

# Coastal Navigation

Charts & Navigation

# IHO

## International Hydrographic Organization

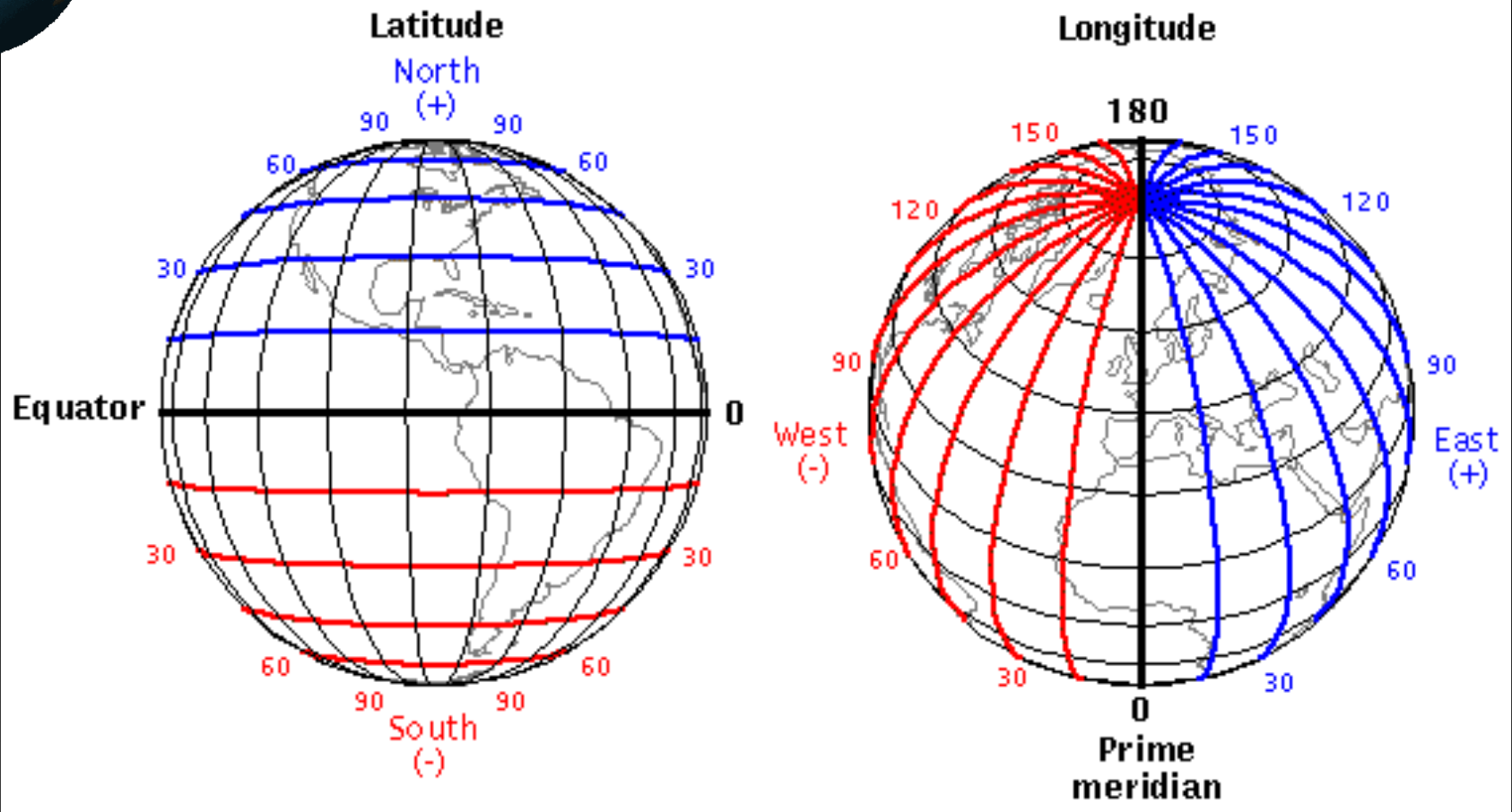
The International Hydrographic Organization is an intergovernmental organization that works to ensure all the world's seas, oceans and navigable waters are surveyed and charted. Established in 1921, it coordinates the activities of national hydrographic offices and promotes uniformity in nautical charts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





