapes and Types for examples.) In the illustrations below, only the standard buoy shapes are used. In the case of fixed beacons (lit or unlit), only the shape of the topmark is of navigational significance.

*In the illustrations below, all marks are the same in Regions A and B.*

### IALA Buoyage Regions A and B



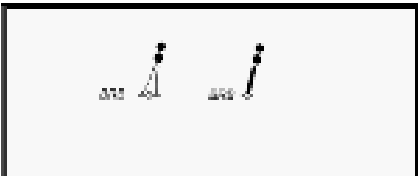
**Cardinal Marks** indicating navigable water to the named side of the marks.



**Isolated Danger Marks** stationed over dangers with navigable water around them.

Body: black with red horizontal band(s).

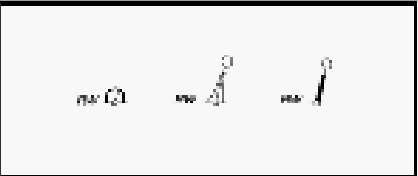
Topmark: 2 black spheres.

| Unlit Marks                                                                       | Lighted Marks                                                                      |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
|  |  |

**Safe Water Marks** such as mid-channel and landfall marks.

Body: red and white vertical stripes.

Topmark (if any): red sphere.

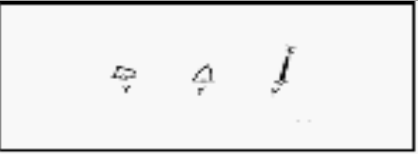
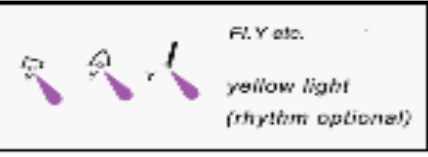
| Unlit Marks                                                                        | Lighted Marks                                                                       |
|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|  |  |

**Special Marks** not primarily to assist navigation, but to indicate special features.

Body (shape optional): yellow. ‡

Topmark (if any): yellow.

‡ In special cases, yellow can be in conjunction with another color.

| Unlit Marks                                                                         | Lighted Marks                                                                        |
|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
|  |  |

BEACONS with IALA System topmarks are charted by upright symbols, eg. 

or, on smaller-scale charts: 

Beacon towers are charted:  etc. (occasionally lighted)

RADAR REFLECTORS on buoys and beacons are not generally charted.

COLOR ABBREVIATIONS under symbols, especially those of spar buoys, may be omitted, or may be at variance with symbols shown above.

LIGHT FLOATS: The IALA System is not usually applied to large lightfloats (replacing manned lightships) but may be applied to smaller lightfloats



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## Supplementary National Simbols

|             |                                          |
|-------------|------------------------------------------|
| <b>NOS</b>  | National Ocean Service (US)              |
| <b>NIMA</b> | National Imagery and Mapping Agency (US) |
| <b>IHO</b>  | International Hydrographic Organization  |

| NOS                                                                                                                                                                                                                                                                                                                                                        | NIMA |                                                                     | Foreign NIMA Charts |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|---------------------------------------------------------------------|---------------------|
|  BELL  BELL                                                                                                                                                                              |      | Bell buoy                                                           |                     |
|  GONG  GONG                                                                                                                                                                              |      | Gong buoy                                                           |                     |
|  WHIS  WHIS                                                                                                                                                                              |      | Whistle buoy                                                        |                     |
|  RW                                                                                                                                                                                                                                                                       |      | Fairway buoy (RWVS)                                                 |                     |
|  RW                                                                                                                                                                                                                                                                       |      | Midchannel buoy (RWVS)                                              |                     |
|  R "2"                                                                                                                                                                                                                                                                   |      | Starboard-hand buoy (entering from seaward, US waters)              |                     |
|  "1"  "1"                                                                                                                                                                            |      | Port-hand buoy (entering from seaward, US Waters)                   |                     |
|  BR  RG  GR  G |      | Bifurcation, Junction, Isolated danger, Wreck and Obstruction buoys |                     |
|  Y                                                                                                                                                                                                                                                                      |      | Fish trap (area) buoy                                               |                     |
|  Y                                                                                                                                                                                                                                                                      |      | Anchorage buoy (marks limits)                                       |                     |
| B                                                                                                                                                                                                                                                                                                                                                          |      | Black                                                               |                     |

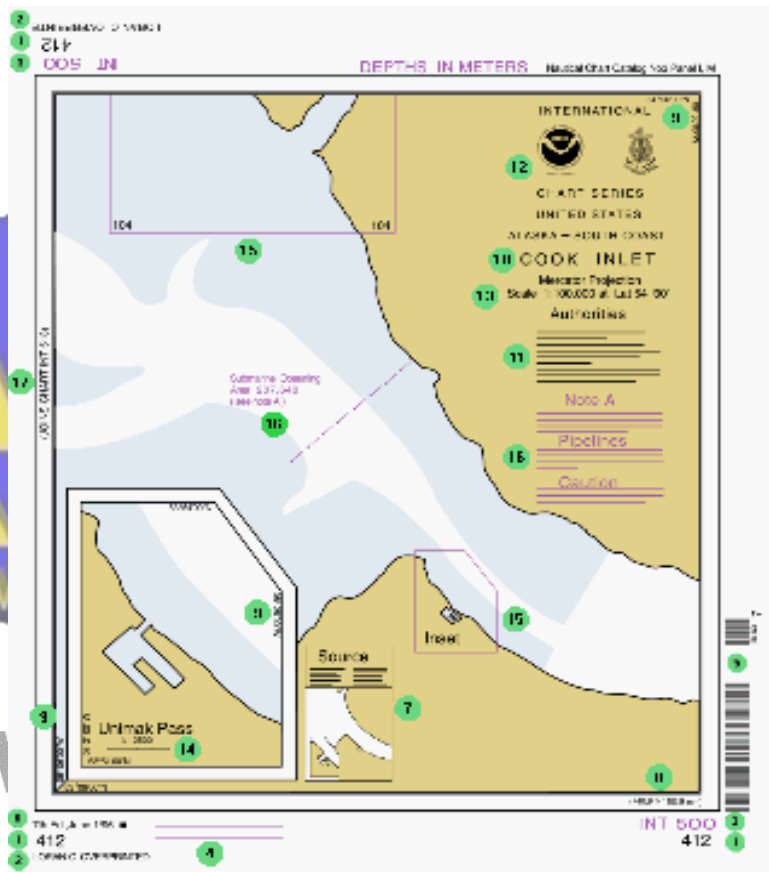
| NOS                                                                                       | NIMA                                                                                                                                                                        |                                              | Foreign NIMA Charts                                                                                                                                                    |
|-------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  R<br>Bn |  RG<br>Bn                                                                                  | Triangular-shaped beacons                    |                                                                                                                                                                        |
|  Bn      |                                                                                                                                                                             | Beacon, color unknown                        |                                                                                                                                                                        |
|                                                                                           |  Tel  Tel | Mooring buoy with telegraphic communications |                                                                                                                                                                        |
|                                                                                           |  T  T     | Mooring buoy with telephonic communications  |                                                                                                                                                                        |
|          |                                                                                                                                                                             | Lighted beacon                               |  Bn  |

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## Schematic Layout of an NOS chart

***Hold your cursor over any green circle for details, or refer to the legend below this picture.***



|   |                                                                            |
|---|----------------------------------------------------------------------------|
| 1 | Chart number in national chart series                                      |
| 2 | Identification of a latticed chart (if any). D=Decca; LC=Loran-C; Om=Omega |

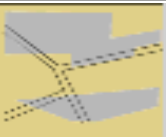
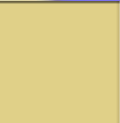
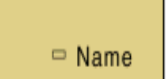
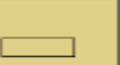
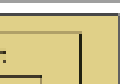
|    |                                                                                                                                                                                                                                                                                                                                                     |
|----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3  | Chart number in international chart series (if any)                                                                                                                                                                                                                                                                                                 |
| 4  | Publication note (imprint)                                                                                                                                                                                                                                                                                                                          |
| 5  | Bar Code                                                                                                                                                                                                                                                                                                                                            |
| 6  | Edition note. (In this example: Seventh edition published in June, 1996)                                                                                                                                                                                                                                                                            |
| 7  | Source data diagram (if any). (For attention to navigators: use caution where surveys are inadequate.)                                                                                                                                                                                                                                              |
| 8  | Dimensions of inner borders                                                                                                                                                                                                                                                                                                                         |
| 9  | Corner coordinates                                                                                                                                                                                                                                                                                                                                  |
| 10 | Chart title                                                                                                                                                                                                                                                                                                                                         |
| 11 | Explanatory notes on chart construction, etc. (to be read before using chart)                                                                                                                                                                                                                                                                       |
| 12 | Seals. In this example, the national and International Hydrographic Organization seals show that this national chart is also an international one. Purely national charts have the national sea only. Reproductions of charts of other nations (facsimile) have the seals of the original producer (left), publisher (center), and the IHO (right). |
| 13 | Projection and scale of chart at stated latitude. (The scale is precisely as stated only at the latitude quoted)                                                                                                                                                                                                                                    |
| 14 | Linear scale on large-scale charts                                                                                                                                                                                                                                                                                                                  |
| 15 | Reference to a larger-scale chart                                                                                                                                                                                                                                                                                                                   |
| 16 | Cautionary notes (if any). Information on particular features (to be read before using chart)                                                                                                                                                                                                                                                       |
| 17 | Reference to an adjoining chart of similar scale                                                                                                                                                                                                                                                                                                    |

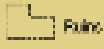
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## Cultural Features

### Settlements, Buildings

|             |                                          |
|-------------|------------------------------------------|
| <b>NOS</b>  | National Ocean Service (US)              |
| <b>NIMA</b> | National Imagery and Mapping Agency (US) |
| <b>IHO</b>  | International Hydrographic Organization  |

| NOS                                                                                 | NIMA                                                                                |                                                | IHO                                                                                  | Foreign NIMA Charts                                                                   |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|    |    | Urban area                                     |    |    |
|    |    | Settlement with scattered buildings            |    |    |
|   |  | Settlement (on medium- and small-scale charts) |   |   |
|  |  | Village                                        |  |  |
|  |  | Buildings in general                           |  |  |
|  |  | Important building in built-up area            |  |  |
|  |  | Street name, Road name                         |  |  |

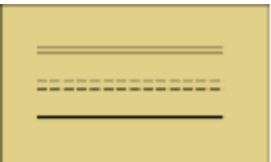
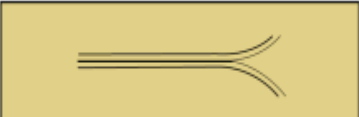
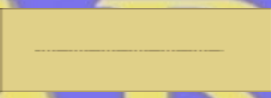
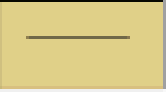
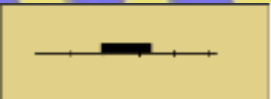
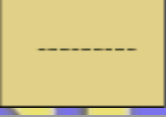
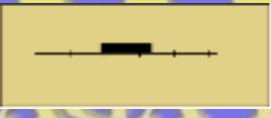
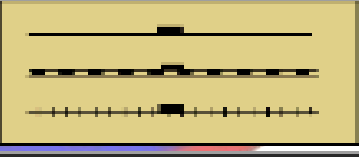
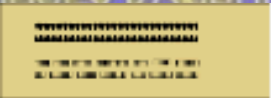
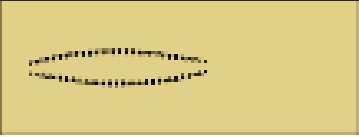
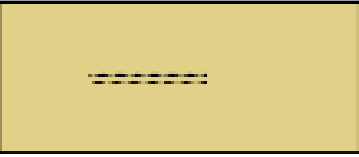
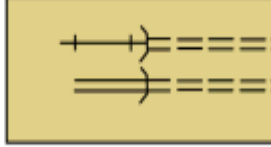
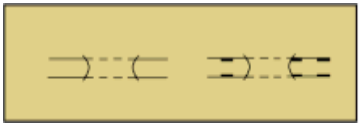
| NOS | NIMA                                                                              |                        | IHO                                                                               | Foreign NIMA Charts                                                               |
|-----|-----------------------------------------------------------------------------------|------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
|     |  | Ruins, Ruined landmark |  |  |



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## Roads, Railways, Airfields

|             |                                          |
|-------------|------------------------------------------|
| <b>NOS</b>  | National Ocean Service (US)              |
| <b>NIMA</b> | National Imagery and Mapping Agency (US) |
| <b>IHO</b>  | International Hydrographic Organization  |

| NOS/NIMA                                                                            |                                   | IHO                                                                                  | Foreign NIMA Charts                                                                 |
|-------------------------------------------------------------------------------------|-----------------------------------|--------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|    | Motorway                          |    |                                                                                     |
|    | Road (hard surfaced)              |    |  |
|   | Track, Path (loose or unsurfaced) |    |  |
|   | Railway, with station             |   |                                                                                     |
|  | Cutting                           |  |                                                                                     |
|  | Embankment                        |  |                                                                                     |
|  | Tunnel                            |  |                                                                                     |

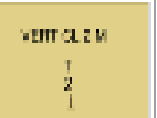
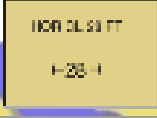
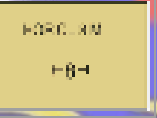
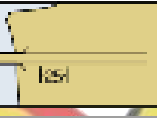
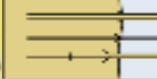
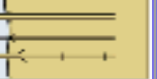
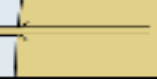
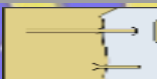
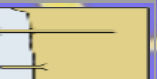
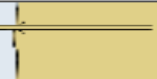
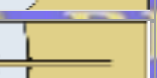
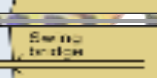
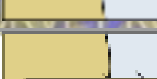
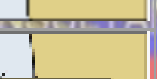
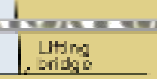
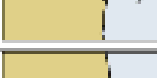
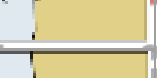
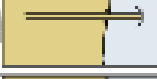
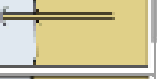
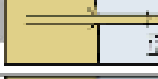
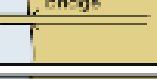
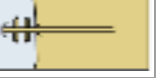
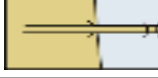
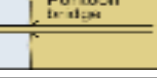
| NOS/NIMA                                                                          |                                                                                                     | IHO                                                                               | Foreign NIMA Charts                                                                |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
|  |  Airport, Airfield |  |  |

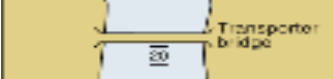


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## Bridges, Clearance

|             |                                          |
|-------------|------------------------------------------|
| <b>NOS</b>  | National Ocean Service (US)              |
| <b>NIMA</b> | National Imagery and Mapping Agency (US) |
| <b>IHO</b>  | International Hydrographic Organization  |

| NOS                                                                                 | NIMA                                                                                |                                     | IHO                                                                                  | Foreign NIMA Charts                                                                   |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|    |    | Vertical clearance above High Water |    |    |
|    |    | Horizontal clearance                |    |    |
|    |    | Fixed bridge                        |    |    |
|    |    | Opening bridge (in general)         |    |    |
|  |  | Swing bridge                        |  |  |
|  |  | Lifting bridge                      |  |  |
|  |  | Bascule bridge                      |  |  |
|  |  | Pontoon bridge                      |  |  |
|  |  | Drawbridge                          |  |  |

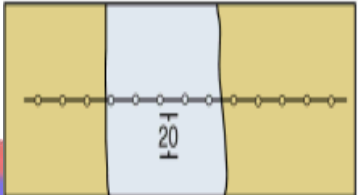
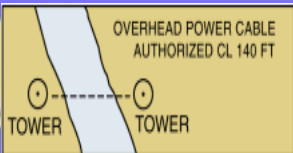
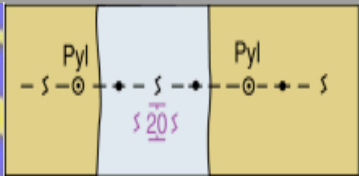
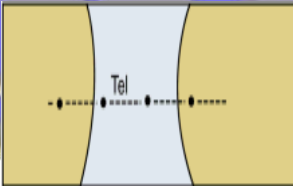
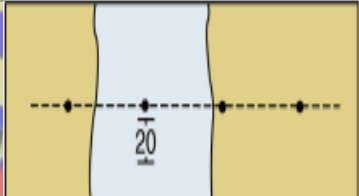
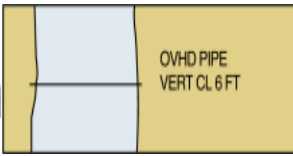
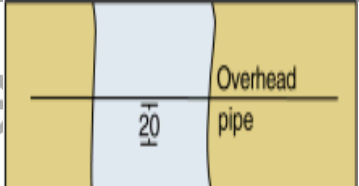
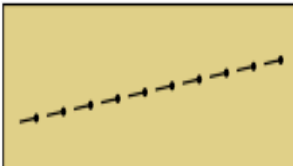
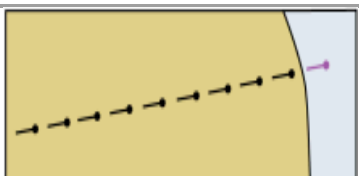
| NOS                                                                               | NIMA |                    | IHO                                                                                | Foreign NIMA Charts |
|-----------------------------------------------------------------------------------|------|--------------------|------------------------------------------------------------------------------------|---------------------|
|  |      | Transporter bridge |  |                     |



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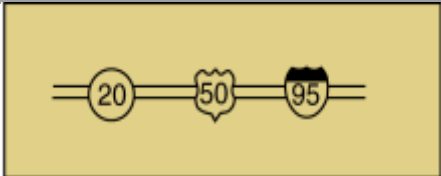
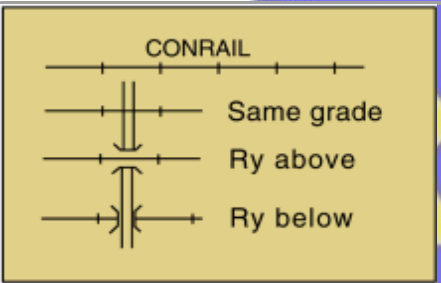
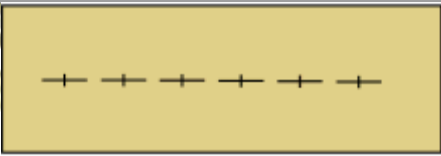
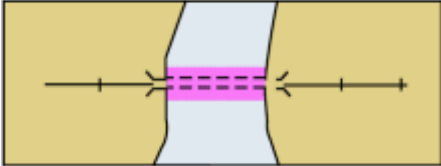
## Other Cultural Features

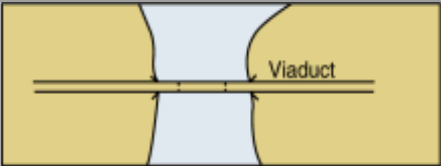
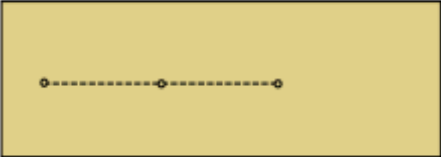
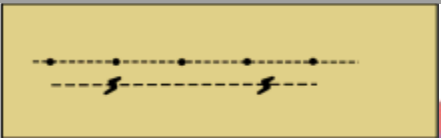
|             |                                          |
|-------------|------------------------------------------|
| <b>NOS</b>  | National Ocean Service (US)              |
| <b>NIMA</b> | National Imagery and Mapping Agency (US) |
| <b>IHO</b>  | International Hydrographic Organization  |

| NOS                                                                                 | NIMA |                                                                 | IHO                                                                                  | Foreign NIMA Charts |
|-------------------------------------------------------------------------------------|------|-----------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------|
|                                                                                     |      | Overhead transporter, Telepheric with vertical clearance        |    |                     |
|    |      | Power transmission line with pylons and safe overhead clearance |    |                     |
|   |      | Overhead cable, Telephone line, Telegraph line                  |   |                     |
|  |      | Overhead pipe with vertical clearance                           |  |                     |
|  |      | Pipeline on land                                                |  |                     |

## Supplementary National Simbols

|             |                                          |
|-------------|------------------------------------------|
| <b>NOS</b>  | National Ocean Service (US)              |
| <b>NIMA</b> | National Imagery and Mapping Agency (US) |
| <b>IHO</b>  | International Hydrographic Organization  |

| NOS/NIMA                                                                            |                                                        |
|-------------------------------------------------------------------------------------|--------------------------------------------------------|
|    | Highway markers                                        |
|   | Railway (Ry), single or double track;<br>Railroad (RR) |
|  | Abandoned railroad                                     |
|  | Bridge under construction                              |
|  | Footbridge                                             |

| NOS/NIMA                                                                          |                         |
|-----------------------------------------------------------------------------------|-------------------------|
|  | Viaduct                 |
|  | Fence                   |
|  | Power transmission line |



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## Depths

### General

**NOS** National Ocean Service (US)

**NIMA** National Imagery and Mapping Agency (US)

**IHO** International Hydrographic Organization

| NOS/NIMA /TH>                                                                                       |                                                | IHO/Foreign NIMA Charts                                                                                                                                             |
|-----------------------------------------------------------------------------------------------------|------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>ED</i>                                                                                           | Existence doubtful                             | <i>ED</i>                                                                                                                                                           |
| <i>SD</i>                                                                                           | Sounding doubtful                              | <i>SD</i>                                                                                                                                                           |
| <i>Rep</i>                                                                                          | Reported, but not yet surveyed                 | <i>Rep</i>                                                                                                                                                          |
|  <i>Rep</i> (1963) | Reported (year of report), but not surveyed    | <i>Rep</i> (1973)                                                                                                                                                   |
|  <i>Rep</i>        | Reported, but not confirmed sounding or danger |   |

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## Soundings

|             |                                          |
|-------------|------------------------------------------|
| <b>NOS</b>  | National Ocean Service (US)              |
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| <b>IHO</b>  | International Hydrographic Organization  |

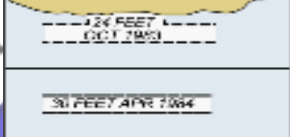
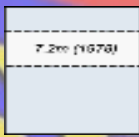
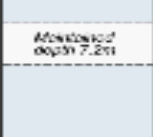
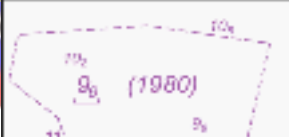
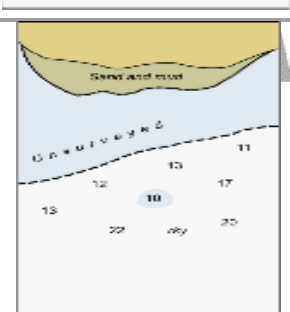
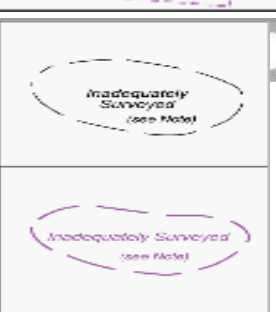
| NOS | NIMA |                                                                                                                                        | IHO/Foreign NIMA Charts |
|-----|------|----------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
|     |      | Sounding in true position<br>(NOS uses upright print on English unit charts, italics for Metric charts).                               |                         |
|     |      | Sounding out of position                                                                                                               |                         |
|     |      | Least depth in narrow channel                                                                                                          |                         |
|     |      | No bottom found at depth shown                                                                                                         |                         |
|     |      | Soundings unreliable or taken from a smaller-scale source (NOS uses italics for English unit charts, upright print for Metric charts). |                         |
|     |      | Drying heights above chart datum                                                                                                       |                         |

## Depths in Fairways and Areas

**NOS** National Ocean Service (US)

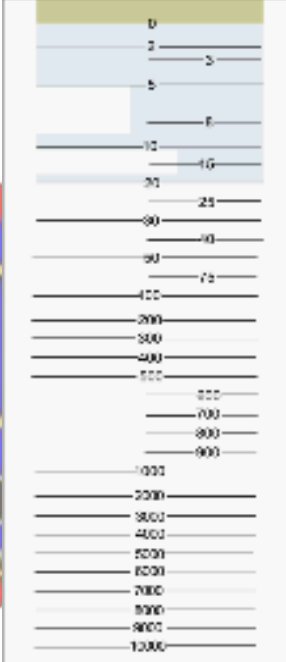
**NIMA** National Imagery and Mapping Agency (US)

**IHO** International Hydrographic Organization

| NOS                                                                                 | NIMA                                                                               |                                                                                                                              | IHO/Foreign NIMA Charts                                                              |                                                                                     |
|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|    |                                                                                    | Limit of dredged area                                                                                                        |    |                                                                                     |
|                                                                                     |   | Dredged channel or area with depth of dredging in meters                                                                     |     |   |
|    |                                                                                    | Dredged channel or area with depth and year of the latest control survey                                                     |     |   |
|                                                                                     |  | Dredged channel or area with maintained depth                                                                                |    |  |
|  |                                                                                    | Depth at chart datum, to which an area has been swept by wire drag. The latest date of sweeping may be shown in parentheses. |  |                                                                                     |
|  |                                                                                    | Unsurveyed or inadequately surveyed area; area with inadequate depth information                                             |  |                                                                                     |

## Depth Contours

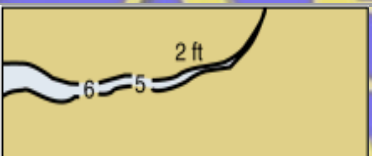
|             |                                          |
|-------------|------------------------------------------|
| <b>NOS</b>  | National Ocean Service (US)              |
| <b>NIMA</b> | National Imagery and Mapping Agency (US) |
| <b>IHO</b>  | International Hydrographic Organization  |

| NOS/NIMA                                                                                                                                                                                                 |                                   | IHO/Foreign NIMA Charts                                                              |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|--------------------------------------------------------------------------------------|
|  <p>Low water line</p> <p>One or two lighter blue tints may be used instead of the "ribbons" of tint at 10 or 20 m</p> |                                   |   |
|                                                                                                                       | <p>Approximate depth contours</p> |  |

*Note: The extent of the blue tint varies with the scale and purpose of the chart or its sources. On some charts, contours and figures are printed in blue.*

## Supplementary National Simbols

|             |                                          |
|-------------|------------------------------------------|
| <b>NOS</b>  | National Ocean Service (US)              |
| <b>NIMA</b> | National Imagery and Mapping Agency (US) |
| <b>IHO</b>  | International Hydrographic Organization  |

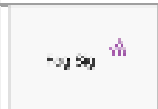
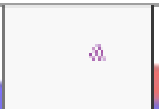
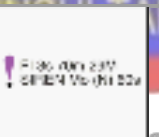
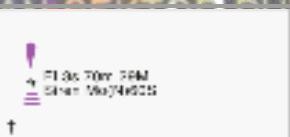
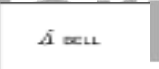
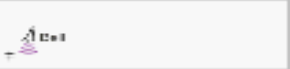
| NOS/NIMA                                                                           |                                                                    | IHO/Foreign NIMA Charts |
|------------------------------------------------------------------------------------|--------------------------------------------------------------------|-------------------------|
|   | Swept channel                                                      |                         |
|   | Swept area, not adequately sounded (shown by purple or green tint) |                         |
|  | Stream                                                             |                         |

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# Fog Signals

## General, Types, Examples, Supplementary National Simbols

|      |                                          |
|------|------------------------------------------|
| NOS  | National Ocean Service (US)              |
| NIMA | National Imagery and Mapping Agency (US) |
| IHO  | International Hydrographic Organization  |

| NOS                                                                                 | NIMA                                                                                |                                                                                                           | IHO/Foreign NIMA Charts                                                              |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| <b>General</b>                                                                      |                                                                                     |                                                                                                           |                                                                                      |
|    |    | Position of fog signal<br>(type of fog signal not stated)                                                 |    |
| <b>Types of Fog Signals, with Abbreviations</b>                                     |                                                                                     |                                                                                                           |                                                                                      |
| GUN                                                                                 |                                                                                     | Explosive                                                                                                 | Explos                                                                               |
| DIA                                                                                 |                                                                                     | Diaphone                                                                                                  | Dia                                                                                  |
| SIREN                                                                               |                                                                                     | Siren                                                                                                     | Siren                                                                                |
| HORN                                                                                |                                                                                     | Horn (Nautophone, reed, tyfon)                                                                            | Horn                                                                                 |
| BELL                                                                                |                                                                                     | Bell                                                                                                      | Bell                                                                                 |
| WHIS                                                                                |                                                                                     | Whistle                                                                                                   | Whis                                                                                 |
| GONG                                                                                |                                                                                     | Gong                                                                                                      | Gong                                                                                 |
| <b>Examples of Fog Signal Descriptions</b>                                          |                                                                                     |                                                                                                           |                                                                                      |
|  |  | Siren at a lighthouse, giving a long blast followed by a short one (N), repeated every 60 seconds         |  |
|  |  | Wave-actuated bell buoy                                                                                   |  |
|  |  | Light buoy, with horn giving a single blast every 15 seconds, in conjunction with a wave-actuated whistle |  |
| ‡ The fog signal symbol may be omitted when a description of the signal is given.   |                                                                                     |                                                                                                           |                                                                                      |
| <b>Supplementary National Simbols</b>                                               |                                                                                     |                                                                                                           |                                                                                      |
| Mo                                                                                  |                                                                                     | Morse Code fog signal                                                                                     |                                                                                      |

# Hydrographic Terms

## Hydrographic Terms and Abbreviations

|             |                                          |
|-------------|------------------------------------------|
| <b>NOS</b>  | National Ocean Service (US)              |
| <b>NIMA</b> | National Imagery and Mapping Agency (US) |
| <b>IHO</b>  | International Hydrographic Organization  |

| <b>NOS</b>       |                      |
|------------------|----------------------|
| <i>Anch</i>      | Anchorage            |
| <i>Apprs</i>     | Approach, Approaches |
| <i>B</i>         | Bay, Bayou           |
| <i>Bk</i>        | Bank                 |
| <i>Chan</i>      | Channel              |
| <i>Co rf; Rf</i> | Coral reef; Reef     |
| <i>Cr</i>        | Creek                |
| <i>Cr</i>        | Cove                 |
| <i>Entr</i>      | Entrance             |
| <i>Est</i>       | Estuary              |
| <i>Fd</i>        | Fjord                |
| <i>G</i>         | Gulf                 |
| <i>In</i>        | Inlet                |
| <i>L</i>         | Loch, Lough, Lake    |
| <i>Lag</i>       | Lagoon               |
| <i>Le</i>        | Ledge                |
| <i>Mt</i>        | Mount, Mountain      |
| <i>Mth</i>       | Mouth                |
| <i>Pass</i>      | Passage, Pass        |
| <i>Pk</i>        | Peak                 |
| <i>Rd</i>        | Roads, Roadstead     |
| <i>Rf; Co rf</i> | Reef; Coral reef     |

|                           |              |
|---------------------------|--------------|
| <i>Sd</i>                 | Sound        |
| <i>Shl</i>                | Shoal        |
| <i>Str</i>                | Strait       |
| <b><i>Other Terms</i></b> |              |
| <i>anc</i>                | ancient      |
| <i>approx</i>             | approximate  |
| <i>D, Destr</i>           | destroyed    |
| <i>dist</i>               | distant      |
| <i>exper</i>              | experimental |
| <i>Subm, subm</i>         | submerged    |



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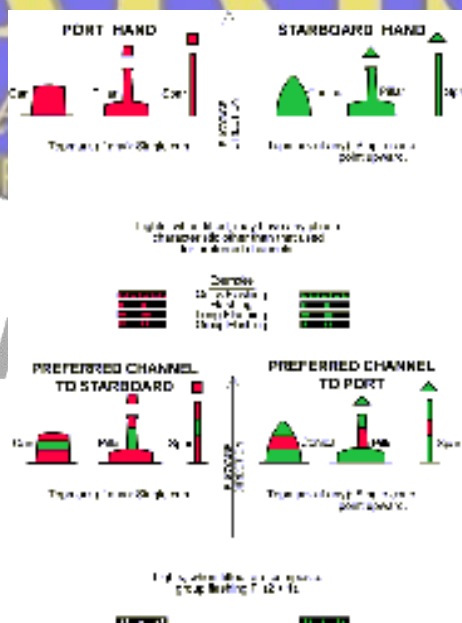
# IALA Maritime Buoyage System

## Lateral Marks (Region A)

IALA International Association of Lighthouse Authorities

**Lateral Marks** are generally for well-defined channels. There are two international Buoyage Regions, A and B, where Lateral marks differ.

