

DIRECTORATE GENERAL OF SEA TRANSPORTATION
MINISTRY OF TRANSPORTATION
THE REPUBLIC OF INDONESIA

**Project on Enhancing
of
Vessel Traffic Service System
Management Capability Phase 2
(Dumai VTS Operator Training)**

Training Completion Report

- Volume 2 -

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JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)



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Project on Enhancing of Vessel Traffic Service System

Management Capability Phase 2

TEXT Book-2 (1)

(VESSEL TRAFFIC SERVICE (VTS)

STANDARD PHRASES)



JAPAN INTERNATIONAL COOPERATION AGENCY



JAPAN AIDS TO NAVIGATION ASSOCIATION (JANA)

November 2016

Project on Enhancing of Vessel Traffic Service System Management Capability Phase 2)

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VESSEL TRAFFIC SERVICE (VTS) STANDARD PHRASES

1. Message Marker Example

<i>INSTRUCTION</i>	<i>"INSTRUCTION."</i>	"Do not cross the fairway."
<i>ADVICE</i>	<i>"ADVICE."</i>	"(Advise you) stand by on VHF Channel six nine (69)."
<i>WARNING</i>	<i>"WARNING."</i>	"Obstruction in the fairway."
<i>INFORMATION</i>	<i>"INFORMATION."</i>	"Alpha" will overtake to the West of you."
<i>QUESTION</i>	<i>"QUESTION."</i>	"(What is) your present maximum draft?"
<i>ANSWER</i>	<i>"ANSWER."</i>	"My present maximum draft is zero seven metres."
<i>REQUEST</i>	<i>"REQUEST."</i>	"I require two tugs."
<i>INTENTION</i>	<i>"INTENTION."</i>	"I will reduce my speed."

Phrases for acquiring and providing data for a traffic image.

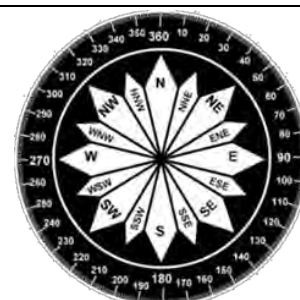
2. Acquiring and providing routine traffic data

2-1. Ship name or Flag state

What is the <i>name</i> of your vessel and <i>call sign</i> or <i>identification</i> ? Spell the name of your vessel.	The <i>name</i> of my vessel is (.....).
	<i>Call sign</i> is (.....).
	<i>Identification</i> is (.....).
What is your <i>flag state</i> ?	My <i>flag state</i> is (.....).
What is your <i>position</i> ?	My <i>position</i> is bearing (..... degrees), distance (.....kilometres) or (.....nautical miles) From (.....Buoy or lighthouse or land mark).

2-2. Course (Speed)

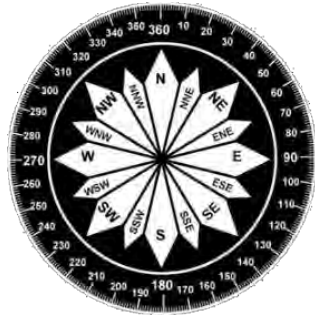
Note: Should be fully aware of the implications of words such as "*track*", "*heading*" and "*course*" made good.



From what <i>direction</i> are you approaching?	I am approaching from (<i>South by South-East</i> , (Cardinal points))
Vessel to the (<i>South by South-East</i> , (Cardinal points)) of you is on same <i>course</i> (..... degrees).	
You are running into danger.	~ Submerged wreck to the (..... cardinal points) ~ Shallow water to the (..... cardinal points) ~ Fog bank to the (..... cardinal points) Of you.
What is your present <i>course</i> and <i>speed</i> ?	My present <i>course</i> is (..... degrees) My <i>speed</i> is (.....knots).
What is your present <i>course</i> or <i>heading</i> ?	My present <i>course</i> (or <i>heading</i>) is (.....degrees).
You are steering a dangerous <i>course</i> . <i>Course</i> to make good is (.....degrees).	
Your <i>track</i> is	~ <i>parallel</i> with the <i>reference line</i> . <i>Parallel with: Equivalent with</i> ~ <i>diverging</i> from the <i>reference line</i> . <i>Diverging from: Deviating from</i> ~ <i>converging</i> to the <i>reference line</i> . <i>Converging to: Meeting to</i>
Advise you ~ keep your present <i>course</i> . Or Steer a new <i>course</i> of (..... degrees).	
Have you altered <i>course</i> ?	Yes, I have altered <i>course</i> . My new <i>course</i> is (..... degrees). No, I have not altered <i>course</i> . My <i>course</i> is (..... degrees).
You are running into danger. It will be risk of collision with a vessel bearing (.....degrees), distance (.....kilometres / nautical miles).	
What is the <i>course</i> to reach you?	The <i>course</i> to reach me is (.....) degrees.

2-3 Destination, Last port, ETA, ETD	
What is your port of <i>destination</i> ?	My port of <i>destination</i> or <i>Destination</i> is. (.....port name).
What was your last port of <i>call</i> ?	My last port of <i>call</i> was (..... port name).
What is your <i>ETA</i> in position (.....)?	My <i>ETA</i> is (.....) UTC (or Indonesian Local time).
What is your <i>ETD</i> from (.....)?	My <i>ETD</i> from (.....) is (.....) UTC (or Indonesian Local time.)

2-4 Assistance by VTS Radar	
I have <i>located</i> you on my radar screen.	
I cannot <i>locate</i> you on my radar screen.	
Say again your <i>position</i> for identification.	
(From vessel):	Yes, shore based radar assistance is available. No, shore based radar assistance is not available.
Is shore based radar assistance available?	Shore based radar assistance is available from (...) to (...) UTC.
Is your radar in operation?	Yes, my radar is in operation. No, my radar is not in operation.
What range scale are you using?	I am using (..... miles) range scale.
Change to a larger / smaller range scale.	
You are leaving my radar screen.	
I have lost radar contact.	
Do you require navigational assistance to reach (Point Name or destination)?	Yes, I require navigational assistance. No, I do not require navigational assistance

2-5 Position		
How was your <i>position</i> obtained?	My <i>position</i> was obtained by (.....)	GPS RADAR Cross-bearing Astronomical observation
Your <i>position</i> is bearing (.....degrees), distance (..... kilometres / nautical miles) from (.....).		
You are entering (reporting line.....).		
Your <i>position</i> is (.....) / bearing (..... degree), distance (.....kilometres / nautical miles) from (.....)		
You are passing (reporting line		
You are	~ in the centre of the fairway.	
	~ On / not on the radar reference line (of the fairway).	
	~ On the (..... cardinal/half cardinal points) side of the fairway.	
You are approaching the (NE) (cardinal/half cardinal points) limit of the fairway.		
Your <i>position</i> is buoy number (.....) distance	(.....) metres (.....) cables	To the (SSE) (cardinal/half cardinal points) of the radar reference line.
Your <i>position</i> is distance /	(.....) metres (.....) cables	From the intersection of radar reference line (.....)
<p>The four main directions of a compass are known as cardinal points. They are north (N), east (E), south (S) and west (W). Sometimes, the half-cardinal points of north-east (NE), north-west (NW), south-east (SE) and south-west (SW) are shown on the compass. The above compass shows degree measurements from 0° to 360° in 10° intervals.</p>		

2-5 Position (Continue)			
MV (..... (Ship Name)) has reported at <i>reporting point</i> or line (.....). MV: Motor Vessel			
You are getting closer to the vessel to the (.....cardinal/ <i>half cardinal points</i>) of you.			
Vessel on opposite course is passing to the (.....cardinal/ <i>half cardinal points</i>) of you.			
MV (.....) which is	Metres cables (..... cardinal points)	of you	~ is ingoing / outgoing.
			~ has stopped.
			~ is at anchor.
			~ is on a reciprocal course
			~ will overtake to the (.....) of you
Vessel has anchored	(..... metres) (.....cables)	to the (..... cardinal or half cardinal points) of you in <i>position</i>	(.....)
<i>A cable length or cable's length is a nautical unit of measure equal to one tenth of a nautical mile or approximately 100 fathoms.</i>			
<i>The unit is named after the length of a ship's anchor cable in the age of sail:</i>			
<i>International: 1/10 nautical mile, or 185.2 m</i>			
Vessel to the (.....cardinal/ <i>half cardinal points</i>) of you is obstructing your movements.			
You will meet crossing traffic in <i>position</i> (.....).			
Vessel is entering or leaving the fairway at (.....).			
(..... Buoy) distance	(..... metres) (.....cables)	to the (.....cardinal/ <i>half cardinal points</i>).	
Vessel to the (..... cardinal / half cardinal points.) of you is	~ turning.		
	~ anchoring.		
	~ increasing / decreasing speed.		
	~ overtaking you.		
	~ Not under command.		

2-6 Draft, Airdraft or List	
What is your <i>draft</i> forward / aft?	My draft forward / aft is (..... metres).
What is your present maximum <i>draft</i> ?	My present maximum draft is (..... metres).
I am / MV (.....) is constrained by <i>draft</i> .	The maximum permitted draft is (..... metres).
Do you have any <i>list</i> (roll)?	Yes, I have a list to port / starboard of (..... degrees). No, I have no list.
Are you on <i>even keel</i> ?	Yes, I am on even keel. No, I am trimmed by the head / stern.
What is your <i>freeboard</i> ? (Height of a ship's deck above the water level).	My freeboard is (..... metres).
What is your air <i>draft</i> ?	My air draft is (.....metres).

2-7. Navigational condition			
Are you <i>underway</i> ? In case of no longer in port, at anchor, moving etc.	Yes, I am <i>underway</i> .		
	No, I am not <i>underway</i> .		
	I am ready to get <i>underway</i> .		
	Be ready to get <i>underway</i> .		
What is	your full <i>speed</i>	My full speed	Is (.....knots)
	your full <i>manoeuvring speed</i> ?	My full <i>manoeuvring speed</i>	

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2-8. Cargo	
What is your <i>cargo</i> ?	My <i>cargo</i> is (.....).
Do you carry any <i>dangerous goods</i> ? (IMDG: The International Maritime Dangerous Goods Code)	Yes, I carry the following <i>dangerous goods</i> (.....) kilograms or tones IMO Class (.....).
	No, I do not carry any <i>dangerous goods</i>
	No, I have no deficiencies (lack) or restrictions.
Do you have any deficiencies or restrictions?	Yes, I have the following deficiencies or restrictions. (.....)

2-9. Information service, Navigational warnings	
Unknown object(s) in position (.....).	
Unlit derelict (abandoned) vessel adrift in vicinity (.....) at (..... date and time).	
Dangerous wreck / obstruction located in position (.....) marked by (.....type of buoy).	
Hazardous mine (bomb) adrift in vicinity (.....) at (.....date and time).	
Uncharted reef / rock / shoal reported in position (.....).	
Pipeline is leaking gas / oil in position (.....). Wide berth requested.	
Depth of water not sufficient in position (.....).	
Navigation closed in area (.....).	

2-10 Navigational information		
Oil spill in position (.....).		
Current meters / hydrographic instruments moored in position (.....) wide berth requested.		
Platform (.....) (name / number) reported / established in position (.....) wide berth requested.		
Charted name of light buoy (.....)	~ unlit	in position (.....)
	~ unreliable	
	~ damaged	
	~ destroyed	
	~ off station/ missing	
	~ temporarily changed to (.....position)	
	~ temporarily removed	
	~ temporarily discontinued	
	~ established	
	~ re-established	
~ moved	(.....kilometres) (.....nautical miles)	in (.....direction) to position (.....).

2-11 Traffic information			
Note: Wide berth requested: Sufficient space for a ship to maneuver is requester, sea room is requested			
Gunnery	Exercises	in area bounded by	<i>Wide berth requested.</i>
rocket firing			
missile			
torpedo			
underwater weapon			
Cable	Operations	along the line joining	From (.....date and time) to (.....date and time).
Pipeline			
Salvage			
Oil clearance			
Transshipment of (kind of cargo) in position (.....) <i>Wide berth requested.</i>			
Difficult tow from (.....port of departure) to (.....destination) on (.....date)			
Vessel not under command in position (.....) or Area (.....).			

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<i>2-11 Traffic information (Continue)</i>	
Hampered vessel in position (.....) area (.....) (course (.....) degrees, speed (.....) knots.	
Vessel in position (.....) on course (.....) and speed (.....) is not complying with traffic regulations.	
Vessel is crossing (.....) traffic lane on course (.....) and speed (.....) in position (.....).	
Small fishing boats in area around (.....) navigate with caution.	
Submarines operating in sea area around (.....) surface vessels are in attendance.	

<i>2-12. Route information</i>		
Route	have been suspended	discontinued
Traffic Lane.....		diverted.

<i>2-13. Hydrographic information</i>			
Tidal prediction for (....., name of station(s)) / (area.....)			
The tide is with you or against you.			
A tide of (.....) metres	Above below	Datum is expected in position (.....) area (.....) at about (.....) UTC.	
Abnormally	High low	tides are expected in position (.....) / area (.....) at about (.....) UTC.	
The tide is rising.	It is (..... hours) before high water / after low water.		
	It is (.....metres) below high water / above low water.		
The tide is falling.	It is (..... Hours) after high water / before low water.		
	It is (.....metres) below high water / above low water.		
The tide is slack.			
Present tide is (..... metres) above or below (datum.....) in (position.....).			
The tide is (..... metres) above or below prediction.			
The tidal stream / current is (.....knots) in (position.....).			
The tide is setting in direction (.....degrees)			
The depth of water is sufficient or is not sufficient in (position			
Charted depth has	Increased decreased	by (.....metres) due to	Winds. Sea state.

<i>2-14. Electronic navigational aids information</i>	
GPS (or GNSS) Satellite (PN number.....) unusable from (.....date and time) to (.....date and time). Cancel one hour after time of restoration.	
Note: GNSS: GPS, GLONASS, BeiDou,	
RACON (..... name of station) in (.....position) off air (from.....date and time) to (.....date and time).	

<i>2-15. Meteorological warnings</i>	
Gale warning or storm warning was issued at (..... UTC) starting at (.....UTC) (Or Indonesian Local time).	
Gale warning or storm warning. Wind at (.....UTC) in (.....met. area) from (directioncardinal/half cardinal points) and force (Beaufort) backing or veering to (.....cardinal/half cardinal points).	
Tropical storm warning was issued at (.....UTC) starting at (.....UTC or Indonesian Local time).	
Tropical storm warning at (.....UTC).	
Tropical cyclone / Tornado / Willy-willy / Typhoon/ Hurricane (.....name) with (..... central pressure of hPascals located in (..... position.)	

<i>2-15. Meteorological warnings (Continue)</i>	
Present movement (.....cardinal points) at (.....knots).	
Winds of (..... knots) within radius of (.....nautical miles) of centre.	
Seas over (..... metres). Further information on VHF (Channel.....) / (frequency.....) at (..... UTC) (or Indonesian Local time).	

<i>2-16. Meteorological information</i>	
Position of tropical storm (.....name) path (..... cardinal/half cardinal points), speed of advance (.....) knots.	
Wind direction (..... cardinal/half cardinal points), force (Beaufort.....) in (position Tanjung Medan).	
Wind is backing / veering and increasing / decreasing.	
<i>Backing Winds: Winds which shift in a counterclockwise direction with time at a given location (e.g. from southerly to southeasterly), or change direction in a counterclockwise sense with height (e.g. westerly at the surface but becoming more southerly aloft).</i>	
<i>The opposite of veering winds.</i>	
Wind is expected to increase / decrease in (position.....) to force (Beaufort.....) within the next. (.....) hours.	
Visibility in (position.....) ~ (position.....)	~ reduced by mist / fog / dust / rain / (.....).
	~ expected to increase (.... metres), (... nautical miles)
	~ expected to decrease to within the next (.....) hours.
Sea / swell in position (.....)	~ (..... metres from (..... cardinal /half cardinal points). ~ expected to increase / decrease within the next (.....) hours.

<i>2-17. Clearance, forward planning</i>	
Traffic clearance is required before entering (.....).	
Do not enter the traffic lane / (.....).	
Proceed to the emergency anchorage.	
You have permission ~ to enter the traffic lane / route - traffic clearance granted.	
~ To enter traffic lane / route in position (.....) at (.....) UTC (or Indonesian local time).	
Do not pass the reporting point or line (.....) until (.....UTC) (or Indonesian local time).	
Report at the next way point / way point (.....) / at (..... UTC) (or Indonesian local time).	
You must arrive at way point (.....) at (.....) UTC (or Indonesian local time). - Your berth is clear.	
Do not arrive in position (.....) before / after (.....) UTC (or Indonesian local time).	

<i>2-18. Anchoring</i>		
You must anchor	~ at (...) UTC (or Indonesian local time)	~ Until the pilot arrives.
	~ In a different position.	~ Until the tugs arrive.
	~ clear of fairway.	~ until sufficient water
Do not anchor in (position.....).		
Anchoring is prohibited.		
You must heave up anchor.		
You are at anchor in a wrong position.		
Have your crew on standby for heaving up anchor when the pilot embarks.		
You have permission to anchor ~ in (position.....) UTC (or Indonesian local time).		
You are obstructing the fairway / other traffic.		
Are you dragging / dredging anchor?	Yes, I am dragging / dredging anchor.	
	No, I am not dragging / dredging anchor.	

<i>2-19. Arrival, berthing and departure</i>	
Your orders are to berth on (.....).	
Your orders are changed to proceed to (.....).	
Proceed to (.....) for orders.	
You have permission to enter / to precede at (.....) UTC (or Indonesian local time).	
Vessel is turning / manoeuvring in position (...).	
MV (.....)	~ will turn in position (.....).
	~ will leave (.....) at (.....) UTC (or Indonesian local time).
	~ is leaving (.....). ~ has left (.....).
	~ entered fairway in position (.....)
Your berth is not clear until (..... UTC) (or Indonesian local time).	
Your berth will be clear at (..... UTC) (or Indonesian local time).	
You will berth / dock at (.....UTC) (or Indonesian local time).	
Berthing has been delayed by (.....hours).	
Move ahead / astern (..... metres).	
Your vessel is in position - make fast.	

<i>2-20. Enforcement</i>	
According to my radar, your course does not comply with Rule 10 of COLREGS.	
Your actions will be reported to the Authorities.	
You are	~ Not complying with traffic regulations.
	~ Not keeping to the correct traffic lane.
Have all navigational instruments in operation before entering this area / area (.....).	
Your navigation lights are not visible.	
Recover your fishing gear.	
You are fishing in the fairway.	
Fishing gear is to the (..... cardinal/half cardinal points) of you.	
Fishing in area (.....) is prohibited.	
You are approaching a prohibited fishing area.	
Fairway speed is (.....) knots.	

<i>2-21. Avoiding dangerous situations, providing safe movements</i>	
It is dangerous	~ To anchor in your present position.
	~ To remain in your present position.
	~ To alter course to the (..... cardinal points).
Large vessel is leaving the fairway- keep clear of the fairway approach.	
Nets with buoys / without buoys in this area - navigate with caution.	
Collision in position (.....).	
MV (.....) is aground / on fire / (.....) in position (.....).	
Stand by for assistance.	
Vessels must	~ keep clear of this area / area (.....)
	~ avoid this area / area (.....).
	~ navigate with caution
Keep clear of (...)- search and rescue in progress.	
Your present course is too close	~ to ingoing / outgoing vessel.
	~ to the vessel that you are overtaking.
	~ to the ... (cardinal/half cardinal points) limit of the fairway.

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2-21. Avoiding dangerous situations, providing safe movements (continue)

Your course is deviating from the radar reference line.	
You are running into danger	~ Shallow water to the (.....) (cardinal/half cardinal points) of you.
	~ submerged wreck to the (.....) (cardinal/half cardinal points) of you.
	~ Fog bank to the (.....) (cardinal/half cardinal points) of you.
	~ risk of collision (with vessel bearing (.....) degrees, distance (.....) kilometres / nautical miles)
You are proceeding at a dangerous speed.	
You must	~ proceed by the fairway / (route.....).
	~ keep to the (... , cardinal/half cardinal points) of the fairway line / radar reference line.
	~ stay clear of the fairway.
You must wait for (MV.....) to cross ahead of you.	
You must wait for MV (.....) to clear (.....) before	~ entering the fairway.
	~ getting underway.
	~ leaving the berth.
Do not	~ overtake.
	~ cross the fairway.
Alter course to the ...(cardinal/half cardinal points) of you.	
Pass to the (....., cardinal/half cardinal points) of	~ Ingoing /outgoing / anchored / disabled vessel.
	~ of (.....) mark / (.....).
Stop engines.	
MV (.....)	~ wishes to overtake to the ... (cardinal points) of you.
	~ agrees / does not agree to be overtaken. .
	~ is approaching an obscured area ... - approaching vessels acknowledge.

2-22. Handing over to another VTS

This sentence should be used in the near future.

(.....) VTS this is (.....)VTS.
MV (.....) position is bearing (.....) degrees, distance (.....) kilometres / nautical miles from (.....).
Working frequency is VHF Channel (.....).
Your target. Please confirm.
(.....) VTS this is (...) VTS.
MV (.....) position bearing is (.....) degrees, distance (.....) kilometres / nautical miles from (.....).
I confirm. My target.
(.....) VTS this is (.....) VTS.
MV (.....) position is bearing (.....) degrees, distance (.....) kilometres / nautical miles from (.....).
I am unable to take over this target.

2-23. Phrases for communication with emergency services and allied services

Tug services

How many tugs do you require?	I require (.....) tug(s).
You must take	~ (.....) tug(s) according to port regulations.
	~ (.....) tug(s) fore and (.....) tug(s) aft.
Wait for the tug(s) in position (.....).	
The tugs will meet you in position (.....) at (.....) UTC (or Indonesian local time).	
Tug services have been suspended until (....., date and time) / resumed on (... , date and time).	

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<i>2-24. Pilot request</i>	
(From vessel) Must I take a pilot?	Yes, you must take a pilot - pilotage is compulsory. No, you need not take a pilot.
Do you require a pilot?	Yes, I require a pilot.
	No, I do not require a pilot - I am holder of Pilotage Exemption Certificate (No. ...).
You are exempted from pilotage.	
Do you require a pilot at (... , name) Pilot Station?	
What is your ETA at (....., name) Pilot Station in local time?	My ETA at (.....) (name) Pilot Station is (.....) hours local time.
What is local time now?	Local time is (.....) hours.
What is your position?	My position is (.....).
What is your distance from (....., name) Pilot Station?	My distance from (.....) (name) Pilot Station is (.....) kilometres / nautical miles.
Take the pilot at (.....) (Pilot Station) / near (.....) at (.....) hour local time.	In what position can I take the pilot?
When will the pilot embark?	The pilot will embark at (.....) hours local time.
The pilot boat is coming to you.	Stop in present position and wait for the pilot.
Keep the pilot boat to the (.....) (cardinal/half cardinal points) of you.	
What is your freeboard?	My freeboard is (.....) metres.
Change to VHF Channel (.....) for pilot transfer.	
Stand by on VHF Channel (.....) until pilot transfer is completed.	
Pilotage at (....., name) Pilot Station has been suspended until (.....) (date and local time).	
Pilotage at (....., name) Pilot Station has been resumed	
The pilot cannot embark at (....., name) Pilot Station due to (.....)	
Do you accept shore-based navigational assistance from VTS Centre?	Yes, I accept shore-based navigational assistance.
	No, I do not accept shore-based navigational assistance.
	I will stay in position (.....) until (.....).
You have permission to proceed by yourself (or wait for the pilot at (.....) buoy)	
Follow the pilot boat inward where the pilot will embark.	