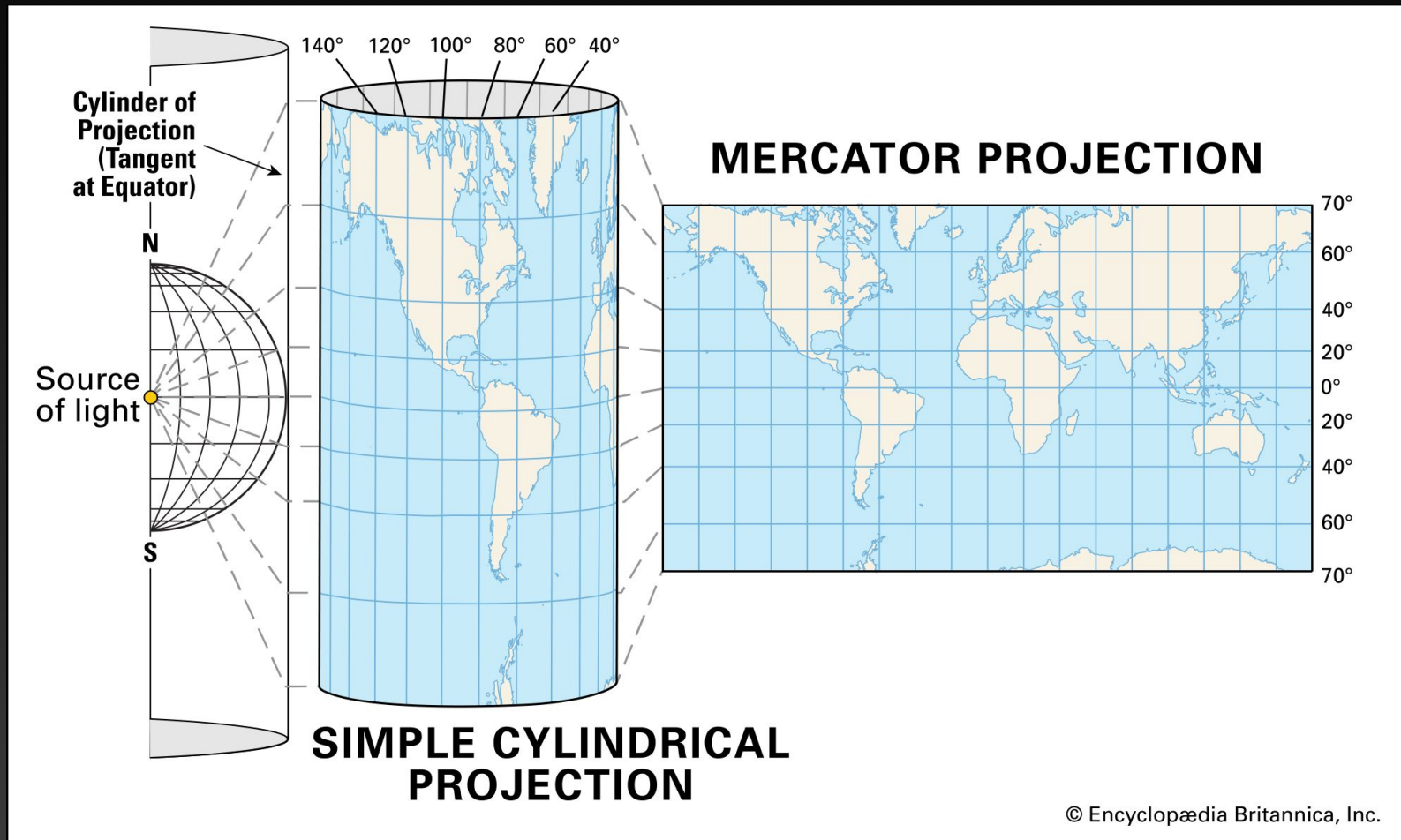
# World

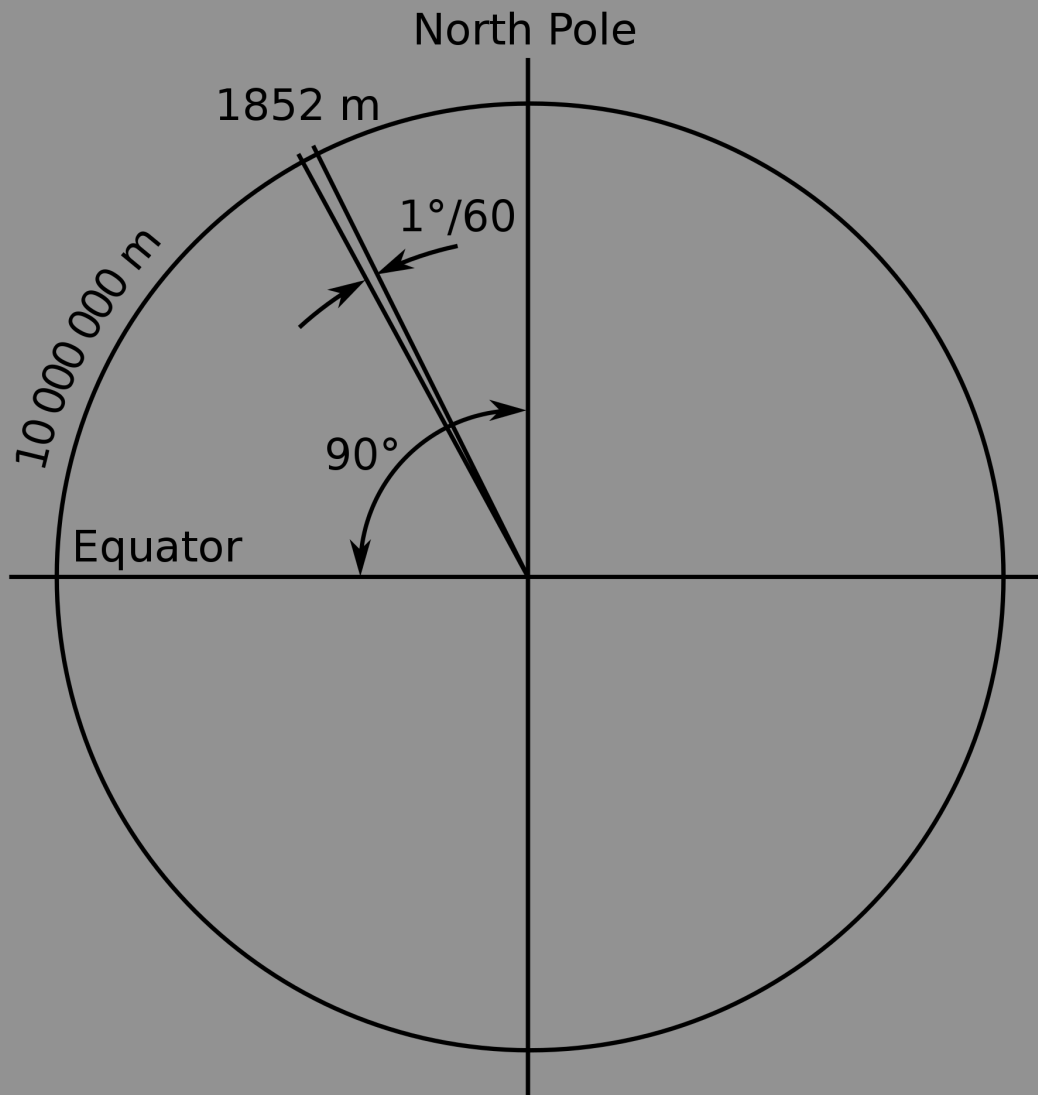
## Latitude and Longitude



# Charts

## Mercator Chart - scale changes with latitude



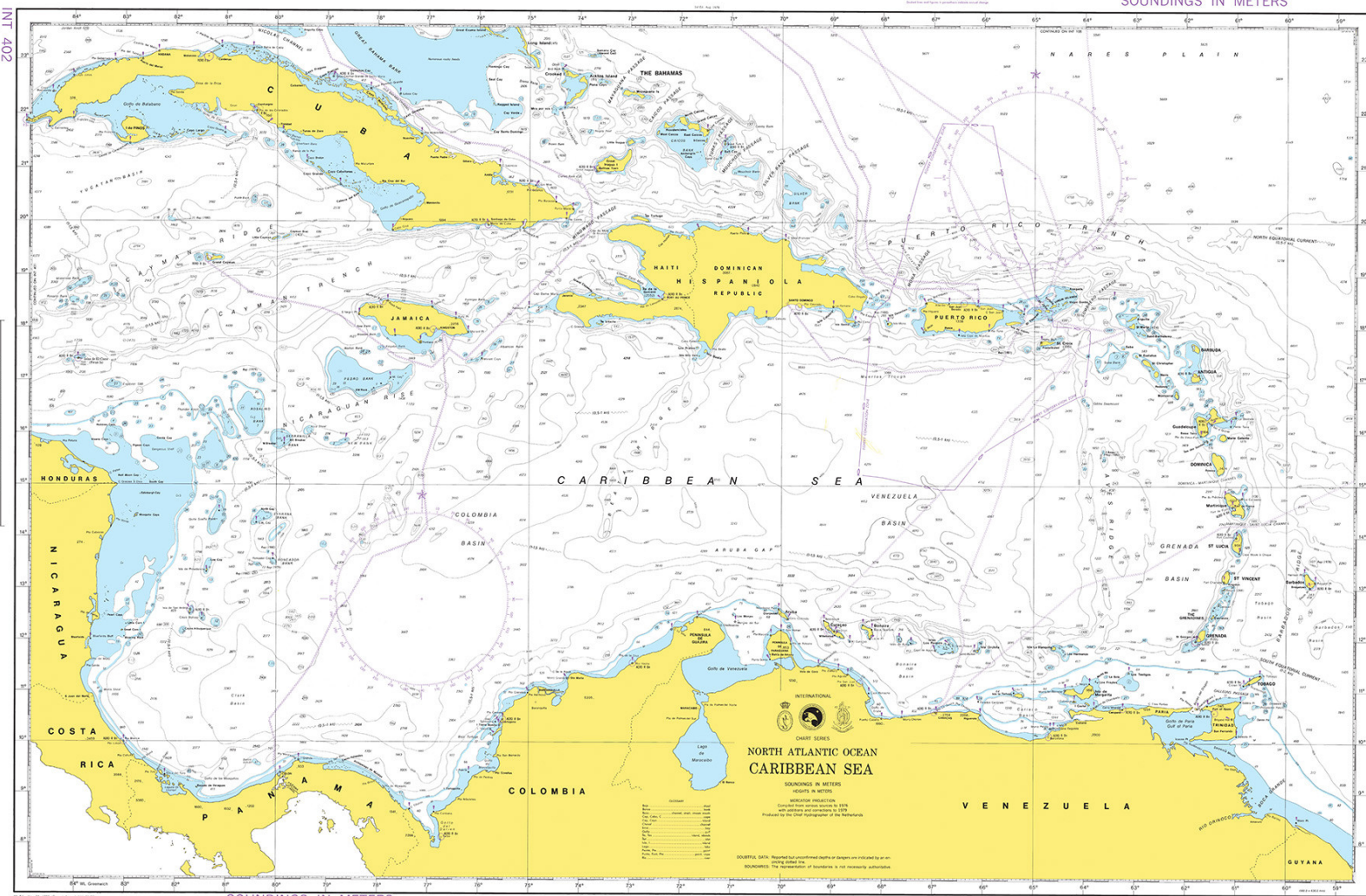


## Nautical Mile

A nautical mile is a unit of length used in air, marine, and space navigation, and for the definition of territorial waters. Historically, it was defined as the meridian arc length corresponding to one minute ( $1/60$  of a degree) of latitude at the equator, so that Earth's polar circumference is very near to 21,600 nautical miles (that is  $60 \text{ minutes} \times 360 \text{ degrees}$ ). Today the international nautical mile is defined as 1,852 meters. The derived unit of speed is the knot, one nautical mile per hour.