### IALA Buoyage Regions A and B

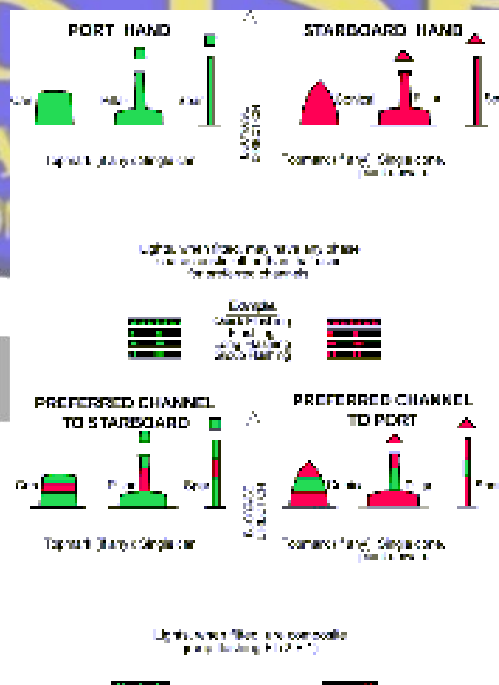


## Lateral Marks (Region B)

IALA International Association of Lighthouse Authorities

*Lateral Marks* are generally for well-defined channels. There are two international Buoyage Regions, A and B, where Lateral marks differ.

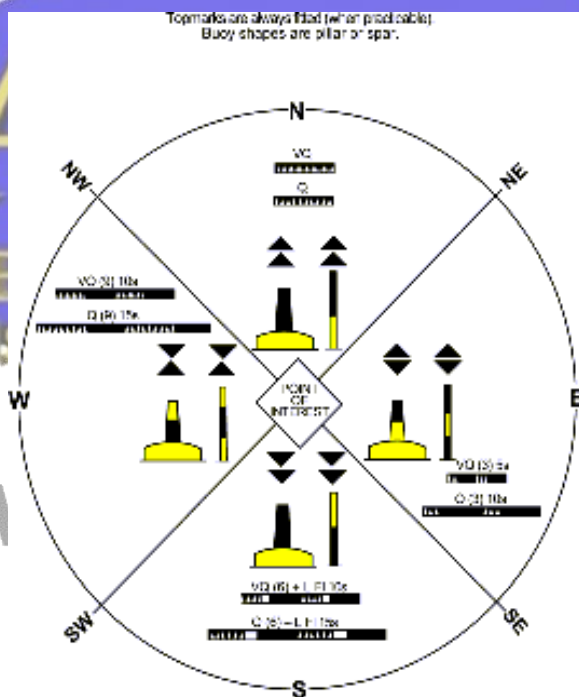
### IALA Buoyage Regions A and B



## Cardinal Marks (Regions A and B)

IALA International Association of Lighthouse Authorities

### IALA Buoyage Regions A and B



Lights, when fitted, are white, Very Quick Flashing or Quick Flashing; a South mark also has a long Flash immediately following the quick flashes.

## Isolated Danger Marks, Safe Water Marks, Special Marks (Regions A and B)

IALA International Association of Lighthouse Authorities

### IALA Buoyage Regions A and B



**ISOLATED DANGER MARKS**

Topmark: none  
always fitted  
(when practicable)

Shape: Optional, but not  
conflicting with lateral  
marks; pillar or spar  
preferred.

Light, when fitted, is  
white  
Group Flashing (2)

— — — — — Fl (2)

**SAFE WATER MARKS**

Topmark (if any):  
Single sphere.

Shape: Spherical  
or  
pillar or spar.

Light, when fitted,  
is white  
Isophase or Occulting,  
or one Long Flash  
every 10 seconds or  
Morse "A"

— — — — — Iso  
— — — — — Occ  
— — — — — L Fl 10s  
— — — — — Morse "A"

**SPECIAL MARKS**

Topmark (if any):  
Single X shape.

Shape: Optional, but not  
conflicting with  
navigational marks.

Light, when fitted, is  
yellow and may have  
any phase (considered as  
not used for white lights).

Example:  
— — — — — Fl Y  
— — — — — Fl (4) Y

# Index of Abbreviations (U.S.)

## Abbreviations

**A B C D E F G H I K L M N O P Q R S T U V W Y**

### A

|                             |                                 |                 |                             |
|-----------------------------|---------------------------------|-----------------|-----------------------------|
| <b>AERO,</b><br><b>Aero</b> | Aero light                      | <b>Aero RBn</b> | Aeronautical<br>radiobeacon |
| <b>AERO</b><br><b>RC</b>    | Aeronautical<br>radiobeacon     | <b>AI</b>       | Alternating                 |
| <b>ALP</b>                  | Articulated<br>Loading Platform | <b>Alt</b>      | Alternating                 |
| <b>Am</b>                   | Amber                           | <b>anc</b>      | ancient                     |
| <b>ANCH,</b><br><b>Anch</b> | Anchorage                       |                 |                             |

### B

|            |            |                |                      |
|------------|------------|----------------|----------------------|
| <b>B</b>   | Bay, bayou | <b>Bdy Mon</b> | Boundary<br>monument |
| <b>bk</b>  | Broken     | <b>Bkw</b>     | Breakwater           |
| <b>Bl</b>  | Blue       | <b>BM</b>      | Benchmark            |
| <b>Bn</b>  | Beacon     | <b>Bn Tr</b>   | Beacon tower         |
| <b>Br</b>  | Breakers   | <b>brg</b>     | Bearing              |
| <b>brk</b> | Broken     | <b>Bu</b>      | Blue                 |

### C

|          |        |             |                               |
|----------|--------|-------------|-------------------------------|
| <b>c</b> | Course | <b>C</b>    | Can, cylindrical<br>Centenary |
| <b>C</b> | Cove   | <b>CALM</b> | Anchor Leg                    |

Mooring



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|              |                     |                            |           |
|--------------|---------------------|----------------------------|-----------|
| <b>Cas</b>   | Castle              | <b>Cb</b>                  | Cobbles   |
| <b>cbl</b>   | Cable               | <b>cd</b>                  | Candela   |
| <b>CD</b>    | Chart datum         | <b>Cem</b>                 | Cemetery  |
| <b>CG</b>    | Coast Guard station | <b>Chan</b>                | Channel   |
| <b>Ch.</b>   | Church              | <b>Chy</b>                 | Chimney   |
| <b>Cl</b>    | Clay                | <b>CL</b>                  | Clearance |
| <b>cm</b>    | Centimeter(s)       | <b>Co</b>                  | Coral     |
| <b>Co rf</b> | Coral reef          | <b>Cr</b>                  | Creek     |
| <b>crs</b>   | Course              | <b>Cup,</b><br><b>Cup.</b> | Cupola    |

|               |               |           |      |
|---------------|---------------|-----------|------|
| <b>Cus Ho</b> | Customs house | <b>Cy</b> | Clay |
|---------------|---------------|-----------|------|

## D

|            |              |                 |                  |
|------------|--------------|-----------------|------------------|
| <b>D</b>   | Destroyed    | <b>Destr</b>    | Destroyed        |
| <b>dev</b> | Deviation    | <b>DIA, Dia</b> | Diaphone         |
| <b>Dir</b> | Direction    | <b>dist</b>     | Distant          |
| <b>dm</b>  | Decimeter(s) | <b>Dn.</b>      | Dolphin          |
| <b>Dol</b> | Dolphin      | <b>DW</b>       | Deep Water route |
| <b>DZ</b>  | Danger Zone  |                 |                  |

## E

|                                 |                         |               |                          |
|---------------------------------|-------------------------|---------------|--------------------------|
| <b>E</b>                        | East, eastern           | <b>ED</b>     | Existence doubtful       |
| <b>EEZ</b>                      | Exclusive Economic Zone | <b>E Int</b>  | Equal interval, isophase |
| <b>Entr</b>                     | Entrance                | <b>Est</b>    | Estuary                  |
| <b>exper</b>                    | Experimental            | <b>Explos</b> | Explosive                |
| <b>Exting,</b><br><b>exting</b> | Extinguished            |               |                          |

## F

|                |                    |                |                    |
|----------------|--------------------|----------------|--------------------|
| <b>f</b>       | Fine               | <b>F</b>       | Fixed              |
| <b>Fd</b>      | Fjord              | <b>F Fl</b>    | Fixed and flashing |
| <b>FISH</b>    | Fishing            | <b>Fl</b>      | Flashing           |
| <b>Fla</b>     | Flare stack        | <b>fm</b>      | Fathom             |
| <b>fms</b>     | Fathoms            | <b>fne</b>     | Fine               |
| <b>Fog Det</b> |                    | <b>Fog Sig</b> | Fog signal         |
| <b>Lt</b>      | Fog detector light | <b>FS, FS.</b> | Flagstaff          |
| <b>FP</b>      | Flagpole           |                |                    |
| <b>ft</b>      | Foot, feet         |                |                    |

## G

|               |                 |              |                |
|---------------|-----------------|--------------|----------------|
| <b>G</b>      | Gravel          | <b>G</b>     | Green          |
| <b>G</b>      | Gulf            | <b>Gp Fl</b> | Group flashing |
| <b>Gp Occ</b> | Group occulting |              |                |

## H

|               |                                 |                    |                           |
|---------------|---------------------------------|--------------------|---------------------------|
| <b>h</b>      | Hard                            | <b>h</b>           | Hour                      |
| <b>H</b>      | Pilot transferred by helicopter | <b>HAT</b>         | Highest astronomical tide |
| <b>Hbr Mr</b> | Harbormaster                    | <b>Historic Wk</b> | Historic wreck            |
| <b>Hk</b>     | Hulk                            | <b>Hor</b>         | Horizontally disposed     |
| <b>Hosp</b>   | Hospital                        | <b>hr</b>          | Hour                      |
| <b>hrd</b>    | Hard                            |                    |                           |

## I

|             |               |           |       |
|-------------|---------------|-----------|-------|
| <b>IALA</b> | International | <b>In</b> | Inlet |
|-------------|---------------|-----------|-------|

Association of  
Lighthouse  
Authorities

|               |                            |                |                            |
|---------------|----------------------------|----------------|----------------------------|
| <b>Intens</b> | Intensified                | <b>IntQkFI</b> | Interrupted quick flashing |
| <b>IQ</b>     | Interrupted quick flashing | <b>I Qk FI</b> | Interrupted quick flashing |
| <b>Iso</b>    | Isophase                   | <b>IUQ</b>     | Interrupted ultra quick    |

K

|           |              |           |         |
|-----------|--------------|-----------|---------|
| <b>km</b> | Kilometer(s) | <b>kn</b> | Knot(s) |
|-----------|--------------|-----------|---------|

L

|                   |                                   |                 |                          |
|-------------------|-----------------------------------|-----------------|--------------------------|
| <b>L</b>          | Loch, lough, lake                 | <b>Lag</b>      | Lagoon                   |
| <b>LANBY</b>      | Large Automatic Navigational Buoy | <b>Lat, lat</b> | Latitude                 |
| <b>LASH</b>       | Lighter aboard ship               | <b>LAT</b>      | Lowest astronomical tide |
| <b>Ldg</b>        | Landing                           | <b>Ldg</b>      | Leading                  |
| <b>Le</b>         | Ledge                             | <b>L FI</b>     | Long flashing            |
| <b>Lndg</b>       | Landing                           | <b>LNG</b>      | Liquefied natural gas    |
| <b>Long, long</b> | Longitude                         | <b>LOP</b>      | Line of position         |
| <b>LPG</b>        | Liquefied petroleum gas           | <b>LSS</b>      | Life-saving station      |
| <b>Lt</b>         | Light                             | <b>Lt Ho</b>    | Lighthouse               |
| <b>Lt V</b>       | Light vessel                      |                 |                          |

M



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|             |                               |                 |                       |
|-------------|-------------------------------|-----------------|-----------------------|
| <b>m</b>    | Meter(s)                      | <b>m</b>        | Minute(s) of time     |
| <b>m</b>    | Medium (in reference to sand) | <b>M</b>        | Mud, muddy            |
| <b>M</b>    | Nautical mile(s)              | <b>mag</b>      | Magnetic              |
| <b>MHHW</b> | Mean higher high water        | <b>MHLW</b>     | Mean higher low water |
| <b>MHW</b>  | Mean high water               | <b>MLWN</b>     | Mean high water neaps |
| <b>MHWS</b> | Mean high water springs       | <b>Mi</b>       | Nautical mile(s)      |
| <b>min</b>  | Minute of time                | <b>Mk</b>       | Mark                  |
| <b>MLHW</b> | Mean lower high water         | <b>MLLW</b>     | Mean lower low water  |
| <b>MLW</b>  | Mean low water                | <b>MLWN</b>     | Mean low water neaps  |
| <b>MLWS</b> | Mean low water springs        | <b>mm</b>       | Millimeter(s)         |
| <b>Mo</b>   | Morse                         | <b>MON, Mon</b> | Monument              |
| <b>MSL</b>  | Mean sea level                | <b>Mt</b>       | Mountain              |
| <b>Mth</b>  | Mouth                         |                 |                       |

N

|                    |                        |           |                  |
|--------------------|------------------------|-----------|------------------|
| <b>N</b>           | North, northern        | <b>N</b>  | Nun              |
| <b>NE</b>          | Northeast              | <b>NM</b> | Nautical mile(s) |
| <b>N Mi</b>        | Nautical mile(s)       | <b>No</b> | Number           |
| <b>Np</b>          | Neap tide              | <b>NW</b> | Northwest        |
| <b>NWS SIG STA</b> | Weather signal station |           |                  |

O

**Obsc**  
**Obs spot**

Obscured  
Observation spot

**Obscd**  
**Obstn**

Obscured  
Obstruction



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|              |                               |              |            |
|--------------|-------------------------------|--------------|------------|
| <b>Obstr</b> | Obstruction                   | <b>Oc</b>    | Occulting  |
| <b>Occ</b>   | Occulting                     | <b>Occas</b> | Occasional |
| <b>ODAS</b>  | Ocean Data Acquisition System | <b>Or</b>    | Orange     |

## P

|                   |                      |                   |                 |
|-------------------|----------------------|-------------------|-----------------|
| <b>P</b>          | Pebbles              | <b>P</b>          | Pillar          |
| <b>PA</b>         | Position approximate | <b>Pass</b>       | Passage, pass   |
| <b>PD</b>         | Position doubtful    | <b>PLT STA</b>    | Pilot station   |
| <b>Pk</b>         | Peak                 | <b>Post Off</b>   | Post office     |
| <b>Priv, priv</b> | Private              | <b>Prod. Well</b> | Production well |
| <b>PROHIB</b>     | Prohibited           | <b>Pyl</b>        | Pylon           |
| <b>P</b>          | Pebbles              | <b>P</b>          | Pillar          |
| <b>PA</b>         | Position approximate | <b>Pass</b>       | Passage, pass   |
| <b>PD</b>         | Position doubtful    | <b>PLT STA</b>    | Pilot station   |
| <b>Pk</b>         | Peak                 | <b>Post Off</b>   | Post office     |
| <b>Priv, priv</b> | Private              | <b>Prod. Well</b> | Production well |
| <b>PROHIB</b>     | Prohibited           | <b>Pyl</b>        | Pylon           |

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## Q

|          |                |              |                |
|----------|----------------|--------------|----------------|
| <b>Q</b> | Quick flashing | <b>Qk Fl</b> | Quick flashing |
|----------|----------------|--------------|----------------|

## R

|          |                                            |           |     |
|----------|--------------------------------------------|-----------|-----|
| <b>R</b> | Coast radio station providing QTG services | <b>R</b>  | Red |
| <b>R</b> | Rocky                                      | <b>Ra</b> |     |

Radar reference  
line



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|                               |                                                  |                                  |                                    |
|-------------------------------|--------------------------------------------------|----------------------------------|------------------------------------|
| <b>Ra</b><br><b>(conspic)</b> | Radar<br>conspicuous<br>object                   | <b>Ra</b><br><b>Antenna</b>      | Dish aerial                        |
| <b>Racon</b>                  | Radar<br>transponder<br>beacon                   | <b>Radar Sc.</b>                 | Radar scanner                      |
| <b>Radar Tr.</b>              | Radar tower                                      | <b>Radome,</b><br><b>Ra Dome</b> | Radar dome                         |
| <b>Ra Ref</b>                 | Radar reflector                                  | <b>RBn</b>                       | Circular<br>radiobeacon            |
| <b>RC</b>                     | Circular<br>radiobeacon                          | <b>Rd</b>                        | Roads,<br>roadstead                |
| <b>RD</b>                     | Directional<br>radiobeacon                       | <b>RDF</b>                       | Radio direction<br>finding station |
| <b>Ref.</b>                   | Refuge                                           | <b>Rep</b>                       | Reported                           |
| <b>Rf</b>                     | Reef                                             | <b>RG</b>                        | Radio direction<br>finding station |
| <b>Rk</b>                     | Rock                                             | <b>Rky</b>                       | Rocky                              |
| <b>R Mast</b>                 | Radio mast                                       | <b>Ro Ro</b>                     | Roll on Roll off                   |
| <b>R Sta</b>                  | Coast radio<br>station providing<br>QTG services | <b>R Tower</b>                   | Radio tower                        |
| <b>Ru</b>                     | Ruins                                            | <b>RW</b>                        | Rotating<br>radiobeacon            |

.....  
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|             |                              |            |                        |
|-------------|------------------------------|------------|------------------------|
| <b>S</b>    | Sand                         | <b>S</b>   | South, southern        |
| <b>S</b>    | Spar, spindle                | <b>s</b>   | Second of time         |
| <b>SALM</b> | Single Anchor<br>Leg Mooring | <b>SBM</b> | Single Buoy<br>Mooring |
| <b>Sc</b>   | Scanner                      | <b>Sd</b>  | Sound                  |
| <b>SD</b>   | Sounding doubtful            | <b>SE</b>  | Southeast              |

**sec**  
**sft**  
**Shl**

Second of time  
Soft  
Shoal

**sf**  
**Sh**  
**Si**

Stiff  
Shells  
Silt



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|                   |                 |                   |                      |
|-------------------|-----------------|-------------------|----------------------|
| <b>so</b>         | Soft            | <b>Sp</b>         | Spring tide          |
| <b>SP</b>         | Spherical       | <b>Sp.</b>        | Spire                |
| <b>Spipe</b>      | Standpipe       | <b>SPM</b>        | Single point mooring |
| <b>SS</b>         | Signal station  | <b>st</b>         | Stones               |
| <b>stf</b>        | Stiff           | <b>stk</b>        | Sticky               |
| <b>Str</b>        | Strait          | <b>Subm</b>       | Submerged            |
| <b>Subm piles</b> | Submerged piles | <b>Subm ruins</b> | Submerged ruins      |
| <b>sy</b>         | Sticky          | <b>SW</b>         | Southwest            |

## T

|            |                      |                    |               |
|------------|----------------------|--------------------|---------------|
| <b>T</b>   | True                 | <b>t</b>           | Metric ton(s) |
| <b>Tel</b> | Telephone, telegraph | <b>Temp, temp</b>  | Temporary     |
| <b>Tk</b>  | Tank                 | <b>Tr, Tr., TR</b> | Tower         |

|                 |                  |                |                 |
|-----------------|------------------|----------------|-----------------|
| <b>TT</b>       | Treetops         | <b>TV Mast</b> | Television mast |
| <b>TV Tower</b> | Television tower |                |                 |

## U

|              |          |           |             |
|--------------|----------|-----------|-------------|
| <b>Uncov</b> | Uncovers | <b>UQ</b> | Ultra quick |
|--------------|----------|-----------|-------------|

## V

|             |                          |                |                    |
|-------------|--------------------------|----------------|--------------------|
| <b>v</b>    | Volcanic                 | <b>var</b>     | Variation          |
| <b>Vert</b> | Vertically disposed      | <b>Vert Cl</b> | Vertical clearance |
| <b>Vi</b>   | Violet                   | <b>Vil</b>     | Village            |
| <b>VLCC</b> | Very large crude carrier | <b>vol</b>     | Volcanic           |

**VQ**

Very quick

**V Qk FI**

Very quick flash



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---

## W

**W** West, western

**Wd** Weed

**Whf** Wharf

**Wk** Wreck

**W** White

**WGS** World Geodetic  
System

**WHIS,**  
**Whis** Whistle

---

## Y

**Y** Yellow

---



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## Supplementary National Abbreviations

**A B C D E F G H I K L M N O P Q R S T U V W Y**

### A

**A** Apartment

### B

|           |       |             |          |
|-----------|-------|-------------|----------|
| <b>B</b>  | Black | <b>bk</b>   | Black    |
| <b>bl</b> | Black | <b>Blds</b> | Boulders |
| <b>br</b> | Brown | <b>bu</b>   | Blue     |

### C

|              |                      |               |                       |
|--------------|----------------------|---------------|-----------------------|
| <b>Cap</b>   | Capitol              | <b>ch</b>     | Chocolate             |
| <b>Chec</b>  | Checkered            | <b>Ck</b>     | Chalk                 |
| <b>Cn</b>    | Cinders              | <b>Co</b>     | Company               |
| <b>Co Hd</b> | Coral head           | <b>COLREG</b> | Collision regulations |
| <b>Corp</b>  | Corporation          | <b>cps</b>    | Cycles per second     |
| <b>CRD</b>   | Columbia River Datum | <b>c/s</b>    | Cycles per second     |
| <b>Ct Ho</b> | Court house          |               |                       |

### D

|            |         |             |                |
|------------|---------|-------------|----------------|
| <b>dec</b> | Decayed | <b>deg</b>  | Degree(s)      |
| <b>Di</b>  | Diatoms | <b>Diag</b> | Diagonal bands |

Discol  
water

Discolored water

dk

Dark



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---

## E

|               |            |
|---------------|------------|
| <b>Explos</b> | Explosives |
| <b>Anch</b>   | anchorage  |

---

## F

|              |              |                |                             |
|--------------|--------------|----------------|-----------------------------|
| <b>Facty</b> | Factory      | <b>F Gp FI</b> | Fixed and group<br>flashing |
| <b>fl</b>    | Flood        | <b>fly</b>     | Flinty                      |
| <b>Fr</b>    | Foraminifera | <b>Fu</b>      | Fucus                       |

---

## G

|                 |             |                |                               |
|-----------------|-------------|----------------|-------------------------------|
| <b>GAB, Gab</b> | Gable       | <b>GCLWD</b>   | Gulf Coast Low<br>Water Datum |
| <b>Gl</b>       | Globigerina | <b>glac</b>    | Glacial                       |
| <b>gn</b>       | Green       | <b>Govt Ho</b> | Government<br>house           |
| <b>Grd</b>      | Ground      | <b>Grs</b>     | Grass                         |
| <b>gty</b>      | Gritty      | <b>GUN</b>     | Fog gun                       |
| <b>gy</b>       | Gray        |                |                               |

---

## H

|             |                                  |                    |                               |
|-------------|----------------------------------|--------------------|-------------------------------|
| <b>HECP</b> | Harbor entrance<br>control point | <b>HHW</b>         | Higher high<br>water          |
| <b>HS</b>   | High school                      | <b>ht</b>          | Height                        |
| <b>HW</b>   | High water                       | <b>HWF &amp; C</b> | High water full<br>and change |
| <b>Hz</b>   | Hertz                            |                    |                               |

# I

|             |           |             |                             |
|-------------|-----------|-------------|-----------------------------|
| <b>in</b>   | Inch      | <b>ins</b>  | Inches                      |
| <b>Inst</b> | Institute | <b>ISLW</b> | Indian springs<br>low water |

# K

|            |           |           |           |
|------------|-----------|-----------|-----------|
| <b>K</b>   | Kelp      | <b>kc</b> | Kilocycle |
| <b>kHz</b> | Kilohertz | <b>kn</b> | Knot(s)   |

# L

|                    |                              |            |                 |
|--------------------|------------------------------|------------|-----------------|
| <b>La</b>          | Lava                         | <b>LLW</b> | Lower low water |
| <b>LOOK TR</b>     | Lookout tower                | <b>lrg</b> | Large           |
| <b>lt</b>          | Light                        | <b>Ltd</b> | Limited         |
| <b>LW</b>          | Low water                    | <b>LWD</b> | Low water datum |
| <b>LWF &amp; C</b> | Low water full and<br>change |            |                 |

# M

|                      |                 |                      |                 |
|----------------------|-----------------|----------------------|-----------------|
| <b>m<sup>2</sup></b> | Square meter(s) | <b>m<sup>3</sup></b> | Cubic meter(s)  |
| <b>Ma</b>            | Mattes          | <b>Magz</b>          | Magazine        |
| <b>Mc</b>            | Megacycle(s)    | <b>Mds</b>           | Madrepores      |
| <b>MHz</b>           | Megahertz       | <b>MI</b>            | Marl            |
| <b>Mn</b>            | Manganese       | <b>Mo</b>            | Morse code      |
| <b>Ms</b>            | Mussels         | <b>MTL</b>           | Mean Tide Level |

# N

|              |            |
|--------------|------------|
| <b>NAUTO</b> | Nautophone |
|--------------|------------|

---

## O

|           |        |            |         |
|-----------|--------|------------|---------|
| <b>or</b> | Orange | <b>Oys</b> | Oysters |
| <b>Oz</b> | Ooze   |            |         |

---

## P

|            |          |           |           |
|------------|----------|-----------|-----------|
| <b>Pav</b> | Pavilion | <b>Pm</b> | Pumice    |
| <b>Po</b>  | Polyzoa  | <b>Pt</b> | Pteropods |

---

## Q

|             |            |           |        |
|-------------|------------|-----------|--------|
| <b>Quar</b> | Quarantine | <b>Qz</b> | Quartz |
|-------------|------------|-----------|--------|

---

## R

|           |            |           |                   |
|-----------|------------|-----------|-------------------|
| <b>Rd</b> | Radiolaria | <b>rd</b> | Red               |
| <b>rt</b> | Rotten     | <b>Ry</b> | Railway, railroad |

---

## S

|             |                    |                |                     |
|-------------|--------------------|----------------|---------------------|
| <b>Sc</b>   | Scoriae            | <b>Sch</b>     | Schist              |
| <b>Sch</b>  | School             | <b>Sem</b>     | Semaphore           |
| <b>Sh</b>   | Shingle            | <b>S-LFI</b>   | Short-long flashing |
| <b>sml</b>  | Small              | <b>Spq</b>     | Sponge              |
| <b>Spi</b>  | Spicules           | <b>spk</b>     | Speckled            |
| <b>Stg</b>  | Sea-tangle         | <b>St M</b>    | Statute (mile)s     |
| <b>Str</b>  | Stream             | <b>str</b>     | Streaky             |
| <b>SUB-</b> |                    | <b>Subm</b>    |                     |
| <b>BELL</b> | Submarine fog bell | <b>crib</b>    | Submerged crib      |
| <b>SUB-</b> |                    |                | Submarine           |
| <b>OSC</b>  | oscillator         | <b>Sub vol</b> | volcano             |

---

**T**

|                |                  |            |              |
|----------------|------------------|------------|--------------|
| <b>T</b>       | Telephone        | <b>T</b>   | Short ton(s) |
| <b>T</b>       | Tufa             | <b>Tel</b> | Telegraph    |
| <b>Tel off</b> | Telegraph office | <b>ten</b> | Tenacious    |

---

**U**

|             |                |             |                |
|-------------|----------------|-------------|----------------|
| <b>unev</b> | Uneven         | <b>Univ</b> | University     |
| <b>μs</b>   | Microsecond(s) | <b>μsec</b> | Microsecond(s) |

---

**V**

|             |        |                |              |
|-------------|--------|----------------|--------------|
| <b>vard</b> | Varied | <b>vel</b>     | Velocity     |
| <b>vi</b>   | Violet | <b>Vol Ash</b> | Volcanic ash |

---

**W**

|           |       |             |         |
|-----------|-------|-------------|---------|
| <b>wh</b> | White | <b>WHIS</b> | Whistle |
|-----------|-------|-------------|---------|

---

**Y**

|           |        |            |       |
|-----------|--------|------------|-------|
| <b>yd</b> | Yard   | <b>yds</b> | Yards |
| <b>yl</b> | Yellow |            |       |

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## International Abbreviations

Positions, Distances, Directions, Compass

Cultural Features

Ports

Depths

Rocks, Wrecks, Obstructions

Offshore Installations, Submarine Cables,

Submarine Pipelines

Areas, Limits

Hydrographic Terms

Lights

Buoys, Beacons

Fog Signals

Radar, Radio, Electronic

Position-Fixing Systems

Tracks, Routes

Services

### Positions, Distances, Directions, Compass

|    |                      |
|----|----------------------|
| PA | Position approximate |
| PD | Position doubtful    |
| N  | North                |
| E  | East                 |
| S  | South                |
| W  | West                 |
| NE | Northeast            |
| SE | Southeast            |
| NW | Northwest            |
| SW | Southwest            |

km Kilometer(s)

m Meter(s)

dm Decimeter(s)

cm Centimeter(s)

mm Millimeter(s)

M Nautical mile(s), Sea mile(s)

|        |                       |
|--------|-----------------------|
| ft     | Foot/feet             |
| h      | Hour                  |
| m, min | Minute(s) of time     |
| s, sec | Second(s) of time     |
| kn     | Knot(s)               |
| t      | Ton(s)                |
| cd     | Candela (new candela) |

---

#### Cultural Features

|    |      |
|----|------|
| Ru | Ruin |
|----|------|

---

#### Ports

|      |                         |
|------|-------------------------|
| Lndg | Landing for boats       |
| RoRo | Roll-on, roll-off Ferry |

---

#### Depths

|    |                    |
|----|--------------------|
| ED | Existence doubtful |
| SD | Sounding doubtful  |

---

#### Rocks, Wrecks, Obstructions

|       |             |
|-------|-------------|
| Br    | Breakers    |
| Wk    | Wreck       |
| Obstn | Obstruction |

---

#### Offshore Installations, Submarine Cables, Submarine Pipelines

|      |                           |
|------|---------------------------|
| Fla  | Flare stack               |
| Prod |                           |
| Well | Submerged Production Well |

---

**Tracks, Routes**

|    |            |
|----|------------|
| Ra | Radar      |
| DW | Deep Water |

---

**Areas, Limits**

|    |            |
|----|------------|
| No | Number     |
| DW | Deep Water |

---

**Hydrographic Terms**

|     |          |
|-----|----------|
| SMT | Seamount |
|-----|----------|

---

**Lights**

|     |                         |
|-----|-------------------------|
| Lt  | Light                   |
| F   | Fixed                   |
| Oc  | Occulting               |
| Iso | Isophase                |
| Fla | Flashing                |
| Q   | Quick                   |
| IQ  | Interrupted quick       |
| VQ  | Very quick              |
| IVQ | Interrupted very quick  |
| UQ  | Ultra quick             |
| IUQ | Interrupted ultra quick |
| Mo  | Morse Code              |
| W   | White                   |
| R   | Red                     |
| G   | Green                   |
| Bu  | Blue                    |
| Vi  | Violet                  |
| Y   | Yellow/orange/amber     |
| Or  | Orange                  |
| Am  | Amber                   |

|                   |                        |
|-------------------|------------------------|
| <b>Ldg</b>        | Leading light          |
| <b>Dir</b>        | Direction light        |
| <b>occas</b>      | occasional             |
| <b>R Lts</b>      | Air obstruction lights |
| <b>Fog Det Lt</b> | Fog detector light     |
| <b>Aero</b>       | Aeronautical           |