<http://www.imla-imec.com/smcp.htm>



*Project on Enhancing of Vessel Traffic Service System
Management Capability Phase2*

TEXT Book-2 (2)

(VESSEL TRAFFIC SERVICE (VTS) STANDARD PHRASES)

(Module 1)



JAPAN INTERNATIONAL COOPERATION AGENCY



JAPAN AIDS TO NAVIGATION ASSOCIATION (JANA)

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<i>Vessel Traffic Service Standard Phrases</i>		
<i>Chapter 1 GENERAL</i>		
<i>"May", "Might", "Should", "Could"</i>		
Use of "May"	May I enter East Passage?	QUESTION. Is it permitted to enter East Passage?
	You may enter East passage.	ANSWER. It is permitted to enter East Passage.
Use of "Might"	I might enter East Passage.	INTENTION. I will enter East Passage.
Use of "Should"	You should anchor in anchorage B ₃ .	ADVICE. Anchor in anchorage B ₃ .
Use of "Could"	You could be running into danger.	WARNING. You are running into danger.
Can: QUESTION. Is it permitted to use···"		
SMCP	Please use Standard Marine Communication Phrases.	I will use Standard Marine Communication Phrases.
Message Markers	<i>QUESTION:</i>	(message is of interrogative character)
	<i>ANSWER:</i>	(message is the reply to previous question)
	<i>REQUEST:</i>	(message is asking for action from others)
	<i>INFORMATION:</i>	(message is restricted to observed fact)
	<i>INTENTION:</i>	(actions intended to be taken)
	<i>WARNING:</i>	(informs ships about danger)
	<i>ADVICE:</i>	(message implies intention of the sender)
	<i>INSTRUCTION:</i>	(implies intention by a regulations)

Call & Response	VTS Dumai VTS Dumai. This is "LANTAU BEACH". How do you read me? Over.	"LANTAU BEACH". This is Dumai VTS. Change to channel 83(eight-three). Over
Readability	Your signal is difficult to copy. I cannot hear you at all.	
	I can hardly hear you. Your signal is very weak.	
	Your signal is very good.	
	Your signal is loud and clear.	
	I read you Bad (One), Poor (Two), Fair (Three), Good (Four), Excellent (Five)	
Request Retry	Your signal is broken, being interference, distorted or unsteady.	
Test	I can hardly hear you for the noise. Call me again 30 minutes later.	
	"PULAU CEBU". This is Dumai VTS. I would like a radio check. Emit radio waves for testing.	Roger. Testing, testing, 1 2 3 4, 1 2 3 4. Thank you for your cooperation.
	Identify Unknown ship	Who is calling? What is your name and call sign? This is Dumai VTS. Unknown south bound vessel in south of (Land Mark.....). This is Dumai VTS.
Change Channel	Back to channel 16. Out. Keep watch on channel 16.	
	Stand by on channel ##. We have no message for you.	
	Go back to channel 16 and stand by.	
	Channel ##1 is busy now. Advice try channel ##2.	
Other Response	Keep watch on VHF radio channel 16 during navigation.	I am ready to receive your message. I am not ready to receive your message.
	Say again please. (Not properly heard)	"YES" (In the Affirmative) "NO" (In the Negative)
	"STAN-BY" (Not immediately but soon will be)	
	"NO INFORMATION" (Cannot be obtained)	
	"Message not understood"	
	"Do not repeat." "Do not overtake". (message are considered sufficiently important) . Have a nice voyage.	

<i>Chapter 2 Port Operation Communication</i>		
Position Report Clearance	Dumai VTS This is "SALZGITTAR". Now I am crossing BS (Bravo Sierra) line. (Or I have just passed BS line.)	"SALZGITTAR". This is Dumai VTS; I confirmed your present position on my radar.
Radar Location	Your vessel's position has been confirmed on my radar.	
	I have confirmed you on my radar.	
	I have located you on my radar screen.	
	We cannot locate you on our radar screen. Tell me the exact position again. Call us again on passing the DN (Delta November) line.	
Arrival & Anchoring	From Vessel	From VTS Center
	We are just passing the BE (Bravo Echo) line and going to anchorage. Over.	Tell me your gross tonnage and your schedule after weighing anchor.
	My tonnage is 2,700 tons. After weighing anchor, I will alongside T-2 berth at 0900 of the 19th day of October.	Roger. Thank you for your report.
	Do you have any messages for me? Over. Thank you for your report. Out.	We have no message for you. Out.
	ETA is 1200.	What is your ETA at the position (.....)?
Report in Advance	Have you already made the notification of entering the anchorage area?	
	Any vessel of 300gross tons or more which intends to navigate in the Dumai VTS area is requested to make a notification by not later than 12 hours before the ETA at the entrance .	
	Whenever you want to make a notification of the entering the Passage to this center, call Coast Station on channel 16 and ask him to connect you with VTS Dumai.	
VTS Regulations	You have no need to make a position report when leaving port and crossing DN (Delta November) line. If you don't know DN line, get the pamphlet from your agent. Have a nice voyage. Out.	
	If there is any change in your ETA. Report it as soon as possible.	

<i>Chapter 3 Acquiring and providing data for a traffic</i>		
Routine traffic data Identity & Flag	From VTS Center	From Vessel
	What is your flag state?	My flag state is Panama.
Destination & ETA, ETD	What is your position?	My position is (.....North.....East)
	What is your destination?	My destination is YOKOHAMA.
	What was your last port of call?	My last port of call was PUSAN.
	What is your ETA at BW Line?	My ETA is 1100 local time.
Draft	What is your ETD from the Berth?	My ETD from T-2 is 1030 local time.
	What is your draft forward (aft)?	My draft forward (aft) is 9.7 meters.
Air draft & freeboard	What is your maximum draft?	My maximum draft is 12 meters.
	What is your freeboard?	My freeboard is 5 meters.
Course & Speed	What is your air draft?	My air draft is 30meters.
	What is your present course and speed?	My present course is 334 degrees, speed is 15 knots.
Speed	From what direction are you approaching?	I am approaching from west.
	Are you underway?	Yes, I am underway.
		No, I am not underway.
		I am ready to go underway.

Speed (Continue)	You are now reducing your speed in the (.....XXX) passage. Why are you doing this? Tell me the reason.	
	What is your full speed?	My full speed is 20knots.
	What is your full maneuvering speed?	My full maneuvering speed is 18 knots.
Cargo	What is your cargo?	My cargo is steel.
	Do you have any dangerous cargo on board?	Yes, I am carrying the following dangerous goods. (Cargo1 is XXX.....) No, I do not have any dangerous goods.
Restriction	Do you have some deficiencies (Restriction)?	No, I have no deficiencies (restrictions).
		Yes, I have the following deficiencies (restrictions).
Arriving & departure	Are you an inbound vessel or an outbound vessel?	
	Incoming or outgoing? Entering or leaving?	
	Entering port or proceeding to sea?	
	Bounding for port or bounding for sea?	
Anchoring, Drifting & Shifting	Are you	Going to anchor? Anchoring or drifting?
	Your drifting is no problem.	
	How long are you going to drift outside of the harbor?	
	Are you a shifting vessel?	
	What is your berth now, and what is your shift berth?	
	Your shifting is no problem.	
Clearance & forward planning	What is your	Gross tonnage?
		Berth?
		Berth name after heaving anchor?
		Anchor position?
	Message?	
	What time will you start navigation?	
	Where is your anchorage?	
	When will you drop anchor?	
	When will you weigh anchor?	
	When will you heave anchor?	
	When you weigh anchor, please notify me.	
	Have you already anchored?	
	Have you anchored at the quarantine anchorage?	
	Are you heaving up anchor?	
Tell me your schedule after weighing anchor.		
Is your anchor clear of the bottom?		
Do not anchor. At that time I will provide you traffic information.		
Sample Of Traffic Organization	What is your message?	Advise me my route. Over.
	What is your ETD?	My ETD is 1530.
	You are an outbound vessel, gross tonnage is 9,272 tons, and berth is Tango One West. ETD is at 1530. Is that correct?	Correct.
	I am just leaving C-4 at 1600. May I depart from XXXX Passage? Over.	Your ETD is 1600. Berth number is C-4. I understood.

<i>Chapter 4 Traffic Information</i>	
Traffic Information Traffic Information	Traffic information. Container vessel "WANHAI 311", gross tonnage is 45,000 tons, is now departing from XXXX AREA. Navigate with caution.
	Now, a large southbound vessel is leaving. Navigate with caution.
	We will give you traffic information.
	The vessel from berth R-1 is now departing. Navigate with caution in the vicinity.
	There is a vessel with engine trouble 5-cable to the west from No.12 light buoy in the east passage.
	A car carrier is entering the north passage from the west passage.
	She will approaching you at XXXX crossing zone. Please pay attention while navigating in the zone.
	Avoid the course of this large vessel and navigate with caution.
	If necessary, make a bridge to bridge contact with her for your safe navigation.
	There is fishing gear set up in the head of you.
Fishing Operation	Navigable water is to the north of the fishing gear. Navigate with caution.
	I have information on fishing operations. Navigate with caution in the vicinity.
	In the vicinity of entrance of EXXX Passage, there are many fishing boats engaged in trawling.
	There are drift nets with buoys within 5 miles of you.
	Fishing operations with divers are now taking place on your course about 5 miles ahead of you. Navigate with caution.
Depth Sounding	I have information on depth sounding work.
	Depth sounding work is underway place at the intersection of XXXXX Area.
	Navigate with caution in the vicinity.
Cable Maintenance	I have information on submarine cable maintenance work. Submarine cable maintenance work is underway in the East Passage between No.7 light buoy and No.8 light buoy. Navigate with caution in the vicinity.
Aids To Navigation Maintenance	I have information on maintenance work. Maintenance work is under way at №2 light buoy of East Passage. Keep clear of the working vessel in the vicinity.

<i>Chapter 5 Instruction, Warning, Enforcement</i>		
Enforcement	You are now proceeding outside the Passage. Tell me the reason.	I got out of the Passage to keep clear of fishing boats.
	Roger, return to the traffic route immediately after avoiding them.	
	There is a huge north bound vessel "SHINWAMARU" near (.....buoy).	
	If you maintain your present course and speed, you will meet her at the intersection of XXX Area in 20 minutes.	
	Advice. You make bridge to bridge contact with her to avoid a dangerous situation.	
	Car ferry "KISO" is scheduled to enter 15 minutes ahead of you.	
	You are advised to enter the traffic route after her, keep 1 mile or more between vessels.	
	A huge vessel, "SHINWAMARU", will follow you.	
	She will enter 20 minutes behind you.	
	There is a tugboat towing a barge around №.4 light buoy.	
	She is preceding south wards at the speed of 5 knots.	
	The total length is 150 meters. Pay attention to her movements on overtaking.	

Destination Flag	Your vessel does not have indication flags of destination.
	Hoist <i>the first substitute flag at the top and then hoist alphabetical flag "W"</i> .
	Hoist the first substitute flag and alphabetical flag "E" in this order from the top.
	Hoist the second substitute flag, alphabetical flag "K" and numeral pendant "3" in this order from the top.

Ship's Position & Instruction	You are	In center of	Fairway.
		In middle of	
		Not on reference line of	
		On port side of	
		Approaching starboard limit of	
		Approaching port limit of	
		Approaching reference line of	
	On reference line.		
	Your position is №2 buoy distance 350 meters (2 cable)	To port side of reference line.	To starboard side of reference line.
	You should return your course to the Passage as soon as possible.		
The vessel now navigating in XXX crossing zone is shifting from I-5 to No.80. Pay attention to this and navigate with caution.			
There is a vessel with engine trouble 5 cables to the west from No.6 buoy at the XXX passage.			
Ships 'Course & Instruction	Car carrier "MIGNON" is entering North Passage from XXX Passage. You will meet her at XXX crossing zone. Pay attention while navigating in this zone.		
	Huge container vessel "MEARSK DRESDEN" is entering the XXX area from East Passage. Avoid the course of this large vessel and navigate with caution. If necessary, keep communication with the adjacent navigating ship for your safe navigation.		
	Your track is	Parallel with reference line.	
		Diverging from reference line.	
		Converging to reference line.	
	You are steering dangerous course. Advise you keep your present course.		
	Have you altered course?	What is your present course?	Yes I have altered course new course 180 degrees.
You are running into danger.			

Anchoring & Shifting	My tonnage is 499 tons. After weighing anchor, I will enter No.17 berth at 0900 of the 2nd day of October. Do you have any messages for me? Over.	Roger. Thank you for your report.
	Thank you for your report.	We have no message for you.
	Roger.	Have a nice voyage.
	Entering or departing?	
	Are you going to anchor?	
	Are you anchoring or drifting?	Your drifting is no problem.
	Are you a shifting vessel?	Your shifting is no problem.
	What is your berth now, and what is your shift berth?	

Instruction	Get out of the traffic route immediately.
	So you cannot enter the passage. Wait outside of the passage.
	Keep to the starboard side of the passage. Now there is a large inbound vessel ahead of you. So proceed out of the passage with caution.
	Your vessel is going outside of the passage. Move into the passage with caution.
	Return to the passage as soon as possible. When you enter the passage, you have to be careful not to interfere with the course of another navigating vessel in the passage. You have to navigate in single file in this passage.
	According to our radar surveillance, your present speed is 20 knots. You are in the speed limit section of the Passage. Reduce your speed to 12 knots immediately.
	You are now proceeding outside the Passage. Tell me the reason. I got out of the Passage to keep clear of fishing boats. Roger, return to the Passage as soon as possible.
	You are getting closer to vessel ahead. Vessel on opposite course passing your port side.
	Vessel on opposite course passing your <i>starboard side</i> .
	Your navigation lights are not visible. Check them immediately.
Unlit	According to a report from another vessel, there seems to be an eastbound cargo ship with unlit navigation lights around “B” light buoy of “A” traffic route. If you are in this area, pay attention.
Grounding	If you continue on your present course, you will run aground the shallows. You are taking a dangerous course. There is shallow water 1 mile ahead of you. The fairway is 3 cables on your port side. Return to the traffic route immediately.
	According to our radar surveillance, your anchoring position is obstructing other navigating vessels. So move to another safe place as soon as possible.
	Your anchoring is danger to the traffic. A captain navigating a large vessel says that your present anchor position is too near and obstructing other traffic.
Anchoring & Instruction	A vessel near you, named “BRIGHT ROYAL” says that your present anchor position is too near and dangerous. Can you shift to another safe place? To shift anchor, you need a pilot, but in case of an emergency it must be decided on by captain’s judgment.
	According to our radar, the position around 5 cables west from your position is relatively clear. But a safe anchor position must be decided on by your captain’s judgment. Because you are now in the passage, your present position is not suitable for anchoring. Shift to another safe place.
	Shift 1mile to the west from your present position. Before you shift there, get in touch with your agent and make arrangement for a pilot.
	You are obstructing other traffic. Would (Can) you change your anchor position to the west more?

Enforcement & Instruction	Your action will be reported to authorities.	
	You are not complying with traffic regulation.	
	You are not keeping on correct lane.	
	Vessels are advised to have all navigational instruments in operation before entering this area.	
	Advise you recover your fishing gear.	
	You are fishing in fairway. Fishing in the area prohibited.	
	Fishing gear ahead of you.	
	You are approaching prohibited fishing area.	
	It is dangerous to	Anchor in your present position.
Remain in your present position.		
Alter course to port/starboard side.		
Large vessel leaving fairway. Keep clear of the fairway.		

Course & Instruction	Vessels must	Keep clear of this area.			
		Avoid this area.			
		Navigate with caution.			
	Your present course	Too close to outbound/inbound vessel.			
		Is too close to vessel that you are overtaking.			
		Too close to starboard (port) limit of fairway. Deviating from reference line.			
	You are running into danger.	Shallow water ahead of you.			
		Submerged wreck ahead of you.			
		Fog bank ahead of you.			
	Proceed to East Passage.				
	Keep to port side of the fairway line.				
	Stay clear of Passage.				
	Do not	Overtake.	Wait for Tanker	To cross ahead of you.	
To clear before entering fairway.					
Cross fairway.		To clear before getting underway. to clear before leaving berth.			
Advise you	Alter course to port (starboard) side.				
	Stop engine.				
Advise you pass	North South East West	of	departing entering anchoring disabled	vessel.	
Advise you pass	North South East west	of	ABC mark.		
Tanker A	Wishes to overtake on your port (starboard) side.				
	Agrees to be overtaken.				
	Approaching obscured area.				
Restricted Visibility	Because of fog, the visibility is 1000 meters or less.				
	Navigation in East Passage is restricted.				
	Wait at a safe place well clear of the traffic route until further notice.				
	Keep watch on channel 16.				
Visibility	In position B area is 1km/(1Nautical mile).				
	Reduced by mist/fog/snow/dust/rain/.				
	Expected to increase (decrease) to 4km/2 miles in position B area within several hours.				

<i>Chapter 6 Distress, Urgency and Safety Communication</i>			
Undesignated Distress	Tell me your position and situation. What is the cause (origin) (reason)	Is there an injured person? Is there any oil spill (leak)? Do you need any rescue? Can you navigate by yourself?	
	Drop anchor in safe place.	What kind of vessel? How many crew members? What is your cargo? I would like to know your agent.	
	Have you collided?	I have collided with an unknown vessel.	
	Have you received any damage in collision? Are there any personal casualties?		
	Have you any casualties owing to collision?	Number of injured and death not yet known. All saved. (All lost.)	
	What is the name of the vessel, which you collided with?	I do not know the vessel which I collided with.	
Collision	What has become of the vessel that collided with you?		
	Inform me after you confirm the condition of the other.		
	What is the condition of both ships?		
	The vessel that collided with my vessel began to sink..		
	What is the place of collision, extent of your damage and angle of collision?	I have collided head-on. Struck midships portside.	
	Tell us the speed of both vessels before collision?		
	How is the condition of your radar?		
	Has the vessel which you have collided with resumed her voyage?		
	Can you voyage yourself?		
	Can you make a voyage without escort ship?		
	The other vessel left the scene without rescuing the survivors.		
	Did you see the vessel sinking?		
	Is it confirmed that the vessel has sunk?		
	Where did the vessel sink?		
	What is	The extent of flooding?	
		You're discharging capacity of water?	
		Your prospect on discharging water?	
		The condition of the outflow?	
	Is there listing? What degrees is your list?		
	Is there an outflow of oil from you? Try to do your best for preventing oil leakage.		
	If there is any further accident with you, please tell me the condition in detail at once. Tanker has collided with(car carrier(unknown, vessel, object, light vessel, a buoy)		
	I have major damage above (below) water line.	I can repair damage. I cannot repair damage.	
	I am under command.	I requires escort.	
	I am not under command.	I require 1 tug.	
I can only proceed at slow speed.			
There has been a collision between an oil tanker, 3,000 tons and a cargo ship, 2,000 tons in position 270 degrees, 3 miles from "AA" Light Beacon. If you are in this area, pay attention.			

Grounding	LPG tanker, 199 tons has gone aground on off F9 berth. There seems to be some oil spill. Pay careful attention while proceeding in the vicinity.
	There was a collision between a small cargo vessel and a fishing boat near №3 buoy.
	We have run aground on the shallows.
	Are there any oil spill? Is there an injured person?
	No, but we need a tugboat, because of getting off the rock.
	Tell me your agent and telephone number. We will send the patrol vessel.
	Uncharted rocks ahead of you. Risk of grounding at low water.
I will jettison cargo to refloat	
I have heavy list to port side/starboard side.	
Listing increasing. (decreasing)	
I will be in danger of capsizing	


<i>Chapter 7 Information on Distress and Urgency</i>				
General	Engine trouble	Rudder trouble	Leak/Collision/Run aground	On fire
	Sick crew member	Injury of crew	Cargo damage	
	Cargo vessel of 8,000 tons is drifting eastwards due to			springing a leak
				Capsizing
				Rudder trouble
			Propeller trouble	
			Engine trouble	
In the vicinity of №3. buoy. Rescue operations are under way by patrol craft (vessel).				
Engine trouble	Because of engine trouble, a passenger ship is drifting near No.3 buoy of East Passage.			
Fire & Explosion	Vessel on fire after explosion in position 4B anchorage.			
	The tanker The cargo ship The Ferry	on fire in	Engine room. Superstructure. Hold. Accommodation.	
	I have urgent information about a fire. Passenger ship, 10,000 tons is on fire near №3 light buoy of East Passage. Fire fighting operations are now taking place.			
	Are dangerous goods on fire?		Yes, dangerous goods on fire. No, dangerous goods not on fire.	
	Is there danger of explosion?		Yes, danger of explosion. No, no danger of explosion.	
Fire & Explosion	Is fire under control?		I have no power supplies. I am not under command. Yes, fire under control. No, fire not under control (fire spreading).	
	What kind of assistance do you require?		Tanker A does not require assistance. Tanker A requires firefighting assistance.	
Dredging Anchor	You should	Anchor with both anchors. Weigh anchor immediately. Change your anchorage. Have your engines ready as quickly as possible.	My anchor chain has broken and so I am adrift. I am dragging my anchor.	
	Is there a good holding ground in your area?		There is a good holding ground in my area.	
	At what time will your engines be ready?			
Wait for a moment, because we will arrange rescue vessel at once.				
Do you require a tug boat?				
Are you all ready for towing? You should do all you can.				

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Flooding	I require divers.	I will send pumps (divers).
	We are in critical condition.	Flooding under control.
	We can proceed without assistance.	We cannot proceed without assistance.
	We require escort.	We require assistance.
Engine & Equipment	How are you getting along with your work? Do you have a spare?	I cannot proceed owing to engine trouble. Propeller shaft is broken. My engine is disabled. I have damaged my rudder and cannot steer.
	Can you navigate yourself? Do you need towing? Are you all ready for towing? How long has it been in trouble out of order (drifting)?	We are investigating the cause of trouble.
Fire & Explosion	What is the extent of trouble?	The extent of trouble has not been ascertained.
	When will it be restored? Can you repair damage without assistance? How long will it take to repair damage?	
	You have reduced speed. Do you have any trouble?	We are drifting now, because of engine trouble. We are repairing now and will finish soon.
	Roger, if it takes long time, drop anchor at safe place and clear of the fairway.	
Oil Spill	Has oil spread out from you? Can you know the direction of tide there?	Fuel oil is likely to be spreading out. Tide flows to southwest. I don't know the speed of it.
	What is the wind condition? What do you intend to do to prevent outflow oil? Do you make an effort to prevent the oil spill prevention? Make every effort to oil spill prevention. What measure do you intend to take?	A large quantity of oil has spread out into the water.
	What is the kind and quantity of outflow oil?	Fuel oil is burning Oil is spreading and drifting toward shore. The vicinity was covered with flowing oil. Gasoline flowed from the collided vessel at the entrance of port.
Sinking	We are sinking after collision.	We are sinking after grounding.
	We are sinking after flooding.	We are sinking after explosion.
Storm	The cargo vessel "A" is having difficulty sailing in the heavy sea and requesting assistance. How is the rudder?	I am having difficulty sailing in the heavy sea. I have run into typhoon and having difficulty sailing. Propeller shaft is broken. Our steering gear is disabled.
	Drop your sea anchor and heave to. Keep the bow to wind ward. Please have all the crew put on life jacket. Do you intend to abandon your vessel?	We are drifting with vent shaft. I am managing to heave now.
	Is there any other problem? Is there any danger of sinking or capsizing? What is your opinion for possibility of voyage?	If the rescue vessel is not in time, we will abandon the vessel.

<i>addendum</i>		
No	<i>1. Acquisition and providing routine traffic data</i>	
1	What is your	Present course and speed? Draft forward (aft)?
2	What time will you start navigation (navigating)?	
3	What is your anchor position?	
4	When will you drop anchor?	
5	When you weigh anchor, please notify me.	
6	Are you carrying some dangerous goods?	
7	Are you an inbound vessel or an outbound vessel?	
8	Do you have any list?	
9	Do you need any rescue?	
10	Give me your ship's name. (What is your name?)	
11	Tell me your	Anchor position with bearing and distance from A light house.
12		schedule after weighing anchor.
13		Position and situation.
14	Is there danger of explosion?	
15	Is there an outflow of oil (oil spillage) from you?	
16	Are dangerous goods on fire?	
17	Are there any casualties?	
18	Can you navigate by yourself?	

<i>2. Information for Maneuvering</i>		
1	Information	There is a westbound motor vessel A, 0 tons near "C" light buoy of B traffic route.
2		There is a vessel crossing "B" traffic lane on course "C" and speed at "B" in position "D". Navigate with caution.
3		There is a vessel with engine trouble 5 cables to the east from No.1 light buoy in the east passage.
4		The vessel from R1 is now departing (leaving).
5		The vessel (is) not under commands in position area A.
6		The Vessel on opposite course is passing your port (starboard) side.
7		Motor vessel B following you will overtake you on your port (starboard) side.
8		(There is a) vessel leaving the East passage at Breakwater.
9		We will give you traffic information.
10		You will meet her at the intersection of B traffic route in 10 minutes.
11		According to a report from another vessel, there seems to be an eastbound cargo ship with unlit navigation lights around "B" light buoy in A traffic route.
12		I have urgent information about a fire.
13	Warning.	If you continue on our present course, you will run aground A.
14		There is a shallow water area 1 mile ahead of you.
15		Check your position and return to the traffic route immediately.
16		According to our radar surveillance, you are obstructing other navigating vessels.
17		You are not complying with traffic regulation.
18		You are dragging anchor.
19	Advice.	Avoid the course of this large vessel and navigate with caution.
20		Navigate with caution. When necessary, make bridge to bridge contact with her.
21		Pay attention to her movement on overtaking.
22		It is dangerous to alter your course to port/starboard side.
23		Keep clear of the fairway.
24		Drop your anchor in safe place.