INT 402  
402

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SOUNDINGS IN METERS

INT 402  
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SOUNDINGS IN METERS

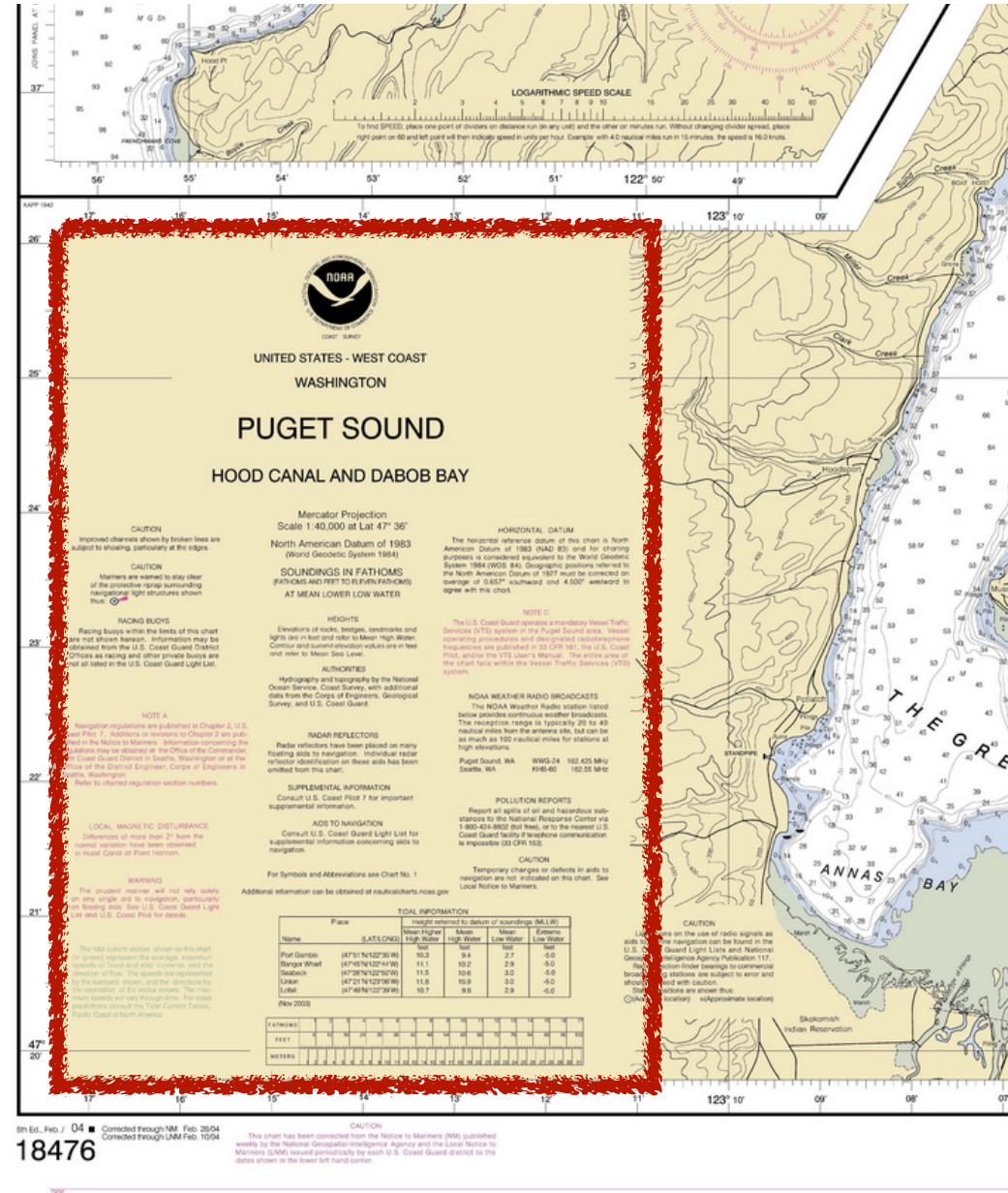
NORTH ATLANTIC OCEAN  
CARIBBEAN SEA  
SOUNDINGS IN METERS

VENEZUELA

Caribbean Sea  
SOUNDINGS IN METERS - (Scale 1:10,000)

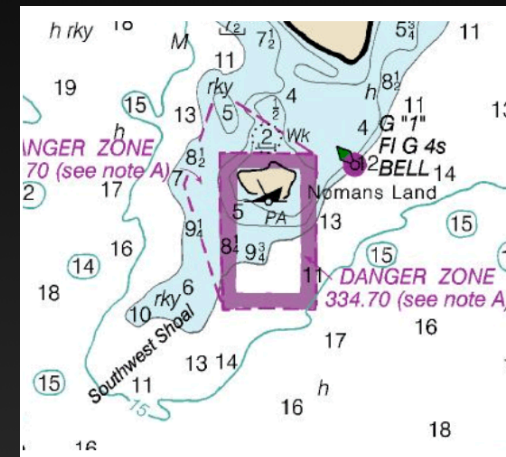
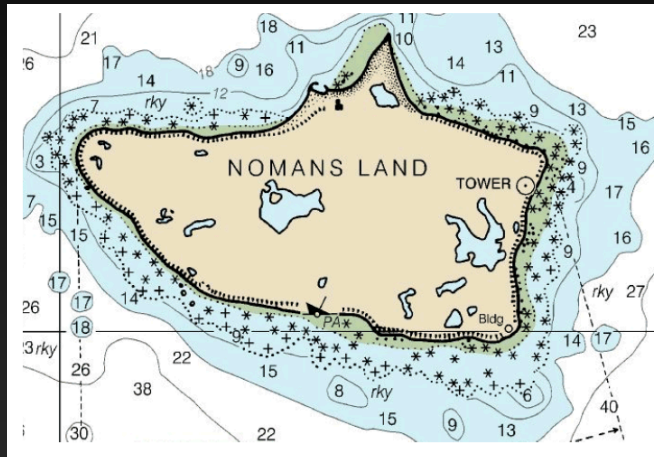
# Information

- Maker
- Chart Name
- Scale
- Chart number and edition
- Geographic features (coastline, landmarks)
- Hydrographic features (depth contours, Sounding)
- Compass rose
- Symbols and abbreviations
- Warnings and local information



# Chart scales

"Large Scale" vs "Small Scale"



- Scale
  - Sailing Chart - 1 : 600,000 or greater (small scale)
  - General Chart - 1 : 100,000 - 1 : 600,000
  - Coastal Chart - 1 : 50,000 - 1 : 100,000
  - Harbor Chart - 1 : 50,000 or less (large scale)