---

#### **Buoys, Beacons**

|             |                                                     |
|-------------|-----------------------------------------------------|
| <b>B</b>    | Black                                               |
| <b>Mk</b>   | Mark                                                |
| <b>IALA</b> | International Association of Lighthouse Authorities |

---

#### **Fog Signals**

|               |           |
|---------------|-----------|
| <b>Explos</b> | Explosive |
| <b>Dia</b>    | Diaphone  |
| <b>Whis</b>   | Whistle   |

---

#### **Radar, Radio, Electronic Position-Fixing Systems**

|                |                                               |
|----------------|-----------------------------------------------|
| <b>Ra</b>      | Coast Radar Station                           |
| <b>Racon</b>   | Radar transponder beacon                      |
| <b>RC</b>      | Circular (non-directional) marine radiobeacon |
| <b>RD</b>      | Directional radiobeacon                       |
| <b>RW</b>      | Rotating-pattern radiobeacon                  |
| <b>RG</b>      | Radio direction-finding stations              |
| <b>R</b>       | QTG service, Coast radio stations             |
| <b>Aero RC</b> | Aeronautical radiobeacon                      |
| <b>WGS</b>     | World Geodetic System                         |

---

#### **Services**

|            |                                  |
|------------|----------------------------------|
| <b>H</b>   | Pilots transferred by helicopter |
| <b>SS</b>  | Signal station                   |
| <b>INT</b> | international                    |

---

# Landmarks

## Landmarks, page 1 (General Examples)

**NOS** National Ocean Service (US)

**NIMA** National Imagery and Mapping Agency (US)

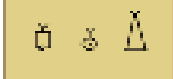
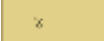
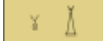
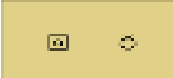
**IHO** International Hydrographic Organization

| NOS                                                                                                                                                                                                    | NIMA                                                                                |                                                                   | IHO                                                                                                                                                                                                                                                                                                                                                                              |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  TANK                                |                                                                                     | Examples of landmarks                                             |  Building  Hotel                                                                                                                                                                                               |
|  CAPITOL DOME<br> WORLD TRADE CENTER |                                                                                     | Examples of conspicuous landmarks                                 |  FACTORY  WATER TOWER<br> HOTEL  WATER TOWER |
|                                                                                                                                                                                                        |                                                                                     | Pictorial symbols (in true position)                              |                                                                                                                                                                                                                |
|                                                                                                                                                                                                        |                                                                                     | Sketches, Views (out of position)                                 |                                                                                                                                                                                                            |
|                                                                                                                                                                                                        |  | Height of top of a structure above plane of reference for heights |                                                                                                                                                                                                                                                                                               |
|                                                                                                                                                                                                        |  | Height of structure above ground level                            |                                                                                                                                                                                                                                                                                               |

## Landmarks, page 2

|             |                                          |
|-------------|------------------------------------------|
| <b>NOS</b>  | National Ocean Service (US)              |
| <b>NIMA</b> | National Imagery and Mapping Agency (US) |
| <b>IHO</b>  | International Hydrographic Organization  |

| NOS/NIMA                                                                            |                           | IHO                                                                                 | Foreign NIMA Charts                                                                   |
|-------------------------------------------------------------------------------------|---------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|    | Church                    |    |    |
|    | Church tower              |    |    |
|    | Church spire              |    |    |
|    | Church cupola             |    |    |
|  | Chapel                    |  |  |
|  | Cross, Calvary            |  |  |
|  | Temple                    |  |  |
|  | Pagoda                    |  |  |
|  | Shinto shrine, Joss house |  |  |
|  | Buddhist temple           |  |  |

| NOS/NIMA                                                                          |                 | IHO                                                                               | Foreign NIMA Charts                                                               |
|-----------------------------------------------------------------------------------|-----------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
|  | Mosque, Minaret |  |  |
|  | Marabout        |  |  |



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## Landmarks, page 3

|             |                                          |
|-------------|------------------------------------------|
| <b>NOS</b>  | National Ocean Service (US)              |
| <b>NIMA</b> | National Imagery and Mapping Agency (US) |
| <b>IHO</b>  | International Hydrographic Organization  |

| NOS | NIMA |                                                    | IHO | Foreign NIMA Charts |
|-----|------|----------------------------------------------------|-----|---------------------|
|     |      | Cemetery (for all religious denominations)         |     |                     |
|     |      | Tower                                              |     |                     |
|     |      | Standpipe<br>Water tower.<br>Water Tank on a tower |     |                     |
|     |      | Chimney                                            |     |                     |
|     |      | Flare stack (on land)                              |     |                     |
|     |      | Monument                                           |     |                     |
|     |      | Windmill                                           |     |                     |
|     |      | Windmill (wingless)                                |     |                     |
|     |      | Flagstaff,<br>Flagpole                             |     |                     |
|     |      | Radio mast,<br>Television mast                     |     |                     |

| NOS                                                                                                                                                                           | NIMA                                                                                                                                                                          |                                  | IHO                                                                               | Foreign NIMA Charts |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|-----------------------------------------------------------------------------------|---------------------|
|  RT<br> TVT |  RT<br> TVT | Radio tower,<br>Television tower |  |                     |



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## Landmarks, page 4

|      |                                          |
|------|------------------------------------------|
| NOS  | National Ocean Service (US)              |
| NIMA | National Imagery and Mapping Agency (US) |
| IHO  | International Hydrographic Organization  |

| NOS                                                                                                            | NIMA                                                                                                     |                                                | IHO                                                                                 | Foreign NIMA Charts                                                                   |
|----------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|  RADAR MAST<br>Radar Mast     |                                                                                                          | Radar mast                                     |    |                                                                                       |
|  RADAR TR<br>Radar Tr         |                                                                                                          | Radar tower                                    |    |                                                                                       |
|                                                                                                                |                                                                                                          | Radar scanner                                  |    |                                                                                       |
|  DOME (RADAR)<br>Dome (Radar) |  RADOME<br>Radarome     | Radar dome                                     |    |                                                                                       |
|  ANT (RADAR)<br>Ant (Radar)   |                                                                                                          | Dish aerial                                    |    |                                                                                       |
|  TANK<br>Tank                 |                                                                                                          | Tanks                                          |   |                                                                                       |
|  SILO<br>Silo               |  ELEVATOR<br>Elevator | Silo, Elevator                                 |  |  |
|                             |                       | Fortified structure<br>(on large-scale charts) |  |                                                                                       |
|                             |                                                                                                          | Castle, Fort, Blockhouse                       |  |  |
|                             |                                                                                                          | Battery, Small fort (on smaller-scale charts)  |  |                                                                                       |
|                                                                                                                |                                                                                                          | Quarry (on large-scale charts)                 |  |                                                                                       |
|                             |                                                                                                          | Quarry (on smaller-scale charts)               |  |  |

| NOS                                                                               | NIMA |      | IHO                                                                               | Foreign NIMA Charts |
|-----------------------------------------------------------------------------------|------|------|-----------------------------------------------------------------------------------|---------------------|
|  |      | Mine |  |                     |

| NOS                                                                                                           | NIMA                                                                                                       |                                                | IHO                                                                                 | Foreign NIMA Charts                                                                 |
|---------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|  RADAR MAST<br>a Radar Mast  |                                                                                                            | Radar mast                                     |    |                                                                                     |
|  RADAR TR<br>a Radar Tr      |                                                                                                            | Radar tower                                    |    |                                                                                     |
|                                                                                                               |                                                                                                            | Radar scanner                                  |    |                                                                                     |
|  DOMERADAR<br>a Dome (Radar) |  RADOME<br>a Radome       | Radar dome                                     |    |                                                                                     |
|  ANTIRADAR<br>a Antiradar    |                                                                                                            | Dish aerial                                    |    |                                                                                     |
|  TANK<br>a Tank              |                                                                                                            | Tanks                                          |    |                                                                                     |
|  SILO<br>a Silo            |  ELEVATOR<br>a Elevator | Silo, Elevator                                 |  |  |
|                            |                         | Fortified structure<br>(on large-scale charts) |  |                                                                                     |
|                            |                                                                                                            | Castle, Fort, Blockhouse                       |  |  |
|                            |                                                                                                            | Battery, Small fort (on smaller-scale charts)  |  |                                                                                     |
|                                                                                                               |                                                                                                            | Quarry (on large-scale charts)                 |  |                                                                                     |
|                            |                                                                                                            | Quarry (on smaller-scale charts)               |  |  |

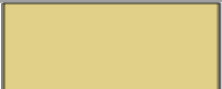
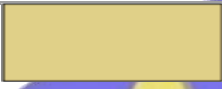
| NOS                                                                               | NIMA |      | IHO                                                                               | Foreign NIMA Charts |
|-----------------------------------------------------------------------------------|------|------|-----------------------------------------------------------------------------------|---------------------|
|  |      | Mine |  |                     |



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## Supplementary National Simbols

**NOS** National Ocean Service (US)  
**NIMA** National Imagery and Mapping Agency (US)  
**IHO** International Hydrographic Organization

| NOS                                                                                                                                                                                                                                                         | NIMA                                                                              |                                 |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|---------------------------------|
|                                                                                                                                                                            |  | Moslem Shrine                   |
|                                                                                                                                                                            |  | Tomb                            |
|                                                                                                                                                                            |  | Watermill (foreign charts only) |
|    Facty |                                                                                   | Factory                         |
|  Well                                                                                                                                                                      |                                                                                   | Well                            |
|  Sch                                                                                                                                                                     |                                                                                   | School                          |
|  Hosp                                                                                                                                                                    |                                                                                   | Hospital                        |
|  Hosp                                                                                                                                                                    |                                                                                   | University                      |
|  GAB  Gab                                                                             |                                                                                   | Gable                           |
|                                                                                                                                                                          |                                                                                   | Camping site                    |
| Tel; Tel Off                                                                                                                                                                                                                                                |                                                                                   | Telegraph office                |
| Magz                                                                                                                                                                                                                                                        |                                                                                   | Magazine                        |

| NOS     | NIMA |                  |
|---------|------|------------------|
| Govt Ho |      | Government house |
| Inst    |      | Institute        |
| Ct Ho   |      | Courthouse       |
| Pav     |      | Pavilion         |
| T       |      | Telephone        |
| Ltd     |      | Limited          |
| Apt     |      | Apartment        |
| Cap     |      | Capitol          |
| Co      |      | Company          |
| Corp    |      | Corporation      |



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# Lights

## Light Structures, Major Floating Lights

**NOS** National Ocean Service (US)

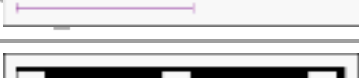
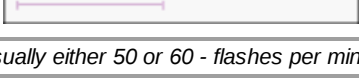
**NIMA** National Imagery and Mapping Agency (US)

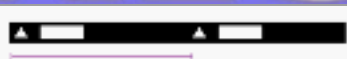
**IHO** International Hydrographic Organization

| NOS | NIMA |                                                       | IHO | Foreign NIMA Charts |
|-----|------|-------------------------------------------------------|-----|---------------------|
|     |      | Major light, minor light, lighthouse                  |     |                     |
|     |      | Lighted offshore platform                             |     |                     |
|     |      | Lighted beacon tower                                  |     |                     |
|     |      | Lighted beacon                                        |     |                     |
|     |      | Articulated light; Buoyant beacon, resilient beacon   |     |                     |
|     |      | Light vessel, Lightship, Normally manned light-vessel |     |                     |
|     |      | Unmanned light-vessel, light float                    |     |                     |
|     |      | LANBY, superbuoy as navigational aid                  |     |                     |

## Light Characters

|             |                                          |
|-------------|------------------------------------------|
| <b>NOS</b>  | National Ocean Service (US)              |
| <b>NIMA</b> | National Imagery and Mapping Agency (US) |
| <b>IHO</b>  | International Hydrographic Organization  |

| Abbreviation                                                                              |          | Class of light                      | Illustration Period shown  |                                                                                       |
|-------------------------------------------------------------------------------------------|----------|-------------------------------------|--------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| International                                                                             | National |                                     |                                                                                                              |                                                                                       |
| F                                                                                         | F        | Fixed                               |                            |    |
| <b>Occulting</b> (total duration of light longer than total duration of darkness)         |          |                                     |                                                                                                              |                                                                                       |
| Oc                                                                                        | Oc       | Single-occulting                    |                            |    |
| Oc (2)<br>Example                                                                         | Oc (2)   | Group-occulting                     |                            |    |
| Oc (2+3)<br>Example                                                                       | Oc (2+3) | Composite group-occulting           |                            |    |
| <b>Isophase</b> (duration of light and darkness equal)                                    |          |                                     |                                                                                                              |                                                                                       |
| Iso                                                                                       | Iso      | Isophase                            |                           |  |
| <b>Flashing</b> (total duration of light shorter than total duration of darkness)         |          |                                     |                                                                                                              |                                                                                       |
| Fl                                                                                        | Fl       | Single-flashing                     |                          |  |
| Fl (3)<br>Example                                                                         | Fl (3)   | Group-flashing                      |                          |  |
| Fl (2+1)<br>Example                                                                       | Fl (2+1) | Composite group-flashing            |                          |  |
| LFI                                                                                       | LFI      | Long-flashing (flash 2 s or longer) |                          |  |
| <b>Quick</b> (repetition rate of 50 to 79 - usually either 50 or 60 - flashes per minute) |          |                                     |                                                                                                              |                                                                                       |
| Q                                                                                         | Q        | Continuous quick                    |                          |  |

| Abbreviation                                                                                      |          | Class of light          | Illustration Period shown  |                                                                                     |
|---------------------------------------------------------------------------------------------------|----------|-------------------------|-------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| International                                                                                     | National |                         |                                                                                                             |                                                                                     |
| Q (3)<br>Example                                                                                  | Q (3)    | Group quick             |                            |                                                                                     |
| IQ                                                                                                | IQ       | Interrupted quick       |                            |    |
| <b>Very quick</b> (repetition rate of 80 to 159 - usually either 100 or 120 - flashes per minute) |          |                         |                                                                                                             |                                                                                     |
| VQ                                                                                                | VQ       | Continuous very quick   |                            |    |
| VQ (3)<br>Example                                                                                 | VQ (3)   | Group very quick        |                            |                                                                                     |
| IVQ                                                                                               | IVQ      | Interrupted very quick  |                            |                                                                                     |
| <b>Ultra quick</b> (repetition rate of 160 or more - usually 240 to 300 - flashes per minute)     |          |                         |                                                                                                             |                                                                                     |
| UQ                                                                                                | UQ       | Continuous ultra quick  |                            |                                                                                     |
| IUQ                                                                                               | IUQ      | Interrupted ultra quick |                            |                                                                                     |
| Mo (A)<br>Example                                                                                 | Mo (A)   | Morse Code              |                           |                                                                                     |
| F FI                                                                                              | F FI     | Continuous ultra quick  |                          |  |
| AI. WR                                                                                            | AIWR     | Alternating             |                          |  |

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## Colors of Lights

|             |                                          |
|-------------|------------------------------------------|
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| <b>NIMA</b> | National Imagery and Mapping Agency (US) |
| <b>IHO</b>  | International Hydrographic Organization  |

| NOS      | NIMA  |                                                   | IHO/Foreign NIMA Charts |
|----------|-------|---------------------------------------------------|-------------------------|
| W        | W     | White (only on sector-<br>and alternating lights) |                         |
| R        | R     | Red                                               |                         |
| G        | G     | Green                                             |                         |
| Bu       | Bu    | Blue                                              |                         |
| Vi       | Vi    | Violet                                            |                         |
| Y        | Y     | Yellow                                            |                         |
| Y;<br>Or | Y; Or | Orange                                            |                         |
| Y;<br>Am | Y; Am | Amber                                             |                         |

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## Period, Elevation, Range, Disposition

**NOS** National Ocean Service (US)

**NIMA** National Imagery and Mapping Agency (US)

**IHO** International Hydrographic Organization

| NOS                                                                            | NIMA   |                                                                                 | IHO/Foreign<br>NIMA Charts |
|--------------------------------------------------------------------------------|--------|---------------------------------------------------------------------------------|----------------------------|
| <b>Period</b>                                                                  |        |                                                                                 |                            |
| 90s                                                                            |        | Period in seconds                                                               | 90s                        |
| <b>Elevation</b>                                                               |        |                                                                                 |                            |
| 12m 36ft                                                                       |        | Elevation of light, given in meters or feet                                     | 12m                        |
| <b>Range</b> (Note: Charted ranges are nominal ranges given in Nautical miles) |        |                                                                                 |                            |
| 15M                                                                            |        | Light with single range                                                         | 15M                        |
| 10M                                                                            | 15/10M | Light with two different ranges<br>(NOS: only lesser of two ranges is charted)  | 15/10M                     |
| 7M                                                                             | 15-7M  | Light with three or more ranges<br>(NOS: only least of three ranges is charted) | 15/10M                     |
| <b>Disposition</b>                                                             |        |                                                                                 |                            |
|                                                                                | (hor)  | horizontally disposed                                                           | (hor)                      |
|                                                                                | (vert) | vertically disposed                                                             | (vert)                     |

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## Examples of a Full Light Description

|      |                                          |
|------|------------------------------------------|
| NOS  | National Ocean Service (US)              |
| NIMA | National Imagery and Mapping Agency (US) |
| IHO  | International Hydrographic Organization  |

|                                                                                   |                                                                                           |                                                                   |
|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|-------------------------------------------------------------------|
|  |                                                                                           | Name<br>Fl (3) WRG 15s 21ft 11M<br>Fl (3) WRG 15s 21m 15-11M/NIMA |
| Fl (3)                                                                            | Class of light: group flashing repeating a group of three flashes                         |                                                                   |
| WRG                                                                               | Colors: white, red, green, exhibiting the different color in defined sectors              |                                                                   |
| 15S                                                                               | Period: the time taken to exhibit one full sequence of 3 flashes and eclipses: 15 seconds |                                                                   |
| 21ft<br>21m                                                                       | Elevation of focal plane above datum: 21 feet or 21 meters                                |                                                                   |
| 11M<br>15-11M                                                                     | Nominal range NIMA: white 16M, green 11M, red between 15 and 11M.                         |                                                                   |

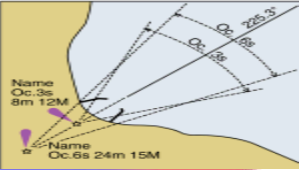
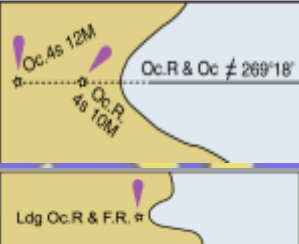
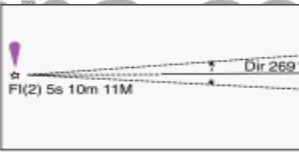
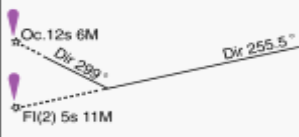
|                                                                                     |                                                                                           |                                   |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|-----------------------------------|
|  |                                                                                           | Name<br>Fl (3) WRG 15s 21m 15-11M |
| Fl (3)                                                                              | Class of light: group flashing repeating a group of three flashes                         |                                   |
| WRG                                                                                 | Colors: white, red, green, exhibiting the different color in defined sectors              |                                   |
| 15S                                                                                 | Period: the time taken to exhibit one full sequence of 3 flashes and eclipses: 15 seconds |                                   |
| 21m                                                                                 | Elevation of focal plane above datum: 21 feet or 21 meters                                |                                   |
| 15-11M                                                                              | Nominal range NIMA: white 16M, green 11M, red between 15 and 11M.                         |                                   |

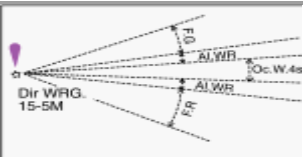
## Lights Marking Fairways

**NOS** National Ocean Service (US)

**NIMA** National Imagery and Mapping Agency (US)

**IHO** International Hydrographic Organization

| NOS                                                                                 | NIMA                                                                                                                 | IHO/Foreign NIMA Charts                                                              |
|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| <b>Leading Lights and Lights in Line</b>                                            |                                                                                                                      |                                                                                      |
|    | Leading lights with leading line (firm line is fairway) and arcs of visibility; Bearing given in degrees and minutes |    |
|    | Leading lights $\nabla$ : any two objects in line Bearing given in degrees and minutes                               |    |
|  | Leading lights on small-scale charts                                                                                 |  |
|                                                                                     | Rear or upper light                                                                                                  | Rear Lt, Upper Lt                                                                    |
|                                                                                     | Front or lower light                                                                                                 | Front Lt or Lower Lt                                                                 |
| <b>Direction Lights</b>                                                             |                                                                                                                      |                                                                                      |
|  | Direction light with narrow sector and course to be followed, flanked by darkness or unintensified light             |  |
|                                                                                     | Direction light with course to be followed; uncharted sector is flanked by darkness or unintensified light           |  |

| NOS | NIMA |                                                                                      | IHO/Foreign NIMA Charts                                                            |
|-----|------|--------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
|     |      | Direction light with narrow fairway sector flanked by sectors of different character |  |
|     |      | Moiré effect light (day and night) Arrows show when course alteration needed         |  |

*Note: Quoted bearings are always from seaward.*



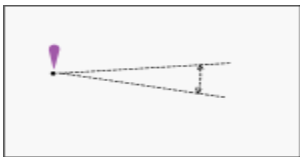
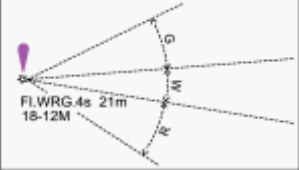
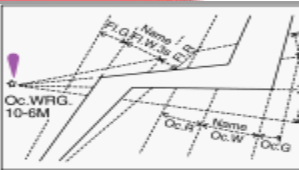
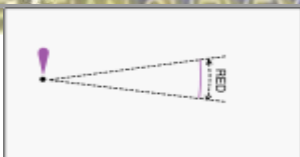
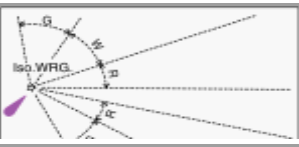
[www.larispa.co.id](http://www.larispa.co.id)

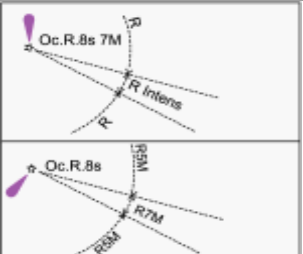
## Sector Lights

**NOS** National Ocean Service (US)

**NIMA** National Imagery and Mapping Agency (US)

**IHO** International Hydrographic Organization

| NOS/NIMA                                                                            |                                                                                               | IHO/Foreign NIMA Charts                                                              |
|-------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
|    | Sector light on standard charts                                                               |    |
|    | Sector light on standard charts, the white sector limits marking the sides of the fairway     |    |
|   | Sector light on multicolored charts, the white sector limits marking the sides of the fairway |   |
|  | Main light visible all-round with red subsidiary light seen over danger                       |  |
|  | All-round light with obscured sector                                                          |  |
|                                                                                     | Light with arc of visibility deliberately restricted                                          |  |

| NOS/NIMA |                               | IHO/Foreign NIMA Charts                                                            |
|----------|-------------------------------|------------------------------------------------------------------------------------|
|          | Light with faint sector       |  |
|          | Light with intensified sector |  |



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## Lights with Limited Times of Exhibition

**NOS** National Ocean Service (US)

**NIMA** National Imagery and Mapping Agency (US)

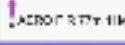
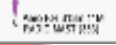
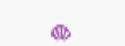
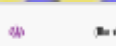
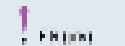
**IHO** International Hydrographic Organization

| NOS   | NIMA                         |                                                                                                     | IHO                                   |
|-------|------------------------------|-----------------------------------------------------------------------------------------------------|---------------------------------------|
| Occas | ! FR (occas)                 | Lights exhibited only when specially needed (for fishing vessels, ferries), and some private lights | ! F.R. (occas)                        |
|       | ! F Bu 9m 6M<br>• (F by day) | Daytime light (charted only where the character shown by day differs from that shown at night)      | ! Fl.10s 40m 27M<br>☆ (F.37m 11M Day) |
|       |                              | Fog light (exhibited only in fog, or else character changes in fog)                                 | ! Fl.5s (U)                           |
|       |                              | Unwatched (unmanned) light with no standby or emergency arrangements                                | ! Fl.5s(U)                            |
|       |                              | Temporary                                                                                           | (temp)                                |
|       |                              | Extinguished                                                                                        | (exting)                              |

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## Special Lights

|             |                                          |
|-------------|------------------------------------------|
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| <b>IHO</b>  | International Hydrographic Organization  |

| NOS                                                                                 | NIMA                                                                                |                                          | IHO                                                                                  | Foreign NIMA Charts                                                                   |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|    |    | Aero light                               |    |    |
|                                                                                     |    | Air obstruction light of high intensity  |    |                                                                                       |
|                                                                                     |    | Air obstruction lights of low intensity  |    |                                                                                       |
|                                                                                     |    | Fog detector light                       |    |                                                                                       |
|                                                                                     |    | Floodlight, floodlighting of a structure |    |                                                                                       |
|                                                                                     |                                                                                     | Strip light                              |  |                                                                                       |
|  |  | Aero light                               |  |  |

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## Supplementary National Simbols

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**NIMA** National Imagery and Mapping Agency (US)

**IHO** International Hydrographic Organization

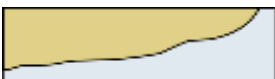
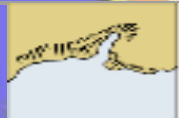
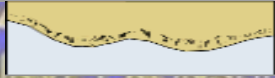
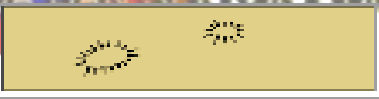
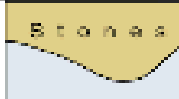
| NOS                                                                               | NIMA |                          | IHO | Foreign NIMA Charts                                                               |
|-----------------------------------------------------------------------------------|------|--------------------------|-----|-----------------------------------------------------------------------------------|
|  |      | Riprap surrounding light |     |                                                                                   |
|                                                                                   |      | Short-Long Flashing      |     |  |
|                                                                                   |      | Group - Short Flashing   |     |  |
|                                                                                   |      | Fixed and Group Flashing |     | F Gp FI                                                                           |

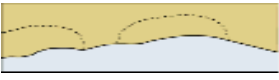
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## Natural Features

### Coastline

|             |                                          |
|-------------|------------------------------------------|
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| <b>NIMA</b> | National Imagery and Mapping Agency (US) |
| <b>IHO</b>  | International Hydrographic Organization  |

| NOS/NIMA                                                                            |                                                   | IHO                                                                                  | Foreign NIMA Charts                                                                   |
|-------------------------------------------------------------------------------------|---------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|    | Coastline, surveyed                               |    |                                                                                       |
|    | Coastline, unsure eyed                            |    |                                                                                       |
|    | Steep coast, Steep coast with rock cliffs, Cliffs |   |   |
|  | Coastal hillocks, elevation not determined        |  |                                                                                       |
|  | Flat coast                                        |  |                                                                                       |
|  | Sandy shore                                       |  |                                                                                       |
|  | Stony shore, Shingly shore                        |  |  |

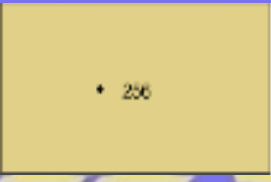
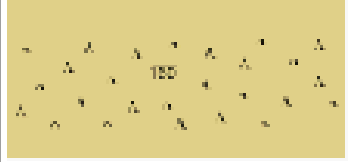
| NOS/NIMA                                                                          |                                                               | IHO                                                                               | Foreign NIMA Charts                                                                |
|-----------------------------------------------------------------------------------|---------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
|  | Sandhills, Dunes                                              |  |  |
|  | Apparent Shoreline                                            |                                                                                   |                                                                                    |
|  | Vegetation or<br>Topographic Feature<br>Area Limit in general |                                                                                   |                                                                                    |



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## Relief

|             |                                          |
|-------------|------------------------------------------|
| <b>NOS</b>  | National Ocean Service (US)              |
| <b>NIMA</b> | National Imagery and Mapping Agency (US) |
| <b>IHO</b>  | International Hydrographic Organization  |

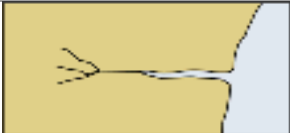
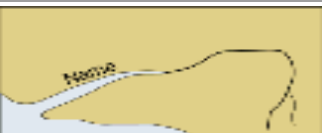
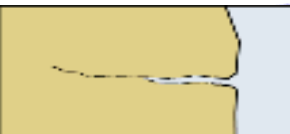
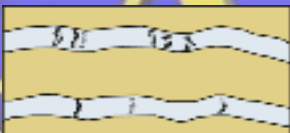
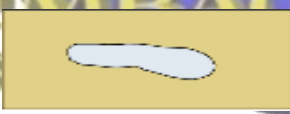
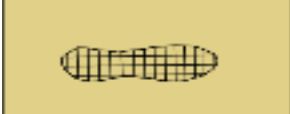
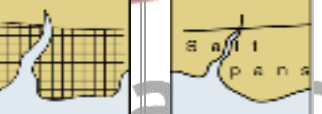
| NOS/NIMA                                                                            |                                                         | IHO                                                                                  | Foreign NIMA Charts                                                                 |
|-------------------------------------------------------------------------------------|---------------------------------------------------------|--------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|    | Contour lines with spot height                          |    |  |
|    | Spot heights                                            |    |                                                                                     |
|   | Approximate contour lines with approximate height       |   |                                                                                     |
|  | Form lines with spot height                             |  |                                                                                     |
|  | Approximate height of top of trees (above height datum) |  |                                                                                     |

## Water Features, Lava

**NOS** National Ocean Service (US)

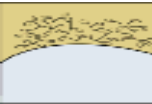
**NIMA** National Imagery and Mapping Agency (US)

**IHO** International Hydrographic Organization

| NOS/NIMA                                                                            |                    | IHO                                                                                  | Foreign NIMA Charts |
|-------------------------------------------------------------------------------------|--------------------|--------------------------------------------------------------------------------------|---------------------|
|    | River, Stream      |    |                     |
|    | Intermittent river |    |                     |
|   | Rapids, Waterfalls |   |                     |
|  | Lakes              |  |                     |
|  | Salt pans          |  |                     |
|  | Glacier            |  |                     |
|  | Lava flow          |  |                     |

## Vegetation

|             |                                          |
|-------------|------------------------------------------|
| <b>NOS</b>  | National Ocean Service (US)              |
| <b>NIMA</b> | National Imagery and Mapping Agency (US) |
| <b>IHO</b>  | International Hydrographic Organization  |

| NOS/NIMA                                                                                 |                                                            | IHO                                                                                  | Foreign NIMA Charts                                                                        |
|------------------------------------------------------------------------------------------|------------------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|
| Wooded  | Wood, in general                                           |    | Wooded  |
|         | Prominent trees (in groups or isolated);<br>Deciduous tree |     |         |
|         | Evergreen<br>(except conifer)                              |     |         |
|         | Conifer                                                    |     |         |
|        | Palm                                                       |   |        |
|       | Nipa palm                                                  |  |       |
|       | Casuarina                                                  |  |       |
|                                                                                          | Filao                                                      |  |       |
|                                                                                          | Eucalyptus                                                 |  |       |
|       | Mangrove                                                   |  |       |