<i>GENERAL</i>	
<i>1. Procedure</i>	
When it is necessary to indicate that the IMO SMCP is to be used, the following message may be sent:	
"Please use IMO Standard Marine Communication Phrases." (A.918)	
"I will use IMO Standard Marine Communication Phrases."	

<i>2. Spelling</i>							
<i>2.1 Spelling of letters</i>							
When spelling is necessary, only the following spelling table should be used:							
<i>Letter</i>	<i>Code</i>	<i>Letter</i>	<i>Code</i>	<i>Letter</i>	<i>Code</i>	<i>Letter</i>	<i>Code</i>
A	<u>A</u> lfa	H	<u>H</u> otel	O	<u>O</u> scar	R	<u>R</u> omeo
B	<u>B</u> ravo	I	<u>I</u> ndia	P	<u>P</u> apa	W	<u>W</u> hisky
C	<u>C</u> harlie	J	<u>J</u> uliet	Q	<u>Q</u> uebec	X	<u>X</u> -ray
D	<u>D</u> elta	K	<u>K</u> ilo	S	<u>S</u> ierra	Y	<u>Y</u> ankee
E	<u>E</u> cho	L	<u>L</u> ima	T	<u>T</u> ango	Z	<u>Z</u> ulu
F	<u>F</u> oxtrot	M	<u>M</u> ike	U	<u>U</u> niform		
G	<u>G</u> olf	N	<u>N</u> ovember	V	<u>V</u> ictor		

<i>2.2 Spelling of digits and numbers</i>					
A few digits and numbers have a modified pronunciation compared to general English:					
<i>Number</i>	<i>Spelling</i>	<i>Pronunciation</i>	<i>Number</i>	<i>Spelling</i>	<i>Pronunciation</i>
0	zero	<u>Z</u> EERO	6	six	<u>S</u> IX
1	one	<u>W</u> UN	7	seven	<u>S</u> EVEN
2	two	<u>T</u> OO	8	eight	<u>A</u> IT
3	three	<u>T</u> REE	9	nine	<u>N</u> INER
4	four	<u>F</u> OWER	1000	thousand	<u>T</u> OUSAND
5	five	<u>F</u> IFE			

<i>GLOSSARY</i>	
The Glossary includes a limited number of technical terms which do not appear in the text of the IMO SMCP, but might be useful in case the content of a given standard Phrase requires modification.	
<i>1. General terms (1)</i>	
Abandon vessel (to)	To evacuate crew and passengers from a vessel following a distress
Accommodation ladder	Ladder attached to platform at vessel's side with flat steps and handrails enabling persons to embark / disembark from water or shore
Adrift	Uncontrolled movement at sea under the influence of current, tide or wind
Air draft	The height from the waterline to the highest point of the vessel
Assembly station	Place on deck, in mess rooms, etc., assigned to crew and passengers where they have to meet according to the muster list when the corresponding alarm is released or announcement made
Backing (of wind)	Shift of wind direction in an anticlockwise manner, for example from north to west (opposite of veering)
Beach (to)	To run a vessel up on a beach to prevent its sinking in deep water
Berth	.1 A sea room to be kept for safety around a vessel, rock, platform, etc. .2 The place assigned to a vessel when anchored or lying alongside a pier, etc.
Blast	A whistle signal made by the vessel
Blind sector	An area which cannot be scanned by the ship's radar because it is shielded by parts of the superstructure, masts, etc.

<i>1. General terms (2)</i>	
Boarding arrangements	All equipment, such as pilot ladder, accommodation ladder, hoist, etc., necessary for a safe transfer of the pilot
Boarding speed	The speed of a vessel adjusted to that of a pilot boat at which the pilot can safely embark/disembark
Bob-cat	A mini-caterpillar with push-blade used for the careful distribution of loose goods in cargo holds of bulk carriers
Briefing	Concise explanatory information to crew and/or passengers
Cable	.1 Chain connecting a vessel to the anchor(s)
	.2 Wire or rope primarily used for mooring a ship
	.3 (Measurement) one hundred fathoms or one tenth of a nautical mile
Capsize (to)	To turn over
Cardinal buoy	A seamark, i.e. a buoy, indicating the north, east, south or west, i.e. the cardinal points/half cardinal points from a fixed point such as a wreck, shallow water, banks, etc.
Cardinal points	The four main points of the compass: north, east, south and west
Casualty	Here: case of death in an accident or shipping disaster
Check (to)	.1 To make sure that equipment etc. is in proper condition or that everything is correct and safe
	.2 To regulate motion of a cable, rope or wire when it is running out too fast
Close-coupled towing	A method of towing vessels through polar ice by means of icebreaking tugs with a special stern notch suited to receive and hold the bow of the vessel to be towed
Close up (to)	To decrease the distance to the vessel ahead by increasing one's own speed
Compatibility (of goods)	Indicates whether different goods can be safely stowed together in one cargo space or in an adjacent hold.
(Vessel) constrained	A vessel severely restricted by her draught in her ability to deviate from by her draft the course followed in relation to the available depth and width of navigable water
Convoy	A group of vessels which sail together, e.g. through a canal or ice
Course	The intended direction of movement of a vessel through the water
Course made good	That course which a vessel makes good over ground, after allowing for the effect of currents, tidal streams, and leeway caused by wind and sea
COW	Crude Oil Washing: a system of cleaning the cargo tanks by washing them with the cargo of crude oil during discharge
CPA/TCPA	Closest Point of Approach/Time to Closest Point of Approach: limit as defined by the observer to give warning when a tracked target or targets will close to within these limits
Crash-stop	An emergency reversal operation of the main engine(s) to avoid a collision
Damage control team	A group of crew members trained for fighting flooding in the vessel
Datum	.1 The most probable position of a search target at a given time
	.2 The plane of reference to which all data as to the depth on charts are referenced
Derelict	Vessel still afloat, abandoned at sea
Destination	Port for which a vessel is bound
Disabled	A vessel damaged or impaired in such a manner as to be incapable of proceeding on its voyage
Disembark (to)	To go from a vessel
Distress alert (GMDSS)	A radio signal from a distressed vessel automatically directed to an MRCC giving position, identification, course and speed of the vessel as well as the nature of distress
Distress/ Urgency traffic	Here: the verbal exchange of information on radio from ship to shore and/or ship to ship / aircraft about a distress / urgency situation as defined in the relevant ITU Radio Regulations
Draft	Depth in water at which a vessel floats

<i>1. General terms (3)</i>	
Dragging (of anchor)	Moving of an anchor over the sea bottom involuntarily because it is no longer preventing the movement of the vessel
Dredging (of anchor)	Moving of an anchor over the sea bottom to control the movement of the vessel
Drifting	Being driven along by the wind, tide or current
Drop back (to)	To increase the distance from the vessel ahead by reducing one's own speed
DSC	Digital Selective Calling (in the GMDSS system)
Embark (to)	To go aboard a vessel
EPIRB	Emergency Position Indicating Radio Beacon
Escape route	A clearly marked way in the vessel which has to be followed in case of an emergency
Escort	Attending a vessel to be available in case of need, e.g. ice-breaker, tug, etc.
ETA	Estimated Time of Arrival
ETD	Estimated Time of Departure
Fathom	A measure of 6 feet
Fire patrol	A member of the watch going around the vessel at certain intervals so that an outbreak of fire may be promptly detected; mandatory in vessels carrying more than 36 passengers
Flooding	Major uncontrolled flow of seawater into the vessel
Fire monitor	Fixed foam/powder/water cannon shooting fire-extinguishing agents on tank deck, manifold etc.
Foul (of anchor)	Anchor has its own cable twisted around it or has fouled an obstruction
Foul (of propeller)	A line, wire, net, etc., is wound round the propeller
Full speed	Highest possible speed of a vessel
Fumes	Often harmful gas produced by fires, chemicals, fuel, etc.
General emergency alarm	A sound signal of seven short blasts and one prolonged blast given with the vessel's sound system
Give way	To keep out of the way of another vessel
GMDSS	Global Maritime Distress and Safety System
(D) GPS	(Differential) Global (satellite) Positioning System
Half cardinal points	The four main points lying between the cardinal points: north east, south east, south west and north west
Hampered vessel	A vessel restricted by her ability to manoeuvre by the nature of her work
Hatchrails	Ropes supported by stanchions around an open hatch to prevent persons from falling into a hold
Heading	The horizontal direction of the vessel's bows at a given moment measured in degrees clockwise from north
Hoist	Here: a cable used by helicopters for lifting or lowering persons in a pick-up operation
Icing	Coating of ice on an object, e.g. the mast or superstructure of a vessel
IMO Class	Group of dangerous or hazardous goods, harmful substances or marine pollutants in sea transport as classified in the International Maritime Dangerous Goods Code (IMDG Code)
Inert (to)	To reduce the oxygen in a tank by inert gas to avoid an explosive atmosphere
Initial course	Course directed by the OSC or other authorized person to be steered at the beginning of a search
Inoperative	Not functioning
Jettison (to) (of cargo)	To throw goods overboard in order to lighten the vessel or improve its stability in case of an emergency
Launch (to)	To lower, e.g. lifeboats, to the water
Leaking	Escape of liquids such as water, oil, etc., out of pipes, boilers, tanks, etc., or a minor inflow of seawater into the vessel due to damage to the hull

<i>1. General terms (4)</i>	
Leeward	On or towards the sheltered side of a ship; opposite of windward
Leeway	Vessel's sideways drift leeward of the desired course
Let go (to)	To set free, let loose, or cast off (of anchors, lines, etc.)
Lifeboat station	Place assigned to crew and passengers to muster before being ordered into the lifeboats
List	Here: inclination of the vessel to port side or starboard side
Located	In navigational warnings: Position of object confirmed
Make water (to)	To have seawater flowing into the vessel due to hull damage, or hatches awash and not properly closed
MMSI	Maritime Mobile Service Identity number
Moor (to)	To secure a vessel in a particular place by means of wires or ropes made fast to the shore, to anchors, or to anchored mooring buoys, or to ride with both anchors down
MRCC	Maritime Rescue Co-ordination Centre: land-based authority responsible for promoting efficient organization of maritime search and rescue and for co-ordinating the conduct of search and rescue operations within a search and rescue region
Muster (to)	To assemble crew, passengers or both in a special place for purposes of checking
Muster list	List of crew, passengers and others on board and their functions in a distress or drill
Not under command	(abbr. NUC): a vessel which through exceptional circumstances is unable to manoeuvre as required by the COLREGs
Obstruction	An object such as a wreck, net, etc., which blocks a fairway, route, etc.
Off air	When the transmissions of a radio station, etc., have broken down, been switched off or suspended
Off station (of buoys)	Not in charted position
Oil clearance	Oil skimming from the surface of the water
Operational	Ready for immediate use
Ordnance exercise	Naval firing practice
OSC	On-Scene Co-ordinator: A person designed to co-ordinate search and rescue operations within a specified area
Overflow	Escape of oil or liquid from a tank because of a twofold condition as a result of overflowing, thermal expansion, change in vessel trim or vessel movement
Polluter	A vessel emitting harmful substances into the air or spilling oil into the sea
Preventers	Ropes or wires attached to derricks to prevent them from swinging during cargo handling operations
Proceed (to)	To sail or head for a certain position or to continue with the voyage
PA-system	Public address system: loudspeakers in the vessel's cabins, mess rooms, etc., and on deck through which important information can be broadcast from a central point, mostly from the navigation bridge
Recover (to)	Here: to pick up shipwrecked persons
Re-float (to)	To pull a vessel off after grounding; to set afloat again
Rendezvous	An appointment between vessels normally made on radio to meet in a certain area or position
Reported	In navigational warnings: position of object unconfirmed
Restricted area	A deck, space, area, etc., in vessels where, for safety reasons, entry is only permitted for authorized crew members
Resume (to)	Here: to re-start a voyage, service or search
Retreat signal	Sound, visual or other signal to a team ordering it to return to its base
Rig move	The movement of an oil rig, drilling platform, etc., from one position to another

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<i>1. General terms (5)</i>	
Roll call	The act of checking how many passengers and crew members are present, e.g. at assembly stations, by reading aloud a list of their names
Safe speed	That speed of a vessel allowing time for effective action to be taken under prevailing circumstances and conditions to avoid a collision and to be stopped within an appropriate distance
SWL	Safe working load: maximum working load of lifting equipment that should not be exceeded
Safe working pressure	The maximum permissible pressure in cargo hoses
SAR	Search and Rescue
SART	Search and Rescue Transponder
Scene	The area or location where the event, e.g. an accident, has happened
Search pattern	A pattern according to which vessels and/or aircraft may conduct a co-ordinated search (the IMOSAR offers seven search patterns)
Search speed	The speed of searching vessels directed by the OSC
Seamark	A navigational aid placed to act as a beacon or warning
Segregation(of goods)	Separation of goods which for different reasons must not be stowed together
Shackle	.1 Length of chain cable measuring 15 fathoms .2 U-shaped link closed with a pin used for connecting purposes
Shifting cargo	Transverse movement of cargo, especially bulk cargo, caused by rolling or a heavy list
Slings	Ropes, nets, and any other means for handling general cargoes
Speed of advance	The speed at which a storm centre moves
Spill	The accidental escape of oil, etc., from a vessel, container, etc., into the sea
Spill control gear	Anti-pollution equipment for combating accidental spills of oils or chemicals
(Elongated) spreader	Here: step of a pilot ladder which prevents the ladder from twisting
Stand by (to)	To be in readiness or prepared to execute an order; to be readily available
Stand clear (to)	Here: to keep a boat away from the vessel
Standing orders	Orders of the Master to the officer of the watch which he/she must comply with
Stand on (to)	To maintain course and speed
Station	The allotted place or the duties of each person on board
Stripping	Final pumping of tank's residues
Survivor	A person who continues to live in spite of being in an extremely dangerous situation, e.g. a shipping disaster.
Take off (to)	To lift off from a vessel's deck (helicopter)
Target	The echo generated, e.g. by a vessel, on a radar screen
Tension winch	A winch which applies tension to mooring lines to keep them tight
TEU	Twenty Foot Equivalent Unit (standard container dimension)
Track	The path followed, or to be followed, between one position and another
Transit	Here: the passage of a vessel through a canal, fairway, etc.
Transit speed	Speed of a vessel required for passage through a canal, fairway, etc.
Transshipment (of cargo)	Here: the transfer of goods from one vessel to another outside harbours
Underway	Describes a vessel which is not at anchor, or made fast to the shore, or aground
Union purchase	A method of cargo handling by combining two derricks, one of which is fixed over the hatch, the other over the ship's side
Unlit	When the light of a buoy or a lighthouse are inoperative

<i>1. General terms (6)</i>	
hours UTC	Universal Time Co-ordinated (GMT)
Variable (of winds)	A wind that is constantly changing speed and direction
Veering (of winds)	Clockwise change in the direction of the wind; opposite of backing
Veer out (to)(of anchors)	To let out a greater length of cable
Walk out (to) (of anchors)	To reverse the action of a windlass to lower the anchor until it is
Walk back (to)	Clear of the hawse pipe and ready for dropping To reverse the action of a windlass to ease the cable (of anchors)
Waypoint	A position a vessel has to pass or at which she has to alter course according to her voyage plan
Windward	The general direction from which the wind blows; opposite of leeward
Wreck	A vessel which has been destroyed, sunk or abandoned at sea

<i>1. VTS special terms</i>	
Fairway	Navigable part of a waterway
Fairway speed	Mandatory speed in a fairway
ITZ	Inshore Traffic Zone (of a TSS): A routing measure comprising a designated area between the landward boundary of a TSS and the adjacent coast
Manoeuvring speed	A vessel's reduced speed in circumstances where it may be required to use the engines at short notice
Receiving point	A mark or place at which a vessel comes under obligatory entry, transit, or escort procedure
Reference line	A line displayed on the radar screens in VTS Centres and/or electronic sea-charts separating the fairway for inbound and outbound vessels so that they can safely pass each other
Reporting point	A mark or position at which a vessel is required to report to the local VTS Station to establish its position
Separation zone / line	A zone or line separating the traffic lanes in which vessels are proceeding in opposite or nearly opposite directions; or separating a traffic lane from the adjacent sea area; or separating traffic lanes designated for particular classes of vessels proceeding in the same direction
Traffic clearance	VTS authorization for a vessel to proceed under conditions specified
Traffic lane	An area within defined limits in which one-way traffic is established
TSS	Traffic Separation Scheme: a routing measure aimed at the separation of opposing streams of traffic by appropriate means and by the establishment of traffic lanes
VTS	Vessel Traffic Services: services designed to improve the safety and efficiency of vessel traffic and to protect the environment
VTS area	Area controlled by a VTS Centre or VTS Station

<i>A1/1.2 Search and Rescue communication</i>	
<i>.1 SAR communications</i>	
. 1	I require / MV ... requires assistance.
. 2	I am / MV ... proceeding to your assistance.
. 3	What is your MMSI number?
. 3.1	My MMSI number is ...
. 4	What is your position?
. 4.1	My position.
. 5	What is your present course and speed?
. 5.1	My present course ... degrees, my speed ... knots.
. 6	Report number of persons on board.
. 6.1	Number of persons on board: ...
. 7	Report injured persons.
. 7.1	No person injured.
. 7.2	Number of injured persons / casualties: ...
. 8	Will you abandon vessel?
. 8.1	I will not abandon vessel.
. 8.2	I will abandon vessel at ... hours UTC.
. 9	Is your EPIRB/SART transmitting?
. 9.1	Yes, my EPIRB/SART is transmitting.
. 9.2	Yes, my EPIRB/SART is transmitting by mistake.
.10	Did you transmit a DSC distress alert?
.10.1	Yes, I transmitted a DSC alert.
.10.2	Yes, I transmitted a DSC alert by mistake.
.11	How many lifeboats / liferafts (with how many persons) will you launch?
.11.1	I will launch ... lifeboats / liferafts (with ... persons).
.12	How many persons will stay on board?
.12.1	No person will stay on board.
.12.2	... persons will stay on board.
.13	What is the weather situation in your position?
.13.1	Wind ... (<i>cardinal points/half cardinal points</i>) force Beaufort ...
.13.2	Visibility good/moderate/poor
.13.3	Smooth/moderate/rough/high sea - slight/moderate/heavy swell ... (<i>cardinal points/half cardinal points</i>).
.13.4	Current ... knots, to ... (<i>cardinal points/half cardinal points</i>).
.14	Are there dangers to navigation?
.14.1	No dangers to navigation.
.14.2	Warning! Uncharted rocks / ice / abnormally low tides / mines / ...
<i>.2 Acknowledgement and / or relay of SAR messages</i>	
. 1	Received MAYDAY from MV ... at ... hours UTC on VHF Channel.../ frequency ...
. 2	Vessel in position ...
	~ on fire. ~ had explosion. ~ flooded. ~ in collision (with ...).
	~ listing / in danger of capsizing. ~ sinking. ~ disabled and adrift. ~ abandoned /..
. 3	Vessel requires assistance.
. 4	Received your MAYDAY.
. 4.1	My position ...
. 4.2	I / MV ... will proceed to your assistance.
. 4.3	ETA at distress position within ... hours / at ... hours UTC.
<i>.3 Performing / co-ordinating SAR operations</i>	
The questions are normally asked and advice given by the On-scene Co-ordinator (OSC). For further information see IAMSAR Manual, London/Montreal, 1998.	

.3 Performing / co-ordinating SAR operations (Continue)

- .1 I will act as On-scene Co-ordinator.
 - .1.1 I will show following signals / lights: ...
- .2 Can you proceed to distress position?
 - .2.1 Yes, I can proceed to distress position.
 - .2.2 No, I cannot proceed to distress position.
- .3 What is your ETA at distress position?
 - .3.1 My ETA at distress position within ... hours / at ... hours UTC.
- .4 MAYDAY position is not correct.
 - .4.1 Correct MAYDAY position is ..
- .5 Vessels are advised to proceed to position ... to start rescue.
- .6 Carry out search pattern ... starting at ... hours UTC.
- .7 Initial course ... degrees, search speed ... knots.
- .8 Carry out radar search.
- .9 MV ... allocated track number ...
- .10 MV / MVs ... adjust interval between vessels to ...kilometers / nautical miles
- .11 Adjust track spacing to ...kilometres / nautical miles.
- .12 Search speed now ... knots.
- .13 Alter course
 - ~ to ... degrees (- at ... hours UTC). ~ for next leg of track now / at ... hours UTC
- .14 We resume search in position ...
- .15 Crew has abandoned vessel / MV ...
- .16 Keep sharp lookout for lifeboats / liferafts / persons in water / ...

.4 Finishing with SAR operations

- .1 What is the result of search?
 - .1.1 The result of search is negative.
- .2 Sighted
 - ~ vessel in position ... ~ lifeboats / life rafts in position... ~ persons in water /... in position...
- .3 Continue search in position ...
- .4 Can you pick up survivors?
 - .4.1 Yes, I can pick up survivors.
 - .4.2 No, I cannot pick up survivors.
- .5 MV ... / I will proceed to pick up survivors.
 - .5.1 Stand by lifeboats / liferafts.
- .6 Picked up
 - ~ ... survivors in position... ~ ... lifeboats / liferafts (with ... persons / casualties) in position.
 - ~ ... persons / casualties in lifejackets in position... ~ ... in position....
- .7 Survivors in bad / good condition.
- .8 Do you require medical assistance?
 - .8.1 Yes, I require medical assistance.
 - .8.2 No, I do not require medical assistance.
- .9 Try to obtain information from survivors.
- .10 There are
 - ~ still ... lifeboats / liferafts with survivors. ~ no more lifeboats / liferafts.
- .11 Total numbers of persons on board was.
- .12 All persons / ... persons rescued
- .13 You / MV ... may stop search and proceed with voyage.
- .14 There is no hope to rescue more persons.
- .15 We finish with SAR operations.

.5 Requesting medical assistance

- . 1 I require / MV ... requires medical assistance.
- . 2 What kind of assistance is required?
 - . 2.1 I require / MV ... requires~ boat for hospital transfer.
 ~ radio medical advice. ~ helicopter with doctor (to pick up person(s)).
- . 3 I / MV ... will
 - ~ send boat. ~ send helicopter with doctor ~ send helicopter to pick up person(s).
 - ~ arrange for radio medical advice on VHF Channel ... / frequency....
- . 4 Boat / helicopter ETA at ... hours UTC / within ... hours.
- . 5 Do you have doctor on board?
 - . 5.1 Yes, I have doctor on board.
 - . 5.2 No, I have no doctor on board.
- . 6 Can you make rendezvous in position...?
 - . 6.1 Yes, I can make rendezvous in position at ... hours UTC / within ... hours.
 - . 6.2 No, I cannot make rendezvous.
- . 7 I / MV ... will send boat / helicopter to transfer doctor.
- . 8 Transfer person(s) to my vessel / to MV ... by boat / helicopter.
- . 9 Transfer of person(s) not possible.

.6 Urgency traffic

Safety of a vessel (other than distress).

Note: An urgency traffic always has to commence with stating the position of the calling vessel if it is not included in the DSC alert

.7 Technical failure

- . 1 I am / MV ... not under command.
- . 2 What problems do you have / does MV ... have?
 - . 2.1 I have / MV ... has problems with engine(s) / steering gear / propeller / ...
- . 3 I am / MV ...is manoeuvring with difficulty.
- . 4 Keep clear of me / MV....
- . 5 Navigate with caution.
- . 6 I require / MV ... requires tug assistance / escort / ...
- . 7 I try / MV ... tries to proceed without assistance.
- . 8 Stand by on VHF Channel ... / frequency ...
 - .8.1 Standing by on VHF Channel ... / frequency ...

.8 Cargo

- . 1 I have / MV has ... lost dangerous goods of IMO-Class ... in position ...
- . 2 Containers / barrels / drums / bags / ... with dangerous goods of IMO-Class ... adrift near position ...
- . 3 I am / MV ... is spilling
 - ~ dangerous goods of IMO-Class ... in position ... ~ crude oil / ... in position
- . 4 I require / MV... requires oil clearance assistance - danger of pollution.
- . 5 I am / MV ... is dangerous source of radiation.

.9 Ice damage

- . 1 I have / MV ... has damage above / below waterline.
- . 2 What kind of assistance is required?
 - . 2.1 I require / MV ... requires
 - ~ tug assistance. ~ ice-breaker assistance / escort / ...
- . 3 I have / MV ... has stability problems due to heavy icing.
- . 4 Can you proceed without assistance?
 - . 4.1 Yes, I can proceed without assistance.
 - . 4.2 No, I cannot proceed without assistance.
- . 5 Stand by on VHF Channel ... / frequency ...
 - . 5.1 Standing by on VHF Channel ... / frequency ...