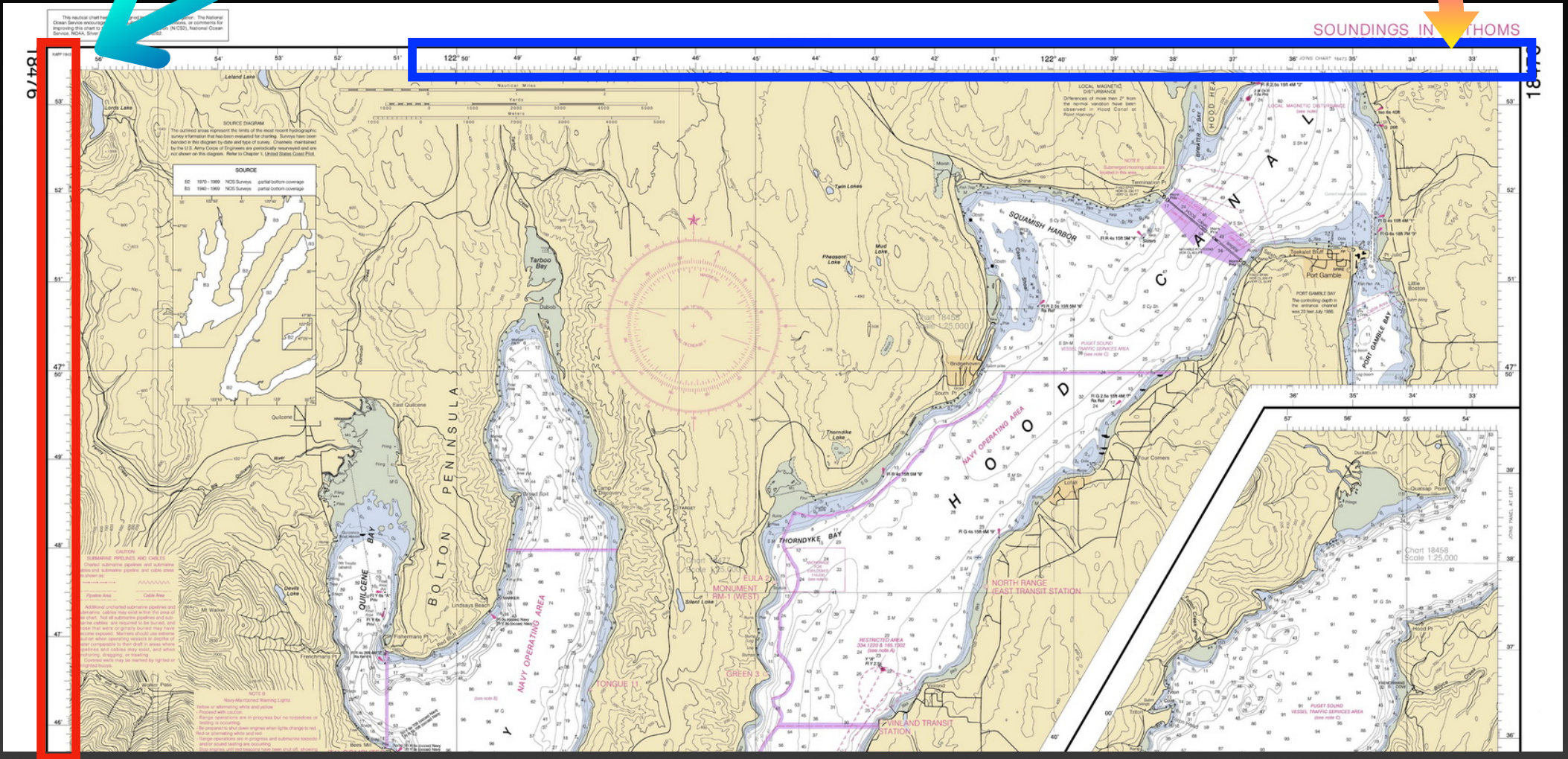


# Latitude

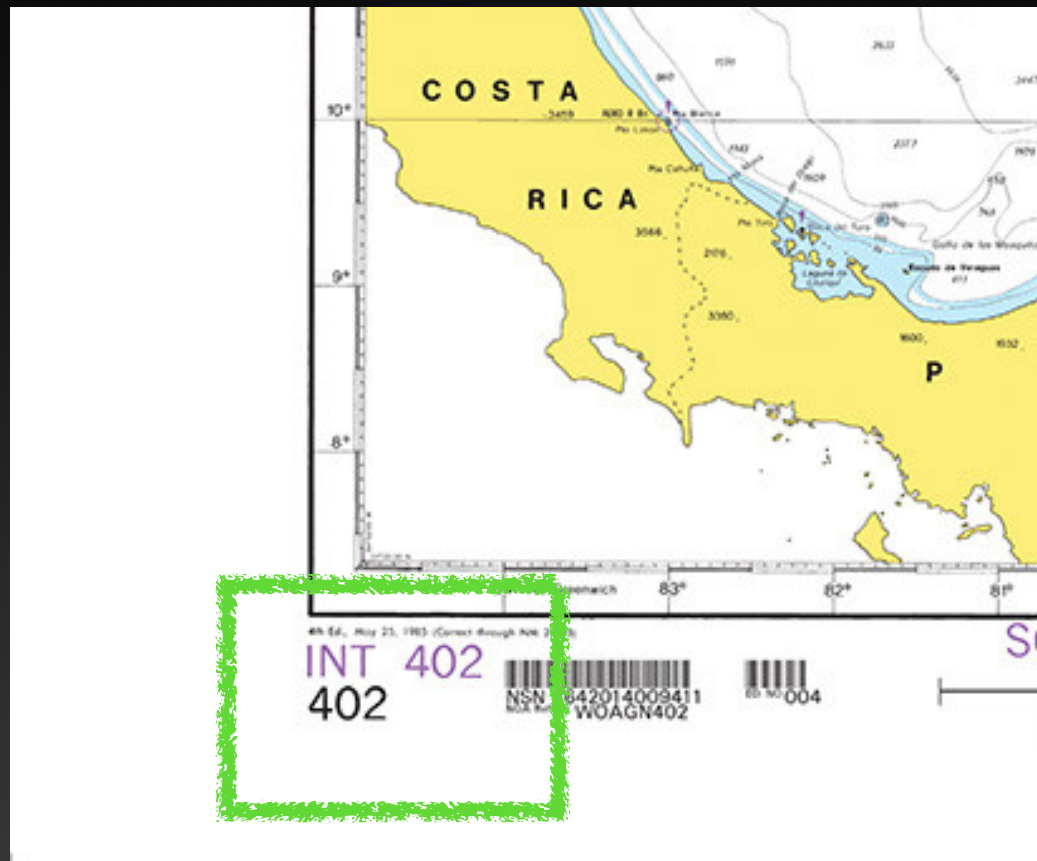
# &

# Longitude

SOUNDINGS IN FATHOMS



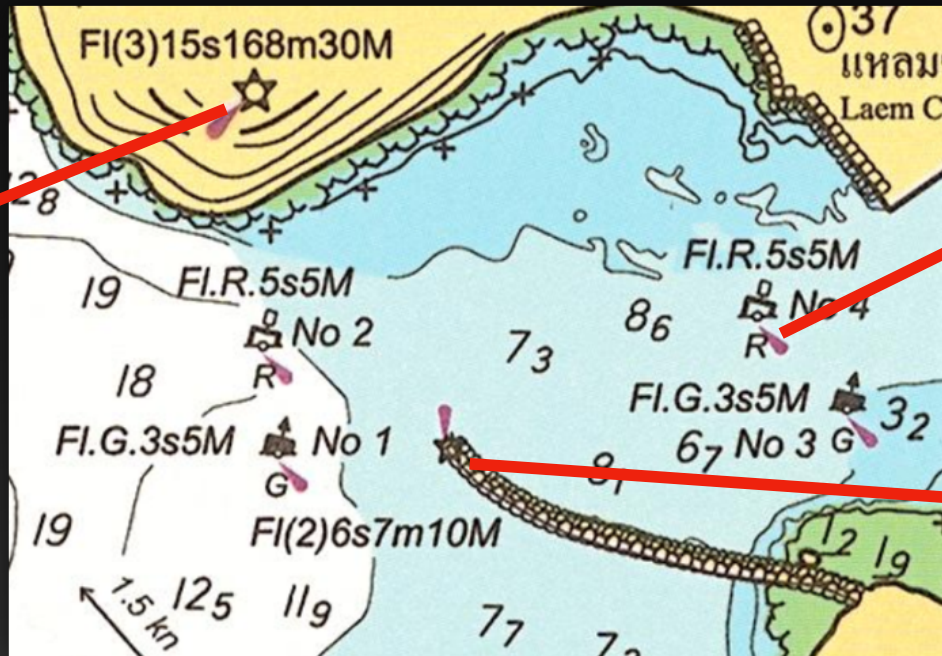
# Chart Number







# Chart symbols



# IALA

INTERNATIONAL ASSOCIATION OF MARINE AIDS TO NAVIGATION  
AND LIGHTHOUSE AUTHORITIES