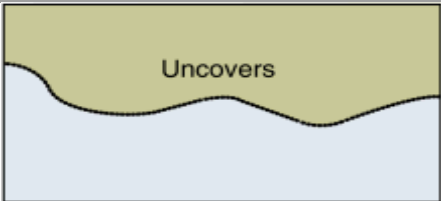
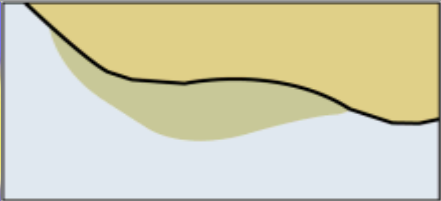
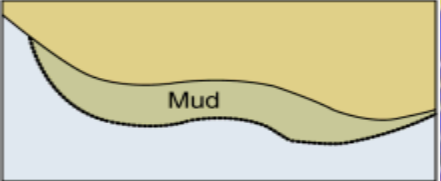
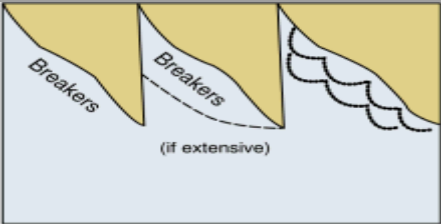
| NOS/NIMA                                                                          |                | IHO                                                                               | Foreign NIMA Charts                                                                |
|-----------------------------------------------------------------------------------|----------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
|  | Marsh<br>Swamp |  |  |
|  | Cypress        |                                                                                   |                                                                                    |

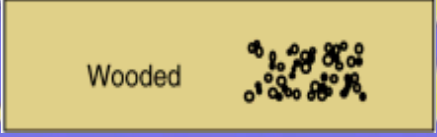


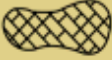
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## Supplementary National Simbols

|             |                                          |
|-------------|------------------------------------------|
| <b>NOS</b>  | National Ocean Service (US)              |
| <b>NIMA</b> | National Imagery and Mapping Agency (US) |
| <b>IHO</b>  | International Hydrographic Organization  |

| NOS/NIMA                                                                            |                                                                    |
|-------------------------------------------------------------------------------------|--------------------------------------------------------------------|
|    | Chart sounding datum line (surveyed)                               |
|    | Approximate sounding datum line (inadequately surveyed)            |
|   | Foreshore, Strand (in general); Stones; Shingle; Gravel; Mud; Sand |
|  | Breakers along a shore                                             |
|  | Rubble                                                             |

| NOS/NIMA                                                                                       |                     |
|------------------------------------------------------------------------------------------------|---------------------|
|               | Hachures            |
|               | Shading             |
|               | Lagoon              |
| Wooded        | Deciduous woodland  |
| Wooded       | Coniferous woodland |
|             | Tree plantation     |
| Cultivated  | Cultivated fields   |
| Grass       | Grass fields        |

| NOS/NIMA |                                                                                   |                       |
|----------|-----------------------------------------------------------------------------------|-----------------------|
| Rice     |  | Rice fields (Paddies) |
| Bushes   |  | Bushes                |



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## Nature of the Seabed

### Types of Seabed, Intertidal Areas

**NOS** National Ocean Service (US)

**NIMA** National Imagery and Mapping Agency (US)

**IHO** International Hydrographic Organization

| NOS/NIMA                                                                            |                                        | IHO/Foreign NIMA Charts                                                              |
|-------------------------------------------------------------------------------------|----------------------------------------|--------------------------------------------------------------------------------------|
| <i>S</i>                                                                            | Sand                                   | <i>S</i>                                                                             |
| <i>M</i>                                                                            | Mud                                    | <i>M</i>                                                                             |
| <i>Cy; Cl</i>                                                                       | Clay                                   | <i>Cy</i>                                                                            |
| <i>Si</i>                                                                           | Silt                                   | <i>Si</i>                                                                            |
| <i>St</i>                                                                           | Stones                                 | <i>St</i>                                                                            |
| <i>G</i>                                                                            | Gravel                                 | <i>G</i>                                                                             |
| <i>P</i>                                                                            | Pebbles                                | <i>P</i>                                                                             |
| <i>Cb</i>                                                                           | Cobbles                                | <i>Cb</i>                                                                            |
| <i>Rk; rky</i>                                                                      | Rock; Rocky                            | <i>Rk</i>                                                                            |
| <i>Co</i>                                                                           | Coral and Coralline algae              | <i>Co</i>                                                                            |
| <i>Sh</i>                                                                           | Shells                                 | <i>Sh</i>                                                                            |
| <i>S/M</i>                                                                          | Two layers (shown here: sand over mud) | <i>S/M</i>                                                                           |
| <i>Wd</i>                                                                           | Weed (including Kelp)                  | <i>Wd</i>                                                                            |
|  | Kelp, Seaweed                          |   |
|  | Mobile bottom (sand waves)             |   |
|  | Freshwater springs in seabed           |   |
|  | Area with stones, gravel or shingle    |  |

| NOS/NIMA                                                                          |                                       | IHO/Foreign NIMA Charts                                                            |
|-----------------------------------------------------------------------------------|---------------------------------------|------------------------------------------------------------------------------------|
|  | Rocky area, which covers and uncovers |  |
|  | Coral reef, which covers and uncovers |  |



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## Qualifying Terms

|             |                                          |
|-------------|------------------------------------------|
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| <b>NIMA</b> | National Imagery and Mapping Agency (US) |
| <b>IHO</b>  | International Hydrographic Organization  |

| NOS/NIMA       |                                        | IHO/Foreign NIMA Charts |
|----------------|----------------------------------------|-------------------------|
| <i>f; fne</i>  | fine                                   | <i>f</i>                |
| <i>m</i>       | medium (only used in relation to sand) | <i>m</i>                |
| <i>c; crs</i>  | coarse                                 | <i>c</i>                |
| <i>bk; brk</i> | broken                                 | <i>bk</i>               |
| <i>sy; stk</i> | sticky                                 | <i>sy</i>               |
| <i>so; sft</i> | soft                                   | <i>so</i>               |
| <i>stf</i>     | stiff                                  | <i>sf</i>               |
| <i>Vol</i>     | volcanic                               | <i>v</i>                |
| <i>Ca</i>      | calcareous                             | <i>ca</i>               |
| <i>h; hrd</i>  | hard                                   | <i>h</i>                |



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## Supplementary National Abbreviations

|             |                                          |
|-------------|------------------------------------------|
| <b>NOS</b>  | National Ocean Service (US)              |
| <b>NIMA</b> | National Imagery and Mapping Agency (US) |
| <b>IHO</b>  | International Hydrographic Organization  |

| <b>NOS</b>    |              |
|---------------|--------------|
| <i>bl; bk</i> | Black        |
| <i>Blds</i>   | Boulders     |
| <i>br</i>     | Brown        |
| <i>bu</i>     | Blue         |
| <i>ch</i>     | Chocolate    |
| <i>Cir</i>    | Cirripedia   |
| <i>Ck</i>     | Chalk        |
| <i>Cn</i>     | Cinders      |
| <i>Co Hd</i>  | Coral head   |
| <i>dec</i>    | Decayed      |
| <i>Di</i>     | Diatoms      |
| <i>dk</i>     | Dark         |
| <i>fly</i>    | Flinty       |
| <i>Fr</i>     | Foraminifera |
| <i>Fu</i>     | Fucus        |
| <i>Gl</i>     | Globigerina  |
| <i>glac</i>   | Glacial      |
| <i>gn</i>     | Green        |
| <i>Grd</i>    | Ground       |
| <i>Grs</i>    | Grass        |
| <i>gty</i>    | Gritty       |
| <i>gy</i>     | Gray         |
| <i>K</i>      | Kelp         |
| <i>La</i>     | Lava         |

| NOS         |            |
|-------------|------------|
| <i>lrg</i>  | Large      |
| <i>lt</i>   | Light      |
| <i>Ma</i>   | Mattes     |
| <i>Mds</i>  | Madrepores |
| <i>MI</i>   | Marl       |
| <i>Mn</i>   | Manganese  |
| <i>Ms</i>   | Mussels    |
| <i>or</i>   | Orange     |
| <i>Oys</i>  | Oysters    |
| <i>Oz</i>   | Ooze       |
| <i>Pm</i>   | Pumice     |
| <i>Po</i>   | Polyzoa    |
| <i>Pt</i>   | Pteropods  |
| <i>Qz</i>   | Quartz     |
| <i>Rd</i>   | Radiolaria |
| <i>rd</i>   | Red        |
| <i>rt</i>   | Rotten     |
| <i>Sc</i>   | Scoriae    |
| <i>Sch</i>  | Schist     |
| <i>sml</i>  | Small      |
| <i>Sn</i>   | Shingle    |
| <i>Spg</i>  | Sponge     |
| <i>Spi</i>  | Spicules   |
| <i>spk</i>  | Speckled   |
| <i>Stg</i>  | Sea-tangle |
| <i>str</i>  | Streaky    |
| <i>T</i>    | Tufa       |
| <i>ten</i>  | Tenacious  |
| <i>unev</i> | Uneven     |
| <i>vard</i> | Varied     |

| NOS            |              |
|----------------|--------------|
| <i>vi</i>      | Violet       |
| <i>Vol Ash</i> | Volcanic ash |
| <i>wh</i>      | White        |
| <i>yl</i>      | Yellow       |

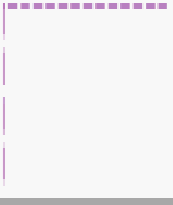
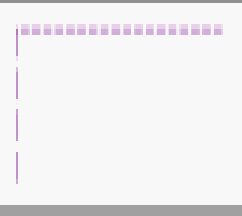


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## Offshore Installations

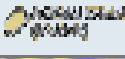
### General

|             |                                          |
|-------------|------------------------------------------|
| <b>NOS</b>  | National Ocean Service (US)              |
| <b>NIMA</b> | National Imagery and Mapping Agency (US) |
| <b>IHO</b>  | International Hydrographic Organization  |

| NOS                                                                                | NIMA                                                                                |                                                   | IHO                                                                                  |
|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------|--------------------------------------------------------------------------------------|
|                                                                                    | DURRAH OILFIELD                                                                     | Name of oilfield or gasfield                      | Oil field                                                                            |
|   |    | Platform with designation/name                    |     |
|  |   | Limit of safety zone around offshore installation |    |
|                                                                                    |  | Limit of development area                         |  |

## Platforms and Moorings

|             |                                          |
|-------------|------------------------------------------|
| <b>NOS</b>  | National Ocean Service (US)              |
| <b>NIMA</b> | National Imagery and Mapping Agency (US) |
| <b>IHO</b>  | International Hydrographic Organization  |

| NOS                                                                                 | NIMA                                                                                |                                                                                             | IHO                                                                                 | Foreign NIMA Charts                                                                 |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|    |    | Production platform, Platform, Oil derrick                                                  |    |                                                                                     |
|                                                                                     |    | Flare stack (at sea)                                                                        |    |  |
|                                                                                     |    | Mooring tower, Articulated Loading Platform (ALP), Single Anchor Leg Moorings (SALM)        |    |                                                                                     |
|    |    | Observation/research platform (with name)                                                   |                                                                                     |                                                                                     |
|   |                                                                                     | Artificial island                                                                           |                                                                                     |                                                                                     |
|  |                                                                                     | Oil or Gas installation buoy, Catenary Anchor Leg Mooring (CALM), Single Buoy Mooring (SBM) |  |                                                                                     |
|  |  | Moored storage tanker                                                                       |                                                                                     |                                                                                     |

## Underwater Installations

**NOS** National Ocean Service (US)

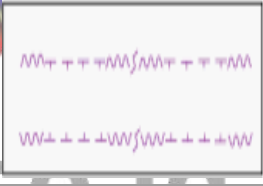
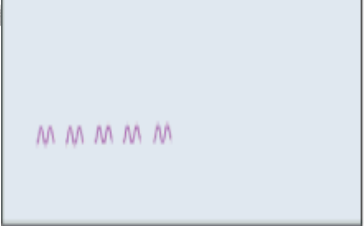
**NIMA** National Imagery and Mapping Agency (US)

**IHO** International Hydrographic Organization

| NOS                                                                                                                                                                                                                                                         | NIMA                                                                                             |                                             | IHO                                                                                                      |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|---------------------------------------------|----------------------------------------------------------------------------------------------------------|
| <br><br> |                 | Submerged production well                   |                         |
| <br><i>Pipe</i>                                                                                                                                                            | <br><i>Well</i> | Suspended well, depth over wellhead unknown | <br><i>Well</i>         |
| <br><i>Pipe (cov 24ft)</i><br><br><i>Pipe (cov 92ft)</i>                                 | <br><i>Well</i> | Suspended well, with depth over wellhead    | <br><i>Well</i>         |
|                                                                                                                                                                                                                                                             |                                                                                                  | Wellhead with depth above the bottom        | <br><i>Well (5.7)</i> |
|                                                                                                                                                                                                                                                             |                                                                                                  | Site of cleared platform                    | <br>#                 |
| <br><i>Pipe</i>                                                                                                                                                          |                                                                                                  | Above-water wellheads                       | <br><i>Pipe</i>       |

## Submarine Cables

|             |                                          |
|-------------|------------------------------------------|
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| <b>NIMA</b> | National Imagery and Mapping Agency (US) |
| <b>IHO</b>  | International Hydrographic Organization  |

| NOS                                                                                 | NIMA |                            | IHO                                                                                  |
|-------------------------------------------------------------------------------------|------|----------------------------|--------------------------------------------------------------------------------------|
|    |      | Submerged production well  |    |
|    |      | Submarine cable area       |    |
|   |      | Submarine power cable      |   |
|  |      | Submarine power cable area |  |
|  |      | Disused submarine cable    |  |

## Submarine Pipelines

**NOS** National Ocean Service (US)

**NIMA** National Imagery and Mapping Agency (US)

**IHO** International Hydrographic Organization

| NOS | NIMA |                                                           | IHO | Foreign NIMA Charts |
|-----|------|-----------------------------------------------------------|-----|---------------------|
|     |      | Oil, Gas pipeline                                         |     |                     |
|     |      | Oil, Gas pipeline areas                                   |     |                     |
|     |      | Waterpipe, sewer, outfall pipe, intake pipe               |     |                     |
|     |      | Discharge pipeline areas                                  |     |                     |
|     |      | Buried pipeline pipe (with nominal depth to which buried) |     |                     |
|     |      | Potable Water intake, diffuser, or drib                   |     |                     |
|     |      | Oil, Gas pipeline areas                                   |     |                     |

## Supplementary National Simbol

|             |                                          |
|-------------|------------------------------------------|
| <b>NOS</b>  | National Ocean Service (US)              |
| <b>NIMA</b> | National Imagery and Mapping Agency (US) |
| <b>IHO</b>  | International Hydrographic Organization  |

| NOS                                                                                                                                                                           | NIMA                                                                                   |                   | Foreign NIMA Charts                                                                 |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|-------------------|-------------------------------------------------------------------------------------|
|  Well  Well |  Well | Oil, Gas pipeline |  |



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# Ports

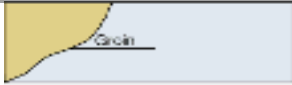
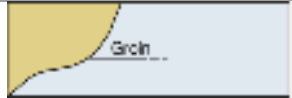
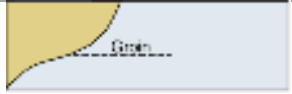
## Hydraulic Structures in General

**NOS** National Ocean Service (US)

**NIMA** National Imagery and Mapping Agency (US)

**IHO** International Hydrographic Organization

| NOS/NIMA |                                                | IHO | Foreign NIMA Charts |
|----------|------------------------------------------------|-----|---------------------|
|          | Dike, Levee                                    |     |                     |
|          | Seawall (on large-scale charts)                |     |                     |
|          | Seawall (on smaller-scale charts)              |     |                     |
|          | Causeway                                       |     |                     |
|          | Breakwater (in general)                        |     |                     |
|          | Breakwater (loose boulders, tetrapods, etc.)   |     |                     |
|          | Breakwater (slope of concrete or masonry)      |     |                     |
|          | Training wall (partly submerged at high water) |     |                     |

| NOS/NIMA                                                                          |                            | IHO                                                                               | Foreign NIMA Charts                                                                 |
|-----------------------------------------------------------------------------------|----------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|  | Groin (always dry)         |  |  |
|  | Groin (intertidal)         |                                                                                   |                                                                                     |
|  | Groin (always under water) |                                                                                   |                                                                                     |



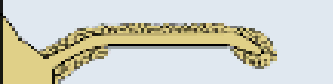
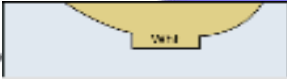
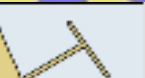
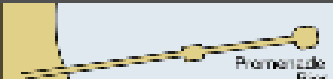
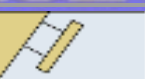
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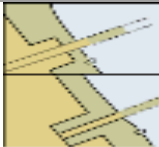
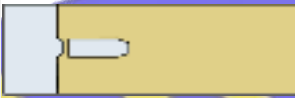
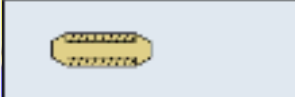
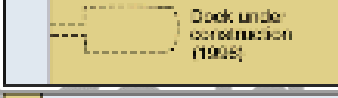
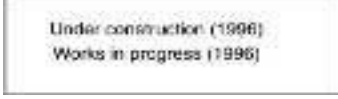
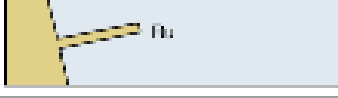
## Harbor Installations

**NOS** National Ocean Service (US)

**NIMA** National Imagery and Mapping Agency (US)

**IHO** International Hydrographic Organization

| NOS                                                                                 | NIMA                                                                                |                       | IHO                                                                                  | Foreign NIMA Charts                                                                  |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-----------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
|                                                                                     |                                                                                     | Fishing harbor        |     |                                                                                      |
|    |                                                                                     | Mole                  |    |                                                                                      |
|    |                                                                                     | Quay, Wharf           |     |    |
|    |                                                                                     | Pier, Jetty           |     |    |
|   |                                                                                     | Promenade pier        |   |                                                                                      |
|                                                                                     |                                                                                     | Pontoon               |   |  |
|  |                                                                                     | Landing for boats     |  |                                                                                      |
|                                                                                     |                                                                                     | Steps, landing stairs |   |  |
|  |  | Designation of berth  |   |   |
|  |  | Dolphin               |   |   |

| NOS | NIMA                                                                                |                                                      | IHO                                                                                  | Foreign NIMA Charts                                                                 |
|-----|-------------------------------------------------------------------------------------|------------------------------------------------------|--------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|     |                                                                                     | Deviation dolphin                                    |     |                                                                                     |
|     | ◀ File ■ File (Great Lakes)                                                         | Minor post or pile                                   | *                                                                                    |                                                                                     |
|     |    | Slipway, Patent slip, Ramp                           |    |  |
|     |                                                                                     | Gridiron, Scrubbing grid                             |    | Gridiron                                                                            |
|     |    | Dry dock, Graving dock                               |    | Dry dock                                                                            |
|     |    | Floating dock                                        |    | Floating dock                                                                       |
|     |                                                                                     | Non-tidal basin, Wet dock                            |   |                                                                                     |
|     |                                                                                     | Tidal basin, Tidal harbor                            |  |                                                                                     |
|     |                                                                                     | Works on land, with year date                        |  | Dock under construction (1998)                                                      |
|     |  | Works at sea, Area under reclamation, with year date |  | Area under reclamation (1996)                                                       |
|     |  | Works under construction, with year date             |  | Under construction (1996)<br>Works in progress (1996)                               |
|     |  | Ruins                                                |  |                                                                                     |

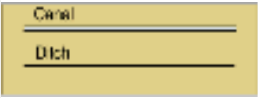
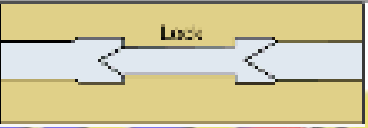
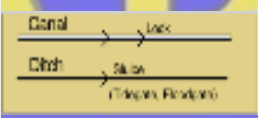
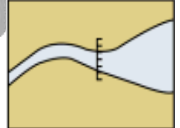
| NOS                                                                               | NIMA |                                                              | IHO                                                                               | Foreign NIMA Charts |
|-----------------------------------------------------------------------------------|------|--------------------------------------------------------------|-----------------------------------------------------------------------------------|---------------------|
|  |      | Ruined pier, partly submerged at high water. Submerged ruins |  |                     |
|  |      | Hulk (actual shape on large-scale charts)                    |  |                     |



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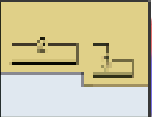
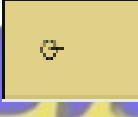
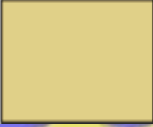
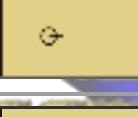
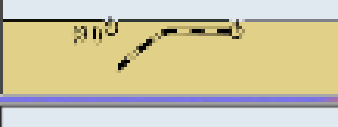
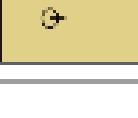
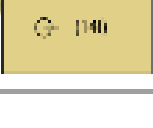
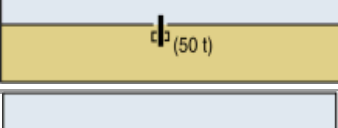
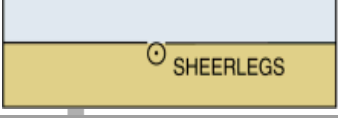
## Canals, Barrages

|             |                                          |
|-------------|------------------------------------------|
| <b>NOS</b>  | National Ocean Service (US)              |
| <b>NIMA</b> | National Imagery and Mapping Agency (US) |
| <b>IHO</b>  | International Hydrographic Organization  |

| NOS/NIMA                                                                            |                                           | IHO                                                                                                                                                                        | Foreign NIMA Charts                                                                 |
|-------------------------------------------------------------------------------------|-------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|    | Canal                                     |                                                                                          |  |
|    | Lock (on large-scale charts)              |                                                                                          |                                                                                     |
|    | Lock (on smaller-scale charts)<br>Caisson |                                                                                          |                                                                                     |
|                                                                                     | Flood barrage                             |                                                                                        |                                                                                     |
|  | Dam                                       |   |                                                                                     |

## Transshipment Facilities

**NOS** National Ocean Service (US)  
**NIMA** National Imagery and Mapping Agency (US)  
**IHO** International Hydrographic Organization

| NOS                                                                                 | NIMA                                                                                |                                                 | IHO                                                                                  | Foreign NIMA Charts                                                                |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------|--------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
|                                                                                     | RoRo                                                                                | Roll-on, Roll-off Ferry (Ro Ro Terminal)        | RoRo                                                                                 |                                                                                    |
|                                                                                     |                                                                                     | Transit shed, Warehouse (with designation)      |     |  |
|    |    | Timber yard                                     |    |                                                                                    |
|   |   | Crane with lifting capacity, crane (on railway) |   |                                                                                    |
|  |  | Container crane with lifting capacity           |  |                                                                                    |
|                                                                                     |                                                                                     | Sheerlegs (conspicuous)                         |  |                                                                                    |

## Public Buildings

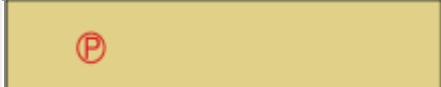
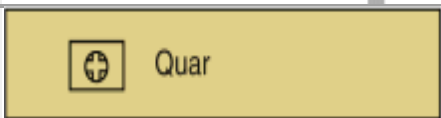
|             |                                          |
|-------------|------------------------------------------|
| <b>NOS</b>  | National Ocean Service (US)              |
| <b>NIMA</b> | National Imagery and Mapping Agency (US) |
| <b>IHO</b>  | International Hydrographic Organization  |

| NOS/NIMA                                                                                        |                         | IHO/Foreign NIMA Charts                                                                        |
|-------------------------------------------------------------------------------------------------|-------------------------|------------------------------------------------------------------------------------------------|
| Hbr Mr                                                                                          | Harbormaster's office   |             |
| ■ Cus Ho                                                                                        | Customhouse             |             |
|  Health Office | Health officer's office |             |
| ■ Hosp                                                                                          | Hospital                |  Hospital |
| ■ PO                                                                                            | Post office             |           |

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## Supplementary National Simbols

|             |                                          |
|-------------|------------------------------------------|
| <b>NOS</b>  | National Ocean Service (US)              |
| <b>NIMA</b> | National Imagery and Mapping Agency (US) |
| <b>IHO</b>  | International Hydrographic Organization  |

| NOS/NIMA                                                                                 |                                 |
|------------------------------------------------------------------------------------------|---------------------------------|
|         | Jetty (partly below MHW) office |
|         | Submerged jetty                 |
|        | Jetty (small scale)             |
|       | Pump-out facilities             |
|  Quar | Quarantine                      |

## Positions, Distances, Directions, Compass

### Geographic Positions

|             |                                          |
|-------------|------------------------------------------|
| <b>NOS</b>  | National Ocean Service (US)              |
| <b>NIMA</b> | National Imagery and Mapping Agency (US) |
| <b>IHO</b>  | International Hydrographic Organization  |

| <b>NOS/NIMA</b> |                      | <b>IHO</b> |
|-----------------|----------------------|------------|
| Lat             | Latitude             | Lat        |
| Long            | Longitude            | Long       |
| °               | Degree(s)            | °          |
| '               | Minute(s) of arc     | '          |
| "               | Second(s) of arc     | "          |
| PA              | Position approximate | PA         |
| PD              | Position doubtful    | PD         |
| N               | North, Northern      | N          |
| E               | East, Eastern        | E          |
| S               | South, Southern      | S          |
| W               | West, Western        | W          |
| NE              | Northeast            | NE         |
| SE              | Southeast            | SE         |
| NW              | Northwest            | NW         |
| SW              | Southwest            | SW         |

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## Control Points

**NOS** National Ocean Service (US)

**NIMA** National Imagery and Mapping Agency (US)

**IHO** International Hydrographic Organization

| NOS/NIMA                                                                          |                     | IHO/Foreign NIMA Charts                                                           |
|-----------------------------------------------------------------------------------|---------------------|-----------------------------------------------------------------------------------|
|  | Triangulation point |  |
|  | Observation spot    |  |
|  | Fixed point         |  |
|  | Benchmark           |  |
|  | Boundary mark       |  |

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## Symbolized Positions (Examples)

|             |                                          |
|-------------|------------------------------------------|
| <b>NOS</b>  | National Ocean Service (US)              |
| <b>NIMA</b> | National Imagery and Mapping Agency (US) |
| <b>IHO</b>  | International Hydrographic Organization  |

| NOS/NIMA |  |                                                       | IHO/Foreign NIMA Charts |
|----------|--|-------------------------------------------------------|-------------------------|
|          |  | Symbols in plan: position is center of primary simbol |                         |
|          |  | Symbols in profile: position is at bottom of simbol   |                         |
|          |  | Point simbols (accurate positions)                    |                         |
|          |  | Approximate position                                  |                         |

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## Units

**NOS** National Ocean Service (US)

**NIMA** National Imagery and Mapping Agency (US)

**IHO** International Hydrographic Organization

| NOS/NIMA       |                                         | IHO | Foreign<br>NIMA<br>Charts |
|----------------|-----------------------------------------|-----|---------------------------|
| km             | Kilometer(s)                            | km  |                           |
| m              | Meter(s)                                | m   |                           |
| dm             | Decimeter(s)                            | dm  |                           |
| cm             | Centimeter(s)                           | cm  |                           |
| mm             | Millimeter(s)                           | mm  |                           |
| M, Mi, NMi, NM | Nautical mile(s) (1852m) or sea mile(s) | M   |                           |
| cbl            | Cable(s) length                         |     |                           |
| ft             | Foot/feet                               | ft  |                           |
| fm, fms        | Fathom(s)                               |     |                           |
| h, hr          | Hour                                    | h   |                           |
| m, min         | Minute(s) of time                       | m   | min                       |
| s, sec         | Second(s) of time                       | s   | sec                       |
| kn             | Knot(s)                                 | kn  |                           |
| t              | Ton(s) (metric ton equals 2,204.6 lbs)  | t   |                           |
| cd             | Candela (new candle)                    | cd  |                           |

## Magnetic Compass

|             |                                          |
|-------------|------------------------------------------|
| <b>NOS</b>  | National Ocean Service (US)              |
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| <b>IHO</b>  | International Hydrographic Organization  |

| NOS/NIMA |                                             | IHO/Foreign NIMA Charts                             |
|----------|---------------------------------------------|-----------------------------------------------------|
| var, VAR | Variation                                   |                                                     |
| mag      | magnetic                                    |                                                     |
| brg      | Bearing                                     |                                                     |
| T        | true                                        |                                                     |
| dev      | Deviation                                   |                                                     |
|          | Note of magnetic variation, in position     | Magnetic Variation<br>4°31'W 1995 (8'E)             |
|          | Note of magnetic variation, out of position | Magnetic Variation at 55°N 8°W<br>4°31'W 1995 (8'E) |

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## Compass Roses, Isogonic Lines, Local Magnetic Disturbance

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**NIMA** National Imagery and Mapping Agency (US)

**IHO** International Hydrographic Organization

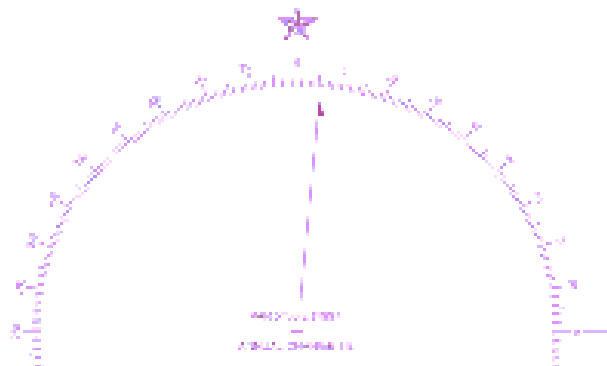
### **Compass rose, normal pattern** (smaller patterns of compass rose may be used)

Map of the North Sea, July 1900. 4th Edition, published by the Hydrographic Office, Washington, D.C., 1900. Annual change of declination is indicated by the number of degrees.

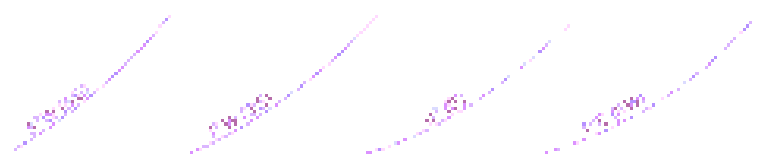
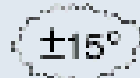


### **True North compass rose**

Map of the North Sea, July 1900.