Safety Communications

1. Meteorological and hydrological conditions

.1 Winds, storms, tropical storms, sea state

- . 1 What is wind direction and force in your position / in position...?
 - . 1.1 Wind direction ...(*cardinal points/half cardinal points*), force Beaufort ... in my position / in position ...
- . 2 What wind is expected in my position / in position...?
 - . 2.1 The wind in your position / in position ... is expected
 - ~ from direction... (*cardinal points/half cardinal points*), force Beaufort ...
 - ~ to increase / decrease. ~ variable.
- . 3 What is the latest gale / storm warning?
 - . 3.1 The latest gale / storm warning is as follows:
 - Gale / storm warning. Winds at ... hours UTC in area ... (*met.area*) from direction ... (*cardinal points/half cardinal points*) and force Beaufort ...
 - backing/veering to ... (*cardinal points/half cardinal points*).
- . 4 What is the latest tropical storm warning?
 - . 4.1 The latest tropical storm warning is as follows:
 - Tropical storm warning at ... hours UTC. Hurricane... (*name*) / tropical cyclone / tornado / willy-willy / typhoon ... (*name*) with central pressure of ... millibars / hectopascals located in position ...
 - Present movement... (*cardinal points/half cardinal points*) at ... knots. Winds of ... knots within radius of ... miles of centre.
 - Seas smooth/moderate/rough/high. Further information on VHF Channel ... / frequency ...
- . 5 What is the atmospheric pressure in your position / in position ... ?
 - . 5.1 The atmospheric pressure in my position / in position ... is ... millibars/hectopascals.
- . 6 What is the barometric change in your position / in position ... ?
 - . 6.1 The barometric change in my position / in position ... is ... millibars / hectopascals per hour / within the last ... hours.
 - . 6.2 The barometer is steady / dropping (rapidly) / rising (rapidly).
- . 7 What maximum winds are expected in the storm area?
 - . 7.1 Maximum winds of ... knots are expected ~ in the safe / dangerous semicircle.
 - ~ in the storm area. ~ within a radius of ... kilometres / miles of the centre.
- .8 What is sea state in your position / in position...?
 - .8.1 The smooth/moderate/rough/high sea - slight/moderate/heavy swell in my position / in position ... is ... metres from... (*cardinal points/half cardinal points*).
- .9 Is the sea state expected to change (within the next hours)?
 - .9.1 No, the sea state is not expected to change (within the next hours).
 - .9.2 Yes, a sea / swell of ... metres from ...(*cardinal points/half cardinal points*) is expected (- within the next hours).
- .10 A tsunami / an abnormal wave is expected by ... hours UTC.

.2 Restricted visibility

- . 1 What is visibility in your position / in position...?
 - . 1.1 Visibility in my position / in position is ... metres / nautical miles
 - . 1.2 Visibility is restricted by mist / fog / snow / dust / rain
 - . 1.3 Visibility is increasing / decreasing / variable.
- . 2 Is visibility expected to change in my position / in position ... (within the next hours)?
 - . 2.1 No, visibility is not expected to change in your position / in position... (within the next hours).
 - . 2.2 Yes, visibility is expected to increase / decrease to ... metres / nautical miles in your position / in position ... (within the next hours).
 - . 2.3 Visibility is expected to be variable between ... metres / nautical miles in your position / in position ... (within the next hours).

.4 Abnormal tides

- . 1 The present tide is ... metres above / below datum in position ...
- . 2 The tide ... is metres above/below prediction.

.4	<i>Abnormal tides (Continue)</i>
.4	Wait until high / low water.
.5	Abnormally high / low tides are expected in position ... at about ... hours UTC / within ... hours.
.6	Is the depth of water sufficient in position ... ?
.6.1	Yes, the depth of water is sufficient in position ...
.6.2	No, the depth of water is not sufficient in position ...
.6.3	The depth of water is ... metres in position ...
.7	My draft ... is metres - can I enter / pass ... (<i>charted name of place</i>)?
.7.1	Yes, you can enter / pass ... (<i>charted name of place</i>).
.7.2	No, you cannot enter / pass... (<i>charted name of place</i>) - wait until ... hours UTC.
.8	The charted depth of water is increased / decreased by ... metres due to sea state / winds.

<i>2. Navigational warnings involving</i>	
.1	<i>Land- or seamarks</i>
.1	Defects...(<i>charted name of light / buoy</i>) in position ... ~ unlit / unreliable / damaged / destroyed / off station / missing.
.2	Alterations ... (<i>charted name of light buoy / buoy</i>) in position ... ~ (temporarily) changed to ... (<i>full characteristics</i>). ~ (temporarily) removed. ~ (temporarily) discontinued.
.3	New and moved ...(<i>charted name of light / buoy</i>) ...(<i>full characteristics</i>) ~ established in position ... ~ re-established in position ... ~ moved ... kilometres / nautical miles in ... (<i>direction</i>) to position ...
.4	(Note: Only for major fog signal stations). Fog signal ... (<i>charted name of light / buoy</i>) in position ... inoperative.

.2	<i>Drifting objects</i>
.1	Super buoy / mine / unlit derelict vessel / ... (<i>number</i>) container(s) adrift in vicinity ...(<i>position</i>) at ...(<i>date and time if known</i>).

.3	<i>Electronic navigational aids</i>
.1	GPS/GLONASS Satellite ... (<i>number</i>) unusable from ... (<i>date and time</i>) to ...(<i>date and time</i>).Cancel one hour after time of restoration.
.2	LORAN station ... (<i>name or number of master / secondary</i>) off air from ...(<i>date and time</i>) to... (<i>date and time</i>). Cancel one hour after time of restoration.
.3	RACON/RAMARK/ERICON ... (<i>name of station</i>) in position ... off air from ...(<i>date and time</i>) to... (<i>date and time</i>). Cancel one hour after time of restoration

.4	<i>Seabottom characteristics, wrecks</i>
<i>Use REPORTED when position is unconfirmed, and use LOCATED when position has been confirmed by survey or other means</i>	
.1	Uncharted reef / rock / shoal / dangerous wreck / obstruction reported / located in position ...
.2	Dangerous wreck in position... marked by ... (<i>type</i>)buoy ...(<i>distance in kilometres/nautical miles</i>) ...(<i>direction</i>).

.5	<i>Miscellaneous</i>
.5.1	<i>Cable, pipeline and seismic / hydrographic operations</i>
.1	Cable / pipeline operations by ... (<i>vessel</i>) in vicinity / along line joining ... (<i>positions</i>) from ... (<i>date and time</i>) to ... (<i>date and time</i>). Wide berth requested (<i>if requested</i>). Contact via VHF Channel ... (<i>if requested</i>). Seismic survey / hydrographic operations by ... (<i>vessel</i>) from ... (<i>date and time</i>) to... (<i>date and time</i>) in ... (<i>position</i>). Wide berth requested. (<i>if requested</i>). Contact via VHF Channel ... (<i>if requested</i>). Survey vessel ...(<i>name</i>) towing ...(<i>length</i>) seismic cable along line joining / in area bounded by / in vicinity ...(<i>position</i>) from ...(<i>date and time</i>) to ...(<i>date and time</i>). Wide berth requested (<i>if requested</i>). Contact via VHF Channel ... (<i>if requested</i>).

<i>.5.1 Cable, pipeline and seismic / hydrographic operations (Continue)</i>	
Hazardous operations by ... (vessel) in area bounded by / in vicinity ... (position) from ... (date and time) to ... (date and time). Wide berth requested (if requested). Contact via VHF Channel ... (if requested). Current meters / hydrographic instruments moored in ... (position). Wide berth requested (if requested).	
<i>.5.2 Diving, towing and dredging operations</i>	
.1	Diving/dredging operations by vessel ... (name) from ... (date and time) to ... (date and time) in position... Wide berth requested (if requested).
.2	Difficult tow from ... (port of departure) on ... (date) to ... (destination) on ... (date). Wide berth requested.
<i>.5.3 Tanker transshipment</i>	
.1	Transshipment of ... (kind of cargo) in position.... Wide berth requested.
.2	I am / MT ... spilling oil / chemicals /... in position....Wide berth requested.
.3	I am / LNG-tanker/LPG-tanker ... leaking gas in position... Avoid passing to leeward.
.4	Oil clearance operations near MT ... in position.... Wide berth requested.
<i>.5.4 Off-shore installations, rig moves</i>	
.1	Platform ...(name/number if available) reported / established in position... at ... (date and time).Wide berth requested (if requested).
.2	Platform ...(name/number if available) removed from ...(position) on ... (date).
.3	Pipelines / platform ...(name/number if available) in position ... spilling oil / leaking gas. Wide berth requested.
.4	Derelict platform ...(name/number if available) being removed from ...(position) at ... (date and time).Wide berth requested.
<i>.5.5 Defective locks or bridges</i>	
.1	Lock ... (name) defective.
.1.1	For entering ...(charted name of place) use lock ...(name).
.2	Lock / bridge ... (name) defective.
.2.1	Avoid this area - no possibility for vessels to turn.
<i>.5.6 Military operations</i>	
.1	Gunnery / rocket firing / missile / torpedo / underwater ordnance exercises in area bounded by ... (positions) from ... (date and time) to... (date and time). Wide berth requested (if requested).
.2	Mine clearing operations from ... (date and time) to ... (date and time) in area bounded by ... (positions).Wide berth requested. Contact via VHF channel ... (if requested).
<i>.5.7 Fishery</i>	
.1	Small fishing boats in area around ... Navigate with caution.
.2	Is fishing gear ahead of me?
.2.1	No fishing gear ahead of you.
.2.2	Yes, fishing gear with buoys / without buoys in position .../ area around ...Navigate with caution.
.3	Fishing gear has fouled my propeller(s).
.4	You have caught my fishing gear.
.5	Advise you to recover your fishing gear.
.6	Fishing in area ... prohibited.

<i>6. Environmental protection communications</i>	
.1	Located oil spills in position ... (cardinal points/half cardinal points) extending ... (length and width in metres) to ... (cardinal points/half cardinal points).
.2	Located oil spill ~ in your wake. ~ in the wake of MV ...
.3	I have / MV ... has accidental spillage of oil / ...
.4	Can you / MV ... stop spillage?
.4.1	Yes, I / MV ... can stop spillage.
.4.2	No, I / MV ... cannot stop spillage.

- .5 What kind of assistance is required?
 - .5.1 I require / MV ... requires
 - ~ oil clearance assistance. ~ floating booms / oil dispersants / ...
- .6 Stay in vicinity of pollution and co-operate with oil clearance team.
- .7 ... (*number*) barrels / drums / containers with IMDG Code marks reported adrift near position.....
- .8 Located a vessel dumping chemicals / waste / ... in position ...
 - .8.1 Located a vessel incinerating chemicals / waste / ... in position ...
- .9 Can you identify the polluter?
 - .9.1 Yes, I can identify the polluter - polluter is MV ...
 - .9.2 No, I cannot identify the polluter.
- .10 What is course and speed of the polluter?
 - .9.1 Course of the polluter ... degrees, speed ... knots.
 - .9.2 The polluter left the scene.

7. Pilotage, Pilot request, Embarking / disembarking pilot

- .1 Stand by pilot ladder.
- .2 Rig the pilot ladder on port side / starboard side/leeside ... metres above water.
- .3 The pilot ladder is rigged on port side / starboard side.
- .4 You must rig another pilot ladder.
- .5 The pilot ladder is unsafe.
- .6 What is wrong with the pilot ladder?
 - .6.1 The pilot ladder
 - ~ has broken / loose steps. ~ has broken spreaders. ~ has spreader too short.
 - ~ is too far aft / forward.
- .7 Move the pilot ladder
 - ~ ... metres aft / forward. ~ clear of discharge.
- .8 Rig the accommodation ladder in combination with the pilot ladder.
- .9 Rig the pilot ladder alongside hoist.
- .10 Put lights on at the pilot ladder.
- .11 Man ropes are required / not required.
- .12 Have a heaving line ready at the pilot ladder.
- .13 Correct the list of the vessel.
- .14 Make a lee on your port side / starboard side.
- .15 Steer ... degrees to make a lee
- .16 Keep the sea on your port quarter / starboard quarter.
- .17 Make a boarding speed of ... knots.
- .18 Stop engine(s) until pilot boat is clear.
- .19 Put helm hard to port / starboard.
- .20 Alter course to ... (*cardinal points/half cardinal points*) - the pilot boat cannot clear the vessel.
- .21 Put engine(s) ahead / astern.
- .22 Embarkation is not possible.
 - .22.1 Boarding arrangements do not comply with SOLAS Regulations.
 - .22.2 Vessel is not suited for the pilot ladder.

8. Tug request

- .1 Must I take tug(s)?
 - .1.1 Yes, you must take ... tug(s).
 - .1.2 No, you need not take tug(s)
- .2 How many tugs must I take?
 - .2.1 You must take ... tug(s) according to Port Regulations.
 - .2.2 You must take ... tug(s) forward and ... tug(s) aft.
- .3 I require ... tug(s).
- .4 In what position will the tug(s) meet me?
 - .4.1 The tug(s) will meet you in position ... at ...hours UTC.
 - .4.2 Wait for the tug(s) in position ...
- .5 Must I use the towing lines of my vessel?
 - .5.1 Yes, you must use the towing lines.
 - .5.2 No, you must use the towing lines of the tug.

9. Phrases for acquiring and providing data for a traffic image

.1 Acquiring and providing routine traffic data

- .1 What is the name of your vessel and call sign / identification?
 - .1.1 The name of my vessel is ... , call sign ... / identification ...
 - .1.2 Spell the name of your vessel.
- .2 What is your flag State?
 - .2.1 My flag State is ...
- .3 What is your position?
 - .3.1 My position is ...
- .4 What is your present course and speed?
 - .4.1 My present course is ... degrees, my speed is ... knots.
- .5 From what direction are you approaching?
 - .5.1 I am approaching from ...
- .6 What is your port of destination / destination?
 - .6.1 My port of destination / destination is ...
- .7 What was your last port of call?
 - .7.1 My last port of call was ...
- .8 What is your ETA in position ... ?
 - .8.1 My ETA is ... hours UTC.
- .9 What is your ETD from ... ?
 - .9.1 My ETD from ... is ... hours UTC.
- .10 What is your draft forward / aft?
 - .10.1 My draft forward / aft is ... metres.
- .11 What is your present maximum draft ?
 - .11.1 My present maximum draft is ... metres
- .12 What is your freeboard?
 - .12.1 My freeboard is ... metres.
- .13 What is your air draft?
 - .13.1 My air draft is ... metres.
- .14 Are you underway?
 - .14.1 Yes, I am underway.
 - .14.2 No, I am not underway.
 - .14.3 I am ready to get underway.
- .15 What is your full speed / full manoeuvring speed?
 - .15.1 My full speed / full manoeuvring speed is ... knots.

- .16 What is your cargo?
 - .16.1 My cargo is ...
- .17 Do you carry any dangerous goods?
 - .17.1 Yes, I carry the following dangerous goods: ... kilograms / tonnes IMO Class ...
 - .17.2 No, I do not carry any dangerous goods.
- .18 Do you have any deficiencies / restrictions?
 - .18.1 No, I have no deficiencies / restrictions.
 - .18.2 Yes, I have the following deficiencies / restrictions: ...
- .19 I am / MV ... is constrained by draft.
- .20 The maximum permitted draft is ... metres.
- .21 Do you have any list?
 - .21.1 Yes, I have a list to port / starboard of ... degrees.
 - .21.2 No, I have no list.
- .22 Are you on even keel?
 - .22.1 Yes, I am on even keel.
 - .22.2 No, I am trimmed by the head / stern.
- .2 *Acquiring and providing distress traffic data*
See A1/1.1 “Distress communications”.

10. Phrases for providing VTS services

.1 Information service

These phrases are normally transmitted from the shore.

.1.1 Navigational warnings

- .1 Unknown object(s) in position ...
- .2 Ice / iceberg(s) in position ... / area around ...
- .3 Unlit derelict vessel adrift in vicinity ... at ... *(date and time)*.
- .4 Dangerous wreck / obstruction located in position ... marked by ... *(type)* buoy.
- .5 Hazardous mine adrift in vicinity ... at ... *(date and time)*.
- .6 Uncharted reef / rock / shoal reported in position ...
- .7 Pipeline is leaking gas / oil in position ... Wide berth requested.
- .8 Depth of water not sufficient in position ...
- .9 Navigation closed in area ...

.1.2 Navigational information

- .1 Oil spill in position ...
- .2 Current meters / hydrographic instruments moored in position ...Wide berth requested.
- .3 Platform ...*(name / number)* reported / established in position ...Wide berth requested.
- .4 ...*(charted name of light / buoy)* in position ...
 - ~ unlit / unreliable / damaged / destroyed / off station / missing
 - ~ (temporarily) changed to ... *(full characteristics)*.
 - ~ (temporarily) removed. ~ (temporarily) discontinued.
- .5 ... *(charted name of light / buoy)* ... *(full characteristics)*.
 - ~ established in position.... ~ re-established in position....
 - ~ moved ... kilometres / nautical miles in ... *(direction)* to position
- .6 (Note: Only for major fog signal stations).
Fog signal ... *(charted name of light / buoy)* in position ... inoperative.

.1.3 Traffic information

- .1 Gunnery / rocket firing / missile / torpedo / underwater ordnance exercises in area bounded by ... *(positions)* and ... from ... *(date and time)* to ... *(date and time)*. Wide berth requested.
- .2 Cable / pipeline operations by... *(vessel)* in vicinity ... / along a line joining ...*(position)* from ... *(date and time)* to... *(date and time)*. Wide berth requested. Contact via VHF Channel

- .1.3 Traffic information (Continue)
- .3 Salvage operations in position ... from ... (*date and time*) to ... (*date and time*). Wide berth requested.
Contact via VHF Channel ...
- .4 Seismic / hydrographic operations by ... (*vessel*)... from ... (*date and time*) to ... (*date and time*) in position ... Wide berth requested.
Contact via VHF Channel ...
- .5 Oil clearance operations near MT ... in position.... Wide berth requested.
- .6 Transshipment of ... (*kind of cargo*) in position.... Wide berth requested.
- .7 Difficult tow from ... (*port of departure*) to ... (*destination*) on ... (*date*). Wide berth requested.
- .8 Vessel not under command in position ... / area....
- .9 Hampered vessel in position ... / area ... (course ... degrees, speed ... knots).
 - .9.1 Vessel constrained by her draft in position ... area ... (course ... degrees ... speed ... knots)
- .10 Vessel in position ... on course ... and speed ... is not complying with traffic regulations.
- .11 Vessel is crossing ... traffic lane on course ... and speed ... in position....
- .12 Small fishing boats in area around Navigate with caution.
- .13 Submarines operating in sea area around Surface vessels are in attendance.
- .1.4 Route information
 - .1 Route .../ Traffic Lane ... has been suspended / discontinued / diverted.
- .1.5 Hydrographic information
 - .1 Tidal prediction for ... (*name of station(s)*) / area ... :
 - .1.1 A tide of ... metres above / below datum is expected in position ... / area ... at about ... hours UTC.
 - .1.2 Abnormally high / low tides are expected in position ... / area ... at about ... hours UTC.
 - .2 The tide is rising: ~ it is ... hours before high water / after low water.
~ it is ... metres below high water / above low water.
 - .3 The tide is falling: ~ it is ... hours after high water / before low water.
~ it is ... metres below high water / above low water.
 - .4 The tide is slack.
 - .5 Present tide is ... metres above / below datum ... in position....
 - .6 The tide is ... metres above / below prediction.
 - .7 The tidal stream / current is ... knots in position ...
 - .8 The tide is setting in direction ... degrees.
 - .9 The depth of water is / is not sufficient in position ...
 - .10 Charted depths has increased / decreased by ... metres due to winds / sea state.
- .1.6 Electronic navigational aids information
 - .1 GPS Satellite ... (*number*) unusable from ... (*date and time*) to ... (*date and time*). Cancel one hour after time of restoration.
 - .2 LORAN station ... (*name number of master / secondary*) off air from ... (*date and time*) to ... (*date and time*). Cancel one hour after time of restoration.
 - .3 RACON ... (*name of station*) in position ... off air ... from ... (*date and time*) to ... (*date and time*).
- .1.7 Meteorological warnings
 - .1 Gale warning / storm warning was issued at ... hours UTC starting at ... hours UTC.
 - .1.1 Gale warning / storm warning. Wind at ... hours UTC in area ... (*met. area*) from direction ... (*cardinal points/half cardinal points*) and force Beaufort ... backing / veering to ... (*cardinal points/half cardinal points*).
- .1.8 Meteorological information
 - .1 Position of tropical storm ... (name) ..., path ... (cardinal points/half cardinal points), speed of advance ... knots.
 - .2 direction ... (cardinal points/half cardinal points), force Beaufort ... in position ...
 - .3 Wind is backing / veering and increasing / decreasing.
 - .4 Wind is expected to increase / decrease in position ... to force Beaufort ... within the next... hours.
 - .5 Visibility in position ...
 - ~ ... metres / nautical miles. ~ reduced by mist / fog / snow / dust / rain / ...
 - ~ expected to increase / decrease to ... metres / nautical miles within the next ... hours.

- .6 Sea / swell in position ...
 ~ ... metres from ... (*cardinal points/half cardinal points*).
 ~ expected to increase / decrease within the next ... hours.
- .7 Icing is expected / not expected in area ...
- .1.9 Meteorological questions and answers
 See A1/3.1 "Meteorological and hydrological conditions"
- .2 Tropical storm warning was issued at ... hours UTC starting at ... hours UTC.
- 2.1 Tropical storm warning at ... hours UTC. Hurricane ... (name) / tropical cyclone / tornado/ willy-willy / typhoon / ... with central pressure of ... millibars/hectopascals located in positionPresent movement ... (cardinal points/half cardinal points) at ... knots. Winds of ... knots within radius of ... nautical miles of centre. Seas over ... metres.
 Further information on VHF Channel ... / frequency ... (at ... hours UTC).

11. Navigational assistance service

Shore based pilotage by navigational assistance service: see also A1/6.4 .3.18 to .3.21

- .2.1 Request and identification
 - .1 Is shore based radar assistance available?
 - .1.1 Yes, shore based radar assistance is available.
 - .1.2 No, shore based radar assistance is not available.
 - .2 Shore based radar assistance is available from ... to ... hours UTC
 - .3 Do you require navigational assistance to reach ... ?
 - .3.1 Yes, I require navigational assistance.
 - .3.2 No, I do not require navigational assistance
 - .4 What is your position?
 - .4.1 My position is bearing ... degrees ..., distance ... kilometres / nautical miles from ...
 - .5 How was your position obtained?
 - .5.1 My position was obtained by GPS / RADAR / cross-bearing / astronomical observation / ...
 - .6 Say again your position for identification.
 - .7 I have located you on my radar screen.
 - .7.1 Your position is bearing ... degrees, distance ... kilometres / nautical miles from ...
 - .8 I cannot locate you on my radar screen
 - .9 What is your present course and speed?
 - .9.1 My present course is ... degrees, my speed is ... knots.
 - .10 What is the course to reach you?
 - .10.1 The course to reach me is ... degrees.
 - .11 Is your radar in operation?
 - .11.1 Yes, my radar is in operation.
 - .11.2 No, my radar is not in operation.
 - .12 What range scale are you using?
 - .12.1 I am using ... miles range scale.
 - .12.2 Change to a larger / smaller range scale.
 - .13 You are leaving my radar screen.
 - .14 Change to radar ... (name) VHF Channel ...
 - .15 I have lost radar contact.

- .2.2 Position
 - .1 You are entering ...
 - .2 Your position is .../ bearing ... degrees, distance ... kilometres / nautical miles from ...
 - .3 You are passing ...
 - ~ in the centre of the fairway
 - ~ on / not on the radar reference line (of the fairway)
 - ~ on the ... (*cardinal points/half cardinal points*) side of the fairway.
 - .4 You are approaching the ... (*cardinal points/half cardinal points*) limit of the fairway.

- .5 Your position is buoy number ... distance ... metres / cables to the ... (cardinal points/half cardinal points) of the radar reference line.
- .6 Your position is distance ... metres / cables from the intersection of radar reference line ... and radar reference line ... and distance ... metres / cables to the ... (cardinal points/half cardinal points) of radar reference line ...
- .7 MV ... has reported at reporting point ...
- .8 You are getting closer to the vessel to the ... (cardinal points/half cardinal points) of you.
- .9 Vessel on opposite course is passing to the ... (cardinal points/half cardinal points) of you.
- .10 MV metres / cables to the ... (cardinal points/half cardinal points) of you
 - ~ is ingoing / outgoing. ~ has stopped. ~ is at anchor.
 - ~ is on a reciprocal course. ~ will overtake to the ... (cardinal points/half cardinal points) of you.
- .11 Vessel has anchored ... metres / cables to the ... (cardinal points/half cardinal points) of you in position ...
- .12 Vessel to the ... (cardinal points/half cardinal points) of you is obstructing your movements.
- .13 You will meet crossing traffic in position ...
- .14 Vessel is entering / leaving the fairway at ...
- .15 Buoy ... distance ... metres / cables to the ... (cardinal points/half cardinal points).
- .16 Vessel to the ... (cardinal points/half cardinal points) of you is
 - ~ turning. ~ anchoring. ~ increasing / decreasing speed.
 - ~overtaking you. ~ not under command.