# MARITIME BUOYAGE SYSTEM

ระบบทุ่นเครื่องหมายทางเรือ





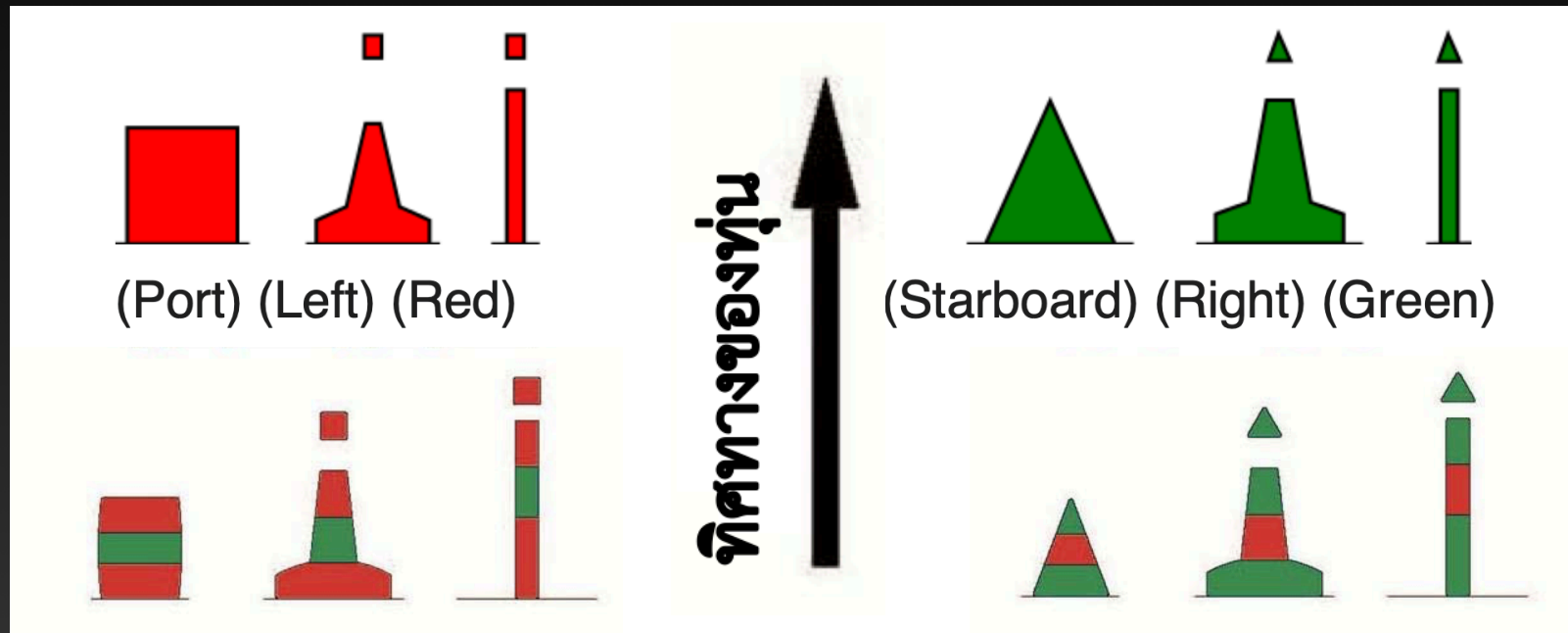
**IALA Maritime Buoyage System**

- Region A (port is red)
- Region B (port is green)



# LATERAL MARKS

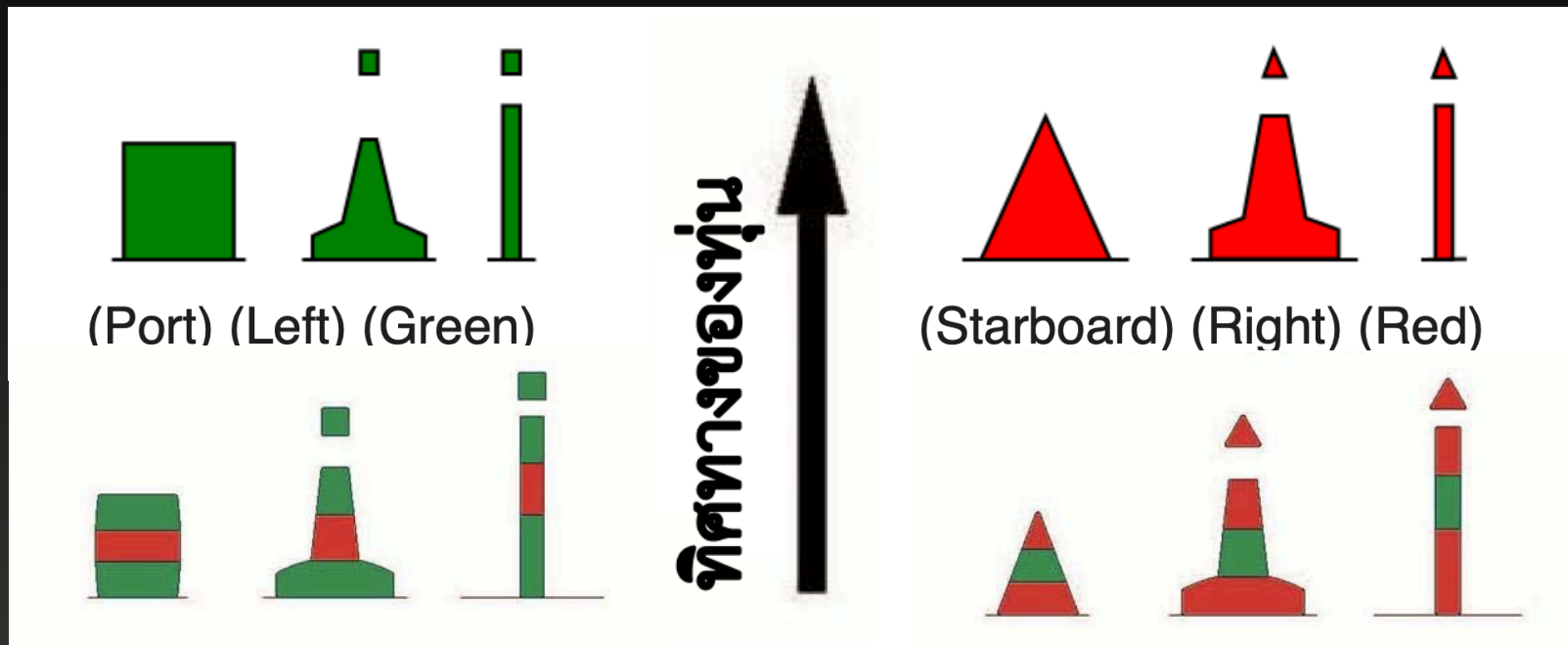
## REGION A



ประเทศที่ใช้ระบบ ภูมิภาค A : EUROPE, AFRICA, ALMOST ASIA, OCEANIA, GREENLAND.