### **Isogonic lines**

|                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                         |                                                                                    |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| <p>Magnetic Variation of Current and Future</p> <p>The Magnetic Variation is given in degrees, followed by an arrow, to show whether the magnetic variation is increasing or decreasing. The magnetic variation is given in degrees and minutes. The variation is given in degrees and minutes, followed by an arrow, to show the variation.</p>  |                                                                                                                                         |                                                                                    |
|                                                                                                                                                                                                                                                                                                                                                    | <p>Local magnetic disturbance.<br/>Within the enclosed area, the magnetic variation may deviate from the normal by the value shown.</p> |  |
| <p>Local Magnetic Disturbance<br/>(see Note)</p>                                                                                                                                                                                                                                                                                                                                                                                    | <p>Local magnetic disturbance.<br/>Where the area affected cannot be easily defined, a legend only is shown at the position.</p>        | <p>Local Magnetic Disturbance<br/>(see Note)</p>                                   |



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## Supplementary National Simbols

|             |                                          |
|-------------|------------------------------------------|
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| <b>NIMA</b> | National Imagery and Mapping Agency (US) |
| <b>IHO</b>  | International Hydrographic Organization  |

| <b>NOS/NIMA</b> |                                        |
|-----------------|----------------------------------------|
| m <sup>2</sup>  | Square meter                           |
| m <sup>3</sup>  | Cubic meter                            |
| in, ins         | Inch(es)                               |
| yd, yds         | Yards                                  |
| St M, St Mi     | Statute mile                           |
| μsec, μs        | Microsecond                            |
| Hz              | Hertz                                  |
| kHz             | Kilohertz                              |
| MHz             | Megahertz                              |
| cps, c/s        | Cycles per second                      |
| kc              | Kilocycle                              |
| Mc              | Megacycle                              |
| T               | Ton (U.S. short ton equals 2,000 lbs.) |
| deg             | Degree(s)                              |

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# Radar, Radio, Electronic Position-Fixing Systems

## Radar

**NOS** National Ocean Service (US)

**NIMA** National Imagery and Mapping Agency (US)

**IHO** International Hydrographic Organization

| NOS                                                                                                   | NIMA |                                                                                                              | IHO/Foreign NIMA Charts                                                                                                                                    |
|-------------------------------------------------------------------------------------------------------|------|--------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  R <sub>1</sub>      |      | Coast radar station, providing range and bearing service on request                                          |  R <sub>1</sub>                                                          |
|  R <sub>2</sub> xxxx |      | Ramark, radar beacon transmitting continuously                                                               |  R <sub>2</sub> xxxx                                                     |
|  R <sub>3</sub> xxxx |      | Radar transponder beacon, with morse identification, responding within the 3-cm (X-) band                    |  R <sub>3</sub> xxxx                                                     |
|                                                                                                       |      | Radar transponder beacon, with morse identification, responding within the 10-cm (S-) band                   |  R <sub>3</sub> xxxx(S) [10cm]                                         |
|                                                                                                       |      | Radar transponder beacon, with morse identification, responding within the 3-cm (X-) and the 10-cm (S-) band |  R <sub>3</sub> xxxx(Z) [3S 10cm]                                      |
|                                                                                                       |      | Radar transponder beacon, with morse identification, responding on a fixed frequency outside the marine band |  R <sub>3</sub> xxxx                                                   |
|                                                                                                       |      | Radar transponder beacons with bearing line                                                                  |  R <sub>3</sub> xxxx Y 200°<br>R <sub>3</sub> xxxx R <sub>3</sub> xxxx |

| NOS                                                                               | NIMA                                                                              |                                               | IHO/Foreign NIMA Charts                                                           |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------|-----------------------------------------------------------------------------------|
|  |  | Floating marks with radar transponder beacons |  |
|  |  | Radar reflector                               |  |
|  |  | Radar-conspicuous feature                     |  |



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## Radar

|             |                                          |
|-------------|------------------------------------------|
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| <b>NIMA</b> | National Imagery and Mapping Agency (US) |
| <b>IHO</b>  | International Hydrographic Organization  |

| NOS                                                                                                             | NIMA                                                                                       |                                                                                                              | IHO/Foreign NIMA Charts                                                                              |
|-----------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|
|  RA                            |                                                                                            | Coast radar station, providing range and bearing service on request                                          |  RA                |
|  RAMARK                        |                                                                                            | Ramark, radar beacon transmitting continuously                                                               |  RAMARK            |
|  RADCON                        |                                                                                            | Radar transponder beacon, with morse identification, responding within the 3-cm (X-) band                    |  RADCON(X)         |
|                                                                                                                 |                                                                                            | Radar transponder beacon, with morse identification, responding within the 10-cm (S-) band                   |  RADCON(S) (10cm)  |
|                                                                                                                 |                                                                                            | Radar transponder beacon, with morse identification, responding within the 3-cm (X-) and the 10-cm (S-) band |  RADCON(X)(10cm) |
|                                                                                                                 |                                                                                            | Radar transponder beacon, with morse identification, responding on a fixed frequency outside the marine band |  F RADCON        |
|                                                                                                                 |                                                                                            | Radar transponder beacons with bearing line                                                                  |                  |
|  RADCON (→)<br>H 2'<br>M 1.5 |  RADCON | Floating marks with radar transponder beacons                                                                |                  |

| NOS                                                                               | NIMA                                                                              |                           | IHO/Foreign NIMA Charts                                                           |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|---------------------------|-----------------------------------------------------------------------------------|
|  |  | Radar reflector           |  |
|  |  | Radar-conspicuous feature |  |



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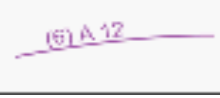
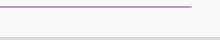
## Radio

|             |                                          |
|-------------|------------------------------------------|
| <b>NOS</b>  | National Ocean Service (US)              |
| <b>NIMA</b> | National Imagery and Mapping Agency (US) |
| <b>IHO</b>  | International Hydrographic Organization  |

| NOS                                                                                                            | NIMA                                                                                      |                                                             | IHO/Foreign NIMA Charts                                                              |
|----------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|-------------------------------------------------------------|--------------------------------------------------------------------------------------|
|  R Bn, RC                     |                                                                                           | Circular (non-directional) marine or aeromarine radiobeacon |     |
|  RD 072.30'<br>RD             |                                                                                           | Directional radiobeacon with bearing line                   |    |
|  RW                           |                                                                                           | Rotating-pattern radiobeacon                                |     |
|  CONSOL Bn<br>190 kHz<br>MMF |  CONSOL | Consol beacon                                               |   |
|  RDF                        |                                                                                           | Radio direction-finding station                             |  |
|  R Sta                      |  R     | Coast radio station providing QTG service                   |  |
|  AERO R Bn                  |                                                                                           | Aeronautical radiobeacon                                    |  |

## Electronic Position-Fixing Systems

|             |                                          |
|-------------|------------------------------------------|
| <b>NOS</b>  | National Ocean Service (US)              |
| <b>NIMA</b> | National Imagery and Mapping Agency (US) |
| <b>IHO</b>  | International Hydrographic Organization  |

| NOS            | NIMA                                                                                |                                                                                          | IHO/Foreign NIMA Charts                                                             |
|----------------|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| <b>Decca</b>   |                                                                                     |                                                                                          |                                                                                     |
|                |    | Identification of Lattice Patterns                                                       |    |
|                |    | Line of Position (LOP)                                                                   |    |
|                |                                                                                     | Line of Position representing Zone Limit (or, on larger scales, other intermediate LOPs) |    |
|                |                                                                                     | Half-lane LOP                                                                            |    |
|                |                                                                                     | LOP from adjoining Chain (on Interchain Fixing Charts)                                   |  |
|                |  | Lane value, with Chain designator (Interchain charts only) and Zone Designator           |  |
| <b>Loran-C</b> |                                                                                     |                                                                                          |                                                                                     |
|                |  | Identification of Loran-C Rates                                                          |  |
|                |  | Line of Position                                                                         |  |
|                |                                                                                     | LOP representing time difference value of an integral thousand $\mu$ s (microseconds)    |  |

| NOS                                                                                                                                                                                                                                | NIMA                                |                                                                   | IHO/Foreign NIMA Charts |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|-------------------------------------------------------------------|-------------------------|
|                                                                                                                                                                                                                                    |                                     | LOP beyond reliable groundwave service area                       |                         |
|                                                                                                                                                                                                                                    |                                     | LOP from adjoining Chain                                          |                         |
|                                                                                                                                                                                                                                    |                                     | LOP from adjoining Chain beyond reliable groundwave service areas |                         |
|                                                                                                                                                                                                                                    | 9960-Z-58000                        | LOP labeled with rate and full $\mu$ s value                      |                         |
|                                                                                                                                                                                                                                    |                                     | LOP labeled with final three digits only                          |                         |
| <p><i>Note: A Loran-C Chain Diagram may be given if rates from more than one Chain appear on a chart. An explanatory note is given if LOPs include propagation delays.</i></p> <p><b>Omega</b></p>                                 |                                     |                                                                   |                         |
|                                                                                                                                                                                                                                    | DF CF AC                            | Charted station pairs                                             | AB BC                   |
|                                                                                                                                                                                                                                    |                                     | Line of Position (LOP)                                            |                         |
|                                                                                                                                                                                                                                    | DF 700                              | Lane values                                                       |                         |
| <p><i>Note: A cautionary note draws attention to the need to consult Propagation Prediction Correction (PPC) tables. An explanatory note draws attention to the unreliability of LOPs within 450 n miles of a transmitter.</i></p> |                                     |                                                                   |                         |
| <b>Satellite Navigation Systems</b>                                                                                                                                                                                                |                                     |                                                                   |                         |
| WGS WGS 72 WGS 84                                                                                                                                                                                                                  | World Geodetic System, 1972 or 1984 | WGS WGS 72 WGS 84                                                 |                         |
| <p><i>Note: A note may be shown to indicate the shifts of latitude and longitude, in hundredths of a minute, which should be made to satellite-derived positions (which are referred to WGS) to relate them to the chart.</i></p>  |                                     |                                                                   |                         |

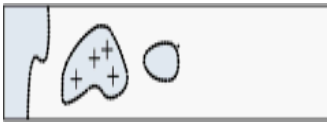
## Rocks, Wrecks, Obstructions

### General

**NOS** National Ocean Service (US)

**NIMA** National Imagery and Mapping Agency (US)

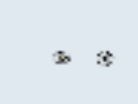
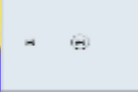
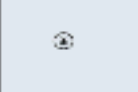
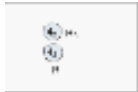
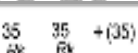
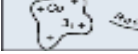
**IHO** International Hydrographic Organization

| NOS                                                                               | NIMA |                             | IHO                                                                                |
|-----------------------------------------------------------------------------------|------|-----------------------------|------------------------------------------------------------------------------------|
|  |      | Danger line, in general     |  |
|  |      | Swept by wire drag or diver |  |

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## Rocks

|             |                                          |
|-------------|------------------------------------------|
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| <b>NIMA</b> | National Imagery and Mapping Agency (US) |
| <b>IHO</b>  | International Hydrographic Organization  |

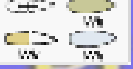
| NOS                                                                                 | NIMA                                                                                |                                                                  | IHO                                                                                  | Foreign NIMA Charts                                                                   |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|    |                                                                                     | Rock (islet) which does not cover, height above height datum     |    |    |
|    |    | Rock (islet) which covers and uncovers, height above chart datum |    |    |
|    |                                                                                     | Rock awash at the level of chart datum                           |    |    |
|   |                                                                                     | Dangerous underwater rock of uncertain depth                     |   |                                                                                       |
|  |  | Dangerous underwater rock of known depth                         |  |                                                                                       |
|  |  | --in the corresponding depth area                                |  |                                                                                       |
|  |  | --outside the corresponding depth area                           |  |  |
|  |  | Non-dangerous rock, depth known                                  |  |  |
|  |  | Coral reef which covers                                          |  |                                                                                       |
|  |  | Breakers                                                         |  |                                                                                       |

## Wrecks

**NOS** National Ocean Service (US)

**NIMA** National Imagery and Mapping Agency (US)

**IHO** International Hydrographic Organization

| NOS                                                                                 | NIMA                                                                                |                                                                             | IHO                                                                                 | Foreign NIMA Charts                                                                  |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
|    |                                                                                     | Wreck, hull always dry (on large-scale charts)                              |    |                                                                                      |
|    |                                                                                     | Wreck, covers and uncovers (on large-scale charts)                          |    |    |
|                                                                                     |                                                                                     | Submerged wreck, depth known (on large-scale charts)                        |    |     |
|                                                                                     |    | Submerged wreck, depth unknown (on large-scale charts)                      |    |    |
|   |                                                                                     | Wreck showing any portion of hull or superstructure at level of chart datum |   |   |
|  |  | Wreck showing mast or masts above chart datum only                          |  |                                                                                      |
|  |  | Wreck, least depth known by sounding only                                   |  |   |
|  |  | Wreck, least depth known, swept by wire drag or diver                       |  |  |
|  |                                                                                     | Dangerous wreck, depth unknown                                              |  |                                                                                      |
|  |                                                                                     | Sunken wreck, not dangerous to surface navigation                           |  |                                                                                      |

| NOS                                                                               | NIMA                                                                              |                                                                                                | IHO                                                                                | Foreign NIMA Charts                                                                 |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|  |  | Wreck, least depth unknown, but considered to have a safe clearance to the depth shown         |  |  |
|                                                                                   |  | Foul ground, non-dangerous to navigation but to be avoided by vessels anchoring, trawling etc. |  |                                                                                     |
|  |                                                                                   | Foul ground, non-dangerous to navigation but to be avoided by vessels anchoring, trawling etc. |                                                                                    |                                                                                     |



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## Obstructions

**NOS** National Ocean Service (US)

**NIMA** National Imagery and Mapping Agency (US)

**IHO** International Hydrographic Organization

| NOS | NIMA |                                                                            | IHO | Foreign NIMA Charts |
|-----|------|----------------------------------------------------------------------------|-----|---------------------|
|     |      | Obstruction, depth unknown                                                 |     | #                   |
|     |      | Obstruction, depth known                                                   |     |                     |
|     |      | Obstruction, depth known, swept by wire drag or diver                      |     |                     |
|     |      | Stumps of posts or piles, all or part of the time submerged                |     |                     |
|     |      | Submerged pile, stake, snag, well, deadhead or stump (with exact position) |     |                     |
|     |      | Submerged pile, stake, snag, well, deadhead or stump (with exact position) |     |                     |
|     |      | Fish trap, fish weirs, tunny nets                                          |     |                     |
|     |      | Fish trap area, tunny nets area                                            |     |                     |
|     |      | Fish haven (artificial fishing reef)                                       |     |                     |

| NOS                                                                               | NIMA                                                                              |                                        | IHO                                                                                | Foreign NIMA Charts |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|----------------------------------------|------------------------------------------------------------------------------------|---------------------|
|  |  | Fish haven with minimum depth          |  |                     |
|  |                                                                                   | Shellfish cultivation (stakes visible) |  |                     |



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## Supplementary National Simbols

|             |                                          |
|-------------|------------------------------------------|
| <b>NOS</b>  | National Ocean Service (US)              |
| <b>NIMA</b> | National Imagery and Mapping Agency (US) |
| <b>IHO</b>  | International Hydrographic Organization  |

| NOS | NIMA |                                                       | Foreign NIMA Charts |
|-----|------|-------------------------------------------------------|---------------------|
|     |      | Rock awash (height unknown)                           |                     |
|     |      | Shoal sounding on isolated rock or rocks              |                     |
|     |      | Sunken wreck covered 20 to 30 meters                  |                     |
|     |      | Submarine volcano                                     |                     |
|     |      | Discolored water                                      |                     |
|     |      | Sunken danger with depth cleared (swept) by wire drag |                     |
|     |      | Reef of unknown extent                                |                     |
|     |      | Coral reef, detached (uncovers at sounding datum)     |                     |

| NOS                                                                                          | NIMA                                                                                         |                                | Foreign NIMA Charts                                                                 |
|----------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------|-------------------------------------------------------------------------------------|
|  Subm Crib  |  Crib       | Submerged Crib                 |  |
|  Crib       |  Duck Blind | Crib, Duck Blind (above water) |                                                                                     |
|  Duck Blind |                                                                                              | Submerged Duck Blind           |                                                                                     |
|  Platform   |                                                                                              | Submerged Platform             |                                                                                     |



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## Services

### Pilotage

**NOS** National Ocean Service (US)

**NIMA** National Imagery and Mapping Agency (US)

**IHO** International Hydrographic Organization

| NOS                                                                                         | NIMA                                                                                         |                                                                                                  | IHO/Foreign NIMA Charts                                                                              |
|---------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|
|  Pilots    |             | Boarding place, position of a Pilot-Cruising Vessel                                              |                     |
|                                                                                             |  Name       | Boarding place, position of a Pilot-Cruising Vessel, with name (e.g. District, Port)             |  Name               |
|                                                                                             |  (see note) | Boarding place, position of a Pilot-Cruising Vessel, with note (e.g. for Tanker, Disembarkation) |  Note               |
|                                                                                             |                                                                                              | Pilots transferred by helicopter                                                                 |  Note              |
|                                                                                             |                                                                                              | Pilot office with Pilot look-out; Pilot look-out                                                 |  Pilot look-out   |
|  PIL STA |  Pilots   | Pilot Office                                                                                     |  Pilots           |
|          |                                                                                              | Port with Pilotage-Service                                                                       |  Pilotage-Service |

## Coast Guard, Rescue Stations

|             |                                          |
|-------------|------------------------------------------|
| <b>NOS</b>  | National Ocean Service (US)              |
| <b>NIMA</b> | National Imagery and Mapping Agency (US) |
| <b>IHO</b>  | International Hydrographic Organization  |

| NOS/NIMA |                                                  | IHO/Foreign NIMA Charts |
|----------|--------------------------------------------------|-------------------------|
|          | Coast Guard station                              |                         |
|          | Coast Guard station with Rescue station          |                         |
|          | Rescue station; Lifeboat station; Rocket station |                         |
|          | Lifeboat lying at a mooring                      |                         |
|          | Refuge for shipwrecked mariners                  |                         |

## Signal Stations

**NOS** National Ocean Service (US)

**NIMA** National Imagery and Mapping Agency (US)

**IHO** International Hydrographic Organization

| NOS                                                                                 | NIMA |                                                              | IHO                                                                                 | Foreign NIMA Charts                                                               |
|-------------------------------------------------------------------------------------|------|--------------------------------------------------------------|-------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
|    |      | Signal station in general                                    |    |  |
|                                                                                     |      | Signal station, showing International Port Traffic Signals   |    |                                                                                   |
|                                                                                     |      | Traffic signal station. Port Entry and Departure signals     |    |                                                                                   |
|    |      | Port control signal station                                  |    |                                                                                   |
|                                                                                     |      | Lock signal station.                                         |    |                                                                                   |
|                                                                                     |      | Bridge passage signal station                                |  |                                                                                   |
|                                                                                     |      | Bridge lights including traffic signals                      |  |                                                                                   |
|                                                                                     |      | Telegraph station                                            |  |                                                                                   |
|                                                                                     |      | Telegraph station                                            |  |                                                                                   |
|  |      | Storm signal station                                         |  |                                                                                   |
|  |      | National Weather Service signal station, Wind signal station |  |                                                                                   |
|                                                                                     |      | Ice signal station                                           |  |                                                                                   |
|                                                                                     |      | Time signal station                                          |  |                                                                                   |

| NOS | NIMA         |                                    | IHO                                                                               | Foreign NIMA Charts |
|-----|--------------|------------------------------------|-----------------------------------------------------------------------------------|---------------------|
|     | o Tide gauge | Tide scale or gauge                |  |                     |
|     |              | Automatically recording tide gauge |  |                     |
|     |              | Tidal signal station               |  |                     |
|     |              | Tidal stream signal                |  |                     |
|     |              | Danger signal station              |  |                     |
|     |              | Firing practice signal station     |  |                     |



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## Supplementary National Simbols

|             |                                          |
|-------------|------------------------------------------|
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| <b>NIMA</b> | National Imagery and Mapping Agency (US) |
| <b>IHO</b>  | International Hydrographic Organization  |

| NOS                                                                                                |                              |
|----------------------------------------------------------------------------------------------------|------------------------------|
|  BELL             | Bell (on land)               |
|  MARINE POLICE    | Marine police station        |
|  FIREBOAT STATION | Fireboat station             |
|                 | Notice board                 |
|  LOOK TR        | Lookout station; Watch tower |
| Sem                                                                                                | Semaphore                    |
|                 | Park Ranger station          |



## Tides, Currents

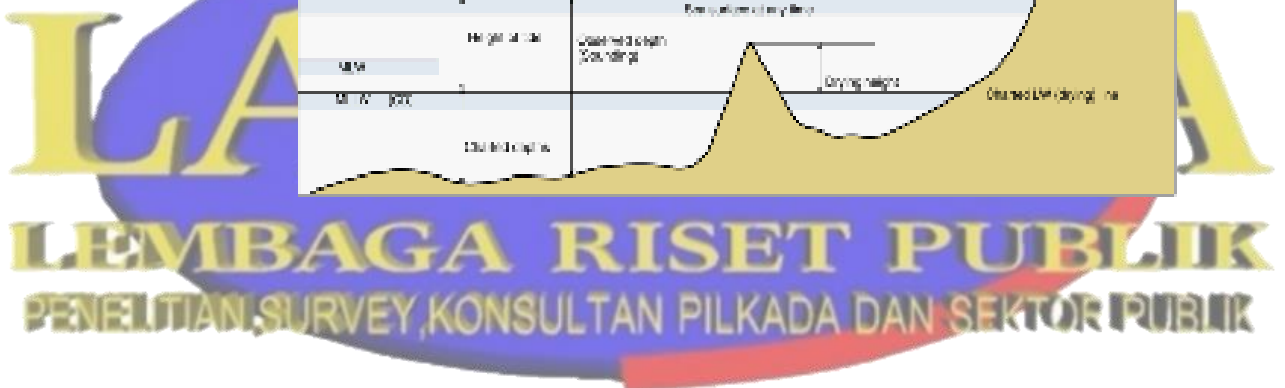
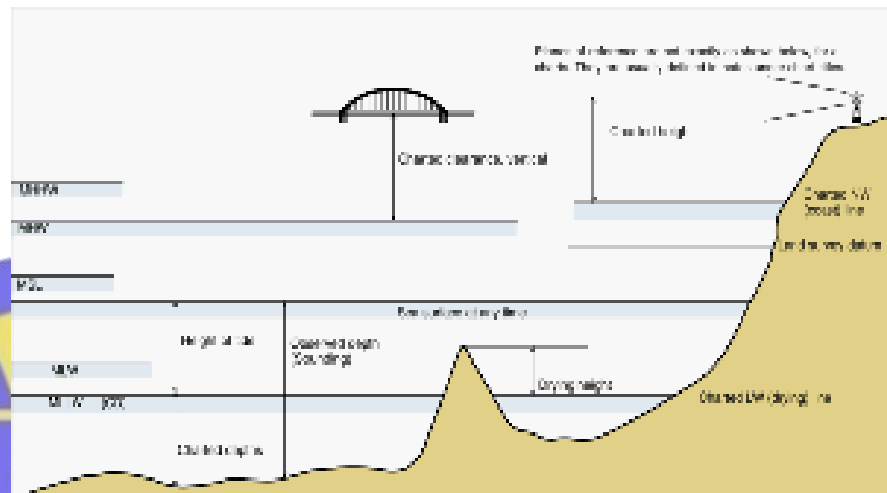
### Terms Relating to Tidal Levels

|             |                                          |
|-------------|------------------------------------------|
| <b>NOS</b>  | National Ocean Service (US)              |
| <b>NIMA</b> | National Imagery and Mapping Agency (US) |
| <b>IHO</b>  | International Hydrographic Organization  |

| NOS/NIMA |                                           | IHO/Foreign<br>NIMA<br>Charts |
|----------|-------------------------------------------|-------------------------------|
|          | Chart Datum, Datum for sounding reduction | CD                            |
|          | Lowest Astronomical Tide                  | LAT                           |
|          | Highest Astronomical Tide                 | HAT                           |
| MLW      | Mean Low Water                            | MLW                           |
| MHW      | Mean High Water                           | MHW                           |
| MLWS     | Mean Low Water Springs                    | MLWS                          |
| MHWS     | Mean High Water Springs                   | MHWS                          |
| MLWN     | Mean Low Water Neaps                      | MLWN                          |
| MHWN     | Mean High Water Neaps                     | MHWN                          |
| MLLW     | Mean Lower Low Water                      | MLLW                          |
| MHHW     | Mean Higher High Water                    | MHHW                          |
|          | Mean Higher Low Water                     | MHLW                          |
|          | Mean Lower High Water                     | MLHW                          |
| Sp       | Spring tide                               | Sp                            |
| Np       | Neap tide                                 | Np                            |

## Tidal Levels and Charted Data

|      |                                          |
|------|------------------------------------------|
| NOS  | National Ocean Service (US)              |
| NIMA | National Imagery and Mapping Agency (US) |
| IHO  | International Hydrographic Organization  |



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## Tide Tables

**NOS** National Ocean Service (US)

**NIMA**      National Imagery and Mapping Agency (US)

**IHO** International Hydrographic Organization

[illegible]

## Tidal Streams and Currents

|             |                                          |
|-------------|------------------------------------------|
| <b>NOS</b>  | National Ocean Service (US)              |
| <b>NIMA</b> | National Imagery and Mapping Agency (US) |
| <b>IHO</b>  | International Hydrographic Organization  |

| NOS/NIMA                                                                            |                                                   | IHO/Foreign NIMA Charts                                                              |
|-------------------------------------------------------------------------------------|---------------------------------------------------|--------------------------------------------------------------------------------------|
|    | Flood stream (current) with rate                  |    |
|    | Ebb stream (current) with rate                    |    |
|    | Current in restricted waters                      |    |
|    | Ocean current with rates and seasons              |    |
|  | Overfalls, tide rips, races                       |  |
|  | Eddies                                            |  |
|  | Position of tabulated tidal data with designation |  |

## Supplementary National Simbols

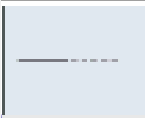
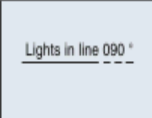
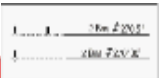
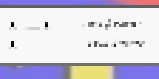
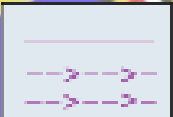
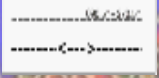
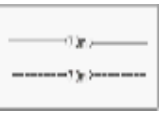
|             |                                          |
|-------------|------------------------------------------|
| <b>NOS</b>  | National Ocean Service (US)              |
| <b>NIMA</b> | National Imagery and Mapping Agency (US) |
| <b>IHO</b>  | International Hydrographic Organization  |

| NOS/NIMA                                                                            |                                                               |
|-------------------------------------------------------------------------------------|---------------------------------------------------------------|
| HW                                                                                  | High water                                                    |
| HHW                                                                                 | Higher high water                                             |
| LW                                                                                  | Low water                                                     |
| LWD                                                                                 | Low-water datum                                               |
| MTL                                                                                 | Mean tide level                                               |
| ISLW                                                                                | Indian spring low water                                       |
| HWF&C                                                                               | High-water full and change (vulgar establishment of the port) |
| LWF&C                                                                               | Low-water full and change                                     |
| CRD                                                                                 | Columbia River Datum                                          |
| GCLWD                                                                               | Gulf Coast Low Water Datum                                    |
| Str                                                                                 | Stream                                                        |
|   | Current, general, with rate                                   |
| vel                                                                                 | Velocity; Rate                                                |
| Str                                                                                 | Stream                                                        |
| Kn                                                                                  | Knots                                                         |
| ht                                                                                  | Height                                                        |
| fl                                                                                  | Flood                                                         |
| Str                                                                                 | Stream                                                        |
|  | New moon                                                      |
|  | Full moon                                                     |
|  | Current diagram                                               |

## Tracks, Routes

### Tracks

|             |                                          |
|-------------|------------------------------------------|
| <b>NOS</b>  | National Ocean Service (US)              |
| <b>NIMA</b> | National Imagery and Mapping Agency (US) |
| <b>IHO</b>  | International Hydrographic Organization  |

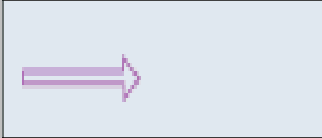
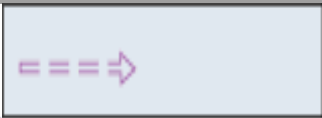
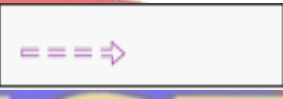
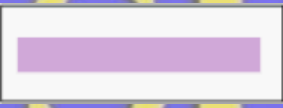
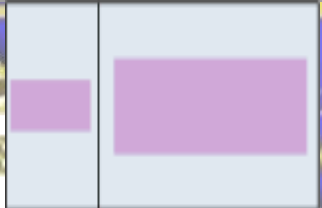
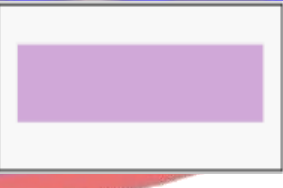
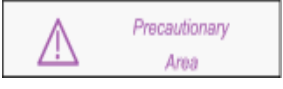
| NOS                                                                                 | NIMA                                                                                |                                                               | IHO                                                                                  | Foreign NIMA Charts                                                                 |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------|--------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|    |    | Leading line (solid line is fairway)                          |    |                                                                                     |
|    |    | Transit, clearing line                                        |    |                                                                                     |
|   |   | Recommended track based on a system of fixed marks            |    |  |
|  |                                                                                     | Recommended tracks NOT based on a system of fixed marks       |  |                                                                                     |
|  |                                                                                     | One-way track                                                 |  |                                                                                     |
|                                                                                     |                                                                                     | Two-way track (including a regulation described in a note)    |  |                                                                                     |
|                                                                                     |  | Track, recommended track with maximum authorized draft stated |  |                                                                                     |

## Routing Measures: Basic Simbols

**NOS** National Ocean Service (US)

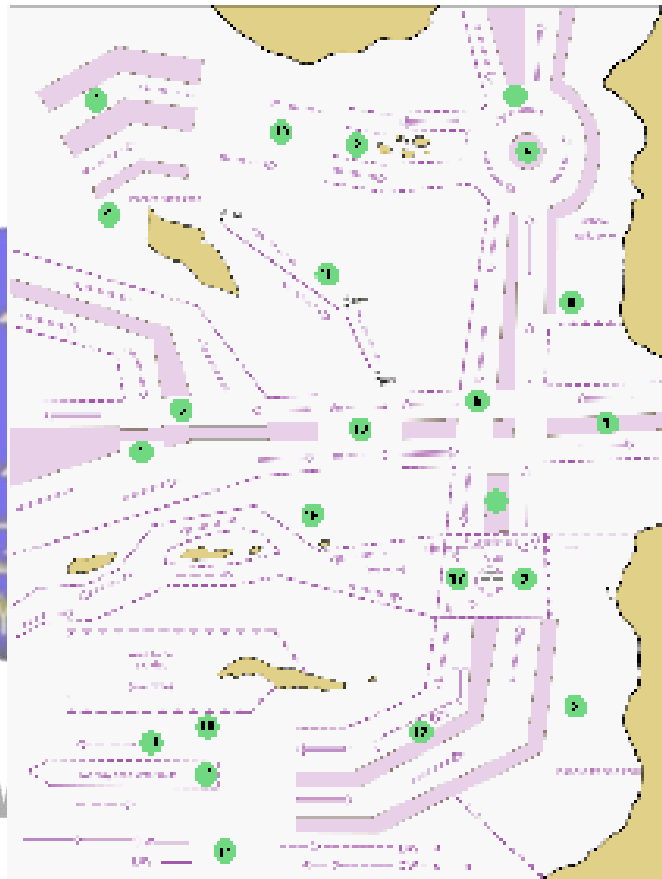
**NIMA** National Imagery and Mapping Agency (US)