.2.3 Course

Note: the user of this phrase should be fully aware of the implications of words such as "track", "heading" and "course made good".

- .1 Your track is
 - ~ parallel with the reference line.
 - ~ diverging from the reference line.
 - ~ converging to the reference line.
- .2 What is your present course / heading?
 - .2.1 My present course / heading is ... degrees.
- .3 You are steering a dangerous course.
- .4 Course to make good is ... degrees.
- .5 Vessel to the ... (cardinal points/half cardinal points) of you is on same course ... degrees.
 - .5.1 Advise you
 - ~ keep your present course.
 - ~ steer a new course of ... degrees.
- .6 Have you altered course?
 - .6.1 Yes, I have altered course - my new course is ... degrees.
 - .6.2 No, I have not altered course - my course is ... degrees
- .7 You are running into danger -
 - ~ shallow water to the ... (cardinal points/half cardinal points) of you.
 - ~ submerged wreck to the ... (cardinal points/half cardinal points) of you.
 - ~ fog bank to the ... (cardinal points/half cardinal points) of you.
 - ~ risk of collision (with a vessel bearing ... degrees, distance ... kilometres /nautical miles).
 - ~ bridge is defective / ..

.3 Traffic organization service

.3.1 Clearance, forward planning

- .1 Traffic clearance is required before entering ...
- .2 Do not enter the traffic lane / ...
- .3 Proceed to the emergency anchorage.
- .4 Keep clear of .../ avoid ...
- .5 You have permission
 - ~ to enter the traffic lane / route - traffic clearance granted
 - ~ to enter traffic lane / route in position ... at ... hours UTC.
- .6 Do not pass the reporting point ... until ... hours UTC.

- .7 Report at the next waypoint / waypoint ... / at ... hours UTC.
- .8 You must arrive at waypoint ... at ... hours UTC - your berth is clear.
- .9 Do not arrive in position ... before / after ... hours UTC.
- .10 The tide is with you / against you.

.3.2 Anchoring

- .1 You must anchor ~ at ... hours UTC. ~ until the pilot arrives.
~ clear of fairway. ~ in a different position.
- .2 Do not anchor in position ...
- .3 Anchoring is prohibited.
- .4 You must heave up anchor.
- .5 You are at anchor in a wrong position.
- .6 Have your crew on stand by for heaving up anchor when the pilot embarks.
- .7 You have permission to anchor (at ... hours UTC)
~ in position ... ~ until the pilot arrives. ~ until the tugs arrive.
~ until sufficient water.
- .8 You are obstructing the fairway / other traffic.
- .9 Are you dragging / dredging anchor?
.9.1 Yes, I am dragging / dredging anchor.
.9.2 No, I am not dragging / dredging anchor.
- .10 Do not dredge anchor.

.3.3 Arrival, berthing and departure

- .1 Your orders are to berth on ...
- .2 Your orders are changed to proceed to ...
- .3 Proceed to ... for orders.
- .4 You have permission to enter / to proceed at ... hours UTC
- .5 Vessel is turning / manoeuvring in position ...
- .6 ~ will turn in position ... ~ will leave ... at ... hours UTC. ~ is leaving ...
MV...
~ has left... ~ entered fairway in position...
- .7 Your berth is not clear (until ... hours UTC).
.7.1 Your berth will be clear at ... hours UTC.
- .8 You will berth / dock at ... hours UTC.
- .9 Berthing has been delayed by ... hours.
- .10 Be ready to get underway.
.10.1 I am ready to get underway.
- .11 Get underway.
- .12 Are you underway?
.12.1 Yes, I am underway.
.12.2 No, I am not underway.
- .13 Move ahead / astern ... metres.
- .14 Your vessel is in position - make fast.

.3.4 Enforcement

- .1 According to my radar, your course does not comply with Rule 10 of the COLREGs.
- .2 Your actions will be reported to the Authorities.
- .3 You are
~ not complying with traffic regulations. ~ not keeping to the correct traffic lane.
- .4 Have all navigational instruments in operation before entering this area / area ...
- .5 Your navigation lights are not visible.
- .6 Recover your fishing gear.
.6.1 You are fishing in the fairway.
- .7 Fishing gear is to the ... (*cardinal points/half cardinal points*) of you.

- .8 Fishing in area ...is prohibited.
- .9 You are approaching a prohibited fishing area.
- .10 Fairway speed is... knots.

.3.5 Avoiding dangerous situations, providing safe movements

- .1 It is dangerous ~ to anchor in your present position. ~ to remain in your present position.
~ to alter course to the ... (*cardinal points/half cardinal points*).
- .2 Large vessel is leaving the fairway- keep clear of the fairway approach.
- .3 Nets with buoys / without buoys in this area - navigate with caution.
- .4 Collision in position ...
- .5 MV ... is aground / on fire / ... in position ...
- .6 Stand by for assistance.
- .7 Vessels must
~ keep clear of this area / area... ~ avoid this area / area ... ~ navigate with caution.
- .8 Keep clear of ... - search and rescue in progress.
- .9 Your present course is too close
~ to ingoing / outgoing vessel. ~ to the vessel that you are overtaking.
~ to the ... (*cardinal points/half cardinal points*) limit of the fairway.
- .10 Your course is deviating from the radar reference line.
- .11 You are running into danger
~ shallow water to the ... (*cardinal points/half cardinal points*) of you.
~ submerged wreck to the ... (*cardinal points/half cardinal points*) of you.
~ fog bank to the ... (*cardinal points/half cardinal points*) of you.
~ risk of collision (with vessel bearing ... degrees,
~distance ... kilometres / nautical miles).
~ bridge is defective.
- .12 You are proceeding at a dangerous speed.
- .13 You must ~ proceed by the fairway / route ...
~ keep to the ... (*cardinal points/half cardinal points*) of the fairway line / radar
reference line
~ stay clear of the fairway.
- .14 You must wait for MV ... to cross ahead of you.
- .15 You must wait for MV ... to clear ... before
~ entering the fairway. ~ getting underway. ~ leaving the berth.
- .16 Do not ~ overtake. ~ cross the fairway.
- .17 Alter course to the ... (*cardinal points/half cardinal points*) of you.
- .18 Pass to the ... (*cardinal points/half cardinal points*) of
~ ingoing /outgoing / anchored / disabled vessel. ~ of ... mark / ...
- .19 Stop engines.
- .20 MV ... ~ agrees / does not agree to be overtaken.
~ is approaching an obscured area ... - approaching vessels acknowledge.
~ wishes to overtake to the ... (*cardinal points/half cardinal points*) of you.

Handing over to another VTS

- .1 ... VTS this is ... VTS: MV ... position is bearing... degrees, distance ... kilometres / nautical miles from...
Working frequency is VHF Channel Your target. Please confirm.
- .2 ... VTS this is ... VTS: MV ... position bearing is ... degrees, distance ... kilometres / nautical miles from.... I
confirm. My target.
- .3 VTS this is ... VTS: MV ... position is bearing... degrees, distance ... kilometres / nautical miles from.... I
am unable to take over this target.

Phrases for communication with emergency services and allied services

- .1 **Emergency services** (SAR, firefighting, pollution fighting)
See A1/1.1 "Distress communications"
- .2 **Tug services**
Also see A2/3.6 "Tug assistance"
 - .1 How many tugs do you require?
 - .1.1 I require ... tug(s).
 - .2 You must take
 - ~ ... tug(s) according to port regulations. ~ ... tug(s) forward and ... tug(s) aft.
 - .3 Wait for the tug(s) in position ...
 - .4 The tugs will meet you in position ... at ... hours UTC.
 - .5 Tug services have been suspended until ...(*date and time*) / resumed on...(*date and time*).
- .3 **Pilot request**
 - .1 Must I take a pilot?
 - .1.1 Yes, you must take a pilot - pilotage is compulsory.
 - .1.2 No, you need not take a pilot.
 - .2 Do you require a pilot?
 - .2.1 Yes, I require a pilot.
 - .2.2 No, I do not require a pilot - I am holder of Pilotage Exemption Certificate (No. ...).
 - .3 You are exempted from pilotage.
 - .4 Do you require a pilot at ... (*name*) Pilot Station?
 - .4.1 Yes, I require a pilot at ...(*name*) Pilot Station.
 - .4.2 No, I do not require a pilot at ...(*name*) Pilot Station - I require a pilot in position ...
 - .5 What is your ETA at ...(*name*) Pilot Station in local time?
 - .5.1 My ETA at...(*name*) Pilot Station is ... hours local time.
 - .6 What is local time?
 - .6.1 Local time is ... hours.
 - .7 What is your position?
 - .7.1 My position is....
 - .8 What is your distance from ... (*name*) Pilot Station?
 - .8.1 My distance from ... (*name*) Pilot Station is ... kilometres / nautical miles.
 - .9 Is the pilot boat on station?
 - .9.1 Yes, the pilot boat is on station.
 - .9.2 No, the pilot boat is not on station.
 - .9.3 The pilot boat will be on station at ... hours local time.
 - .10 In what position can I take the pilot?
 - .10.1 Take the pilot at ...(*Pilot Station*) / near position...
 - .11 When will the pilot embark?
 - .11.1 The pilot will embark at ... hours local time.
 - .12 The pilot boat is coming to you.
 - .13 Stop in present position and wait for the pilot.
 - .14 Keep the pilot boat to the ... (*cardinal points/half cardinal points*) of you.
 - .15 What is your freeboard?
 - .15.1 My freeboard is ... metres.
 - .16 Change to VHF Channel ... for pilot transfer.
 - .17 Stand by on VHF Channel ... until pilot transfer is completed.
 - .18 Pilotage at ...(*name*) Pilot Station has been suspended until ... (*date and local time*).
 - .19 Pilotage at ...(*name*) Pilot Station has been resumed.
 - .20 The pilot cannot embark at ... (*name*) Pilot Station due to ...

.21	Do you accept shore-based navigational assistance from VTS Centre?	
.21.1	Yes, I accept shore-based navigational assistance.	
.21.2	No, I do not accept shore-based navigational assistance.	
.21.3	I will stay in position ... until ...	
.22	You have permission to proceed by yourself (or wait for the pilot at ... buoy).	
.23	Follow the pilot boat inward where the pilot will embark.	
.4	<i>Embarking / disembarking pilot</i>	<i>See A1/4.2 "Embarking/disembarking pilot"</i>

<i>12. Anchoring</i>		
<i>.1 Going to anchor</i>		
.1	Stand by port / starboard / both anchor(s) for letting go.	
.2	Walk out the anchor(s).	
.3	We are going to anchorage.	
.4	We will let go port / starboard / both anchor(s).	
.5	Put ... shackles in the water / in the pipe / on deck.	
.6	Walk back port / starboard / both anchor(s) one / one and a half shackle(s).	
.7	We will let go port / starboard / both anchor(s) ... shackle(s) and dredge it / them	
.8	Let go port / starboard / both anchor(s).	
.9	Slack out the cable(s).	
.9.1	Check the cable(s).	
.9.2	Hold on the port / the starboard / both cable(s).	
.10	How is the cable leading?	
.10.1	The cable is leading ~ ahead / astern. ~ to port / to starboard. ~ round the bow. ~ up and down.	
.11	How is the cable growing?	
.11.1	The cable is slack / tight / coming tight.	
.12	Is / are the anchor(s) holding.	
.12.1	Yes, the anchor(s) is / are holding.	
.12.2	No, the anchor(s) is / are not holding.	
.13	Is she brought up?	
.13.1	Yes, she is brought up in position	
.13.2	No, she is not brought up (yet).	
.14	Switch on the anchor light(s).	
.15	Hoist the anchor ball.	
.16	Check the anchor position by bearings / by	
.16.1	The anchor position is bearing ... degrees, distance ... kilometres / nautical miles to	
.16.2	Check the anchor position every ... minutes.	

<i>.2 Leaving the anchorage</i>		
.1	How much cable is out?	
.1.1	... shackle(s) is / are out.	
.2	Stand by for heaving up.	
.3	Put the windlass in gear.	
.3.1	The windlass is in gear.	
.4	How is the cable leading?	
<i>.2 Leaving the anchorage</i>		
.4.1	The cable is leading ~ ahead / astern. ~ to port / to starboard. ~ round the bow. ~ up and down.	
.5	Heave up port / starboard / both cable(s).	
.6	How much weight is on the cable?	
.6.1	Much / too much weight is on the cable.	
.6.2	No weight is on the cable.	

.7	Stop heaving.
.8	How many shackles are left (to come in)?
.8.1	... shackles are left (to come in).
.9	Attention! Turn in cable(s).
.10	The anchor(s) is / are aweigh.
.10.1	The cables are clear.
.11	The anchor(s) is / are clear of the water / home / foul / secured.

.3 Tug assistance

.1	We will take ... tug(s).
.2	The tug(s) will pull / push.
.3	We use the towing line(s) of your vessel.
.3.1	We use the towing line(s) of the tug(s).
.4	Stand by for making fast the tug(s).
.5	Use the centre lead / panama lead.
.5.1	Use the fairlead ~ on port side / starboard side. ~ amidships. ~ on port bow / starboard bow. ~ on port / starboard quarter.
.6	Send heaving line(s) to the tug(s).
.7	Send two towing lines to the tug(s).
.8	Lower towing line(s) ~ to the tug(s). ~ ... meter(s) from the water. ~ on port quarter / starboard quarter.
.9	Slack away towing line(s).
.10	Make fast the tug(s).
.10.1	Make fast the tug(s) ~ forward / aft. ~ on port bow / starboard bow.
.11	Make fast the forward / aft tug(s) alongside on port side / starboard side.
.12	Make fast ... tug(s) on each bow / quarter.
.13	Put the eyes of the towing line(s) on bits.
.14	The tug(s) is / are fast (on ...).
.15	Keep clear of towing line(s).
.16	Stand by for letting go the tug(s).
.17	Let go the tug(s).
.18	Towing line(s) is/are broken.

.4 Berthing and unberthing

.1 General

.1	Is/are the propeller(s) clear?
.1.1	Yes, the propeller(s) is/are clear.
.1.2	No, the propeller(s) is/are not clear.
.1.3	Keep the propeller(s) clear.
.2	Are fenders on the berth?
.2.1	Yes, fenders are on the berth.
.2.2	No, fenders are not on the berth.
.3	Have fenders ready forward and aft.

.2 Berthing

.1	We will berth port side / starboard side alongside.
.2	We will moor ~ to buoy(s) (ahead and astern). ~ alongside. ~ to dolphins.
.3	Send out ~ the head / stern / breast lines. ~ the ... spring(s) forward / aft.
.4	Do you have tension winches?

.4.1	Yes, we have tension winches (forward and aft).
4.2	No, we do not have tension winches.
.5	Have the heaving lines ready forward and aft.
.6	Send the heaving / head / stern / breast line(s) ashore
.7	The linesmen will use shackles / lashings for securing the mooring
.8	Use ~ the centre lead / panama lead. ~ the bow lead. ~ the port quarter / starboard quarter lead.
.9	Heave on the ... line(s) / ... spring(s).
.10	Pick up the slack on the ... line(s) / ... spring(s).
.11	Heave away.
.11.1	Stop heaving.
.12	Slack away / check the ... line(s) / ... spring(s).
.13	Hold on the ... line(s) / ... spring(s).
.14	Heave in easy.
.14.1	Heave alongside.
.15	Keep the ... line(s) / ... spring(s) tight.
.16	Report the forward / aft distance to....
.16.1	The forward / aft distance to is metres.
.17	We have to move ... metres ahead / astern.
.18	We are in position.
.19	Make fast forward and aft.
.20	Finished with manoeuvring stations.

<i>.3 Unberthing</i>	
.1	Stand by engine(s).
.2	Are you ready to get underway?
.2.1	Yes, we are ready (to get underway).
.2.2	No, we are not ready (yet) (to get underway).
.2.3	We will be ready to get underway in ... minutes.
.3	Stand by for letting go.
.4	Single up the ... lines and ... springs forward and aft.
.5	Slack away / hold on / heave on the ~ head / stern line. ~ breast line. ~ forward / aft spring.
.6	Let go ~ the head / stern line. ~ the breast line. ~ the forward / aft spring ~ all (forward / aft).
.7	Let go the towing line(s).
.8	Stand by bow anchor(s).
.9	Finished with manoeuvring stations.

<i>13. Grounding</i>	
<i>Reporting grounding and ordering actions</i>	
.1	We are aground.
.2	Stop engine(s).
.3	Close watertight doors and report.
.3.1	Watertight doors closed.
.4	Is vessel (still) making way?
.4.1	Yes, vessel making way ahead / astern.
.4.2	No, vessel not making way.
.5	Give "vessel aground" signals.
.6	Inform engine room.

- .7 What part is aground?
- .7.1 Vessel aground forward / amidships / aft / full length.
- .8 Stand by forward station and aft station and report.
- .8.1 Forward station / aft station standing by.
- .9 Stand by port anchor / starboard anchor.
- .10 What is position?
- .10.1 Position....

14. Reporting damage

- .1 Report damage.
- .1.1 No damage.
- .1.2 Crack(s) in plating / no. ... double bottom / no. ... hold(s) / tank(s) / main/auxiliary engine(s) foundation / ...
- .1.3 Deformation(s) / indentation(s) to plating / to....
- .2 Check flooding and report.
- .2.1 No flooding.
- .2.2 Flooding in... .
- .3 Is danger imminent?
- .3.1 No, danger not imminent.
- .3.2 Yes, danger of ~ heavy listing (to port / starboard) ~ decreasing stability. ~ damage by sea.
~ environmental medi. ~ breaking apart. ~
- .4 What is nature of sea bottom?
- .4.1 Sea bottom rocky.
- .4.2 Sea bottom soft.
- .5 What is state of tide?
- .5.1 No tide.
- .5.2 Tide ... metres / rising / falling / turning at ... hours, hours UTC / within ... hours.
- .6 What is wind force and direction?
- .6.1 Wind force Beaufort... from ... (*cardinal points/half cardinal points*).
- .6.1.1 Wind expected to decrease / increase (within the next ... hours).
- .6.1.2 Wind expected to back / veer (within the next ... hours).
- .6.1.3 No change expected (within the next ... hours).
- .7 What is sea state?
- .7.1 Sea smooth/moderate/rough/high / swell slight/moderate/heavy... metres from ... (*cardinal points/half cardinal points*).
- .7.2 Sea smooth/moderate/rough/high - swell slight/moderate/heavy ... expected to decrease / increase (within the next ... hours).
- .7.3 No change expected (within the next ... hours).
- .8 What is draft?
- .8.1 Draft ... metres (port side / starboard side) forward / aft / amidships.
- .9 What is depth of water?
- .9.1 Greatest depth ... metres (port side / starboard side) forward / aft / amidships.

15. Rescue operation - reporting readiness for assistance

- .1 Received an alarm signal / PAN-PAN / distress alert - MAYDAY at ... hours UTC on ... (*VHF Channel/frequency*).
- .2 Observed the following distress signal in ... degrees.
- .3 Report the distress position.
- .3.1 Distress position ...



*Project on Enhancing of Vessel Traffic Service System
Management Capability Phase 2*

TEXT Book-2(3) (Module-2)

“Marine Traffic Management”



Text Book for Vessel Traffic Services “Traffic Management”



IALA V-103-1 Model-Course



INTERNATIONAL COOPERATION AGENCY



NAVIGATIONAL AIDS TO NAVIGATION ASSOCIATION (JANA)

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CHAPTER 1 TRAFFIC MANAGEMENT (Day1)	
MODULE 2 (From Recommendation V-103/1)	
1.1 INTRODUCTION	Keyword
Instructors should have experience in <i>traffic routeing</i> and <i>traffic management</i> as well as in the general VTS and maritime fields. Every instructor should have full access to <i>simulated VTS</i> . If practicable, arrangements should be made, for trainees to visit operations VTS centres.	<ul style="list-style-type: none"> • <i>traffic routeing</i> • <i>traffic management</i> • <i>simulated VTS</i> • <i>operations VTS centres</i>

1.2 SUBJECT FRAMEWORK	
1.2.1 Scope	Keyword
This syllabus covers the theory and practice of managing traffic in a VTS area, including <i>area limits</i> , <i>shipping lanes</i> , <i>safety zones</i> , <i>traffic separation schemes</i> and <i>geographical constraints</i> . It also deals with the theory and practice of monitoring and organising traffic, as well as providing knowledge of <i>applicable international and national regulations</i> and <i>ships' safety certificates</i> .	<ul style="list-style-type: none"> • <i>area limits</i> • <i>shipping lanes</i> • <i>safety zones</i> • <i>traffic separation schemes(TSS)</i> • <i>Geographical constraints</i>.
1.2.2 Aims	Keyword
On completion of the course the trainee will possess a thorough <i>knowledge of the principles of traffic management and the skills to analyse and apply the knowledge</i> . In addition the trainee will have a <i>good understanding of national and international regulations as pertaining to the provision and conduct of vessel traffic services</i> .	<ul style="list-style-type: none"> • <i>principles of traffic management</i> • <i>the skills to analyse and apply the knowledge</i>
The understanding by trainees of the subject and knowledge and skills gained in other areas, including <i>on-the-job training</i> , will enable the routine <i>day-to-day duties of a VTS Operator to be carried out in an efficient and safe manner</i> .	<ul style="list-style-type: none"> • <i>on-the-job training</i> • <i>day-to-day duties</i> • <i>Efficient and safe manner</i>.
They will also have sufficient knowledge, comprehension and skills in the subject to serve as the basis for further training to the level of VTS Supervisor. Every effort should be made to give the trainees realistic exercises on the <i>role of VTS in assisting a ship to navigate safely and expeditiously through a VTS area</i> . Integrated exercises on handling <i>emergency situations</i> should also be carried out.	<ul style="list-style-type: none"> • <i>role of VTS</i> • <i>assisting a ship</i> • <i>emergency situations</i>

1.3 SUBJECT OUTLINE OF MODULE 2		
Subject Area		Key word
Regulatory requirements	International regulations, National regulations including local bye laws. Legal liabilities of VTS functions and safety related ship certificates	<ul style="list-style-type: none"> • <i>Regulations</i> • <i>local bye laws</i> • <i>liabilities of VTS</i>
Roles and responsibilities	Ship masters, Marine pilots, VTS and Allied services	<ul style="list-style-type: none"> • <i>Roles and responsibilities</i>
VTS environment	Area limits, boundaries, separation zones, shipping lanes and channels. Prohibited or dangerous areas, safety zones, anchorages and restricted areas. Traffic separation schemes and Traffic separation criteria.	<ul style="list-style-type: none"> • <i>Prohibited or dangerous areas</i> • <i>Geographical constraints</i>
Principles of waterway and traffic management	Planning, risk management and allocation of space. Criteria which determines the parameters for the safe passage of shipping and Aids to navigation	<ul style="list-style-type: none"> • <i>Planning</i> • <i>Criteria for the safe passage</i>
Traffic monitoring and organisation	Traffic patterns and VTS sailing or route plans Situation analysis	<ul style="list-style-type: none"> • <i>Traffic patterns</i> • <i>Situation analysis</i>

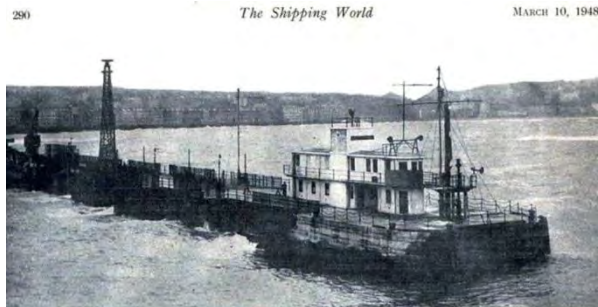
1.4 DETAILED TEACHING SYLLABUS OF MODULE 2	
Regulatory requirements	Key word
Identify the <i>legislative requirements</i> relating to the VTS area and protection of the marine environment	<ul style="list-style-type: none"> • <i>legislative requirements</i>
International regulations: Sources of literature on international legislative requirements (Ship reporting systems; carriage of dangerous goods; World VTS Guide; etc.	<ul style="list-style-type: none"> • <i>IMO Resolution 857(20)</i>;
National regulations, including local bye laws; Sources of national legislation and statement byelaws. Notices to Mariners and other nautical publications.	<ul style="list-style-type: none"> • <i>Sources of national legislation</i>
Legal liabilities of VTS functions; Extent of competence authority and responsibility, Competent authority, VTS authority and Personnel	<ul style="list-style-type: none"> • <i>Competent authority</i>
Carriage of relevant ship certificates	<ul style="list-style-type: none"> • <i>Ship certificates</i>
Explain the roles, responsibilities of and relationships ship masters, marine pilots and allied services to VTS.	
Ship masters	Responsibility of the ship master and responsibility of the ship master to VTS.
Marine pilots	Responsibility of the pilot to the ship master and responsibility of the pilot to VTS.
Allied services	Knowledge of allied services (i.e. harbour master, port authority) and roles of allied services
VTS	Responsibility to the master and pilot and Responsibility of VTS to allied services

1.4.1 VTS environment
Demonstrate knowledge of the VTS operational area, including geographical features, traffic routing measures and aids to navigation.
Area limits, boundaries, separation zones, shipping lanes and channels.
Prohibited or dangerous areas, safety zones, anchorages and restricted areas.
Traffic separation schemes and traffic separation criteria.
Geographical constraint and Aids to navigation (e-navigation, virtual aids to navigation)

1.4.2 Principles of waterway and traffic management		
Demonstrate a knowledge of the procedures for maintaining a safe and efficient waterway		
Planning	Routeing	Channel geography, traffic restriction areas, anchorage areas and obstructions
	Type of traffic	Ship characteristics and cargo characteristics
	Information	Traffic of Waterway (Notice to shipping, regattas etc.). Environmental (visibility, waterspouts, dust storms, pollution)
Risk management	Controllable risks	Experience of VTS Operators, utilisation of equipment and contingency plans/pollution
	Uncontrollable risks	Geography, meteorological factors, hydrographic factors and traffic congestion
	Procedures to mitigate risks	
Allocation of space	Ships domain, un-authorizing ship movements and allocation of priorities	
Criteria which determine the parameters for the safe passage of shipping	Water reference level	Tide gauges, correlation between predicted and actual water levels and allowance for delayed manoeuvres
	Safe underkeel clearance	Draught measurements vertical ship movements, <i>allowance for squat and swell</i> , Safety margins in rock and soft sea-bed conditions, Net underkeel clearance, Gross underkeel clearance, including allowance for weather; exposure and topography
	Safe air draft	Factors affecting and sources of information for calculating air draft

1.4.2 Principles of waterway and traffic management (Continue)		
Criteria which determine the parameters for the safe passage of shipping	Safe channel width	Principles of devising a safe width under calm and adverse conditions, limiting factors in precise navigation, adequacy of safe underkeel clearance across channel width, calculation of safe channel or fairway width.
	Shipping movements	Movements authorised only when safe criteria have been determined and conditions satisfactorily met

1.4.3 Traffic monitoring and organisation		
Demonstrate a knowledge of traffic patterns, sailing/route plans and perform situational analysis required to maintain a safe and efficient waterway		
Traffic patterns	Normal traffic patterns Non-routine items affecting traffic patterns (rogue vessels, weather)	
VTS sailing or route plan	Developing a plan to ensure safe and efficient movement of vessel traffic	
Situation analysis	Conflict assessment	Spatial separation
	Determination of relevant traffic	Participating/non-participating traffic National and international regulations Local procedures
	Tools for determining relevant traffic - risk of collision, unclear intentions, non-routine action, blind corner etc.	