# LATERAL MARKS

## REGION B



ประเทศที่ใช้ระบบ ภูมิภาค B : AMERICA, JAPAN, SOUTH KOREA, PHILIPPINES, TAIWAN HAWAII

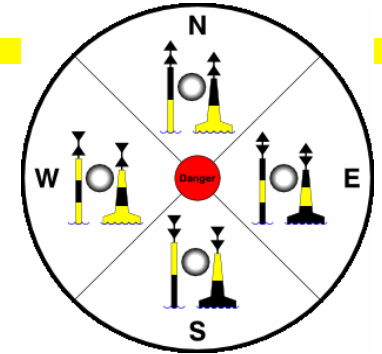
# CARDINAL MARKS

เครื่องหมายจตุรทิศ



# CARDINAL MARKS

## เครื่องหมายจตุรทิศ



**A cardinal mark is a sea mark (a buoy or other floating or fixed structure) commonly used in maritime pilotage to indicate the position of a hazard and the direction of safe water.**

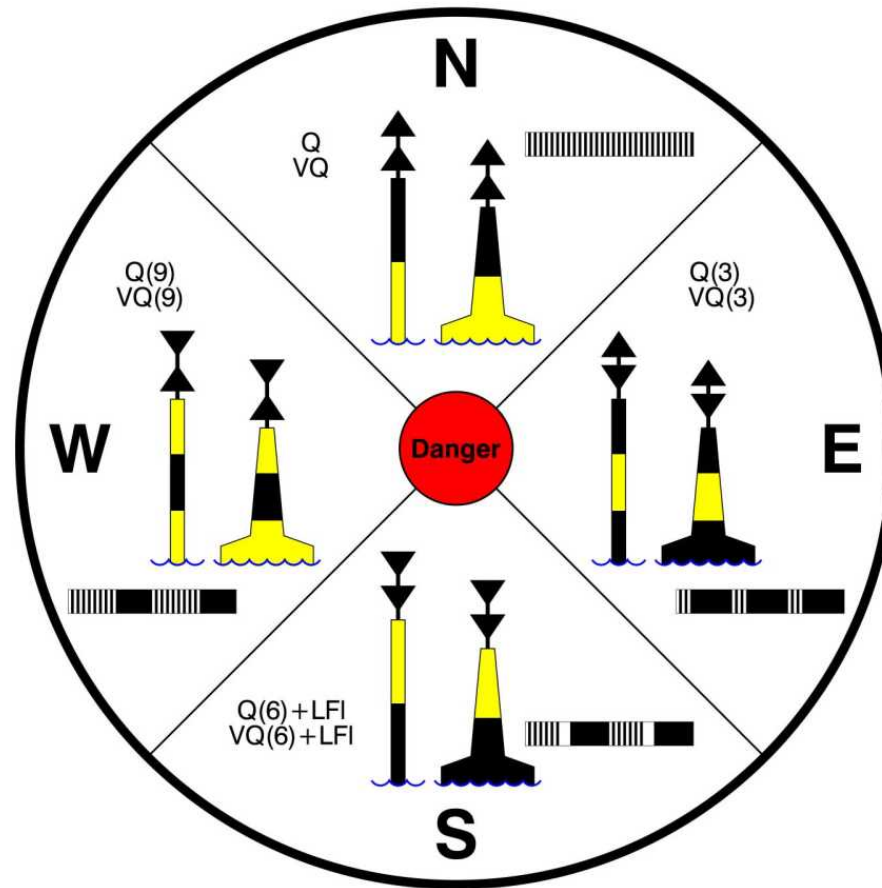
**Cardinal marks indicate the direction of safety as a cardinal direction (north, east, south or west) relative to the mark. This makes them meaningful regardless of the direction or position of the approaching vessel, in contrast to the (perhaps better-known) lateral mark system.**

**A cardinal mark may be used to accomplish the following :**

- **Indicate that the deepest water is an area on the named side of the mark**
- **Indicate the safe side on which to pass a danger**

# CARDINAL MARKS

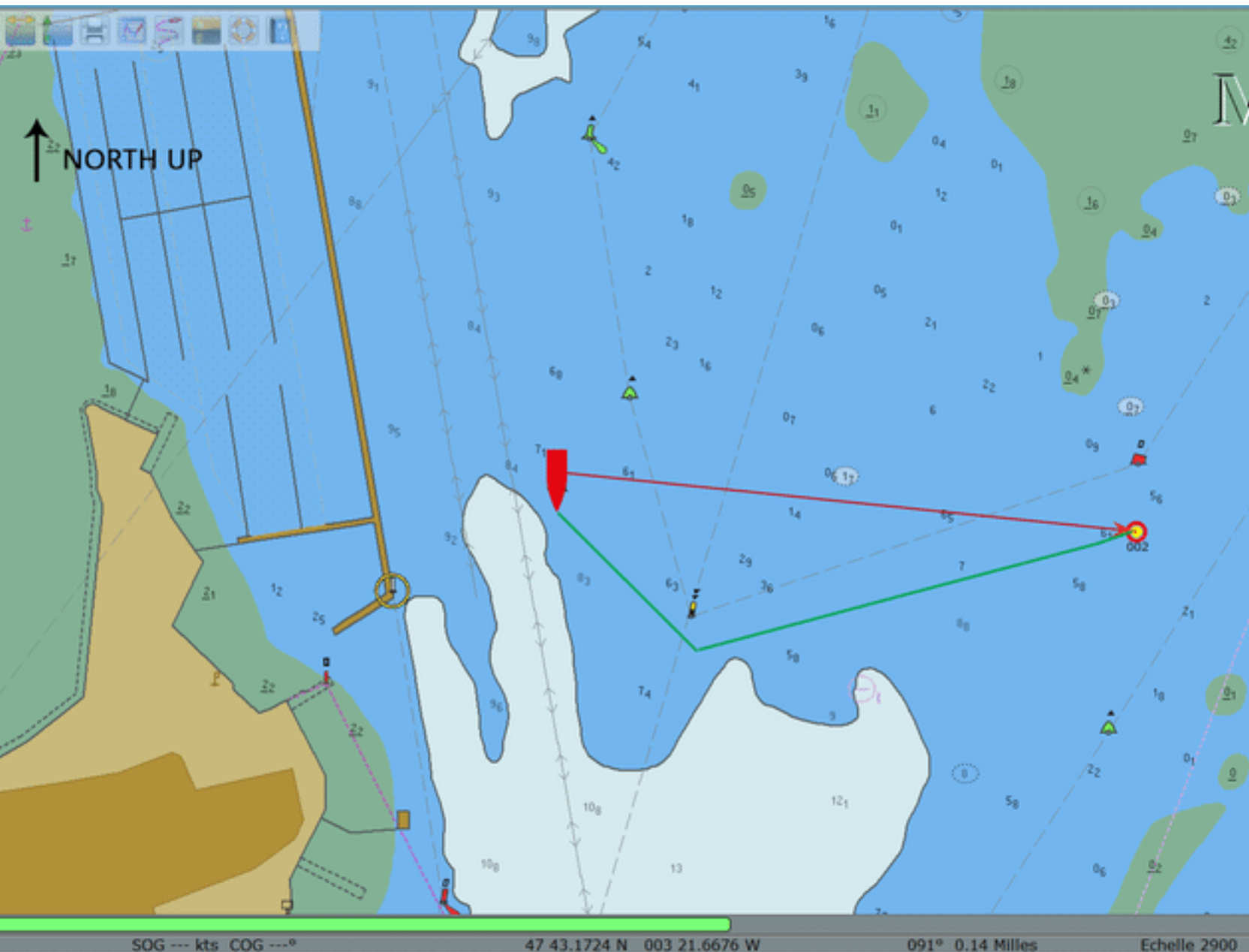
เครื่องหมายจตุรทิศ



# CARDINAL MARKS

เครื่องหมายจตุรทิศ





The user look at  
the south cardinal

? ?