**IHO** International Hydrographic Organization

| NOS                                                                                 | NIMA |                                                   | IHO/Foreign NIMA Charts                                                              |
|-------------------------------------------------------------------------------------|------|---------------------------------------------------|--------------------------------------------------------------------------------------|
|    |      | Established (mandatory) direction of traffic flow |    |
|    |      | Recommended direction of traffic flow             |    |
|    |      | Separation line                                   |    |
|   |      | Separation zone                                   |   |
|  |      | Limit of restricted area                          |  |
|  |      | Maritime limit in general                         |  |
|  |      | Precautionary area                                |  |

## Routing Measures: Examples

|      |                                          |
|------|------------------------------------------|
| NOS  | National Ocean Service (US)              |
| NIMA | National Imagery and Mapping Agency (US) |
| IHO  | International Hydrographic Organization  |



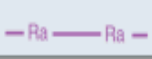
|   |                                                                      |
|---|----------------------------------------------------------------------|
| 1 | Traffic separation scheme; traffic separated by separation zone      |
| 2 | Traffic separation scheme, traffic separated by natural obstructions |
| 3 | Traffic separation scheme with outer separation zone (separating     |

|    |                                                                                |
|----|--------------------------------------------------------------------------------|
|    | traffic using scheme from traffic not using it)                                |
| 4  | Traffic separation scheme, roundabout                                          |
| 5  | Traffic separation scheme, with "crossing gates"                               |
| 6  | Traffic separation schemes crossing, without designated precautionary area     |
| 7  | Precautionary area                                                             |
| 8  | Inshore traffic zone, with defined end-limits                                  |
| 9  | Inshore traffic zone without defined end-limits                                |
| 10 | Recommended direction of traffic flow, between Traffic separation schemes      |
| 11 | Recommended direction of traffic flow, for ships not needed a deep water route |
| 12 | Deep water route, as part of one-way traffic lane                              |
| 13 | Two-way deep water route, with minimum depth stated                            |
| 14 | Deep water route, centerline as recommended. One-way or two-way track.         |
| 15 | Recommended route (often marked by centerline buoys)                           |
| 16 | Two-way route with one-way sections                                            |
| 17 | Area to be avoided, around navigational aid                                    |
| 18 | Area to be avoided, because of danger of stranding                             |

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## Radar Surveillance Systems

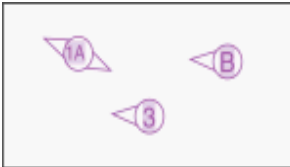
|             |                                          |
|-------------|------------------------------------------|
| <b>NOS</b>  | National Ocean Service (US)              |
| <b>NIMA</b> | National Imagery and Mapping Agency (US) |
| <b>IHO</b>  | International Hydrographic Organization  |

| NOS                                                                               | NIMA |                                                     | IHO                                                                                | Foreign NIMA Charts                                                                 |
|-----------------------------------------------------------------------------------|------|-----------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|  |      | Radar Surveillance Station                          |  |                                                                                     |
|                                                                                   |      | Radar range                                         |   |                                                                                     |
|                                                                                   |      | Radar reference line                                |  |  |
|                                                                                   |      | Radar reference line coinciding with a leading line |  |                                                                                     |

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## Radio Reporting Points

|             |                                          |
|-------------|------------------------------------------|
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| <b>NIMA</b> | National Imagery and Mapping Agency (US) |
| <b>IHO</b>  | International Hydrographic Organization  |

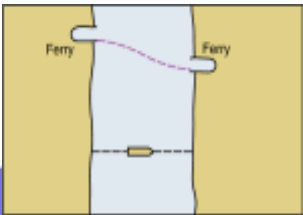
| NOS/NIMA                                                                          |                                                                                                                            | IHO/Foreign NIMA Charts                                                            |
|-----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
|  | Radio reporting<br>(calling-in or<br>way)points showing<br>direction(s) of vessel<br>movement with<br>designation (if any) |  |



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## Ferries

|             |                                          |
|-------------|------------------------------------------|
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| <b>NIMA</b> | National Imagery and Mapping Agency (US) |
| <b>IHO</b>  | International Hydrographic Organization  |

| NOS/NIMA                                                                          |             | IHO/Foreign NIMA Charts                                                            |
|-----------------------------------------------------------------------------------|-------------|------------------------------------------------------------------------------------|
|  | Ferry       |  |
|  | Cable Ferry |  |

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## Supplementary National Simbols

|             |                                          |
|-------------|------------------------------------------|
| <b>NOS</b>  | National Ocean Service (US)              |
| <b>NIMA</b> | National Imagery and Mapping Agency (US) |
| <b>IHO</b>  | International Hydrographic Organization  |

| NOS                                                                                 | NIMA |                                                                                 | IHO/Foreign<br>NIMA Charts |
|-------------------------------------------------------------------------------------|------|---------------------------------------------------------------------------------|----------------------------|
|    |      | Recommended track for deep draft vessels (track not defined by fixed marks)     |                            |
|    |      | Depth is shown where it has been obtained by the cognizant authority            |                            |
|    |      | Alternate course                                                                |                            |
|   |      | Established traffic separation scheme:<br>Roundabout                            |                            |
|  |      | If no separation zone exists, the center of the roundabout is shown by a circle |                            |

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## SISTEM PERPELAMPUNGAN (*BOUYAGE SYSTEM*)

Sistem perpelampungan dibagi menjadi:

1. SISTEM LATERAL
  - a. IALA -A
  - b. IALA-B
2. SISTEM CARDINAL
3. ISOLATED DANGER MARK
4. SAFE WATER MARK
5. SPECIAL MARK

Perpelampungan ini digunakan untuk sarana bantu navigasi untuk menjamin keselamatan kapal dalam memasuki pelabuhan atau alur pelayaran. Tetapi kepercayaan yang berlebihan terhadap alat bantu navigasi ini dapat membahayakan dalam bernavigasi karena kemungkinan *bouy* mengalami hanyut (*out of position*), belum dipetakan, lampu tidak nyala bisa terjadi. Untuk itu perlu diadakan *cross check* dengan alat bantu navigasi yang lain. Untuk itu seorang mualim (*deck officer*) harus dapat mengidentifikasi pelampung-pelampung dengan tepat dan benar antara yang tertera di peta dan di laut.

Perpelampungan dapat dikenali dari berbagai macam cara yaitu:

- a. Warna pelampung.
- b. Bentuk pelampung.
- c. Tanda puncak pelampung.
- d. Karakter lampu pelampung.
- e. Nomor pelampung.

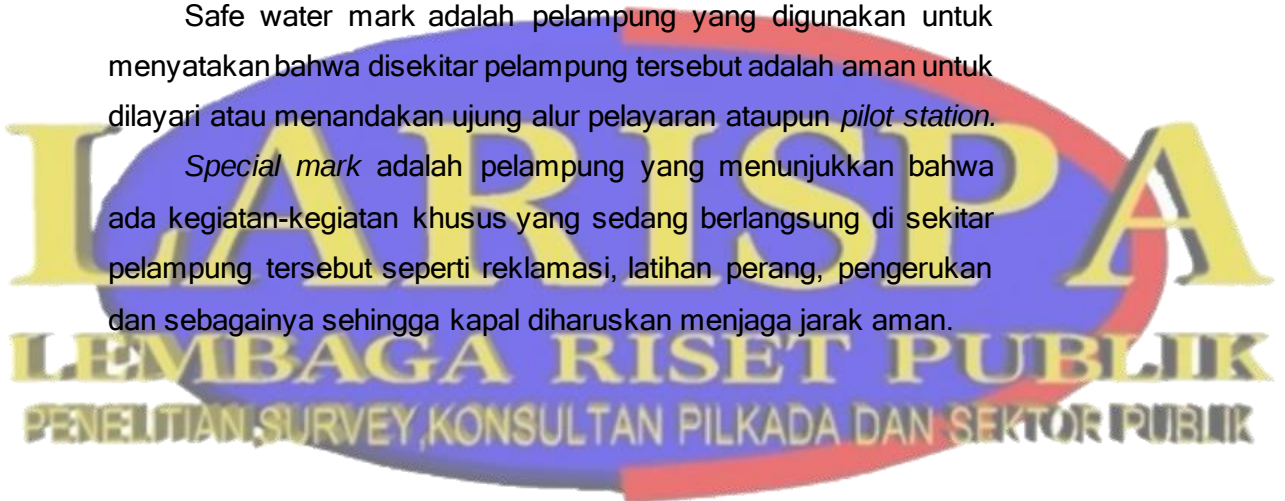
Sistem lateral adalah sistem perpelampungan yang digunakan untuk menandai suatu alur pelayaran baik itu di pelabuhan atau alur pelayaran sempit guna menjamin keselamatan kapal

Sistem *cardinal* adalah sistem perpelampungan yang digunakan untuk menunjukkan sisi yang aman yang harus dilayari oleh kapal.

*Isolated danger mark* adalah pelampung yang digunakan untuk menandai bahwa di sekitar pelampung tersebut terdapat bahaya navigasi yang harus dihindari.

Safe water mark adalah pelampung yang digunakan untuk menyatakan bahwa disekitar pelampung tersebut adalah aman untuk dilayari atau menandakan ujung alur pelayaran ataupun *pilot station*.

*Special mark* adalah pelampung yang menunjukkan bahwa ada kegiatan-kegiatan khusus yang sedang berlangsung di sekitar pelampung tersebut seperti reklamasi, latihan perang, pengerukan dan sebagainya sehingga kapal diharuskan menjaga jarak aman.



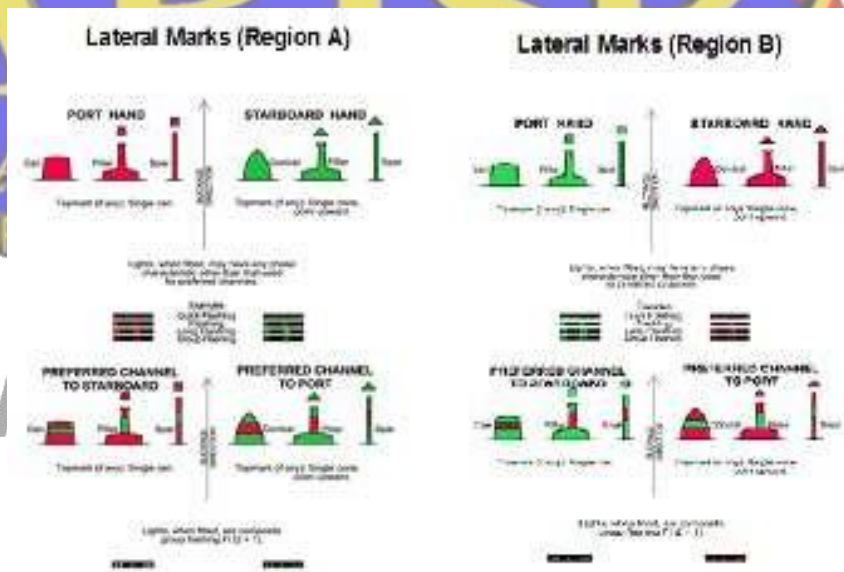
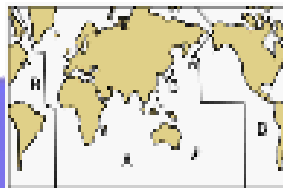
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## IALA Maritime Buoyage System

International Association of Lighthouse Authorities

**Lateral Marks** are generally for well-defined channels. There are two international Buoyage Regions, A and B, where Lateral marks differ.

### IALA Buoyage Regions A and B





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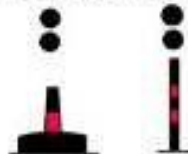
## IALA Maritime Buoyage System

### Isolated Danger Marks, Safe Water Marks, Special Marks (Regions A and B)

#### ISOLATED DANGER MARKS

Topmarks are always fitted (when practicable)

Shape: Optional, but not conflicting with lateral marks; pillar or spar preferred.



Light, when fitted, is **white**  
Group Flashing (2)

 Fl (2)

#### SAFE WATER MARKS

Topmark (if any):  
Single sphere.

Shape: Spherical  
or  
pillar or spar.



Light, when fitted,  
is **white**  
Isophase or Occulting,  
or one Long Flash  
every 10 seconds or  
Morse "A"

 Iso  
 Occ  
 L Fl 10s  
 Morse "A"

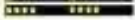
#### SPECIAL MARKS

Topmark (if any):  
Single X shape.

Shape: Optional; but not  
conflicting with  
navigational marks.



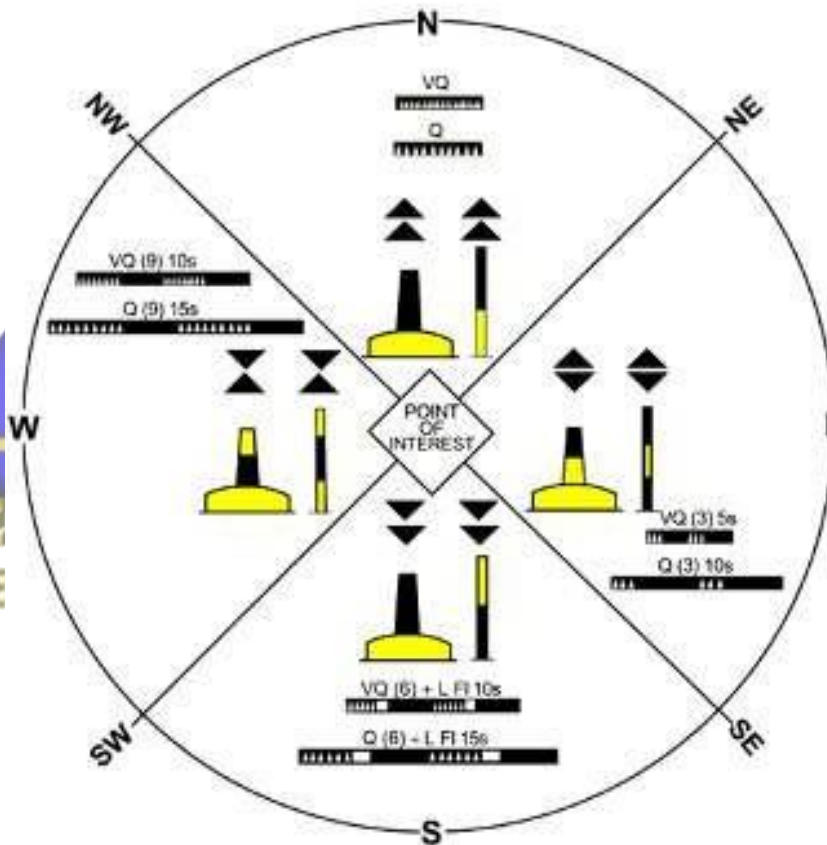
Light, when fitted, is  
**yellow** and may have  
any phase characteristic  
not used for white lights.

Examples  
 Fl Y  
 Fl(4) Y

## IALA Maritime Buoyage System

### Cardinal Marks (Regions A and B)

Topmarks are always fitted (when practicable).  
Buoy shapes are pillar or spar.



Lights, when fitted, are **white**. Very Quick Flashing or Quick Flashing; a South mark also has a Long Flash immediately following the quick flashes.



Selain itu dengan *buoys* dapat kita gunakan untuk menentukan sudut bahaya horizontal untuk menjaga keselamatan dalam navigasi. Perhatikan gambar berikut:



**Mengenali alur pelayaran yang sesuai untuk mendekati tempat labuh jangkar**

Di dalam memilih tempat berlabuh jangkar sebaiknya menggunakan area berlabuh jangkar yang sudah direkomendasikan di dalam peta, tetapi kadang-kadang tempat berlabuh dapat ditentukan sendiri dengan memperhatikan aspek- aspek keselamatan seperti:

- Kedalam sehubungan *draft* kapal.
- Jenis dasar.
- Ada tidaknya (rintangan) *obstruction* pada area berlabuh seperti: kabel bawah laut, pipa bawah laut, kerangka kapal, dan lain-lain.
- Arus pasang surut.
- Keamanan dari pencurian dan perampokan.

Pada saat mendekati tempat berlabuh harus dipilih beberapa baringan (minimum 2 buah) yang pasti sehingga satu baringan dijadikan penuntun dan baringan yang lain digunakan sebagai kontrol untuk menuju tempat berlabuh yang sudah ditentukan.



## RENCANA PELAYARAN

Rencana pelayaran harus dibuat terlebih dahulu sebelum kapal melaksanakan pelayaran dengan mempertimbangkan informasi-informasi yang relevan untuk menentukan *track* yang akan diikuti sebelum pelayaran dimulai. Rencana pelayaran ini juga harus dikonsultasikan kepada nakhoda dan *chief engineer* guna memastikan bahan bakar perbekalan dan perlengkapan yang akan diperlukan selama pelayaran cukup.

Sebelum melaksanakan pelayaran nakhoda harus menjamin bahwa *route-route* yang akan dilayari dari pelabuhan tolak ke pelabuhan tujuan direncanakan menggunakan peta-peta dan buku-buku publikasi lain yang memberikan informasi lengkap, valid, akurat sehubungan dengan keterbatasan dan bahaya navigasi baik yang permanen ataupun yang terprediksi untuk menjamin keselamatan dalam bernavigasi. Dalam merencanakan rute khususnya pada saat menyusuri pantai atau daratan harus diperhatikan *margins of safety and safe passing distances offshore*.

Referensi *nautical publication* yang dapat digunakan:

- a. *ICS Bridge Procedure Guide*
- b. *MPA Circulars*
- c. *Ship Routeing*
- d. *Routing charts or pilot charts*
- e. *Notices to Mariners*
- f. *Admiralty List of Radio Signals*
- g. *Admiralty List of Lights*
- h. *Admiralty or Local Tide Table and Tidal Stream Atlases*

- i. *Admiralty Sailing Directions, as applicable*
- j. *Admiralty Ocean Passages of the World, as applicable*
- k. *Weather information*
- l. *Load-line chart*
- m. *Distance tables*
- n. *Navigational warnings (including NAVTEX, radio navigational warnings)*
- o. *Radio and local warnings*
- p. *Information and guidelines from owner, charterers and other relevant sources*
- q. *Ship's conditions (draught, trim, stability, cargo and etc.)*
- r. *Mariner's handbook*
- s. *IMO STCW 95 A-VIII/2*
- t. *Relevant local regulations*
- u. *Other relevant nautical publications*

#### MERENCANAKAN JALANNYA PELAYARAN

Pakailah selalu peta dengan skala yang terbesar.

1. Tariklah haluan-haluan yang akan diikuti pada peta skala kecil yang mencakup rute yang akan dilayari, kemudian pindahkan haluan-haluan tersebut pada peta skala besar.
2. Tentukan patokan-patokan yang dipakai untuk mengubah haluan kapal, misalnya: tanjung, suar, bukit, dll. Perubahan-perubahan haluan sedapat mungkin dengan patokan (penuntun atau baringan tegak lurus) untuk mencegah kekeliruan-kekeliruan pada saat mengubah haluan (*alter course*).

3. Garis haluan harus sedemikian rupa sehingga bebas dari bahaya-bahaya navigasi. Juga kemungkinan hujan atau kabut menutupi bahaya-bahaya ini harus diperhitungkan agar dalam keadaan seperti itu kapal masih tetap aman.
4. Hitunglah pasang surut untuk tempat-tempat yang tertentu.
5. Perkirakanlah kemungkinan adanya kapal-kapal lain pada perairan yang sama terutama perairan-perairan yang sempit
6. Hitunglah lamanya perjalanan

KETERANGAN YANG DITULISKAN PADA PETA-PETA ADALAH SEBAGAI BERIKUT:

- *Planned track showing the true course of each leg and leg distances.*
- *Turn radius for each course alteration, where appropriate;*
- *Maximum allowable off-track margins for each leg.*
- *Wheel over positions for each course alteration, where appropriate;*
- *Parallel indexing (not from floating objects unless they have been first checked for position);*
- *Chart changes;*
- *Methods and frequency of position fixing;*
- *Prominent navigation and radar marks;*
- *No-go areas (the excessive marking of no-go areas should be discouraged)*
- *Landfall targets and lights;*
- *Clearing lines and bearings;*
- *Transits, heading marks and leading lines;*

- *Significant tides or current;*
- *Safe speed and necessary speed alterations;*
- *Changes in machinery status;*
- *Minimum under keel clearance;*
- *Positions where the echo sounder should be activated;*
- *Crossing and high density traffic areas;*
- *Safe distance off;*
- *Anchor clearance;*
- *Contingency plans;*
- *Abort positions;*
- *VTS and reporting points;*
- *Extra-precautionary areas.*



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Form No. 6. Tide:

Passage plan (Ocean)

Date:

| PASSAGE PLAN       |             |            |           |            |  | From : |               |          |            | To:           |                     |          | Date:   |
|--------------------|-------------|------------|-----------|------------|--|--------|---------------|----------|------------|---------------|---------------------|----------|---------|
| VESSEL :           |             | Voy. No. : |           | Position   |  | UNC    | Fixing Method | Interval | Course (T) | Distance (NM) | Total Distance (NM) | DTG (NM) | Remarks |
| WIP                | Description | Latitude   | Longitude | Used Chart |  |        |               |          |            |               |                     |          |         |
|                    |             |            |           |            |  |        |               |          |            |               |                     |          |         |
| Important Notice : |             |            |           |            |  |        |               |          |            |               |                     |          |         |
| REMARKS:           |             |            |           |            |  |        |               |          |            |               |                     |          |         |

Prepared by : \_\_\_\_\_ Checked by : \_\_\_\_\_ Master \_\_\_\_\_ Page \_\_\_\_ of  
2nd Officer \_\_\_\_\_ Ch. Officer \_\_\_\_\_ 3rd Officer \_\_\_\_\_



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### Checklist- Preparing a Voyage Plan (Ocean)

|                                                                                                                                                         |  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <b>✓ Indicates the check has been considered and/or prepared.<br/>N/A indicates the check is not applicable to the vessel or prevailing conditions.</b> |  |
| Port of Departure-ETD (date/time) and Departure draft                                                                                                   |  |
| Port of Destination- ETA (date/time) and Arrival draft                                                                                                  |  |
| Total Distance                                                                                                                                          |  |
| Pilot to pilot distance                                                                                                                                 |  |
| Average speed and steaming time in open waters                                                                                                          |  |
| Charts-large scale for coastal waters & small scale for ocean passages-corrected up to date                                                             |  |
| Charts-Routeing, climatic, pilot, load line zone                                                                                                        |  |
| Notices to Mariners, Local & NAVAREA Warnings, Navtex & T&P notices                                                                                     |  |
| Nautical publications (Light list, ALRS, tide table, Sailing direction etc)                                                                             |  |
| Local information/ VHF Channels                                                                                                                         |  |
| Tides and currents                                                                                                                                      |  |
| Pilots- time to notify                                                                                                                                  |  |
| Tugboats- time to notify                                                                                                                                |  |
| Pilot embarkation/disembarkation areas                                                                                                                  |  |
| Route planning- waypoints/courses/distances                                                                                                             |  |
| Alternative routes, emergency anchoring, no-go areas, abort positions                                                                                   |  |
| Traffic separation/routing schemes, Ship Reporting System, VTS                                                                                          |  |
| Under keel clearance- draught, speed and squat                                                                                                          |  |
| Position fixing methods                                                                                                                                 |  |
| Position fixing intervals                                                                                                                               |  |
| Navigational marks, including parallel indexing                                                                                                         |  |
| Traffic likely to be encountered                                                                                                                        |  |
| Obstructions and hazards to navigation                                                                                                                  |  |
| Vessel's security including piracy taken into consideration                                                                                             |  |
| Weather information and weather routeing                                                                                                                |  |
| Ship to Shore Master/Pilot Exchange form prepared                                                                                                       |  |
| Port guides studied including arrival/berthing restriction                                                                                              |  |

|                                                                                                                                             |  |
|---------------------------------------------------------------------------------------------------------------------------------------------|--|
| Passage plan signed by the officer who prepared it                                                                                          |  |
| Passage plan approved and signed by the Master                                                                                              |  |
| Any special route requirement for cargo on board                                                                                            |  |
| Fuel, water, lubricants, chemicals, expendable and other spare parts, tools, suppliers and etc. (Discussed & confirmed with Chief Engineer) |  |



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## PASANG SURUT

Pengetahuan tentang pasang surut sangat diperlukan dalam transportasi laut, kegiatan di pelabuhan, pembangunan di daerah pesisir pantai, dan lain-lain.

Berikut contoh tabel pasang surut.

| TIME ZONE (UT)<br>For Summer Time add ONE<br>hour in non-shaded areas |             | ENGLAND – DARTMOUTH<br>LAT 50°21'N LONG 3°34'W<br>TIMES AND HEIGHTS OF HIGH AND LOW WATERS |             |
|-----------------------------------------------------------------------|-------------|--------------------------------------------------------------------------------------------|-------------|
| MAY                                                                   |             | JUNE                                                                                       |             |
| Time                                                                  | m           | Time                                                                                       | m           |
| 1 0426 1.6                                                            | 16 0424 2.0 | 1 0045 4.1                                                                                 | 16 0555 1.8 |
| 1112 3.7                                                              | 1055 3.5    | 0654 1.4                                                                                   | 1228 3.7    |
| SU 1657 1.9                                                           | M 1651 2.2  | W 1336 3.9                                                                                 | TH 1824 1.9 |
| 2335 3.9                                                              | 2313 3.7    | 1923 1.6                                                                                   |             |
| 2 0556 1.8                                                            | 17 0540 2.1 | 2 0157 4.1                                                                                 | 17 0040 3.9 |
| 1245 3.7                                                              | 1215 3.4    | 0800 1.3                                                                                   | 0701 1.7    |
| M 1840 1.9                                                            | TU 1813 2.2 | TH 1439 4.1                                                                                | F 1332 3.8  |
|                                                                       |             | 2027 1.4                                                                                   | 1930 1.7    |
| 3 0114 3.9                                                            | 18 0033 3.7 | 3 0259 4.2                                                                                 | 18 0148 4.0 |
| 0731 1.6                                                              | 0656 1.9    | 0859 1.1                                                                                   | 0801 1.5    |
| TU 1413 3.8                                                           | W 1341 3.6  | F 1535 4.2                                                                                 | SA 1435 3.9 |
| 2003 1.6                                                              | 1925 2.0    | 2123 1.2                                                                                   | 2030 1.5    |
| 4 0235 4.2                                                            | 19 0155 3.8 | 4 0355 4.3                                                                                 | 19 0255 4.1 |
| 0840 1.2                                                              | 0759 1.6    | 0952 1.0                                                                                   | 0900 1.3    |
| W 1518 4.1                                                            | TH 1442 3.8 | SA 1624 4.4                                                                                | SU 1536 4.1 |
| 2105 1.2                                                              | 2024 1.7    | 2215 1.0                                                                                   | 2129 1.3    |
| 5 0336 4.4                                                            | 20 0256 4.0 | 5 0446 4.4                                                                                 | 20 0400 4.2 |
| 0936 0.9                                                              | 0854 1.3    | 1041 0.9                                                                                   | 0957 1.1    |
| TH 1612 4.4                                                           | F 1535 4.0  | SU 1710 4.5                                                                                | M 1633 4.4  |
| 2158 0.9                                                              | 2117 1.4    | 2302 0.9                                                                                   | 2225 1.1    |
| 6 0428 4.6                                                            | 21 0350 4.2 | 6 0530 4.4                                                                                 | 21 0500 4.4 |
| 1025 0.6                                                              | 0945 1.1    | 1124 0.9                                                                                   | 1053 1.0    |
| F 1658 4.6                                                            | SA 1623 4.3 | M 1750 4.6                                                                                 | TU 1728 4.6 |
| 2246 0.6                                                              | 2207 1.1    | 2344 0.9                                                                                   | 2320 0.8    |
|                                                                       |             | 7 0611 4.4                                                                                 | 22 0557 4.5 |
|                                                                       |             | 1203 0.9                                                                                   | 1146 0.8    |
|                                                                       |             | TU 1825 4.6                                                                                | W 1820 4.7  |
|                                                                       |             |                                                                                            | 1840 4.5    |

### Pengertian Pasang Surut

Pasang surut laut merupakan suatu fenomena pergerakan naik turunnya permukaan air laut secara berkala yang diakibatkan

oleh kombinasi gaya gravitasi dan gaya tarik menarik dari benda-benda astronomi terutama oleh matahari, bumi dan bulan. Pengaruh benda angkasa lainnya dapat diabaikan karena jaraknya lebih jauh atau ukurannya lebih kecil.

Faktor non astronomi yang mempengaruhi pasang surut terutama di perairan semi tertutup seperti teluk adalah bentuk garis pantai dan topografi dasar perairan.

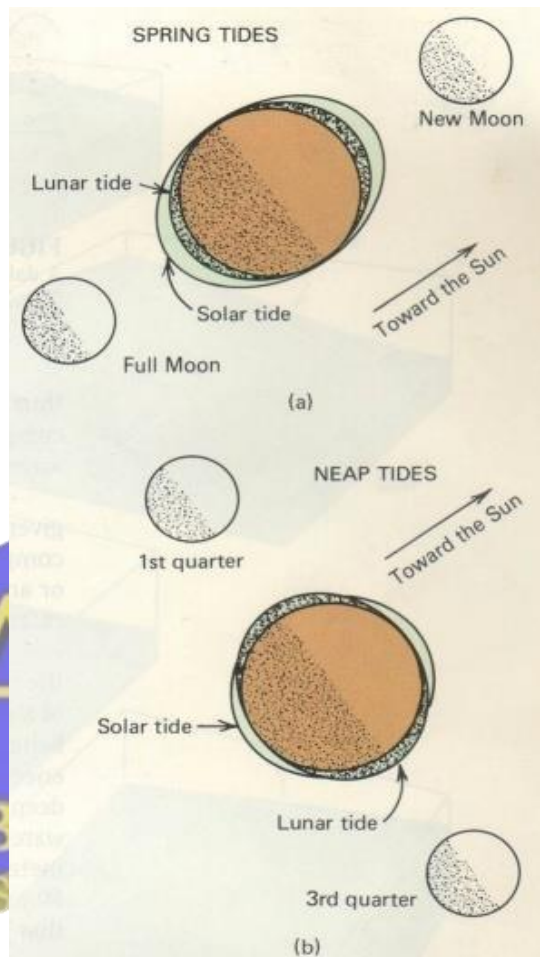
Puncak gelombang disebut **pasang tinggi** dan lembah gelombang disebut **pasang rendah**.

Perbedaan vertikal antara pasang tinggi dan pasang rendah disebut rentang pasang surut (*tidal range*).

Periode pasang surut adalah waktu antara puncak atau lembah gelombang ke puncak atau lembah gelombang berikutnya.

**Pasang purnama (*spring tide*)** terjadi ketika bumi, bulan dan matahari berada dalam suatu garis lurus. Pada saat itu akan dihasilkan pasang tinggi yang sangat tinggi dan pasang rendah yang sangat rendah. Pasang surut purnama ini terjadi pada saat bulan baru dan bulan purnama.

**Pasang perbani (*neap tide*)** terjadi ketika bumi, bulan dan matahari membentuk sudut tegak lurus. Pada saat itu akan dihasilkan pasang tinggi yang rendah dan pasang rendah yang tinggi. Pasang surut perbani ini terjadi pada saat bulan 1/4 dan 3/4.



Gambar. *Spring Tide* dan *Neap Tide*

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Tipe pasang surut ditentukan oleh frekuensi air pasang dengan surut setiap harinya. Hal ini disebabkan karena perbedaan respons setiap lokasi terhadap gaya pembangkit pasang surut. Jika suatu perairan mengalami satu kali pasang dan satu kali surut dalam satu hari, maka kawasan tersebut dikatakan bertipe pasang

surut harian tunggal (*diurnal tides*), namun jika terjadi dua kali pasang dan dua kali surut dalam sehari, maka tipe pasang surutnya disebut tipe harian ganda (*semidiurnal tides*). Tipe pasang surut lainnya merupakan peralihan antara tipe tunggal dan ganda disebut dengan tipe campuran (*mixed tides*) dan tipe pasang surut ini digolongkan menjadi dua bagian yaitu tipe campuran dominasi ganda dan tipe campuran dominasi tunggal.