CHAPTER 2. LEGAL FRAMEWORK AND GUIDELINES FOR VTS	
2.1 Introduction	Keyword
<p>The successful organization and provision of Vessel Traffic Services generates a self-evident need for <i>international agreement</i>. It means how shipping from various flag-states can successfully and harmoniously interact. At the same time, there is also a need for <i>domestic national and regional law</i> to reflect universally accepted objectives in relation to the ports that such shipping uses.</p>	<ul style="list-style-type: none"> • <i>International agreement</i> • <i>Domestic national and regional law</i>
<p>There is the requirement to have a clear and unambiguous link from the global concept, characterised in <i>Lord Donaldson's report</i> in 1993 - '<i>Safer Ships, Cleaner Seas</i>' - to the local bye-law requirements that might govern the actions of a single VTS Operator in a small local port. Generally, the <i>mariner wishes</i> to be part of a regime where the regulatory requirements and procedures for all ports are consistent, the <i>only principal difference</i> between ports being <i>location</i>.</p>	<ul style="list-style-type: none"> • <i>Lord Donaldson's report</i> • <i>Mariner wishes only principal difference</i>
<p>It is the purpose of this chapter to demonstrate the link between conventions and the <i>successful provision</i> of VTS at a local level as part of an effective safety management system.</p>	<ul style="list-style-type: none"> • <i>Internationally agreed</i> • <i>Successful provision at a local level</i>
2.2 The United Nations and International Law	Keyword
<p>Several major developments in international law have occurred under the sponsorships of the United Nations. These range from the development in the 1970-80s of the Law of the Sea to, more recently, the negotiation and adoption of several key international treaties in such areas as international <i>environmental law</i>, international <i>economic law</i>, the legal measures to counter international <i>terrorism</i>, and the creation of new international entities.</p>	<ul style="list-style-type: none"> • <i>Environmental</i> • <i>Economic</i> • <i>Terrorism</i>
2.3 United Nations Convention on the Law Of the Sea (UNCLOS)	Key word
<p><i>UNCLOS</i> was adopted in 1982. This lays down a comprehensive regime of law and order in the <i>world's oceans</i> and seas establishing rules governing <i>all uses of the oceans</i> and their resources. It embodies in one instrument traditional rules for the uses of the oceans and introduces <i>new legal concepts</i> and addresses new concerns. The sovereignty of a coastal State extends, <i>beyond its land territory</i> and internal waters and, in the case of an archipelagic State, its archipelagic waters, to an adjacent belt of sea, described as the territorial sea.</p>	<ul style="list-style-type: none"> • <i>UNCLOS</i> • <i>World's oceans</i> • <i>All uses of the oceans</i> • <i>New legal concepts</i> • <i>Beyond its land territory</i>
2.3.1 Exclusive economic zones (EEZs)	Key word
<p>As a result, coastal States can claim jurisdiction over internal waters, territorial seas, contiguous zones, archipelagic waters, <u><i>exclusive economic zones (EEZs)</i></u> and the continental shelf. When a VTS is being considered, care should be taken to establish the extent of jurisdiction that can be applied to the VTS area and its sub-areas or sectors, <u><i>noting that participation is not mandatory outside of territorial waters.</i></u></p>	<ul style="list-style-type: none"> • <i>EEZs</i> • <i>Participation is not mandatory</i> • <i>Outside of territorial waters</i>
<p>With regard to the authority that may be given to a VTS, a <u><i>State retains the right to control its territorial waters and all vessels that are subject to the jurisdiction of the State.</i></u> Therefore, the authority to establish and operate VTS in a region is <i>clearly</i> established, including the right to mandate participation in a VTS scheme and to regulate a vessel's movements. Within territorial waters, a coastal State may exercise its authority subject to the right of innocent passage. <u><i>Beyond territorial waters, a State's authority with regard to VTS is substantially reduced.</i></u></p>	<ul style="list-style-type: none"> • <i>The right to control</i> • <i>Clearly</i> • <i>Participation in a VTS scheme</i> • <i>Innocent passage</i>

2.3.2 In straits used for international navigation	Keyword
<p><u>In straits used for international navigation, a VTS Authority cannot restrict or impede the innocent passage of vessels.</u> In these instances a State should endeavour to enter into agreements with neighbouring States. These standards may include provisions for voluntary participation in a VTS or the <u>requirements of an internationally agreed Ship Reporting System.</u></p>	<ul style="list-style-type: none"> • <i>Agreements with neighbouring States</i>
<p>International Maritime Organization (IMO) is explicitly mentioned in only one of the articles of UNCLOS (article 2 of Annex VIII). Several provisions refer to the 'competent international organization' to adopt international shipping rules and standards in matters concerning maritime safety, efficiency of navigation and the prevention of marine pollution from vessels and by dumping. In such cases, the expression 'competent international organization', when used in the singular in UNCLOS, applies exclusively to IMO.</p>	<ul style="list-style-type: none"> • 'Competent international organization'

2.4 International Maritime Organization (IMO)	Keyword
<p>The best way of improving safety at sea is by developing international regulations that are followed by all shipping nations and from the mid-19th century.</p> <p>In 1948 an international conference in Geneva adopted a convention formally establishing IMO (the original name was the Inter-Governmental Maritime Consultative Organization or IMCO).</p> <p>The IMO Convention entered into force in 1958 and the new Organization met for the first time the following year.</p>	<ul style="list-style-type: none"> • <i>Best way of improving safety</i> • <i>IMO-IMCO</i>
<p>The purposes of the Organization are 'to provide machinery for cooperation among Governments in the field of governmental regulation and practices relating to technical matters of all kinds affecting shipping engaged in international trade; to encourage and facilitate the general adoption of the highest practicable standards in matters concerning maritime safety, efficiency of navigation and prevention and control of marine pollution from ships'.</p>	<ul style="list-style-type: none"> • <i>International trade</i> • <i>Practicable standards</i> • <i>Efficiency of navigation</i> • <i>Marine pollution</i>

2.5 IMO - Mandate	Keyword
<p>IMO's first task was to adopt a new version of the International Convention for the <i>Safety of Life at Sea</i> (SOLAS), the most important of all treaties dealing with <u>maritime safety</u>. This was achieved in 1960 and IMO then turned its attention to facilitation of international maritime traffic, load lines and the carriage of dangerous goods, while the system of measuring the tonnage of ships was revised.</p>	<ul style="list-style-type: none"> • <i>Safety of Life at Sea</i> • <i>Maritime safety.</i>
<p>A new problem began to emerge - <u>pollution</u>. The growth in the amount of oil being transported by sea and in the size of oil tankers was of particular concern and the <u>Torrey Canyon</u> disaster of 1967, in which 120,000 tonnes of oil was spilled, demonstrated the scale of the problem.</p>	<ul style="list-style-type: none"> • <i>Pollution</i> • <i>Torrey Canyon</i>
<p>IMO introduced a series of measures designed to prevent tanker accidents and to minimize their consequences. It also tackled the environmental threat caused by routine operations such as the cleaning of oil cargo tanks and the disposal of engine room wastes – in tonnage terms a bigger <u>threat</u> than accidental pollution.</p>	<ul style="list-style-type: none"> • <i>Prevent tanker accidents</i> • <i>Minimize their consequences</i>
<p>The most important of all these measures was the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto (<i>MARPOL 73/78</i>).</p> <p>It covers not only accidental and operational oil pollution but also pollution by chemicals, goods in packaged form, sewage, garbage and air pollution.</p>	<ul style="list-style-type: none"> • <i>MARPOL 73/78</i>

2.5 IMO – Mandate (<i>Continue</i>)	Keyword
<p>IMO was also given the task of establishing a system for providing compensation to those who had suffered financially as a result of pollution. Two treaties were adopted, in 1969 and 1971, which enabled victims of oil pollution to obtain compensation much more simply and quickly than had been possible before. Both treaties were amended in 1992, and again in 2000, to increase the limits of compensation payable to victims of pollution. A number of other legal conventions have been developed since, most of which concern liability and compensation issues.</p>	<ul style="list-style-type: none"> • <i>Compensation suffered financially</i>
<p><u>“The Global Maritime Distress and Safety System (GMDSS)”</u> was adopted in 1988 and began to be phased in from 1992. In February 1999, the GMDSS became fully operational, so that now a ship that is in distress anywhere in the world can be virtually guaranteed assistance, even if the ship’s crews do not have time to radio for help, as the message will be transmitted automatically.</p>	<ul style="list-style-type: none"> • <i>GMDSS</i>
<p>Two initiatives relate to the human element in shipping. On 1 July 1998 the International Safety Management Code entered into force and became applicable to all ships and mobile offshore drilling units from 1 July 2002.</p>	<ul style="list-style-type: none"> • <i>International Safety Management Code</i>
<p>In July 2004 a comprehensive security regime for international shipping, including the <u>International Ship and Port Facility Security (ISPS) Code</u> became mandatory under SOLAS.</p>	<ul style="list-style-type: none"> • <i>ISPS Code</i>
<p>In 2005, IMO adopted amendments for the <u>Suppression of Unlawful Acts (SUA)</u> and its related Protocol introduced the right of a State to board a ship flying the flag of another State when the requesting State has reasonable grounds to suspect that the ship or a person on board the ship.</p>	<ul style="list-style-type: none"> • <i>Suppression of Unlawful Acts (SUA)</i>
<p>Key issues on the IMO agenda in 2016 included:</p> <ul style="list-style-type: none"> • introduction of the Ballast Water Management Convention amongst other measures; • reduction of greenhouse gas emissions from ships and contribution to the <i>climate change</i> issue; • keeping the safety of life at sea and the human element, especially the seafarer, at the heart of IMO’s work; • protecting maritime radio frequencies. 	

2.6 Member States, NGOs and IGOs	Keyword
<p>IMO currently has 171 Member States and three Associate Members. In 2014 there were 76 international Non-Governmental Organizations (NGO) in consultative status with IMO, of which IALA have been one such organization since 1961. Non-governmental international organizations that have the capability to make a substantial contribution to the work of IMO may be granted consultative status by the Council with the approval of the Assembly.</p>	<ul style="list-style-type: none"> • <i>IALA Non-Governmental Organizations</i>
<p>IMO may enter into agreements of co-operation with other Inter-Governmental Organizations (IGO) on matters of common interest. In 2014 there were 64 inter-governmental organizations that have signed agreements of cooperation with IMO.</p>	<ul style="list-style-type: none"> • <i>Inter-Governmental Organizations (IGO)</i>
<p>All Members may participate at meetings of IMO bodies in charge of the elaboration and adoption of recommendations containing safety and antipollution rules and standards. These rules and standards are normally adopted by consensus; and All States, irrespective of whether or not they are Members of IMO or the United Nations, are invited to participate at IMO conferences for the adoption of new IMO conventions.</p>	<ul style="list-style-type: none"> • <i>Adopted by consensus</i>

2.7 Structure of IMO	Keyword
<p>IMO consists of an Assembly, a Council and five main Committees: <i>Maritime Safety Committee (NAV,Sub-comitee)</i> ; Marine Environment Protection Committee; Legal Committee; Technical Co-operation Committee and Facilitation Committee and a number of Sub-Committees.</p>	<ul style="list-style-type: none"> • <i>Assembly, a Council and five main Committees</i>
<p>The Assembly is the highest Governing Body of the Organization. It consists of all Member States and it meets once every two years in regular sessions. The Assembly is responsible for approving the work programme, voting the budget and determining the financial arrangements of the Organization.</p>	<ul style="list-style-type: none"> • <i>Highest Governing Body</i>
<p>The functions of the MSC are to ‘consider any matter within the scope of the Organization concerned with aids to navigation, construction and equipment of vessels, manning from a safety standpoint, rules for the prevention of collisions, handling of dangerous cargoes, maritime safety information, log-books and navigational records, marine casualty investigations, salvage and rescue and any other matters directly affecting maritime safety’.</p>	<ul style="list-style-type: none"> • <i>Functions of the MSC</i>
<p>The MSC is also required to provide machinery for performing any duties assigned to it by the IMO Convention or any duty within its scope of work that may be assigned to it by or under any international instrument and accepted by the Organization. It also has the responsibility for considering and submitting recommendations and guidelines on safety for possible adoption by the Assembly.</p>	
2.8 IMO Conventions	Keyword
<p>There is one directly related to VTS, namely the SOLAS Convention (Chapter V Regulation12).</p>	<ul style="list-style-type: none"> • <i>Chapter V Regulation12.</i>
2.8.1 Safety Of Life At Sea (SOLAS) Convention	Keyword
<p>This Convention in its successive forms is generally regarded as the most important of all international treaties concerning the safety of merchant ships. The first version was adopted in 1914, in response to the Titanic disaster, the 2nd in 1929, the 3rd in 1948 and the 4th in 1960. The 1974 version includes the implicit acceptance procedure. The Convention in force today is sometimes referred to as SOLAS.</p>	<ul style="list-style-type: none"> • <i>Titanic disaster</i> • <i>SOLAS 1974</i>
2.8.2 SOLAS Chapter V - Safety of Navigation	Keyword
<p>Chapter V identifies certain navigation safety services that should be provided by Contracting Governments and applicable in general to all ships on all voyages. This is in contrast to the Convention as a whole, which only applies to certain classes of ship engaged on international voyages.</p>	<ul style="list-style-type: none"> • <i>Engaged on international voyages</i>
2.8.3 SOLAS Chapter V - Regulation 12 - VTS	Keyword
<p>Regulation 12, which came into force in July 2002, contains five paragraphs.</p> <ol style="list-style-type: none"> 1. Vessel traffic services (VTS) contribute to safety of life at sea, safety and efficiency of navigation and protection of the marine environment, adjacent shore areas. 2. Undertake to arrange for the establishment of VTS where, in their opinion, the volume of traffic or the degree of risk justifies such services. 3. Planning and implementing VTS shall, wherever possible, follow the guidelines developed by the Organization*. The use of VTS may only be made mandatory in sea areas within the territorial seas of a coastal State. 4. Shall endeavour to secure the participation in, and compliance with, the provisions of vessel traffic services by ships entitled to fly their flag. 5. Nothing in this regulation or the guidelines adopted by the Organization shall prejudice the rights and duties of Governments under international law or the legal regimes of straits used for international navigation and archipelagic sea lanes. 	<ul style="list-style-type: none"> • <i>Regulation 12 – VTS</i>

2.9 IMO Resolutions and Codes (Day 2)	Keyword
<p>Besides Conventions, IMO has also issued a series of Resolutions and Codes, including guidelines on navigation issues and performance standards for ship borne navigational and radio communications equipment.</p> <p>Some are simply Recommendations - while others are referred to by relevant Regulations of specific Conventions, thereby giving them the same weight as the Convention Regulations themselves.</p>	<ul style="list-style-type: none"> • <i>radio communications equipment</i> • <i>ITU</i>
2.9.1 Safety of Navigation & Maritime Security	Keyword
<p>The events of 11 September 2001 sent shock waves not least in the maritime community. The new Chapter XI-2 introduced regulations under the heading - 'Special Measures to Enhance Maritime Security', as well as the International Code for the Security of Ships and Port Facilities.</p>	
<p>The ISPS Code is a comprehensive set of measures to enhance the security of ships and port facilities as well as the security of passengers and crews and has two parts, one mandatory and one recommendatory.</p>	<ul style="list-style-type: none"> • <i>Chapter XI-2</i> • <i>ISPS Code</i>
<p>The ISPS Code indirectly affects a VTS centre, which is generally part of a port's infrastructure. Port facilities, to which Chapter XI-2 applies, are required to develop and maintain a port facility security plan on the basis of a port facility security assessment. These facilities are also required to designate port facility security officers who, together with appropriate port facility security personnel, are required to undergo training in maritime security in accordance with the guidance given in Part B of the ISPS Code.</p>	
2.9.2 Places of Refuge and Maritime Assistance Services	Keyword
<p>IMO Resolution A.949 (23) - 'Guidelines On Places Of Refuge For Ships In Need Of Assistance', is intended for use when a ship is in need of assistance but the safety of life is not involved.</p>	<ul style="list-style-type: none"> • <i>Places Of Refuge</i>
<p>The guidelines recognize that, when a ship has suffered an incident, the best way of preventing damage or pollution from its progressive deterioration is to transfer its cargo and bunkers, and to repair the casualty.</p>	
<p><i>IMO Resolution A.950 (23) - 'Maritime Assistance Services' (MAS)</i> recommends that all coastal States should establish MAS. The principal purposes would be to receive the various reports, consultations and notifications required in a number of IMO instruments; monitoring a ship's situation if such a report indicates that an incident may give rise to a situation whereby the ship may be in need of assistance etc..</p>	<ul style="list-style-type: none"> • <i>IMO Resolution A.950 (23)</i> • <i>'Maritime Assistance Services'</i>
<p>The need to review the issues surrounding the need for places of refuge was included in a list of measures aimed at enhancing safety and minimizing the risk of oil pollution, drawn up in December 2000 in response to the <i>oil tanker Erika incident of December 1999</i>. The November 2002 sinking of the oil tanker <i>Prestige</i> further highlighted the issue.</p>	<ul style="list-style-type: none"> • <i>Oil tanker Erika incident of December 1999</i>
<p>International law recognizes the right of States to regulate entry into their ports (UNCLOS, Article 2, refers to the sovereignty of a coastal State over its land territory, internal waters, archipelagic waters and the territorial sea). The right of a foreign ship to stop and anchor in cases of force majeure or distress is explicitly referred to by UNCLOS in the case of navigation in the territorial sea (Article 18(2)), Straits used for international navigation (Article 39.1(c)) and in archipelagic waters (Article 54).</p>	<ul style="list-style-type: none"> • <i>UNCLOS</i>
<p>Although this constitutes an internationally accepted practice, at least in order to preserve human life. This, however, does not preclude the adoption of rules or guidelines complementing the provisions of UNCLOS.</p>	

2.9.3 Standards for Training Certification and Watchkeeping (STCW)	Keyword
<p>The 1978 STCW Convention was the first to establish basic requirements on training, certification and watchkeeping for seafarers on an international level. The Convention prescribes minimum standards relating to training, certification and watchkeeping for seafarers.</p>	<ul style="list-style-type: none"> • 1978 STCW
<p>On 1st February 1997, the 1995 amendments to the International Convention on STCW. They greatly improved seafarer standards and, for the first time, gave IMO itself powers to check Government actions with Parties required to submit information to IMO regarding their compliance with the Convention. <u>The 1995 Conference was of particular importance for VTS, with the adoption of Resolution 10.</u></p>	<ul style="list-style-type: none"> • The 1995 Conference was of particular importance for VTS, with the adoption of Resolution 10.
<p>The Manila amendments to the STCW Convention and Code were adopted on 25th June 2010, marking a major revision of the STCW Convention and Code. The 2010 amendments came into force on 1st January 2012 under the tacit acceptance procedure and are aimed at bringing the Convention and Code up to date with developments since they were initially adopted and to enable them to address issues that are anticipated to emerge in the foreseeable future.</p>	<ul style="list-style-type: none"> • Manila amendments
<p><i>The amendments also drew attention to the use of the SMCP (Standard Marine Communication Phrases) together with VTS procedures.</i> IALA developed a training regime (V-103) for VTSOs to match the format and requirements of those established for mariners in STCW 1995. This training regime was initially approved by IMO in MSC Circ.952, which was superseded in 2002 by MSC Circ.1065 - 'IALA Standards For Training And Certification Of Vessel Traffic Service (VTS) Personnel'. This approval by IMO of the IALA standard of training was recognised as a significant milestone for the VTS world.</p>	<ul style="list-style-type: none"> • IALA developed a training regime (V-103)
2.9.4 Marine Pollution - Particularly Sensitive Sea Areas (PSSA)	Keyword
<p>A Particularly Sensitive Sea Area (PSSA) is an area that needs special protection through action by IMO because of its significance for recognised ecological or socio-economic or scientific reasons and which may be vulnerable to damage by international maritime activities.</p>	<ul style="list-style-type: none"> • PSSA
<p>Guidelines on designating a Particularly Sensitive Sea Area (PSSA) are contained in IMO Resolution A.982 (24) - 'Revised Guidelines for the Identification and Designation of Particularly Sensitive Sea Areas (PSSAs)'. These guidelines include criteria to allow areas to be designated a PSSA if they fulfil a number of criteria, including: ecological criteria, such as unique or rare ecosystem, diversity of the ecosystem or vulnerability to degradation by natural events or human activities; social, cultural and economic criteria,.</p>	<ul style="list-style-type: none"> • IMO Resolution A.982 (24)
<p>When an area is approved as being a particularly sensitive sea area, specific measures can be used to control the maritime activities in that area, such as routing measures, strict application of MARPOL discharge and equipment requirements for ships, such as oil tankers and installation of VTS.</p>	<ul style="list-style-type: none"> • Control the maritime activities
<p>A PSSA can be protected by ships routing measures – such as an: an area within defined limits in which either navigation is particularly hazardous or it is exceptionally important to avoid casualties and which should be avoided by all ships, or by certain classes of ships.</p>	<ul style="list-style-type: none"> • Installation of VTS Area to be avoided
<p>Wetlands of international importance are covered by the Convention on Wetlands (Ramsar), which is an intergovernmental treaty that embodies the commitments of its member countries to maintain the ecological character of their Wetlands of International Importance and to plan for the 'wise use', or sustainable use, of all of the wetlands in their territories.</p>	<ul style="list-style-type: none"> • Ramsar

2.10 Enforcement	Keyword
<p>The enforcement of IMO conventions depends upon the Governments of Member States. Contracting Governments enforce the provisions of IMO conventions as far as their own ships are concerned and also set the penalties for infringements.</p>	<ul style="list-style-type: none"> • <i>Enforcement of IMO conventions</i>
<p>In some conventions, certificates are required to be carried on board ship to show that they have been inspected and have met the required standards. These certificates are normally accepted as proof by authorities from other States that the vessel concerned has reached the required standard.</p>	<ul style="list-style-type: none"> • <i>Certificates</i> • <i>Standard</i>
<p>Under the terms of the 1969 International Convention Relating to Intervention on the High Seas in Cases of Oil Pollution Casualties, Contracting States are empowered to act against ships of other countries that have been involved in an accident or have been damaged on the high seas if there is a grave risk of oil pollution occurring as a result.</p>	<ul style="list-style-type: none"> • <i>Oil Pollution Casualties</i>
<p>In 1973 The Conference adopted the Protocol relating to Intervention on the High Seas in Cases of Marine Pollution by Substances other than Oil. This extended the regime of the 1969 Intervention Various amendments have been made to this Protocol in line with a revision of the list of substances other than oil. The latest amendment came into force in June 2004.</p>	

2.11 National Legislation	Keyword
<p>Whilst it is for governments to determine how best to enact international agreements within the framework of national legislation, it is evident that some broad similarities emerge in the way that States undertake this responsibility. Most governments find it necessary in the maritime context to rely on two broad bodies of primary legislation; one concerned with its flag shipping, the other with its geographical jurisdictions. These can be summarised as:</p> <ul style="list-style-type: none"> • Marine, Shipping, Merchant Shipping Laws or Acts; and • Harbour, Port, Docks Laws or Acts. 	<p><i>Marine, Shipping, Merchant Shipping Laws or Acts</i></p>
<p>With regard to the second category, which is normally of a national character with uniform applicability to all port undertakings, it may be accompanied by local legislation that has applicability only to the port to which it refers.</p>	

2.12 Port State Control	Keyword
<p>Under the provisions of the IMO Conventions, a flag state is responsible for promulgating laws and regulations to give the effect to applicable conventions, ensuring that a ship is fit for service.</p> <p>In some cases it is difficult for the flag State to exercise the necessary degree of continuous control over their ships, because they may not frequently visit the flag State.</p> <p>This can be partly overcome by the delegation of these tasks to the Port State that the ships visit.</p>	<ul style="list-style-type: none"> • <i>Port State Control procedures</i>
<p>Port State Control procedures have been established by IMO and promulgated in IMO Resolution A.787 (19) - 'Procedures for Port State Control', together with amendments, in IMO Resolution A.882 (21).</p> <p>These documents are intended to provide basic guidance on conduct of port State control inspections and afford consistency in the conduct of these inspections, the recognition of deficiencies of a ship, its equipment, or its crew, and the application of control procedures.</p>	

2.13 European Union (EU)	Keyword
Although the European Parliament is the only directly-elected body of the European Union, it is the Commission who presents, explains and defends its legislative proposals to the parliamentary committees, and must take account of the changes called for by Parliament.	
Under EU Directive 2002/59/EC - 'Establishing a Community Vessel Traffic Monitoring and Information System' (as amended by EU Directive 2009/17/EC), the EU established a Vessel Traffic Monitoring and Information System along the coasts of Member States.	