# ISOLATED DANGER MARKS

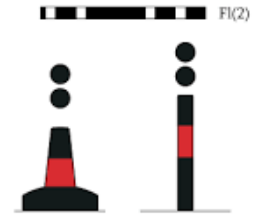
เครื่องหมายสิ่งอันตรายโดดเดี่ยว





# ISOLATED DANGER MARKS

เครื่องหมายสิ่งอันตรายโดดเดี่ยว



**An Isolated Danger Mark, as defined by the International Association of Lighthouse Authorities, is a sea mark used in maritime pilotage to indicate a hazard to shipping such as a partially submerged rock.**

# SAFE WATER MARKS

เครื่องหมายแสดงที่ปลอดภัย



# SAFE WATER MARKS

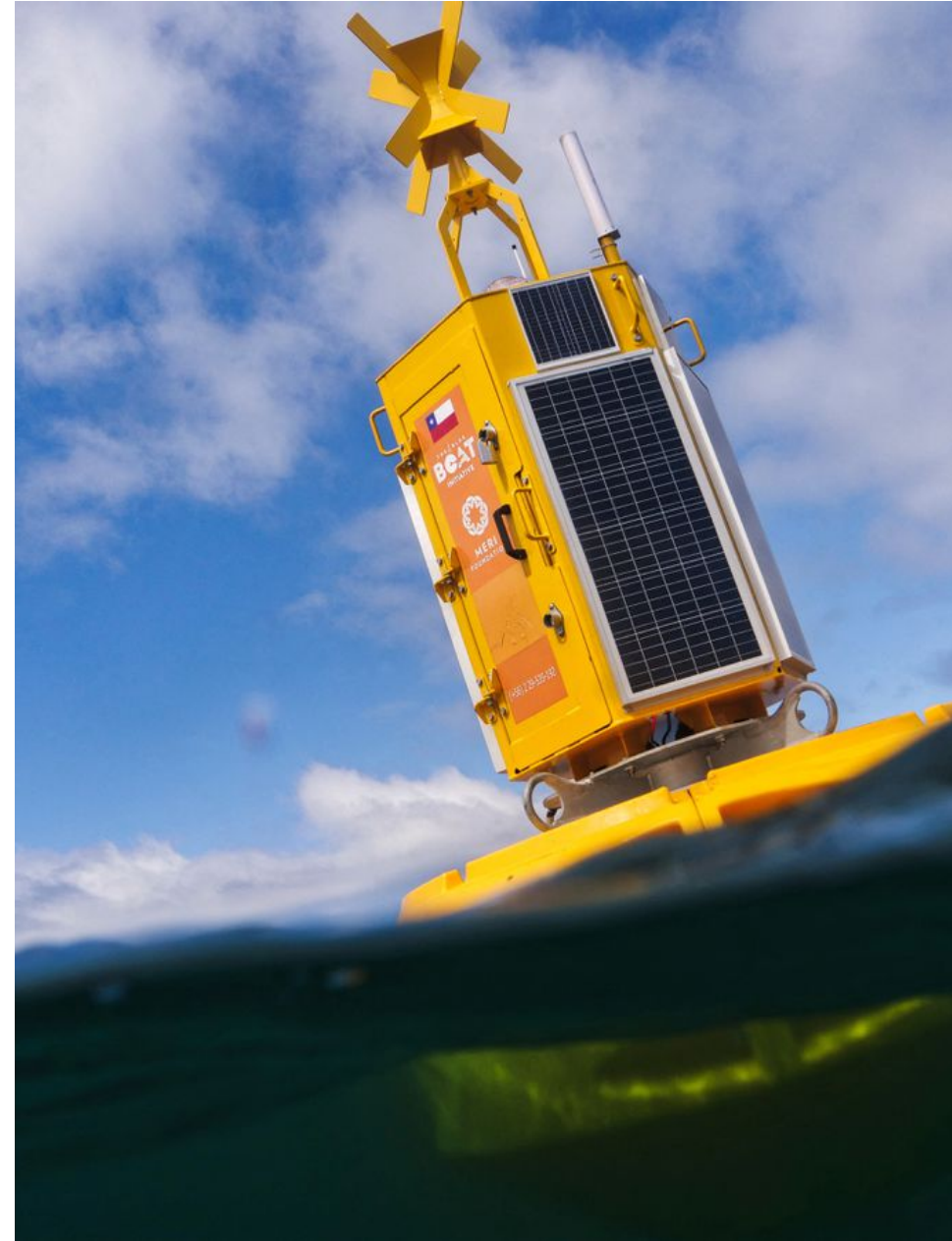
เครื่องหมายแสดงที่ปลอดภัย



**A safe water mark is a sea mark used in maritime pilotage to indicate the end of a channel. They usually imply that open, deep and safe water lies ahead. They are also used to indicate the start and end of a buoyed section of a continuous narrow channel; and a series of them may mark a safe route through shallow areas. It is therefore important to consult appropriate charts to determine their meaning in each location. They are also known as fairway buoys and clear water buoys.**

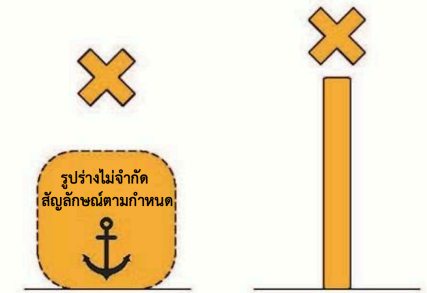
# SPECIAL MARKS

เครื่องหมายพิเศษ



# SPECIAL MARKS

เครื่องหมายพิเศษ



**A Special Mark is a sea mark used in maritime pilotage. It is recognisable by its yellow colour and X, (also referred to as a St. Andrews Cross or saltire) top-mark. It has a distinctive sequence of various flashes that does not match any other navigational mark flashes in its vicinity.**

# SPECIAL MARKS

## เครื่องหมายพิเศษ

Special marks can indicate:

- Administrative areas
- Water skiing areas
- Anchorage areas
- Mooring areas
- Waiting areas
- Traffic separation scheme
- Oil wells
- Dead ends
- Pipelines
- Historic wrecks
- Protected areas
- Outfall pipes (such as Stormwater, and Cooling water)
- Sewerage pipes
- Intake pipes
- Submarine cables