Selain dengan melihat data pasang surut yang diplot dalam bentuk grafik, tipe pasang surut juga dapat ditentukan berdasarkan bilangan Formzal ( $F$ ) yang dinyatakan dalam bentuk:

$$F = \frac{A(O_1) + A(K_1)}{A(M_2) + A(S_2)}$$

dengan ketentuan:

|                     |   |                                                                                           |
|---------------------|---|-------------------------------------------------------------------------------------------|
| $F \leq 0.25$       | : | Pasang surut tipe ganda ( <i>semidiurnal tides</i> )                                      |
| $0.25 < F \leq 1.5$ | : | Pasang surut tipe campuran condong harian ganda ( <i>mixed mainly semidiurnal tides</i> ) |
| $1.50 < F \leq 3.0$ | : | Pasang surut tipe campuran condong harian tunggal ( <i>mixed mainly diurnal tides</i> )   |
| $F > 3.0$           | : | Pasang surut tipe tunggal ( <i>diurnal tides</i> )                                        |

Di mana:

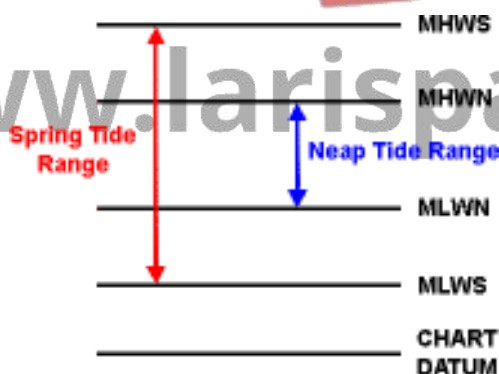
|        |   |                                                                                                  |
|--------|---|--------------------------------------------------------------------------------------------------|
| $F$    | : | bilangan Formzal                                                                                 |
| $AK_1$ | : | amplitudo komponen pasang surut tunggal utama yang disebabkan oleh gaya tarik bulan dan matahari |
| $AO_1$ | : | amplitudo komponen pasang surut tunggal utama yang disebabkan oleh gaya tarik bulan              |
| $AM_2$ | : | amplitudo komponen pasang surut ganda utama yang disebabkan oleh gaya tarik bulan                |
| $AS_2$ | : | amplitudo komponen pasang surut ganda utama yang disebabkan oleh gaya tarik matahari             |

Karena sifat pasang surut yang periodik, maka ia dapat diramalkan. Untuk meramalkan pasang surut, diperlukan data amplitudo dan beda fasa dari masing-masing komponen pembangkit pasang surut. Komponen-komponen utama pasang surut terdiri dari komponen tengah harian dan harian. Namun demikian, karena interaksinya dengan bentuk (morfologi) pantai dan superposisi antar gelombang pasang surut komponen utama, akan terbentuklah komponen-komponen pasang surut yang baru.

Pada buku peramalan pasang surut yang dikeluarkan oleh DISHIDROS dan BOKOSURTANAL tertulis nilai komponen pasang surut tersebut baik amplitudo maupun fase pada beberapa lokasi di perairan Indonesia. Dengan mengetahui amplitudo komponen tersebut, maka dapat dihitung nilai bilangan Formzalnya sehingga tipe pasang surutnya dapat ditentukan.

Nah mungkin sedikit bingung tentang apa itu komponen M2, S2, O1, K1, P1, M4, MS4 dan lain-lain.

#### Istilah-istilah dalam Pasang-surut



**Mean Sea Level (MSL) atau Duduk Tengah** adalah muka laut rata-rata pada suatu periode pengamatan yang panjang, sebaiknya selama 18,6 tahun.

**Mean Tide Level (MTL)** adalah rata-rata antara air tinggi dan air rendah pada suatu periode waktu.

**Mean High Water (MHW)** adalah tinggi air rata-rata pada semua pasang tinggi.

**Mean Low Water (MLW)** adalah tinggi air rata-rata pada semua surut rendah.

**Mean Higher High Water (MHHW)** adalah tinggi rata-rata pasang tertinggi dari dua air tinggi harian pada suatu periode waktu yang panjang. Jika hanya satu air tinggi terjadi pada satu hari, maka air tinggi tersebut diambil sebagai air tinggi tertinggi.

**Mean Lower High Water (MLHW)** adalah tinggi rata-rata air terendah dari dua air tinggi harian pada suatu periode waktu yang panjang. Hal ini tidak akan terjadi untuk pasang surut harian (diurnal).

**Mean Higher Low Water (MHLW)** adalah tinggi rata-rata air tertinggi dari dua air rendah harian pada suatu periode waktu yang panjang. Hal ini tidak akan terdapat pada pasang surut diurnal.

**Mean Lower Low Water (MLLW)** adalah tinggi rata-rata air terendah dari dua air rendah harian pada suatu periode waktu yang panjang. Jika hanya satu air rendah terjadi pada satu hari, maka harga air rendah tersebut diambil sebagai air rendah terendah.

**Mean High Water Springs (MHWS)** adalah tinggi rata-rata dari dua air tinggi berturut-turut selama periode pasang purnama, yaitu jika tunggang (*range*) pasang surut itu tertinggi.

**Mean Low Water Springs (MLWS)** adalah tinggi rata-rata yang diperoleh dari dua air rendah berturut-turut selama periode pasang purnama.

**Mean High Water Neaps (MHWN)** adalah tinggi rata-rata dari dua air tinggi berturut-turut selama periode pasang surut perbani (*neap tides*), yaitu jika tunggang (*range*) pasang surut paling kecil.

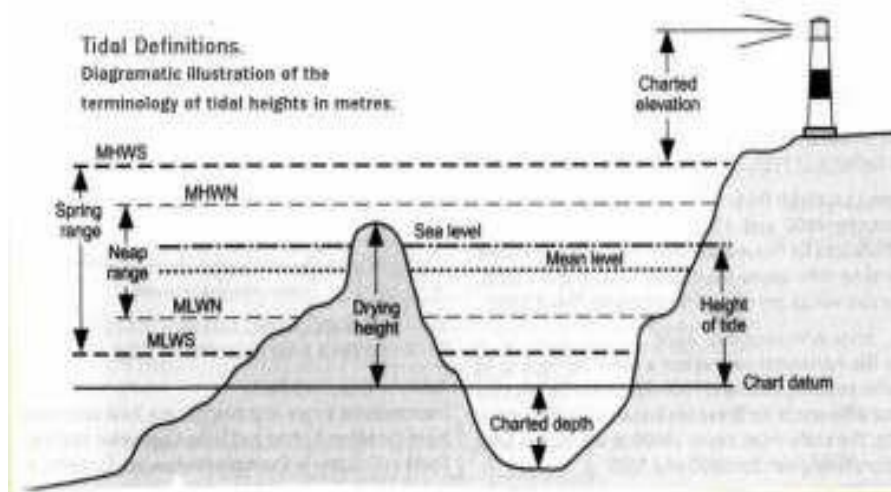
**Mean Low Water Neaps (MLWN)** adalah tinggi rata-rata yang dihitung dari dua air berturut-turut selama periode pasang surut perbani.

**Highest Astronomical Tide (HAT)/Lowest Astronomical Tide (LAT)** adalah permukaan laut tertinggi/terendah yang dapat diramalkan terjadi di bawah pengaruh keadaan meteorologis rata-rata dan kombinasi keadaan astronomi. Permukaan ini tidak akan dicapai pada setiap tahun. HAT dan LAT bukan permukaan laut yang ekstrem yang dapat terjadi, *storm surges* mungkin saja dapat menyebabkan muka laut yang lebih tinggi dan lebih rendah. Secara umum permukaan (level) di atas dapat dihitung dari peramalan satu tahun. Harga HAT dan LAT dihitung dari data beberapa tahun.

**Mean Range (Tunggang Rata-rata)** adalah perbedaan tinggi rata-rata antara MHW dan MLW.

**Mean Spring Range** adalah perbedaan tinggi antara MHWS dan MLWS.

**Mean Neap Range** adalah perbedaan tinggi antara MHWN dan MLWN.



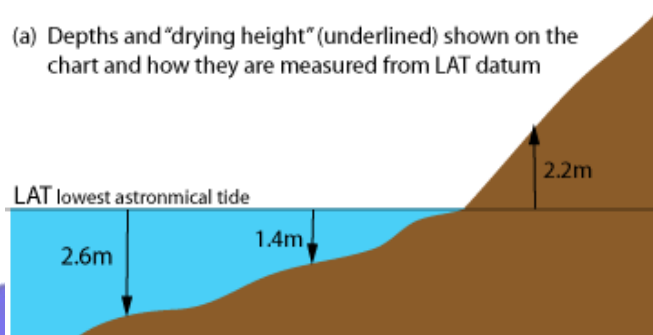
### Melakukan perhitungan dengan UKC

*Under keel clearance* adalah salah satu faktor penting dalam menjamin keselamatan pelayaran. Selama dalam pelayaran UKC harus senantiasa diperhitungkan khususnya pada saat kapal melayari daerah dangkal (*shallow water area*) dan alur pelayaran sempit (*narrow channel*). Kedalaman yang ditunjukkan di dalam peta adalah kedalaman pada saat muka surutan terendah (*lowest astronomical tide*) untuk memudahkan pemahaman mengenai kedalaman perhatikan penjelasan gambar berikut:

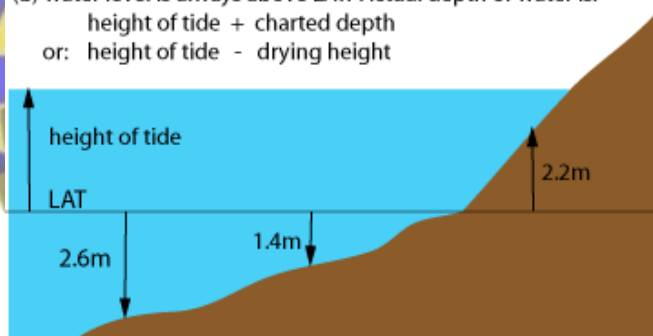
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(a) Depths and “drying height” (underlined) shown on the chart and how they are measured from LAT datum



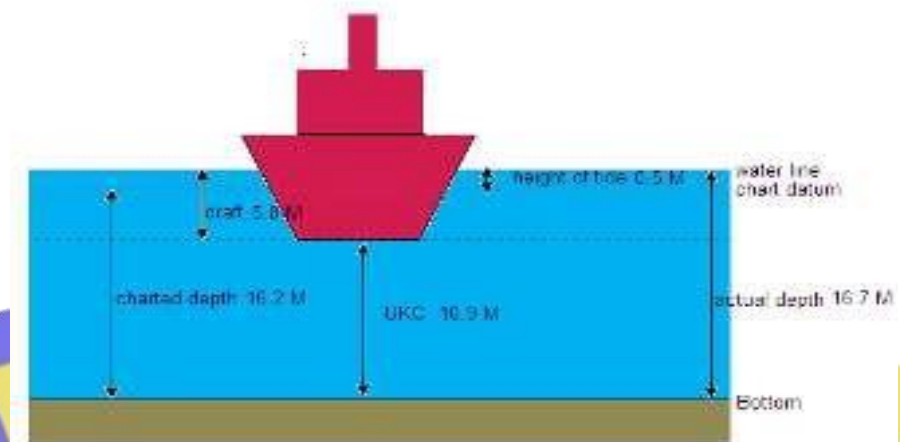
(b) water level is always above LAT. Actual depth of water is:  
height of tide + charted depth  
or: height of tide - drying height



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Contoh: kedalaman di peta ditunjukkan 16.2 meter, ketinggian air pasang 0.5 meter dan *draft* kapal 5.8 meter. Berapakah UKC?

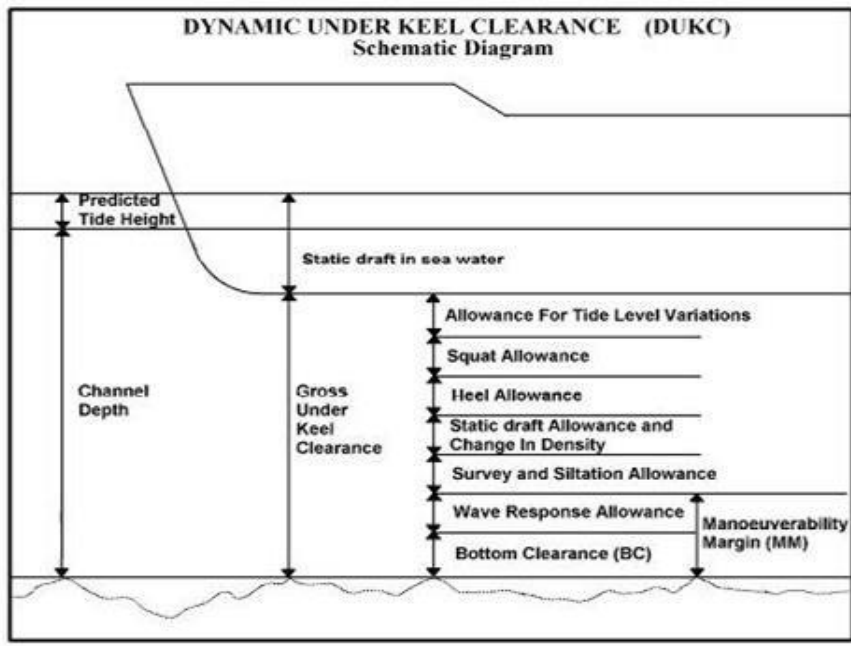
Untuk menjawab UKC perhatikan gambar berikut:



Untuk memperhitungkan dinamik UKC pada saat *maneuver* harus diperhitungkan faktor-faktor lain yaitu:

1. *Tides*
2. *Vessel Motions (caused by swell)*
3. *Squat*
4. *Heel*
5. *Change of density*

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## PENGISIAN LOG BOOK

Buku harian kapal diselenggarakan di atas kapal atas dasar:

1. Pasal 348, 349 dan 351 KUHD (penyelenggaraan umum dari buku harian);
2. Pasal 352a dan 349a KUHD (perihal pencatatan hukuman-hukuman dan penyelidikan terhadap kejahatan-kejahatan);
3. Pasal 46 dari peraturan perihal menyelenggarakan daftar-daftar pendaftaran warga Negara tentang pencatatan kelahiran di atas kapal;
4. Pasal 76 dari peraturan perihal menyelenggarakan daftar-daftar warga Negara tentang pencatatan kematian-kematian di atas kapal;

5. Pasal 18, ayat-ayat dari ordonansi kapal-kapal 1935 (cara bertindak dalam hal kerugian yang diderita diluar negeri);
6. Pasal 162 ayat-ayat 1, 3, 4 dari Undang-undang kapal 1935 (yang mana buku harian kapal diwajibkan).

Hal-hal yang perlu ditulis dalam *log book*:

- a. *Crewlist*
- b. Kelahiran di kapal.
- c. Kematian di kapal.
- d. Hukuman-hukuman dan Penyelidikan tentang pelanggaran.
- e. Nasihat-nasihat kepada anggota ABK (ps 351 KUHD).
- f. Kecelakaan (Kerusakan yang dialami kapal).
- g. Naik dok, perbaikan-perbaikan yang penting.
- h. Pembukaan dan penutupan pintu-pintu kedap air, dll.
- i. Latihan-latihan berkala untuk kepentingan keselamatan.
- j. Perawatan-perawatan Radio Telegraf, Radar, Perum-gema, Pedoman gasing, dll.
- k. Pemuatan barang berbahaya, yang mana menurut pasal 155 "U.U. Kapal 1935" perlu dijelaskan.
- l. Pemeriksaan alat-alat penolong.
- m. Pemeriksaan alat-alat bongkar muat.
- n. Pemeriksaan oleh Biro Pemeriksa yang sah.
- o. Penanda tanganan buku harian kapal oleh Syahbandar/penyijil atau Pegawai. Konsul.
- p. Aktivitas harian pada saat kapal berlayar maupun berada di pelabuhan
  - Waktu *commence discharge* atau *loading*.

- Keterangan secara rinci mengenai keterlambatan kapal karena alasan cuaca atau alasan lain.
- Jumlah kargo yang dimuat atau dibongkar setiap harinya.
- Kondisi selama pelayaran setiap jam jaga (posisi, haluan sejati, haluan yang dikemudikan, waktu, jarak yang ditempuh, kecepatan, arah dan kecepatan angin, keadaan awan, keadaan cuaca, keadaan laut, tekanan udara, suhu, keadaan tangki-tangki *ballast*, *non position*, ROB bahan bakar serta pemakaian dan lain-lain.

Hal-hal yang perlu diperhatikan dalam penulisan *log book*:

1. Semua keterangan-keterangan yang penting selama kegiatan di atas kapal harus ditulis secara cermat dan detail. Untuk itu pada umumnya sebelum keterangan-keterangan tersebut ditulis di dalam *log book* terlebih dahulu semua pencatatan dilaksanakan di *rough log*. Bila ada kesalahan di dalam penulisan *log book* tidak diperbolehkan di tipe-x tetapi cukup dicoret dan diparaf. *Log book* dapat digunakan sebagai barang bukti di dalam persidangan dalam penyelesaian masalah-masalah yang dialami oleh kapal.
2. Setiap halaman ditanda tangani oleh muallim setiap jaga sesuai periode jaganya.
3. Setiap halaman harus dievaluasi dan diteliti oleh nakhoda sebelum ditandatangani setiap hari.

## MENGHITUNG ESTIMATE TIME ARRIVAL

Untuk menghitung ESTIMATE TIME ARRIVAL (ETA) harus diperhatikan hal-hal sebagai berikut:

1. *Estimate time departure* (ETD)
2. Total jarak (*total distance*)
3. Kecepatan rata-rata kapal (*average speed* kapal)
4. Perbedaan waktu antara pelabuhan tolak dan pelabuhan tiba.

Informasi ETD kapal dapat diperoleh dari nakhoda, agen atau Kepanduan, sedangkan total jarak dapat diperoleh dari data-data *passage planning* yang telah dibuat.

Dalam menentukan kecepatan rata-rata kapal harus diperhitungkan faktor lain di antaranya arus, angin maupun keadaan cuaca yang akan dialami selama pelayaran.

Untuk memperoleh keterangan penggunaan waktu *standard time* dari tiap-tiap Negara (pelabuhan tujuan) dapat menggunakan buku-buku di antaranya:

- a. *Guide to port entry*
- b. *Almanac nautika*
- c. *Admiralty list of radio signals*

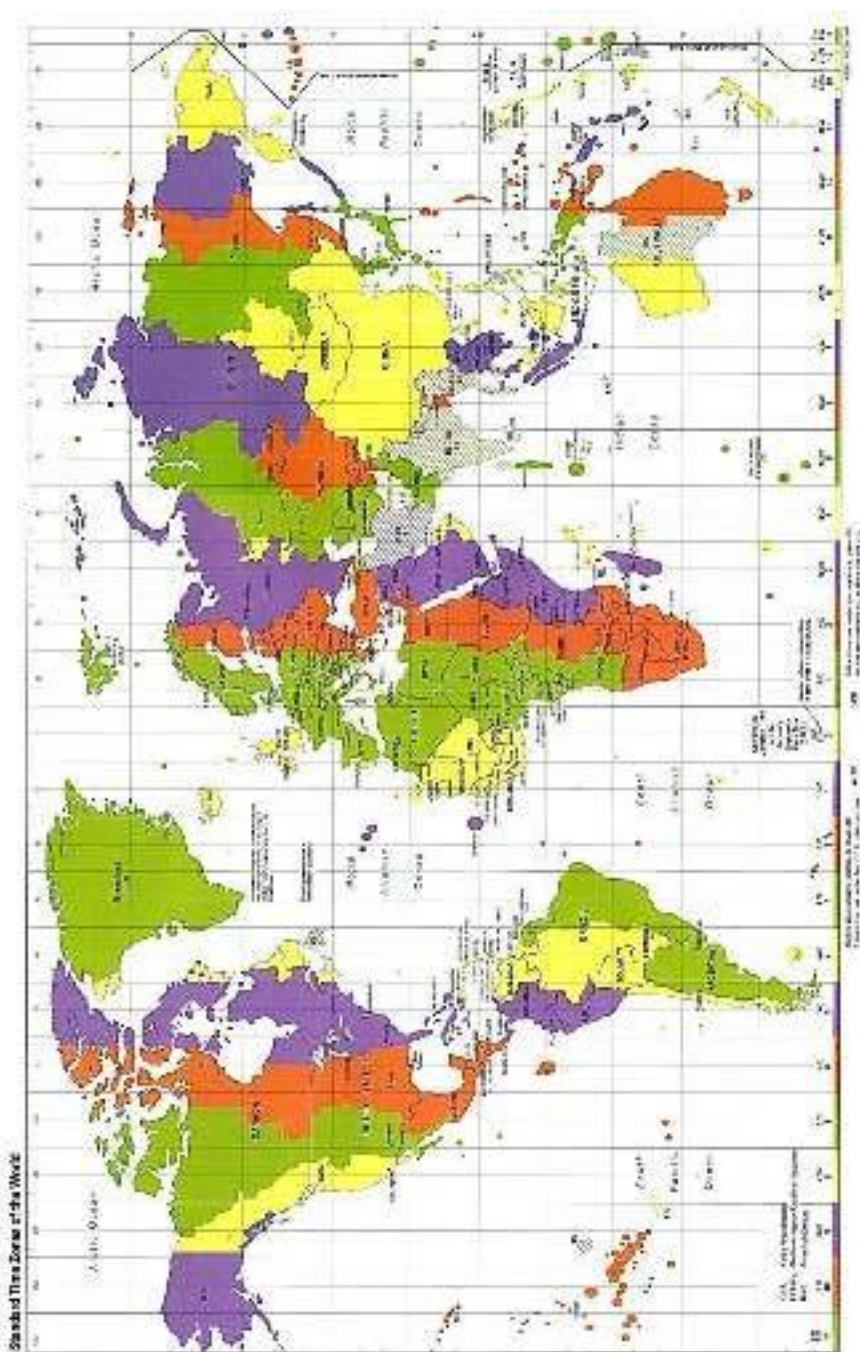
Untuk menyeragamkan waktu yang digunakan dilaut oleh kapal-kapal maka digunakan *uniform time system* yaitu berdasarkan area (15 °) yang dibatasi oleh garis-garis bujur hal ini bertujuan agar ada kesamaan antara waktu yang digunakan dikapal dengan waktu didarat pada area yang sama.

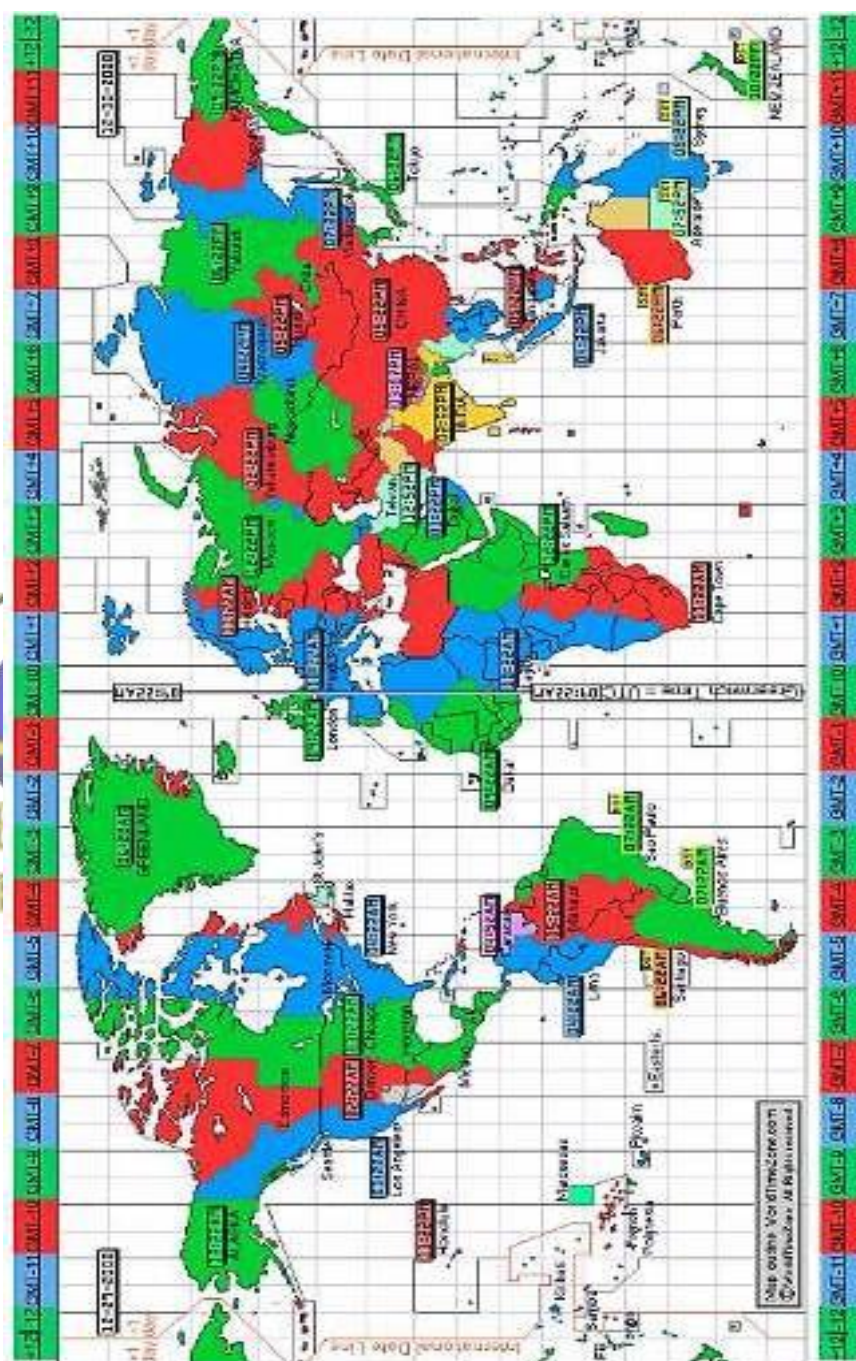
Pembagian waktu didunia ini dibagi menjadi 24 *zone time*. Dimulai dari *zone 0* sebagai pusatnya adalah garis Greenwich meridian (*zone 0* = 7.5 °W s.d. 7.5 °E)

Detail dari pembagian waktu dapat dilihat dari diagram berikut:



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WW

| Territory                                                                                                              | Standard Time | Daylight Saving Time |                       |
|------------------------------------------------------------------------------------------------------------------------|---------------|----------------------|-----------------------|
|                                                                                                                        |               | Begins               |                       |
|                                                                                                                        |               | Ends                 |                       |
| Bahamas                                                                                                                | +07           | *                    |                       |
| Barbados                                                                                                               | +04           | +03                  | First Sunday in April |
| Belize                                                                                                                 | +04           | *                    |                       |
| Bolivia                                                                                                                | +04           | *                    |                       |
| Bonaire and Netherlands                                                                                                | +07           | +05                  | Last Sun in March     |
| Botswana                                                                                                               | +02           | *                    |                       |
| Brazil                                                                                                                 |               |                      |                       |
| (1) Eastern (Brasilia)                                                                                                 | +03           | +02                  | 14-Oct-2007           |
| (2) North-East (Roraima and Paraiba)                                                                                   | +03           | *                    |                       |
| (3) Western (Acre)                                                                                                     | +04           | +03                  | 14-Oct-2007           |
| (4) Rondonia, Mato Grosso, Amazonas and Roraima                                                                        | +04           | *                    |                       |
| (5) Acre and Manaus City                                                                                               | +03           | *                    |                       |
| Brunei                                                                                                                 | +08           | *                    |                       |
| Bulgaria                                                                                                               | +02           | +03                  | Last Sun in March     |
| Burkina Faso                                                                                                           | +04           | *                    |                       |
| Burkina Faso                                                                                                           | +04           | *                    |                       |
| Burundi                                                                                                                | +02           | *                    |                       |
| Cambodia                                                                                                               | +07           | *                    |                       |
| Cameroon                                                                                                               | +01           | *                    |                       |
| Canada                                                                                                                 |               |                      |                       |
| (1) Eastern (Atlantic, Quebec)                                                                                         | +04           | +03                  | First Sunday in April |
| (2) Atlantic Zone (Nova Scotia, New Brunswick, Prince Edward Island, Nova Scotia, New Brunswick, Prince Edward Island) | +04           | +03                  | First Sunday in April |
| (3) Atlantic Zone (Eastern Quebec)                                                                                     | +03           | *                    |                       |
| (4) Eastern Zone (Atlantic, New Brunswick, Prince Edward Island, Nova Scotia, New Brunswick, Prince Edward Island)     | +03           | +04                  | First Sunday in April |
| (5) Eastern Zone (Western Ontario, Nunavut)                                                                            | +03           | *                    |                       |
| (6) Central Zone (Manitoba, Central, New Territories, Cambridge Bay and Repulse Bay)                                   | +04           | +04                  | First Sunday in April |
| (7) Central Zone (Yukon, Northwest Territories)                                                                        | +03           | *                    |                       |
| (8) Mountain Zone (Alberta, Saskatchewan, Northwest Territories)                                                       | +07           | +06                  | First Sunday in April |
| (9) Mountain Zone (British Columbia, Yukon, Northwest Territories)                                                     | +07           | +07                  | First Sunday in April |
| (10) Pacific Zone (British Columbia, Yukon, Northwest Territories)                                                     | +08           | +07                  | First Sunday in April |
| Cape Verde Is.                                                                                                         | +01           | +02                  | Winter Solst          |
| Cayman Is.                                                                                                             | +05           | *                    |                       |
| Central Is.                                                                                                            | +02           | +03                  |                       |
| (1) Palau                                                                                                              | +09           | +08                  |                       |
| (2) Yap                                                                                                                | +09           | +08                  |                       |
| (3) Pohnpei, Pingelap, Kosrae                                                                                          | +11           | +10                  |                       |
| Ceylon Is.                                                                                                             | +05           | *                    |                       |
| Central African Republic                                                                                               | +02           | *                    |                       |

## LOCAL TIME

| Territory                     | Standard Time | Daylight Saving Time |                   |
|-------------------------------|---------------|----------------------|-------------------|
|                               |               | Region               | Ends              |
| Chad                          | +01           | *                    |                   |
| Chagos Archipelago            | +05           | *                    |                   |
| Chadhoru Is.                  | +12           | +04                  | First Sun in Oct  |
| Chile                         | +04           | +04                  | 1st Sun in Oct    |
| China                         | +08           | -                    |                   |
| Christmas I. (Indian Ocean)   | +12           | *                    |                   |
| Cocos Is.                     | +07           | *                    |                   |
| Cook Is.                      | +13           | *                    |                   |
| Colombia                      | +05           | -                    |                   |
| Comoros                       | +03           | -                    |                   |
| Congo, Democratic Republic of | +01           | *                    |                   |
| Congo, Republic of            | +01           | *                    |                   |
| Cook Is.                      | +13           | *                    |                   |
| Cote d'Ivoire                 | +00           | -                    |                   |
| Croatia                       | +01           | +02                  | Last Sun in March |
| Cuba                          | +05           | +04                  | 25 March 2007     |
| Cyprus                        | +02           | +03                  | 25 March 2007     |
| Czech Republic                | +01           | +02                  | Last Sun in March |
| Denmark                       | +01           | +02                  | Last Sun in March |
| Djibouti                      | +03           | *                    |                   |
| Dominican Republic            | +04           | *                    |                   |
| East Timor                    | +09           | -                    |                   |
| Easter I. (Jama de Pascua)    | +06           | +07                  | 14 Oct 2004       |
| Ecuador                       | +05           | *                    |                   |
| Egypt                         | +02           | +03                  | 27 April 2007     |
| El Salvador                   | +06           | *                    |                   |
| Equatorial Guinea             | +01           | -                    |                   |
| Eritrea                       | +03           | *                    |                   |
| Estonia                       | +02           | +03                  | Last Sun in March |
| Ethiopia                      | +03           | -                    |                   |
| Falkland Is.                  | +04           | +03                  | First Sun in Sep  |
| Fernando de Noronha, Ang de   | +03           | *                    |                   |