2.14 National Legislative Measures (DAY 3)	
Examples of national legislative measures are given below and summary tables are at Annex.	
2.14.1 Australia	
Australia has implemented its obligations under SOLAS in the Navigation Act 2012 and Marine Order 64 (Vessel Traffic Services) 2013 (. Australian Maritime Safety Authority (AMSA) as the competent authority for VTS in Australia.	<ul style="list-style-type: none"> • <i>Navigation Act</i> • <i>Marine Order 64)</i>
In particular, Marine Order 64 sets out the arrangements for AMSA to regulate: <ul style="list-style-type: none"> ● VTS Authorities, including authorisation, certification and auditing ● VTS training organisations, including accreditation, approval of model courses and auditing ● Masters of vessels to provide reports required by VTS authorities and to comply with their instructions 	<ul style="list-style-type: none"> • <i>Australian Maritime Safety Authority</i>
2.14.2 Canada	
The Canadian Coast Guard's Marine Communications and Traffic Services Program (MCTS) fulfills, through the provision of marine communications and traffic management services, the obligations of the Minister of Fisheries and Oceans for coast guard services relating to the safe, economical and efficient movement of ships in Canadian waters, as charged by section 41(1)(a) of the Oceans Act.	<i>Canadian Coast Guard's</i>
MCTS guiding legislation includes Part 5 of the Canada Shipping Act, 2001, which empowers the Minister of Fisheries and Oceans to designate persons as marine communications and traffic services officers for the purpose of VTS. CSA 2001 empowers MCTS Officers to give direction to a vessel to leave or refrain from entering a VTS Zone or an area of a VTS Zone for safe and efficient navigation and environmental protection purposes or to proceed to or to remain in any location of it. Such vessels must obtain a clearance prior to entering, leaving or proceeding with a VTS Zone, and be able to maintain direct communication with a MCTS officer when proceeding within a VTS Zone.	<i>Canada Shipping Act</i>
2.14.3 China, Hong Kong	
The Shipping and Port Control Ordinance, chapter 313 of the Laws of Hong Kong is the principal legislative instrument for marine and port control affairs in the Special Administrative Region.	
These regulations include the requirement for vessels to: <ul style="list-style-type: none"> • provide Pre-Arrival Notification not less than 24 hours before the intended entry into Hong Kong waters; • carry radio equipment that is capable of operating on the HK VTS working VHF channels; • report their arrival, departure and movements in Hong Kong waters to the VTS centre; and • report any anomalies to the VTS centre. 	<i>Laws of Hong Kong</i>

2.14.4 Italy		Keyword
The Italian Coast Guard is the National Competent Authority on:		<i>Italian Coast Guard</i>
• maritime security;	• SAR (Italian Maritime Rescue Coordination Centre);	
• PSC and FSC;	• VTS/VTMIS (vessel traffic monitoring, control, management and VTS Authority);	
• marine fishery control & monitoring;	• National and international NAVTEX service (promulgation of maritime safety information).	
It is also involved in the following matters:		
• harbour master;	• marine environmental protection;	
• seamen data-bases.	• investigations of marine incidents/accidents;	
	• conservation and management of flag Register of Ships;	
2.14.5 The Netherlands		
The primary legislation stems from the Scheepvaartverkeerswet, the national Shipping Traffic Act of 1988 and its subsequent amendments. At local level competent authorities are empowered to and, port or local area; provisions for the regulation of VTS are included in this legislation.		<i>Shipping Traffic Act of 1988</i>
2.14.6 Turkey		
The national regulation on the establishing and operating Vessel Traffic Services came into force in 2007. It includes:		<i>Directorate General of Coastal Safety</i>
• authorizations and responsibilities of the Competent and VTS Authorities;		
• operational and technical principles;		
• qualification, training and certification of VTS Operators and Supervisors; and		
• other functions of VTS.		
Directorate General of Coastal Safety has been appointed as VTS Authority for four VTSs in Turkey; Turkish Strait VTS, Izmit VTS, Izmir VTS and Mersin VTS.		
Each VTS has its own operating procedures that prepared based on the national regulation on VTS and other related national and international legislation. In addition to this the Maritime Traffic Regulations for the Turkish Straits is one of the most important regulations for the Turkish Strait VTS.		
2.14.7 United Kingdom		
The Vessel Traffic Monitoring and Reporting Regulations 2004 is the Statutory Notice by the Maritime and Coastguard Agency regulates VTS. United Kingdom implementation of the European Parliament and Council Directive 2002/59/EC is published also by the UK Hydrographic Office.		<i>Maritime and Coastguard Agency</i>
The Harbours Act of 1964, provides for harbour authorities to establish 'control of movement' orders for securing, so far as is practicable, the safe and uninterrupted movement of ships in their respective harbours.		<i>Harbours Act of 1964</i>
In addition, Port of London Act, 1968, provides for the making of 'general directions' for navigation of vessels in the Thames.		<i>Port of London Act</i>
Port London, therefore, have published General Directions for Navigation that require the mandatory reporting of vessels to the ports' VTS and for vessels to be regulated in accordance with directions given from the VTS. The 'Duty Port Controller' in the Port of London Authority Thames Navigation Service has the full delegated responsibility of the 'Harbour Master.'		<i>Harbour Master</i>
Harbour Authorities have Specific Duties and Powers to establish VTS to mitigate risk, enhance vessel safety and to protect the environment. To be recognised as a VTS, the service must conform to IMO and national standards and operated by personnel trained to the appropriate standard. The VTS must be designated as such by the MCA in its capacity as the National Competent Authority for VTS.		<i>National Competent Authority for VTS</i>

CHAPTER 3. FUNCTIONS OF VTS
<p>‘Vessel Traffic Services (VTS) contribute to the safety of life at sea, safety and efficiency of navigation, the protection of the marine environment, the adjacent shore area, worksites, and offshore installations from possible adverse effects of maritime traffic’ - SOLAS V-12.</p>
3.1 Introduction
<p>At its simplest, the main objectives of a VTS are to:</p> <ul style="list-style-type: none"> • aid the mariner in the safe and efficient use of navigable waterways; • afford unhindered access to pursue commercial and leisure activities, subject to any restrictions that may exist; and • contribute to keeping the seas and adjacent environment free from pollution.
<p>Experience shows that, in general, these ideals are subject to potentially greater and more intense risks in coastal waters particularly at shipping congestion points and at the interface with ports and estuaries. The benefits derived from VTS can be of considerable value and, when properly implemented, outweigh the costs of provision.</p>
<p>IMO recognises the importance and value of VTS as a vital tool in the management of a number of potentially high risk geographic areas and for the protection of the environment.</p>
<p>Contracting Governments undertake to arrange for the establishment of VTS where, in their opinion, the volume of traffic or the degree of risk justifies such services (SOLAS V - Regulation 12). When planning and implementing VTS Contracting Governments shall, whenever practical, follow IMO Guidelines on VTS (IMO Resolution A.857(20)) and endeavour to secure participation in and compliance with, the provisions of VTS by ships entitled to fly their flag.</p>

3.2 Type of VTS (DAY 4)
<p>A clear distinction may need to be made between a Port or Harbour VTS and a Coastal VTS. A Port VTS is mainly concerned with vessel traffic to and from a port or harbour or harbours, while a Coastal VTS is mainly concerned with vessel traffic passing through the area. A VTS could also be a combination of both types. (IMO Resolution A.857(20))</p>
3.2.1 Port / Harbour VTS
<p>In order to ensure safety and efficiency, the movement of vessels within port areas may demand specific traffic management which not only minimizes incidents but also promotes economic results. The coordination of a number of different port services may be required. A port/harbour VTS should help prevent unnecessary delays and reduce the number of close quarter situations between vessels that may jeopardize the ports integrity.</p>
<p>Port VTS around the world ensure the economic profitability of ports, the safety of human life and the protection of the marine environment.</p>
<p>The techniques used in port VTS may be different from a coastal VTS, because the navigation is in itself different. In port areas both the separation between vessels and the required under-keel clearances may be reduced. These two factors directly affect the navigation of vessels and therefore port VTS procedures.</p>
<p>A port/harbour VTS may promulgate port entry requirements and may issue instructions. Examples of such requirements/instructions are:</p> <ul style="list-style-type: none"> • Clearances for entering/exiting VTS areas. • The obligation of taking pilot. • The obligation of taking tugs. • Maximum speed in the area. • Separation distance between vessels. • Assignments of anchor positions. • Overtaking permissions in narrow channel.
<p>These functions are normally rendered under a traffic organization service (TOS). In a port area, VTS should also provide a navigation assistance service (NAS), where vessels are assisted in complex navigational situations.</p>

3.2.2 Coastal VTS
<p>A coastal VTS should assist the safe and expeditious passage of shipping through coastal waters. It may also be involved in providing assistance to vessels before embarkation or disembarkation of a pilot.</p> <p>The types of service provided by a coastal VTS will depend on its legal basis but is likely to include more than just an information service. IALA has provided further guidance on this where the VTS area covers an international strait or extends beyond territorial waters in Guideline 1071 – Establishment of a Vessel Traffic Service beyond Territorial Seas.</p>
3.2.3 VTS in Inland Waters
<p>The purpose of VTS in inland waters is to improve the safety and efficiency of navigation, safety of life and the protection of the environment and/or the adjoining waterway banks, nearby residents and enterprises from possible adverse effects of vessel traffic.</p> <p>Inland waters are rivers, lakes or other stretches of water, whether linked to the sea or landlocked, which by natural or man-made features are suitable for navigation.</p> <p>A part of the objectives of a VTS in inland waters may include the support of efficient transport and the collection of data and information that, as a consequence, may be required.</p> <p>The benefits of implementing a VTS in inland waters are that it allows identification and monitoring of vessels, the strategic, tactical and operational planning of vessel movements, managing traffic by allocation of space, as well as the provision of navigational information and assistance.</p> <p>A VTS in inland waters may provide an information service (INS), a navigational assistance service (NAS) and a traffic organisation service (TOS).</p> <p>Further information may be found in IALA Recommendation V-120, - 'Vessel Traffic Services in Inland Waters'.</p>

3.3 Functions of a VTS		
<p>VTS functions - can be subdivided into internal and external functions. Internal functions are the preparatory activities that have to be performed to enable a VTS to operate. These include data collection, data evaluation and decision-making.</p> <p>External functions are activities executed with the purpose of influencing the traffic characteristics. They relate to the primary traffic management functions of rule-making, allocation of space, routine control of vessels and manoeuvres to avoid collisions, as well as to other management functions such as enforcement, remedial and ancillary activities.</p> <p>Amongst the most important functions that a VTS may carry out are those related to, contributing to and thereby enhancing:</p>		
<table border="0" style="width: 100%;"> <tr> <td style="vertical-align: top; width: 50%;"> <ul style="list-style-type: none"> • Safety of life at sea; • Search and Rescue; • Protection of the marine environment; • Supporting law enforcement; </td> <td style="vertical-align: top; width: 50%;"> <ul style="list-style-type: none"> • Safety of navigation; • Efficiency of vessel traffic movement; • Supporting maritime security; • Protection of adjacent communities and infrastructure. </td> </tr> </table>	<ul style="list-style-type: none"> • Safety of life at sea; • Search and Rescue; • Protection of the marine environment; • Supporting law enforcement; 	<ul style="list-style-type: none"> • Safety of navigation; • Efficiency of vessel traffic movement; • Supporting maritime security; • Protection of adjacent communities and infrastructure.
<ul style="list-style-type: none"> • Safety of life at sea; • Search and Rescue; • Protection of the marine environment; • Supporting law enforcement; 	<ul style="list-style-type: none"> • Safety of navigation; • Efficiency of vessel traffic movement; • Supporting maritime security; • Protection of adjacent communities and infrastructure. 	
<p>The benefits of implementing a VTS are that it allows identification and monitoring of vessels, strategic planning of vessel movements and provision of navigational information and assistance. It can also assist in prevention of pollution and co-ordination of pollution/emergency response. The efficiency of a VTS will depend on the reliability and continuity of communications and on the ability to provide accurate and unambiguous information. The quality of accident prevention measures will depend on the ability to detect developing dangerous situations and on the provision of timely warnings of such dangers.</p> <p>The precise functions of any VTS will depend upon the particular circumstances in the VTS area and the volume and character of maritime traffic.</p> <p>A port VTS will often have different objectives and functions to that of a coastal VTS, which is addressed in more detail in Next CHAPTER – Provision and Types of Service in a VTS. When a VTS is established, the existence of the VTS and the functions carried out, will need to be promulgated to all relevant stakeholders.</p>		

3.4 Safety of Life at Sea and Safety of Vessel Traffic
<p>Incidents involving vessels can lead not only to material damage and injuries, but also to loss of life. VTS endeavours to prevent incidents resulting from vessel traffic movements, thereby contributing not only to the improvement of vessel traffic safety but also to the improvement of safety of life at sea and protection of the environment.</p>
<p>By being proactive, a VTS can contribute to:</p> <ul style="list-style-type: none"> • Preventing incidents from developing; • Preventing incidents from developing into accidents; • Preventing accidents from developing into disasters; and • Mitigating the consequences of incidents, accidents and disasters.
<p>Unlike other aids to navigation, VTS, being active, has the capability to interact and influence the decision-making process on board the vessel.</p>
<p>For example, VTS might detect the development of close-quarter situations between vessels or vessels standing into danger, and can thus alert such vessels accordingly and, in some cases, instructing them to take certain avoiding action, providing that any instructions or advice issued by the VTS is result-orientated only. As the majority of maritime accidents can be attributed to human factors, it is clear that the involvement of a VTS, and interaction with it, can provide a significant additional safeguard.</p>
<p>Although safety of life should be a primary reason for implementing VTS, the needs of other VTS functions often provide more persuasive arguments for its establishment. However, the beneficial effects of VTS on the expected (or even actual) number or size of vessel traffic accidents and casualties will often be difficult to determine. The preferred way to assess the effect of VTS on vessel traffic safety is by determining the risk reduction, which can be achieved by VTS. IALA has developed a risk management toolbox of concepts and tools for risk assessment and evaluation of various risk mitigating measures, for further information see Section 3.8.</p>
<p>If an incident has occurred or is likely to occur, VTS can be used to support other incident mitigation operations. In the context of vessel traffic safety, VTS might support, for example Maritime Assistance Services (IMO Resolution A.950 (23)), Places of Refuge (IMO Resolution A.949(23)), Search and Rescue (SAR), firefighting, pollution response and salvage operations. In some VTS centres such operations are carried out under the supervision of the VTS and/or Competent Authority.</p>

3.5 Efficiency of Vessel Traffic
<p>VTS can improve the efficiency of vessel traffic in two ways through:</p> <ul style="list-style-type: none"> • Reducing accidents; and • Increasing the utilisation of the infrastructure (waterways, locks, ports etc.).
<p>Prevention of an accident directly leads to an improvement in the efficiency of vessel traffic. An accident causes delays, not only for the vessels involved but also for other vessels in the vicinity. Serious accidents can lead to lengthy delays, especially when the movement of vessels is being restricted and possibly being re-routed, or in extreme cases when the VTS has to close the navigable waterways to vessel traffic.</p>
<p>An infrastructure will have a certain capacity, both in the size and the number of the vessels that can be accommodated. A VTS can safely increase the capacity by enabling:</p> <ul style="list-style-type: none"> • Larger vessels to use the infrastructure (e.g. larger draught, beam, length, air draught); • Longer use of the infrastructure (e.g. tidal windows, continued operation under adverse conditions); and • More use of the infrastructure (e.g. higher traffic density, higher speed).
<p>The resulting improvement for the vessels concerned in carrying capacity and reduction in delays increases the efficiency of these vessels.</p> <p>At the same time this increases the utilisation of the infrastructure, which may either eliminate delays or reduce the need for costly investments in the expansion of this infrastructure. These economic benefits are more directly noticeable to the stakeholders concerned and are easier to determine than the benefits of VTS for safety of navigation.</p>

3.6 Protection of the Environment
<p>In many societies, communities and areas, the protection of the environment is considered the highest priority. Pollution can cause substantial economic damage, in particular to those activities dependent on a clean environment, such as tourism, recreation and fisheries. Generally, oil or other toxic liquid pollution is the biggest concern but accidental emissions of polluting gasses can also cause environmental pollution.</p>
<p>Protection of the environment is often a substantial driving force for determining the need for VTS. It may even result in a VTS being implemented in an area with relatively low traffic volumes and limited risk to vessel safety if relatively large quantities of polluting cargoes are transported through areas that are considered to be environmentally sensitive.</p>
<p>In addition to the explicit formal recognition of the contribution of VTS in SOLAS, there is an implicit recognition of the contribution VTS can deliver to the protection of the environment in UNCLOS. VTS is one of the four possible 'associated protective measures' specifically mentioned in IMO Resolution A.982 (24) - 'Revised Guidelines for the Identification And Designation of Particularly Sensitive Sea Areas', for the establishment of 'Particularly Sensitive Sea Areas' (PSSA).</p>
<p>At regional level, there is a formal recognition of the contribution VTS can offer to the protection of the environment. In the EU, the Directive for the establishment of a community vessel traffic monitoring and information system 2002/59/EC (as amended) specifically mentions VTS as one of the components of this EU-wide system to protect the environment.</p>
<p>MARPOL 73/78 defines certain sea areas as 'special areas' in which, for technical reasons relating to their oceanographically and ecological condition and to their sea traffic, the adoption of special mandatory methods for the prevention of sea pollution is required. Under the Convention, these special areas are provided with a higher level of protection than other areas of the sea.</p>
<p>A Particularly Sensitive Sea Area (PSSA) is an area that needs special protection through action by IMO because of its significance for recognised ecological or socio-economic or scientific reasons and which may be vulnerable to damage by international maritime activities. The criteria for the identification of particularly sensitive sea areas and the criteria for the designation of special areas are not mutually exclusive. In many cases a Particularly Sensitive Sea Area may be identified within a Special Area and vice versa.</p>
<p>The Ramsar Convention on Wetlands is an intergovernmental treaty adopted in 1971, is the first global intergovernmental treaty on the conservation and sustainable use of natural resources. The Convention entered into force in 1975 and by 2011, had 160 Contracting Parties, or member States. Though the central Ramsar message is the need for the sustainable use of all wetlands, the 'flagship' of the Convention is the 'List of Wetlands of International Importance' (the Ramsar List').</p>
<p>In 2011 this listed more than 1,830 wetlands for special protection as 'Ramsar Sites', covering 170 million hectares (1.7 million square kilometres), larger than the surface area of France, Germany, and Switzerland combined. Many of these sites are in coastal zones and estuaries adjacent to shipping and port activities.</p>
<p>Apart from preventative actions to avoid incidents and mitigation actions, when incidents have occurred, VTS can provide support as well as contribute to the identification of sources of illegal spills. With the information available in the VTS on vessel movements in the VTS area, sources of pollution in or nearby the VTS area may be more easily identified and proven. The very presence of a VTS can often act as a deterrent to vessels illegally discharging pollutants.</p>
<p>As environmentally sensitive areas are often at sea outside port areas, it might sometimes be desirable to have the VTS coverage extend into international waters or straits for the protection of these sea areas. It should be realised that VTS participation by vessels can only be made voluntary in international waters or straits. However, mandatory participation in VTS in international waters or straits may be achieved by establishing a mandatory Ship Reporting System or Ship Routeing measures that have been adopted by IMO.</p>
<p>As with the safety of vessel traffic, measuring the effect of VTS on protection of the environment is not easy. The impact of VTS on the size and number of accidents is difficult to determine, as is the impact of VTS on the reduction of pollution, which could possibly result from such accidents. This requires a thorough risk analysis, which needs availability and access to data on traffic, circumstances and environmental sensitivity.</p>

3.7 Protection of the Adjacent Communities and Infrastructure

In certain ports, narrow straits and inland waterways, vessels sail in close proximity to populated areas, industrial activities and their associated infrastructure. Generally, accidents involving spills or emissions of hazardous chemicals in fluid or gaseous form are the biggest concern, but deaths, injuries and damage can be caused by vessels colliding with habited areas on waterfronts.

The additional impact of a chain reaction in oil or chemical plants on a waterfront initiated by an accident with a vessel needs to be considered.

A VTS may help prevent such accidents occurring or developing into disasters. It can also be used by the emergency services in the event of marine associated emergencies, which necessitate the coordination of all activities within the area concerned.

3.8 Risk Assessment DAY 5

Assessing the effectiveness of a VTS in managing the safety of vessel traffic, protecting the environment, reducing the number of accidents and lessening the risk to the adjacent communities and infrastructure is a complex process. This requires a thorough risk analysis and, thus, availability and access to data on traffic, circumstances and sensitivity of the adjacent communities and infrastructure.

The current tools / concepts are:

- IWRAP (IALA Waterway Risk Assessment Programme); and
- PAWSA (Ports and Waterways Safety Assessment)
- Simulation (**Play Back System -> Working Group to analyze Traffic situation -> Once/Month*)

IWRAP is useful for estimating the frequency of unwanted incidents, such as collisions and groundings. It is a quantitative concept, based on the analysis of objective data such as AIS data and bathymetry information. IWRAP was developed during the 1990s by IALA working with the Canadian Coast Guard, the Technical Universities of Denmark and Wismar. IWRAP Mk2 was released in 2009 with additional contribution from the University of Helsinki.

PAWSA was originally developed for the United States Coast Guard and is a qualitative model, requiring an experienced facilitator to run each PAWSA workshop. The PAWSA concept is based on a structured approach to interviewing 20-30 different stakeholders on their knowledge and beliefs with regard to the risks and effectiveness of possible mitigating measures in a given waterway.