# EMERGENCY WRECK MARKING BUOY

เครื่องหมายสิ่งอันตรายใหม่



# SPECIAL MARKS

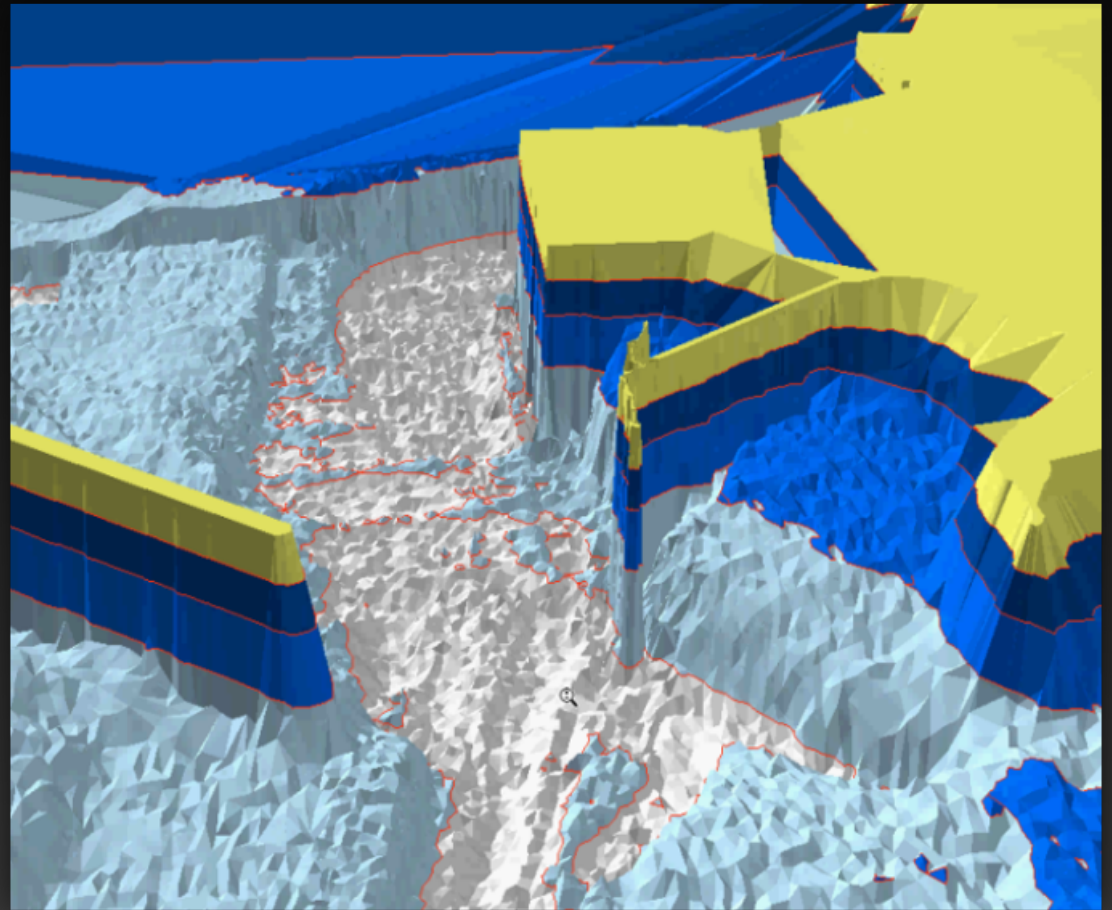
เครื่องหมายพิเศษ



**An Emergency wreck buoy is used to warn of a new wreck which has not yet been listed in maritime documents. The buoy is expected to be deployed for the first 24-72 hours after the wreck occurs. After that time more permanent buoyage (such as isolated danger marks or cardinal marks) should be deployed and charts updated.**



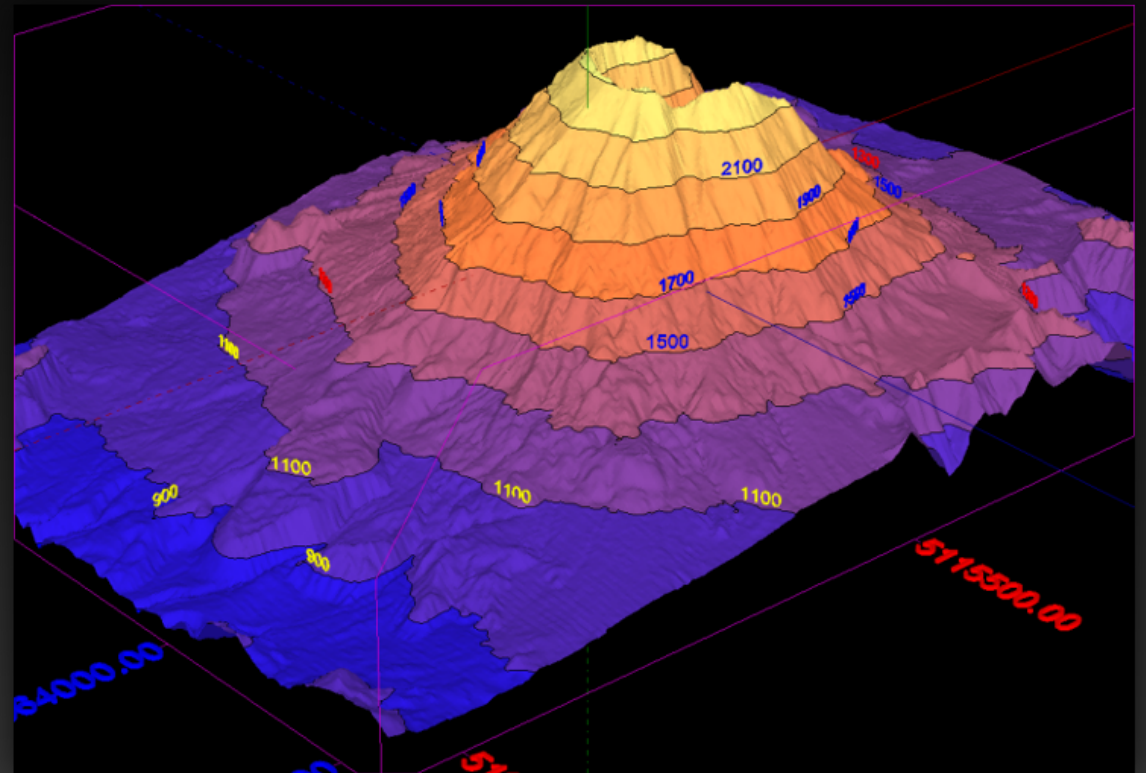
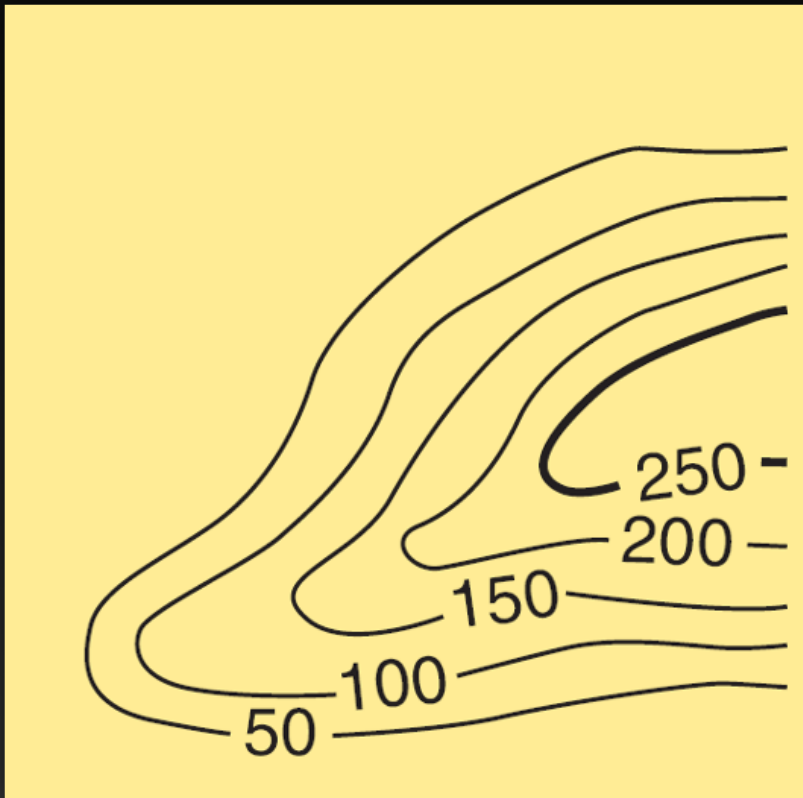
# Depth



# Depth Contour



# Mountain



# Mariner's Navigation kit

- Divider
- Nautical triangle ruler
- Nautical parallel ruler