[illegible]

| Territory                         | Standard Time | Daylight Saving Time |                        |
|-----------------------------------|---------------|----------------------|------------------------|
|                                   |               |                      | Notes                  |
| Anguilla                          | +01           | +01                  | 1 Apr each year        |
| Antigua, Republic of              | +00           | +01                  | Apr for United Kingdom |
| Aruba                             | +05           | +01                  | 9 Apr 2001             |
| Australia                         | +1            | +02                  | Last Sun in March      |
| Bahamas                           | +00           | +                    |                        |
| Belize                            | +05           | +01                  | 1 Apr each year        |
| Bermuda                           | +04           | +03                  | 1st March 2001         |
| Bhutan                            | +06           | +07                  | Apr for China          |
| Bolivia                           | +04           | +05                  | 1st March 2001         |
| Bonaire                           | +01           | +01                  | 1 Apr each year        |
| Bosnia and Herzegovina            | +01           | +02                  | 1st March 2001         |
| Botswana                          | +02           | +03                  | 1st March 2001         |
| Brazil                            | +03           | +04                  | 1st March 2001         |
| British Indian Ocean Territory    | +05           | +05                  |                        |
| Bulgaria                          | +02           | +03                  | 1st March 2001         |
| Burkina Faso                      | +01           | +02                  | 1st March 2001         |
| Burundi                           | +02           | +03                  | 1st March 2001         |
| Cambodia                          | +07           | +08                  | 1st March 2001         |
| Cameroon                          | +01           | +02                  | 1st March 2001         |
| Canada                            | +05           | +04                  | 1st March 2001         |
| Cape Verde                        | +00           | +01                  | 1st March 2001         |
| Cayman Islands                    | +05           | +06                  | 1st March 2001         |
| Central African Republic          | +01           | +02                  | 1st March 2001         |
| Chad                              | +01           | +02                  | 1st March 2001         |
| Chile                             | +04           | +05                  | 1st March 2001         |
| China                             | +08           | +09                  | 1st March 2001         |
| Cocos (Keeling) Islands           | +07           | +07                  |                        |
| Colombia                          | +05           | +05                  |                        |
| Comoros                           | +03           | +04                  | 1st March 2001         |
| Congo                             | +01           | +02                  | 1st March 2001         |
| Congo, Democratic Republic of the | +01           | +02                  | 1st March 2001         |
| Cook Islands                      | +12           | +13                  | 1st March 2001         |
| Costa Rica                        | +05           | +06                  | 1st March 2001         |
| Cote d'Ivoire                     | +00           | +01                  | 1st March 2001         |
| Croatia                           | +01           | +02                  | 1st March 2001         |
| Cuba                              | +05           | +06                  | 1st March 2001         |
| Cyprus                            | +02           | +03                  | 1st March 2001         |
| Czech Republic                    | +01           | +02                  | 1st March 2001         |
| Dominica                          | +04           | +05                  | 1st March 2001         |
| Dominican Republic                | +04           | +05                  | 1st March 2001         |
| DRC                               | +01           | +02                  | 1st March 2001         |
| Ecuador                           | +05           | +06                  | 1st March 2001         |
| Egypt                             | +02           | +03                  | 1st March 2001         |
| El Salvador                       | +06           | +07                  | 1st March 2001         |
| Equatorial Guinea                 | +01           | +02                  | 1st March 2001         |
| Eritrea                           | +03           | +04                  | 1st March 2001         |
| Estonia                           | +02           | +03                  | 1st March 2001         |
| Ethiopia                          | +03           | +04                  | 1st March 2001         |
| Falkland Islands                  | +00           | +01                  | 1st March 2001         |
| Fiji                              | +12           | +13                  | 1st March 2001         |
| Finland                           | +02           | +03                  | 1st March 2001         |
| France                            | +01           | +02                  | 1st March 2001         |
| French Polynesia                  | +12           | +13                  | 1st March 2001         |
| Gabon                             | +01           | +02                  | 1st March 2001         |
| Gambia                            | +00           | +01                  | 1st March 2001         |
| Georgia                           | +04           | +05                  | 1st March 2001         |
| Germany                           | +01           | +02                  | 1st March 2001         |
| Ghana                             | +00           | +01                  | 1st March 2001         |
| Gibraltar                         | +00           | +01                  | 1st March 2001         |
| Greece                            | +02           | +03                  | 1st March 2001         |
| Greenland                         | +00           | +01                  | 1st March 2001         |
| Grenada                           | +04           | +05                  | 1st March 2001         |
| Guadeloupe                        | +04           | +05                  | 1st March 2001         |
| Guam                              | +10           | +11                  | 1st March 2001         |
| Guatemala                         | +06           | +07                  | 1st March 2001         |
| Guinea                            | +00           | +01                  | 1st March 2001         |
| Guinea-Bissau                     | +00           | +01                  | 1st March 2001         |
| Guyana                            | +04           | +05                  | 1st March 2001         |
| Haiti                             | +05           | +06                  | 1st March 2001         |
| Honduras                          | +06           | +07                  | 1st March 2001         |
| Hong Kong                         | +08           | +09                  | 1st March 2001         |
| Hungary                           | +01           | +02                  | 1st March 2001         |
| Iceland                           | +00           | +01                  | 1st March 2001         |
| India                             | +05           | +06                  | 1st March 2001         |
| Indonesia                         | +07           | +08                  | 1st March 2001         |
| Iran                              | +03           | +04                  | 1st March 2001         |
| Ireland                           | +00           | +01                  | 1st March 2001         |
| Israel                            | +02           | +03                  | 1st March 2001         |
| Italy                             | +01           | +02                  | 1st March 2001         |
| Jamaica                           | +05           | +06                  | 1st March 2001         |
| Japan                             | +09           | +10                  | 1st March 2001         |
| Jersey                            | +00           | +01                  | 1st March 2001         |
| Jordan                            | +02           | +03                  | 1st March 2001         |
| Kazakhstan                        | +06           | +07                  | 1st March 2001         |
| Kenya                             | +03           | +04                  | 1st March 2001         |
| Kiribati                          | +12           | +13                  | 1st March 2001         |
| Korea, North                      | +08           | +09                  | 1st March 2001         |
| Korea, South                      | +09           | +10                  | 1st March 2001         |
| Kosovo                            | +01           | +02                  | 1st March 2001         |
| Kuwait                            | +03           | +04                  | 1st March 2001         |
| Kyrgyzstan                        | +06           | +07                  | 1st March 2001         |
| Laos                              | +07           | +08                  | 1st March 2001         |
| Lao PDR                           | +07           | +08                  | 1st March 2001         |
| Latvia                            | +02           | +03                  | 1st March 2001         |
| Lebanon                           | +02           | +03                  | 1st March 2001         |
| Lesotho                           | +02           | +03                  | 1st March 2001         |
| Liberia                           | +00           | +01                  | 1st March 2001         |
| Libya                             | +02           | +03                  | 1st March 2001         |
| Liechtenstein                     | +01           | +02                  | 1st March 2001         |
| Lithuania                         | +02           | +03                  | 1st March 2001         |
| Luxembourg                        | +01           | +02                  | 1st March              |

| Territory                                  | Standard Time | Daylight-Saving Time |                              |
|--------------------------------------------|---------------|----------------------|------------------------------|
|                                            |               | Region               | Notes                        |
| 15 Territories of the Republic of Kiribati | +14           | +                    |                              |
| Lithuania                                  | +02           | +                    |                              |
| Lord Howe I.                               | +10 30        | 15                   | First Sun in Oct             |
| Luxembourg                                 | +01           | +                    | Second, or Last Sun in March |
| Madagascar                                 | +03           | +                    | Second, or Last Sun in Oct   |
| Malawi                                     | +02           | +                    | Second, or Last Sun in March |
| Malaysia                                   | +08           | +                    |                              |
| Maldives Is.                               | +05           | +                    |                              |
| Mali                                       | +00           | +                    |                              |
| Malta                                      | +01           | +03                  | Last Sun in March            |
| Marshall Is.                               | +12 00        | +                    | Second, or Last Sun in Oct   |
| Martinique, France                         | +04           | +                    |                              |
| Mauritania                                 | +00           | +                    |                              |
| Mauritius                                  | +04           | +                    |                              |
| Mexico                                     |               |                      |                              |
| Yucatán (except Yuc. I.) and Mex.          | +06           | +05                  | First Sun in May             |
| Baja California Sur, Mexico                | +07           | +06                  | First Sun in Apr             |
| Quintana Roo, Mexico                       | +06           | +                    | Second, or Last Sun in Sept  |
| Yucatan, Quintana Roo, Mex.                | +06           | +07                  | First Sun in May             |
| Yucatan, Quintana Roo, Mex.                | +06           | +                    | Second, or Last Sun in Oct   |
| Midway Is.                                 | +11           | +                    |                              |
| Moldova                                    | +02           | +03                  | Last Sun in March            |
| Morocco                                    | +01           | +04                  | Last Sun in March            |
| Mongolia                                   | +08           | +09                  | 20 March 2006                |
| Morocco                                    | +00           | +                    | Second, or Last Sun in Sept  |
| Montserrat                                 | +04           | +                    |                              |
| Mozambique                                 | +02           | +                    |                              |
| Namibia                                    | +01           | +02                  | 5 Sept 2006 C                |
| Nauru                                      | +12           | +                    | 7 April 2001 C               |
| Netherlands Antilles                       | +04           | +                    |                              |
| Nepal                                      | +05 30        | +                    |                              |
| Netherlands                                | +02           | +03                  | Last Sun in March            |
| New Zealand                                | +12           | +13                  | First Sun in Sep             |
| Nicaragua                                  | +06           | +                    | Second, or Last Sun in Oct   |
| Niue Is.                                   | +13 30        | +                    | Second, or Last Sun in March |
| Niger                                      | +01           | +                    |                              |
| Nigeria                                    | +01           | +                    |                              |



## LEGAL TIME

| Territory                                                                                                  | Standard Time | Daylight Saving Time |                    |                            |
|------------------------------------------------------------------------------------------------------------|---------------|----------------------|--------------------|----------------------------|
|                                                                                                            |               | Begin                | End                |                            |
| Zone 8 (including Iceland, Newfoundland, Greenland, East Greenland)                                        | +10           | +11                  | Last Sun in March  | Sat before last Sun in Oct |
| Zone 8 (including Mongolia)                                                                                | +11           | +12                  | Last Sun in March  | Sat before last Sun in Oct |
| Zone 10 (including Palau, Kiribati, Marshall Islands, Micronesia, Nauru)                                   | +12           | +13                  | Last Sun in March  | Sat before last Sun in Oct |
| Rwanda                                                                                                     | +02           | +                    |                    |                            |
| Saint Helena                                                                                               | +01           | +                    |                    |                            |
| East Pacific Is.                                                                                           | +05           | +                    |                    |                            |
| Saint Pierre and Miquelon                                                                                  | +03           | +02                  | First Sun in April | Sat before last Sun in Oct |
| Samoa Is.                                                                                                  | +11           | +                    |                    |                            |
| San Marino, Italy                                                                                          | +01           | +2                   | As for Italy       |                            |
| San Marino                                                                                                 | +01           | +02                  | Last Sun in March  | Sat before last Sun in Oct |
| Santa Cruz I.                                                                                              | +11           | +                    |                    |                            |
| Sao Tomé e Príncipe                                                                                        | +01           | +                    |                    |                            |
| Sandagrat                                                                                                  | +01           | +02                  | As for Italy       |                            |
| Saudi Arabia                                                                                               | +03           | +                    |                    |                            |
| Senegal                                                                                                    | +01           | +                    |                    |                            |
| Seychelles                                                                                                 | +04           | +                    |                    |                            |
| Sierra Leone                                                                                               | +01           | +02                  | As for Italy       |                            |
| Singapore                                                                                                  | +08           | +                    |                    |                            |
| Slovakia                                                                                                   | +01           | +02                  | Last Sun in March  | Sat before last Sun in Oct |
| Slovenia                                                                                                   | +01           | +02                  | Last Sun in March  | Sat before last Sun in Oct |
| Spain, Iles de la                                                                                          | +10           | +                    |                    |                            |
| Solomon Is.                                                                                                | +11           | +                    |                    |                            |
| Somalia                                                                                                    | +03           | +                    |                    |                            |
| South Africa                                                                                               | +02           | +                    |                    |                            |
| South Georgia                                                                                              | +02           | +                    |                    |                            |
| South Sandwich Is.                                                                                         | +03           | +                    |                    |                            |
| Spain and blue Belians                                                                                     | +01           | +02                  | Last Sun in March  | Sat before last Sun in Oct |
| Spanish Possessions in Africa and Asia, Ceuta, Iles Chafarinas, Melilla, Palos de la Gran Canaria, Alcazar | +01           | +2                   | As for Spain       |                            |
| Sri Lanka                                                                                                  | +05           | +                    |                    |                            |
| Swain                                                                                                      | +05           | +                    |                    |                            |
| Switzerland                                                                                                | +02           | +                    |                    |                            |
| Switzerland                                                                                                | +01           | +02                  | As for Austria     |                            |
| Sweden                                                                                                     | +02           | +                    |                    |                            |
| Sweden                                                                                                     | +01           | +02                  | Last Sun in March  | Sat before last Sun in Oct |
| Switzerland                                                                                                | +01           | +02                  | Last Sun in March  | Sat before last Sun in Oct |
| Syria                                                                                                      | +02           | +03                  | 1 April 2011       | 30 September 2011          |

TABLE

| Territory                        | Standard Time | Daylight Saving Time |                            |
|----------------------------------|---------------|----------------------|----------------------------|
|                                  |               | Begin                | End                        |
| Algeria                          | +1            |                      |                            |
| Tahiti                           | +10           |                      |                            |
| Tanzania                         | +3            |                      |                            |
| Thailand                         | +7            |                      |                            |
| Togo                             | +0            |                      |                            |
| Tonkwa                           | +11           |                      |                            |
| Tonga Is.                        | +13           | Last Sun in Mar      | End to last Sat in Oct     |
| Tinidad, Trinidad                | +4            |                      |                            |
| Turkey and Tokelau               | +3            |                      |                            |
| Tuvalu                           | +12           |                      |                            |
| Tunisia                          | +1            |                      |                            |
| Turkey                           | +3            | Last Sun in Mar      | End before last Sun in Oct |
| Tuvalu                           | +12           |                      |                            |
| Turk and Caicos Is.              | +4            | First Sun in Apr     | End before last Sun in Oct |
| Tuvalu                           | +12           |                      |                            |
| Uganda                           | +3            |                      |                            |
| Ukraine                          | +2            | 25 Last Sun in Mar   | End before last Sun in Oct |
| United Arab Emirates             | +4            |                      |                            |
| United Kingdom                   | +1            | 1st Sun in Mar       | End before last Sun in Oct |
| United States of America         |               |                      |                            |
| Alaska (except Aleutian Islands) | +8            | 1st Sun in Apr       | End before last Sun in Oct |
| Alaska                           | +9            |                      |                            |
| Arizona                          | +7            | 1st Sun in Apr       | End before last Sun in Oct |
| California                       | +8            | 1st Sun in Apr       | End before last Sun in Oct |
| Colorado                         | +7            | 1st Sun in Apr       | End before last Sun in Oct |
| Connecticut                      | +5            | 1st Sun in Apr       | End before last Sun in Oct |
| Delaware                         | +4            | 1st Sun in Apr       | End before last Sun in Oct |
| District of Columbia             | +4            | 1st Sun in Apr       | End before last Sun in Oct |
| Florida                          | +4            | 1st Sun in Apr       | End before last Sun in Oct |
| Georgia                          | +4            | 1st Sun in Apr       | End before last Sun in Oct |
| Hawaii                           | +10           |                      |                            |
| Idaho                            | +7            | 1st Sun in Apr       | End before last Sun in Oct |
| Illinois                         | +5            | 1st Sun in Apr       | End before last Sun in Oct |
| Indiana                          | +4            | 1st Sun in Apr       | End before last Sun in Oct |
| Iowa                             | +5            | 1st Sun in Apr       | End before last Sun in Oct |
| Kansas                           | +6            | 1st Sun in Apr       | End before last Sun in Oct |
| Kentucky                         | +4            | 1st Sun in Apr       | End before last Sun in Oct |
| Louisiana                        | +5            | 1st Sun in Apr       | End before last Sun in Oct |
| Maine                            | +4            | 1st Sun in Apr       | End before last Sun in Oct |
| Maryland                         | +4            | 1st Sun in Apr       | End before last Sun in Oct |
| Massachusetts                    | +4            | 1st Sun in Apr       | End before last Sun in Oct |
| Michigan                         | +5            | 1st Sun in Apr       | End before last Sun in Oct |
| Minnesota                        | +6            | 1st Sun in Apr       | End before last Sun in Oct |
| Mississippi                      | +5            | 1st Sun in Apr       | End before last Sun in Oct |
| Missouri                         | +6            | 1st Sun in Apr       | End before last Sun in Oct |
| Montana                          | +7            | 1st Sun in Apr       | End before last Sun in Oct |
| Nebraska                         | +6            | 1st Sun in Apr       | End before last Sun in Oct |
| Nevada                           | +8            | 1st Sun in Apr       | End before last Sun in Oct |
| New Hampshire                    | +4            | 1st Sun in Apr       | End before last Sun in Oct |
| New Jersey                       | +4            | 1st Sun in Apr       | End before last Sun in Oct |
| New Mexico                       | +7            | 1st Sun in Apr       | End before last Sun in Oct |
| New York                         | +4            | 1st Sun in Apr       | End before last Sun in Oct |
| North Carolina                   | +4            | 1st Sun in Apr       | End before last Sun in Oct |
| North Dakota                     | +6            | 1st Sun in Apr       | End before last Sun in Oct |
| Ohio                             | +4            | 1st Sun in Apr       | End before last Sun in Oct |
| Oklahoma                         | +6            | 1st Sun in Apr       | End before last Sun in Oct |
| Oregon                           | +8            | 1st Sun in Apr       | End before last Sun in Oct |
| Pennsylvania                     | +4            | 1st Sun in Apr       | End before last Sun in Oct |
| Rhode Island                     | +4            | 1st Sun in Apr       | End before last Sun in Oct |
| South Carolina                   | +4            | 1st Sun in Apr       | End before last Sun in Oct |
| South Dakota                     | +6            | 1st Sun in Apr       | End before last Sun in Oct |
| Tennessee                        | +5            | 1st Sun in Apr       | End before last Sun in Oct |
| Texas                            | +6            | 1st Sun in Apr       | End before last Sun in Oct |
| Vermont                          | +4            | 1st Sun in Apr       | End before last Sun in Oct |
| Virginia                         | +4            | 1st Sun in Apr       | End before last Sun in Oct |
| Washington                       | +8            | 1st Sun in Apr       | End before last Sun in Oct |
| West Virginia                    | +4            | 1st Sun in Apr       | End before last Sun in Oct |
| Wisconsin                        | +5            | 1st Sun in Apr       | End before last Sun in Oct |
| Wyoming                          | +7            | 1st Sun in Apr       | End before last Sun in Oct |

| LEGAL TIME                                   |               |                      |                   |                            |
|----------------------------------------------|---------------|----------------------|-------------------|----------------------------|
| Territory                                    | Standard Time | Daylight Saving Time |                   |                            |
|                                              |               |                      | Begin             | Ends                       |
| (i) Marignac                                 | +04           | +                    |                   |                            |
| Yemen                                        | +03           | +                    |                   |                            |
| Yugoslavia, Federal Republic of (Montenegro) | +01           | +02                  | Last Sun in March | Sat before last Sun in Oct |
| Zambia                                       | +02           | +                    |                   |                            |
| Zimbabwe                                     | +02           | +                    |                   |                            |

Untuk mempermudah perhitungan dapat digunakan format sebagai berikut:

|                | Date | Hours | Minute | Second |
|----------------|------|-------|--------|--------|
| Speed .....    | ETD  | =     |        |        |
| Steaming time  | =    |       |        |        |
| Time different | =    |       |        |        |
| ETA            | =    |       |        |        |



S : jarak (Mile)

v : Kecepatan (Knots)

t : Waktu tempuh (Jam)

Contoh : Hitunglah ETA apabila jarak yang ditempuh 2620 NM dengan kecepatan 13.0 knots ETD tanggal 06 Januari 2009 jam 12.00 Local time perbedaan waktu adalah + 02 H 00 M

Jawab :

2620 NM : 13.0 knots = 201.5384615 jam : 24 jam = 8,397435 hari

↓ (-) 8  
0,397435 hari x 24 jam  
↓ (-)  
9,53646 jam  
↓ (-) 9  
0,53646 jam x 60 menit  
↓ (-)  
32,30769 menit  
↓ (-) 32  
0,30769 menit x 60 detik  
↓ (-)  
18,46153 detik 18

|                    |                  | Date | Hours  | Minute | Second |
|--------------------|------------------|------|--------|--------|--------|
| Speed = 13.0 knots | ETD              | 12   | 12     | 00     | 00     |
|                    | =                |      |        |        |        |
|                    | Steaming time =  | 8    | 9      | 32     | 18     |
|                    |                  |      |        |        |        |
|                    | Time different = |      | (+) 02 | 00     | 00     |
|                    |                  |      |        |        |        |
|                    | ETA              | 20   | 23     | 32     | 18     |
|                    | =                |      |        |        |        |

Jadi ETA 20 Januari jam 23-32-18

## PERHITUNGAN HALUAN DAN JAUH

### DEFINISI:

|                  |                                                               |
|------------------|---------------------------------------------------------------|
| Tempat tolak     | = tempat dari mana kapal berlayar                             |
| Lintang tolak    | = lintang dari tempat tolak ( $I_0$ )                         |
| Bujur tolak      | = bujur dari tempat tolak ( $B_0$ )                           |
| Tempat tiba      | = tempat di mana kapal tiba (lintang/bujur tiba)              |
| Lintang tiba     | = lintang dari tempat tiba ( $I_1$ )                          |
| Bujur tiba       | = bujur dari tempat tiba ( $B_1$ )                            |
| Lintang menengah | = lintang pertengahan antara lintang tolak dan tiba ( $I_m$ ) |

$$I_m = \frac{I_0 + I_1}{2}$$

Perubahan lintang = busur derajat antara jajar-jajar yang melalui tempat tolak dan tempat tiba ( $\Delta I$ )

- Lintang tolak dan lintang tiba senama

$$\Delta I = I_1 - I_0 \text{ atau } \Delta I = I_0 - I_1$$

- Lintang tolak dan lintang tiba tak senama

$$\Delta I = I_1 + I_0$$

$\Delta I$  utara apabila kapal berlayar menuju utara dan  $\Delta I$  selatan apabila kapal berlayar menuju selatan

Perubahan bujur = bujur khatulistiwa antara derajat-derajat yang melalui tempat tolak dan tempat tiba ( $\Delta B$ )

- Bujur tolak dan bujur tiba senama

$$\Delta B = B_1 - B_0 \text{ atau } \Delta B = B_0 - B_1$$

- Bujur tolak dan bujur tiba tak senama

$$\Delta B = B_1 + B_0$$

$\Delta B$  barat apabila kapal berlayar menuju ke barat dan  $\Delta B$  timur apabila kapal berlayar menuju ke timur

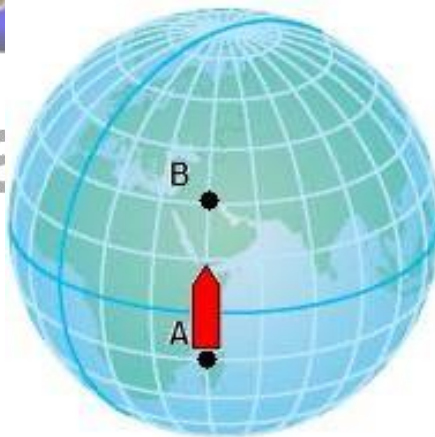
### Haluan Utara dan Selatan

Apabila kapal berlayar pada haluan Utara atau Selatan artinya kapal berlayar sepanjang derajat yang sama; jadi bujuranya tidak berubah, tetapi hanya berubah dalam lintangnya.

Pada haluan U dan S:

$$\Delta l = \text{jauh}$$

$$\Delta B = \text{nol}$$



### Haluan timur dan barat

Pada haluan T dan B kapal berlayar mengikuti suatu jajar, maka di sini lintangnya tidak berubah, tetapi yang berubah hanya bujurnya.

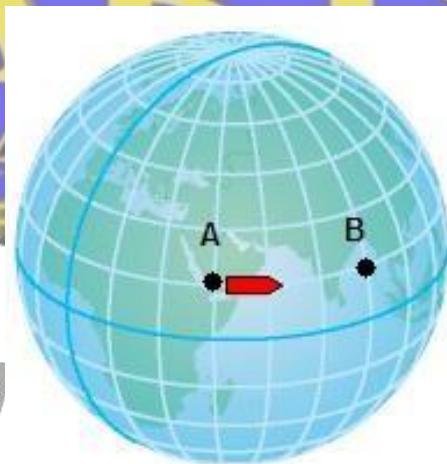
Jadi pada haluan T dan B;

$$\Delta \text{ lintang} = \text{nol}$$

$$\Delta \text{ bu} = \text{simp sec lintang}$$

Hanya pada khatulistiwa, kita dapati:

$$\Delta \text{ Bu} = \text{simp}$$



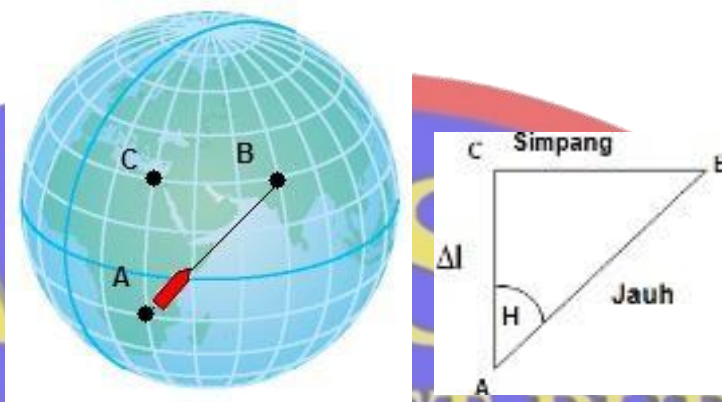
Jika kapal berlayar sepanjang jajar dari A ke B, maka AB adalah jauhnya dan di sini jauh disebut simpang

### Haluan Serong

Pada haluan serong kapal tidak lagi berlayar mengikuti derajat ataupun jajar

Dalam hal ini maka lintang dan bujurnya mengalami perubahan dan kita sebut sekarang; kapal berlayar mengikuti loksodrom.

Loksodrom = garis lurus di peta laut yang membentuk sudut-sudut yang sama dengan semua derajat.



Dari gambar di atas diperoleh rumusan sebagai berikut:

$$\text{Tg } H = \frac{\text{Simpang}}{\Delta l}$$

$$\Delta l = \text{Jauh} \cos H$$

$$\text{Jauh} = \Delta l \sec H$$

$$\text{Simpang} = \text{Jauh} \sin H$$

Sedangkan untuk mencari Perubahan bujur dapat menggunakan rumusan:

$$\Delta bu = \text{simp sec lintang}$$

$$\Delta bu = \Delta \text{Lintang bertumbuh Tg H}$$

$$\text{Lintang bertumbuh} = (10800/n) \times \ln (\text{Sec lintang} + \text{Tg lintang})$$

Perhitungannya dapat dilakukan dengan:

1. dengan kalkulator,
2. daftar ilmu pelayaran.



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## DAFTAR PUSTAKA

*Admiralty Chart and Publications*

Bowditch, Nathaniel, LL.D. 2002. *American Practical Navigator*.  
Defense Mapping Agency.

Capt. H.R. Soebekti, M.Mar. *Intisari Ilmu Pelayaran Datar*.

IMO. *Model Course 7.03 For Officer In Charge of an Navigational Watch*.



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## BIOGRAFI PENULIS



Iskandar lahir di Tanjung Karang, 21 Juni 1973. Penulis lulus sekolah dasar di SDN 1 Penengahan pada tahun 1987. Setelah itu, pada tahun 1990 penulis menyelesaikan sekolah menengah pertama di SMPN 1 Kedaton.

Kemudian, penulis lulus sekolah menengah atas di SMA Negeri 3 Tanjung Karang pada tahun 1993. Pada tahun yang sama, penulis melanjutkan pendidikan tinggi di Fakultas Ekonomi Universitas Lampung. Pada tahun 1994, penulis melanjutkan pendidikan tinggi di AIP (Akademi Ilmu Pelayaran) BPLP Ujung Pandang dan lulus pada tahun 1998. Pada tahun yang sama, menjadi ASN (Aparatur Sipil Negara) di PIP (Politeknik Ilmu Pelayaran) Makassar. Kemudian, penulis menyelesaikan pendidikan Magister Teknik Kelautan di Institut Teknologi Sepuluh Nopember pada tahun 2010. Pada tahun 2015, penulis menyelesaikan pendidikan doktor bidang Manajemen Pendidikan di Universitas Negeri Surabaya. Selain itu, sebagai pelaut penulis menyelesaikan pendidikan Ahli Nautika Tingkat II pada tahun 2005 dan menyelesaikan Master Marine pada tahun 2018. Pada tahun 2001, penulis dipindahtugaskan di BP2IP yang berganti menjadi Politeknik Pelayaran Surabaya. Selanjutnya, pada tanggal 3 September 2019 mendapat tugas di Politeknik Pelayaran Sorong hingga sekarang.

Sebagai dosen Program Studi Nautika, penulis telah mengikuti beberapa pendidikan dan pelatihan, seperti Instructor Upgrading Training bidang Navigasi United State Merchant Marine Academy (2003), RADAR N ARPA Training Course for Instructor (Jepang), Training Course for Instructor based on IMO M.C. (International Maritime Organization Model Course) 6.09, Training of Train the Simulator Trainer and Assessor IMO M.C. 6.10, Training Course for Assessment, Examination and Certification IMO

M.C. 3.12. Selain itu, penulis memiliki pengalaman berlayar sebagai perwira di kapal niaga selama empat tahun. Saat ini, penulis mengampu mata kuliah Ilmu Pelayaran pada Program D-3, Diklat Pelaut Pembentukan dan Peningkatan. Diharapkan dengan kehadiran buku ini dapat menambah referensi bagi pembaca tentang ilmu pelayaran datar dan tentunya menambah wawasan bagi taruna/i untuk mempelajari ilmu kepelautan.



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# *Buku Ajar* **ILMU PELAYARAN DATAR**

Ilmu pelayaran datar adalah suatu cabang ilmu navigasi yang mempelajari bagaimana merencanakan, membawa, dan menentukan posisi kapal dengan bantuan benda-benda bumiawi untuk mendapatkan posisi kapal secara tepat dan cepat. Buku ini membahas tentang definisi lingkaran-lingkaran bumi, proyeksi peta dan peta laut, teknik penentuan posisi dengan menggunakan baringan benda darat dan peralatan menjangka peta, perhitungan haluan dan jauh, dan publikasi-publikasi yang dibutuhkan oleh para navigator dalam bernavigasi di atas kapal.



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