Experience is showing that a combination of PAWSA and IWRAP Mk2 can produce a better result than either model on its own.

Interest in simulation for the study of risk management is increasing and greater use of simulators as a risk management tool can be expected.

3.9 Efficiency of Related Activities

In ports there are many activities related to shipping, known as 'allied services', such as:

- *Pilotage Towage*
- *Repairs Chandlery*
- Cargo/passenger transfer Customs
- Treatment/processing
- Bunkering Line handling
- Immigration Inspections
- Cargo (onward) transport Cargo
- Security Agents

All of these allied services may benefit from correct and timely information about actual and expected vessel positions, movements, destinations and times of arrival. This enables the allied services to enhance their own efficiency through improved planning and better utilisation of resources, which should lead to a reduction in the cost base.

Ports seek improvement in information gathering and dissemination to offer a better service to the shipping community and as a means to gain a competitive advantage over other ports. Improved information exchange with interested stakeholders, including other VTS centres, forms part of the management of vessel traffic.

3.9 Efficiency of Related Activities
<p>By good point of the various services it provides, VTS has a significant amount of relevant information. In this respect the contribution that can be offered by supplying this information to stakeholders involved in cargo transfer and ahead transport (by road, rail, inland waters and sea) is of increasing importance. It improves the optimisation of the overall logistical chain for intermodal transport from producer to consumer.</p>
<p>The transfer of information concerning cargo, position, movement, destination and ETA is a key part of the interconnectivity within this chain. Whilst the cargo is still on-board, information concerning the whereabouts and intentions of involved vessel may be an acceptable substitute for more detailed cargo information.</p>
<p>Making information accessible to other VTS users and allied services, offers direct benefits to the port and transport community. This, in itself, can be a significant driving force for implementing VTS, in particular for authorities trying to improve the competitive position of their port. However, special attention needs to be given to the sensitivity and access to such data. Legal restrictions and societal sensitivities may have to be considered in the protection of potentially commercially sensitive information. Unlawful misuse of this information by individuals and organizations is of increasing concern and conflicts may occur when the VTS is not the only source of vessel related information.</p>

3.10 Supporting Maritime Security
<p>As a result of terrorist and piracy attacks and the increased threat from such activities, security is a high priority for the maritime community. Together with the aviation industry, maritime transport is one of the forerunners in improving the security of transport. IMO has addressed maritime security by the adoption of the International Ship and Port Facility Security (ISPS) code.</p>
3.10.1 International Ship and Port Facility Security (ISPS)
<p>Security assessments have three essential components. The first step is to identify and evaluate important assets and infrastructures that are critical to the port facility as well as those areas or structures that, if damaged, could cause significant loss of life or damage to the port facility's economy or environment. The assessment must then identify the actual threats to those critical assets and infrastructure in order to prioritise security measures. Finally, the assessment must address vulnerability of the port facility by identifying its weaknesses in physical security, structural integrity, protection systems, procedural policies, communications systems, transportation infrastructure, utilities, and other areas within a port facility that may be a likely target. Once this assessment has been completed, Contracting Government can accurately evaluate risk.</p>

3.11 Security in the VTS Environment		
<p>There are three distinct aspects associated with security in the VTS environment.</p>		
<p><i>Firstly</i>, there is the need to ensure that the operation of a VTS is not exposed to, or susceptible to, the risk of terrorist attack. This situation should apply to all VTS operations, not least because of the general duty of care that a VTS Authority should exercise in relation to client shipping. Under ISPS there are a number of minimum functional security requirements for ships and port facilities. For port facilities, the requirements include:</p>		
<table border="0"> <tr> <td style="vertical-align: top;"> <ul style="list-style-type: none"> • Port facility security plans; • Certain security equipment; • Monitoring and controlling access; </td> <td style="vertical-align: top;"> <ul style="list-style-type: none"> • Port facility security officers; • Monitoring the activities of people and cargo; • Ensuring security communications are readily available. </td> </tr> </table>	<ul style="list-style-type: none"> • Port facility security plans; • Certain security equipment; • Monitoring and controlling access; 	<ul style="list-style-type: none"> • Port facility security officers; • Monitoring the activities of people and cargo; • Ensuring security communications are readily available.
<ul style="list-style-type: none"> • Port facility security plans; • Certain security equipment; • Monitoring and controlling access; 	<ul style="list-style-type: none"> • Port facility security officers; • Monitoring the activities of people and cargo; • Ensuring security communications are readily available. 	
<p><i>Secondly</i>, there is the potential for VTS to obtain information that may aid or assist security agencies in counter-terrorist activities. However, this situation will normally only apply when a VTS Authority enters into specific agreement with national authorities.</p>		
<p><i>Thirdly</i>, although VTS is not by definition a security-related system, the integrity of VTS data and systems must be protected and security assessments should be considered. It is necessary to prevent unwanted and unauthorised access to the VTS system, i.e. connection to external systems, such as the internet, should be established through a robust firewall.</p> <p>Whilst it may often be desirable to make some VTS information public, the firewall should prevent any opportunity for unauthorised access to be gained into the system or to the data it holds.</p>		

3.11 Security in the VTS Environment <i>(Continue)</i>
<p>Protection against terrorist action in the maritime domain requires, among many things, a complete image of vessel traffic in areas of concern with information on the intentions and cargoes of those vessels as well as vigilant monitoring of this vessel traffic. This information could also be of use to support actions against smuggling (unlawful trade) goods and illegal immigration.</p>
<p>A VTS centre maintains a vessel traffic image of almost all vessels in the VTS area and possibly in adjacent waters. The VTS has trained VTS Operators monitoring this traffic in real-time and has the potential to contribute to State security, although such involvement is a national consideration. The limitations of VTS should, however, be recognised and these include radar detection capability, particularly of small craft, and the training of VTSOs in the recognition of potential security threats.</p>
<p>Port facilities which have to comply with the requirements of SOLAS Chapter XI-2 and part A of the ISPS Code - 'mandatory requirements', are required to designate a Port Facility Security Officer, who has the responsibility to co-ordinate appropriate actions when a ship encounters difficulties with respect to maritime security. The use of a vessel traffic image display may facilitate this work.</p>

3.12 Standards Trends
<ul style="list-style-type: none"> • Environmental standards will continue to acquire ever-higher stringency and priority; • Professional competence of marine personnel will continue to vary, nevertheless the adoption of international standards; • The pursuit of common standards will continue, particularly on a regional basis; • Comprehensive and effective risk assessment will increasingly become the basis for the safe management of navigation; and • The development of the IMO e-navigation concept may lead to further development of new services (Maritime Service Portfolios) with a need for further worldwide harmonization. • The growing focus on Safety Awareness and Safety Culture may lead to a need for training on those aspects.
3.12.1 User Requirements
<ul style="list-style-type: none"> • Commercial pressures will demand ever more rapid and reliable transport and cargo handling schedules, while reducing costs and improving quality of service; • The need for more comprehensive wide-area traffic information will lead to an increase in the volume of information being exchanged mainly digitally between ships and shore organizations; • Predicted restrictions on water-space for vessel traffic, specifically in areas of high traffic density and those areas where alternative utilization of this space is expected, may lead to an increasing need for management of vessel traffic from shore; • Coastal waters and inland waterways will be increasingly used for recreational and other purposes. • Inland and short sea shipping will become increasingly attractive from an environmental perspective as methods of transport of goods and passengers; and • Co-ordination of port services will become increasingly important in the interests of safety, security, protection of the environment and improved economic performance, particularly where such services may be obtained from external sources.
3.12.2 Technology
<ul style="list-style-type: none"> • Ship design and technology will continue to evolve, particularly in the areas of information processing and communication; and • Advances in technology will require an expanding requirement for capital expenditure and trained personnel. This will offer opportunities for increased efficiencies and the potential for the delivery of additional services.
3.12.3 Security and Allied Services
<ul style="list-style-type: none"> • Heightened international security concerns will have an impact on maritime trade and transport processes. These same concerns are already leading to a requirement to track commercial shipping at long range; • The use of formal and more effective systems to manage safety and security at sea and in port will increase; and • The need for protection of data and information against intended/unintended access is increasing (cyber security).

3.13 Consequential impact on VTS

These overall maritime trends are likely to lead to the following consequences for VTS:

- VTS will play a central role in gathering and disseminating information for safety, security, environmental protection and economic performance purposes;
- Automated systems for the effective management and validation of transferred data between ships, VTS centres and VTS networks will be increasingly required;
- Exchange of information between VTS systems will lead to the formation of VTS networks;
- VTS information will increasingly be used by various allied services in the global tracking of vessels;
- The need for quality promise to international standards for VTS systems, including equipment, personnel, and operating procedures, will increase;
- The need to assure and certify the competency of VTS Operators and VTS Supervisors in order to reduce any exposure to increased liability will add to the scope and priority of such training. This should be achieved through the establishment of a Revalidation Process as prescribed in IALA Model Course V-103/5;
- The need to manage recreational and other small craft traffic by VTS and by other means in order to ensure the safety of navigation in areas where commercial and high-density recreational traffic co-exist, will increase;
- As the quality and accuracy of vessel tracking improves, the potential for greater control of vessel traffic may be used more widely as a mechanism for reducing risk; and
- The regulated control of traffic by VTS centres may bring a greater exposure to liability.



CHAPTER 4. PROVISION AND TYPES OF SERVICE IN A VTS Day 6

4.1 Introduction

In many waterways vessels can operate independently under any conditions of traffic and weather. In such circumstances there is no need for a VTS since vessels operate safely and unaided. However, there are many waterways where vessels rely on interaction with shore authorities to conduct their movements safely and efficiently and where a VTS may be required. The purpose of this chapter is to set out the options available to a Competent Authority for the provision of a VTS.

Vessel Traffic Services (VTS) is a service implemented by a Competent Authority, designed to improve the safety and efficiency of vessel traffic and to protect the environment. The service should have the capability to interact with the traffic and to respond to traffic situations developing in the VTS area.

'The Competent Authority is the Authority made responsible, in whole or in part, by the Government for the safety, including environmental safety, and efficiency of vessel traffic and the protection of the environment'. IMO Resolution A.857(20)

4.2 prerequisites

The fundamentals for Vessel Traffic Services (VTS) are:

4.2.1 Vessel, Traffic Services prerequisites

- Authorised by the Competent Authority;
- Interacts with traffic;
- Equipped to provide INS/NAS/TOS as appropriate.
- Staffed by V-103 certificated personnel;
- Responds to traffic situations; and

4.3 Provision and Declaration of Services

The responsibility for determining the types of service provided by the VTS to mitigate identified hazards lies with the Competent/VTS Authority who is accountable for the standards set. This includes the resources, staffing levels, training and qualifications.

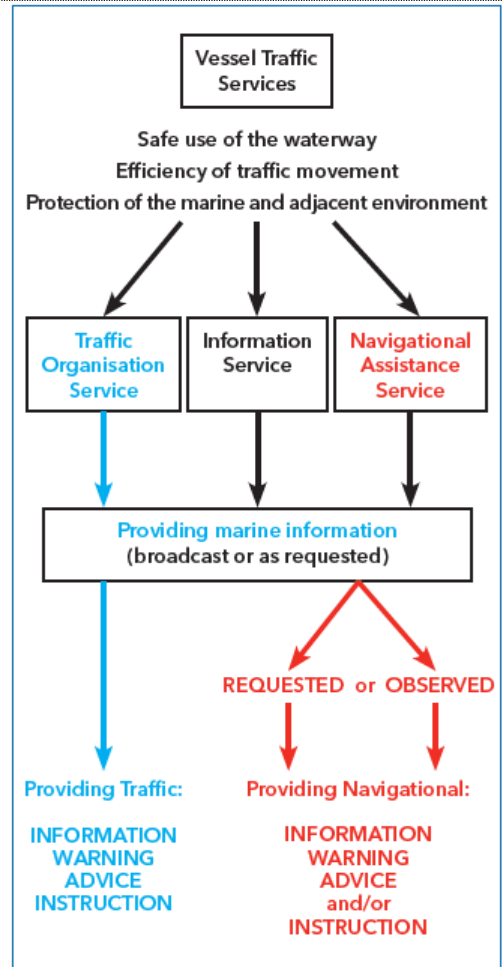
An Information Service (INS) is the basic type of service. It should be declared formally and provided as a service by all VTS. When a VTS Authority organises and manages traffic within its VTS Area as part of its function, then it would normally also declare the provision of a Traffic Organization Service (TOS).

While VHF should be the primary means of communicating information, any available means within the maritime mobile service may be used when providing any of the services.

Normally a VTS Authority would be expected to respond to situations where a vessel was observed, or otherwise deemed, by the VTS to be in need of navigational assistance, using appropriate procedures. It would also be expected to respond to requests from a vessel that is in need of navigational assistance in situations such as an equipment failure or incapacitation of a key member of the bridge team; this may be limited to getting the vessel to the nearest place of safety.

It therefore follows that, normally, a VTS Authority should declare a Navigational Assistance Service (NAS) in addition to an INS or TOS and those VTS personnel should be trained appropriately.

Where the delivery of NAS is subject to special conditions or additional capabilities/requirements relating to a specific VTS Area, these should be clearly promulgated in the appropriate publications.



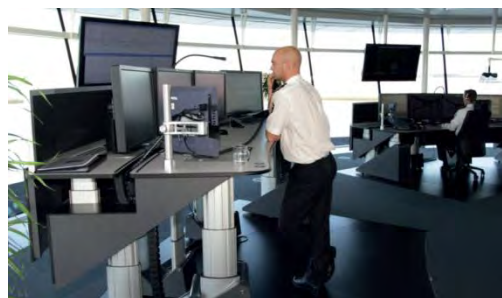
4.4 Types of service within a VTS (INS/TOS/NAS)
4.4.1 Information Service (INS)
A. General
An Information Service provides relevant information at appropriate times and on request for the promulgated VTS area.
An Information Service involves maintaining a traffic image and allows interaction with traffic and response to developing traffic situations. An Information Service should provide essential and timely information to assist the on board decisionmaking process, which may include but is not limited to: <ul style="list-style-type: none"> • The position, identity, intention and destination of vessels; • Amendments and changes in promulgated information concerning the VTS area such as boundaries, procedures, radio frequencies, reporting points; • The mandatory reporting of vessel traffic movements; • Meteorological and hydrological conditions, notices to mariners, status of aids to navigation; • Manoeuvrability limitations of vessels in the VTS area that may impose restrictions on the navigation of other vessels, or any other potential hindrances: or • Any information concerning the safe navigation of the vessel.
More detailed examples of different types of information that may be provided by the VTS operating an Information Service will be found in IALA Guideline 1089 on Provision of Vessel Traffic Services (INS, TOS & NAS)
B. Provision of an Information Service
An Information Service should be provided when: <ul style="list-style-type: none"> • broadcasting information at fixed times and intervals, as promulgated in the appropriate navigational publications; • deemed necessary by the VTS; or • the vessel has requested information.
If a VTS is tasked with providing a maritime safety information service (MSI), guidance on this type of information is found in IMO Resolution A.706 (17), as amended, – World-wide navigational warning service.
4.4.2 Traffic Organisation Service (TOS)
A. General
A Traffic Organization Service (TOS) is a service to prevent the development of dangerous maritime traffic situations and to provide for the safe and efficient movement of vessel traffic within the declared VTS area. It concerns the operational management of traffic and the planning of vessel movements and is particularly relevant in times of high traffic density or when vessel movements may affect the traffic flow.
A Traffic Organization Service may be provided in part, or all, of the declared VTS area.
B. Provision of a Traffic Organization Service
A Traffic Organization Service should be provided when the VTS is authorized to provide services, such as when: <ul style="list-style-type: none"> • vessel movements need to be planned or prioritised to prevent congestion or dangerous situations; • special transports or vessels with hazardous or polluting cargo may affect the flow of other traffic and need to be organised; • an operating system of traffic clearances or sailing plans, or both, has been established; • the allocation of space needs to be organised; • mandatory reporting of movements in the VTS area has been established; • special routes should be followed; • speed limits should be observed; • the VTS observes a developing situation and deems it necessary to interact and coordinate vessel traffic; • nautical activities (e.g. sailing regattas) or marine works in-progress (such as dredging or submarine cable-laying) may interfere with the flow of vessel movement.

B. Provision of a Traffic Organization Service <i>(Continue)</i>
A Traffic Organization Service should be responsible for separating traffic in the interest of safety. This separation could be defined in space, time and/or distance.
Enforcement may also be carried out within a Traffic Organization Service where the VTS should monitor adherence to applicable rules and regulations and to take appropriate action where required and within the authority of the VTS.
4.4.3 Navigational Assistance Service (NAS)
A. General
A Navigational Assistance Service is a service that provides essential and timely navigational information to assist in the on board navigational decision-making process and to monitor its effects. It may also involve the provision of navigational advice and/or instruction.
The Navigational Assistance Service is especially important in difficult navigational or meteorological circumstances or in case of defects or deficiencies.
A Navigational Assistance Service is an important supplement to the provision of other navigational services, such as pilotage. Navigational Assistance Service may be provided at the request of a vessel, irrespective of whether a pilot is on board, or when a navigational situation is observed and intervention by the VTS is deemed necessary.
Navigational Assistance Service requires positive identification and continuous communication throughout the process. If possible and if time permits, checks should normally be made prior to commencement of the provision of Navigational Assistance Service to assess the capability of the vessel to respond to the guidance given. An example of a checklist for provision of NAS is found in IALA Guideline 1089, which should be modified as required for local requirements.
VTS operators should be appropriately trained and ready to deliver Navigational Assistance Service when a situation that compromises navigational safety occurs.
B. Provision of a Navigational Assistance Service
It is recommended that a Navigational Assistance Service:
1. Is provided to an individual vessel, at the request of the vessel or when deemed necessary by the VTS, to assist the decisionmaking process on board the vessel concerned. This service consists of navigational matters relating to a specific vessel and may include information, warning, advice and instruction subject to the authority of the VTS.
2. Has a start and end time.
It is important that information to assist the on board decision-making is provided in a timely manner. It should be conducted in a clear and concise manner in order to maximise on board understanding and to eliminate the chance of misinterpretation and to minimize the risk of unwanted consequences.
Examples of developing situations where a Navigational Assistance Service may be provided:
<ul style="list-style-type: none"> • Risk of grounding; • Vessel deviating from the VTS sailing/passage plan; • Vessel unsure of its position or unable to determine its position; • Vessel unsure of the route to its destination; • Assistance to a vessel to an anchoring position; • Vessel defects or deficiencies, such as navigation or manoeuvring equipment failure; • Severe meteorological conditions (e.g. low visibility, strong winds); • Risk of collision between vessels; • Risk of collision with a fixed or floating object; • Assistance to a vessel to support the unexpected incapacity of a key member of the bridge team.
C. When should a Navigational Assistance Service be provided?
Navigational Assistance Service should be provided when:
<ul style="list-style-type: none"> • observed / deemed necessary by the VTS; • the vessel has requested the service.

<p>C. When should a Navigational Assistance Service be provided? <i>(Continue)</i></p>
<p>1. Observed / deemed necessary by the VTS. This may occur when the VTS observes a developing situation (e.g. vessel approaching shallow waters) and deems it necessary to interact with the bridge team.</p> <p>When the VTS observes a developing situation (e.g. a vessel deviating from a recommended route) and deems it necessary to intervene, it is likely that, under such circumstances, the immediate priority will be placed on providing the necessary assistance before attempting to formally negotiate the commencement of navigational assistance. However, once the immediate situation has been resolved, the continuation or completion of the service should be subsequently clarified and the use of the checklist considered.</p>
<p>2. On request by a vessel This may occur on request by a vessel in circumstances such as equipment failure or navigational unfamiliarity. Individual circumstances will dictate the degree of preparation that can be undertaken prior to commencing the Navigational Assistance Service on request. If possible, preparations should include an assessment of the capability of the vessel to undertake the passage safely and/or the risks involved if for any reason the VTS is not able to provide navigational assistance.</p> <p>The provision of navigational assistance does not absolve the master from the responsibility for the safety of the vessel; furthermore, the master should be made aware of any limitations that may affect the service provided. The VTS operator should also be aware of the specific responsibilities for collision avoidance that apply to the vessel.</p> <p>If possible and if time permits, checks should normally be made prior to commencement of the provision of navigational assistance to assess the capability of the vessel to respond to the guidance given. An example checklist for provision of NAS can be found in IALA Guideline 1089, which should be modified as required for local requirements.</p>
<p>D. Methods of communicating NAS</p>
<p>In providing a Navigational Assistance Service it is important that the interaction from a VTS centre to assist the on-board decision-making is conducted in a timely manner, is unambiguous and clearly understood by both parties and not open to interpretation.</p> <p>Messages relating to Navigational Assistance Service should always be addressed by name to the vessel participating in the service so that there is no doubt to which the content of the message is directed.</p> <p>Consideration should be given regarding the VHF radio frequency on which the Navigational Assistance Service should be provided depending on individual and local circumstances. An assessment should be made of the benefits of conducting the assistance on a discrete frequency so that interference from other users can be avoided, or the use of a common working frequency such that other users are aware of the likely actions of the vessel participating in the Navigational Assistance Service. Other options may be available if the participating vessel is able to monitor two or more frequencies.</p>
<p>E. Message Markers within NAS</p>
<p>Although any message marker may be used when providing a Navigational Assistance Service, INSTRUCTION as a message marker should only be provided when the VTS Operator has been given the authority to use it within the Navigational Assistance Service.</p> <p>It is recommended as best practice that message markers are always used when delivering Navigational Assistance Service irrespective of the language ability of the recipient. Navigational Assistance Service is often provided when a degree of stress or urgency exists and the use of message markers can help to ensure that the purpose of each part of the message is clear and unambiguous.</p> <p>Message Markers are further described in VTS Operational Procedures.</p> <p>For more details on the provision of VTS, see IALA Guideline 1089 Provision of Vessel Traffic Services (INS, TOS & NAS).</p>

4.6 Allied and Other Services
4.6.1 Introduction
Allied Services are services actively involved in the safe and efficient passage of the vessel through the VTS area.
Other Services refer to services other than the allied services, which MAY use VTS data to more effectively undertake their work (e.g. ensuring local security or preventing illegal imports).
The role of VTS is well established and its services are well positioned in the maritime domain. VTS information may be needed to support other services such as maritime security or environmental agencies, with which the VTS Authority may not have had previous interaction. The possible stakeholders who may wish or need to co-operate with the VTS Authority need to be identified. IALA Guideline 1102 VTS Interaction with Allied or Other Services has a broad perspective, to help VTS Authorities in their interaction with other services, outside the VTS area and examples of possible stakeholders can be found at ANNEX A to this Guideline.
4.6.2 Possible Interaction with Allied and Other Services
It should be taken into account, that interaction between VTS and allied or other services – inside or outside the maritime domain – could be necessary to sustain those services. In such a case, an arrangement between the VTS Authority and the provider(s) of those services should be in place.
In some cases, when considered necessary, support from VTS may extend outside the VTS area. This could result from national, regional or international arrangements.
Some examples of interaction between VTS and allied and other services are: <ul style="list-style-type: none"> • Security • Safety and protection of the marine environment • Efficiency of maritime traffic • Search and Rescue

4.7 Certification and Audit of Vessel Traffic Services (Day 7)
Appropriate and adequate operational and administrative procedures of the VTS should be in place. The Competent Authority should ensure that the operational and administration procedures used by a VTS Authority are appropriate for the declared services through certification and continual improvements.
Certification can be achieved by an appropriate auditing and accreditation process. IALA Guideline 1101 Auditing and Assessing VTS provides guidance for auditing and assessing a VTS and the subsequent on-going assessment and evaluation to ensure conformity with international obligations and is a framework to assist authorities to meet their requirements for the establishment and operation of VTS in a consistent manner.
Useful guidance may also be found in IALA Guideline 1115 on Preparing for an IMO IALA Member State Audit Scheme (IMSAS).
For further details on audits and quality management systems (QMS), see Quality Management in VTS.



CHAPTER 5. PRINCIPLES OF MANAGING VESSEL TRAFFIC
5.1 Introduction
<p>This chapter discusses the principles of managing vessel traffic that an authority may wish to implement in order to enhance safety and efficiency of vessel traffic in a port, waterway or coastal waters. These principles may be enacted in conjunction with the various types of service discussed in the previous chapter and with nautical service providers where necessary. However, before implementing any measure, the authority should evaluate the local conditions and, in addition, the authority should evaluate the arrangements concerned between shipping interests and terminals, where appropriate.</p> <p>The evaluation should include a review of the geography, meteorology, hydrology and environmental issues of the port or regional area; an assessment of the types and numbers of vessels operating within it; consideration of port business interests; a review of water-space management techniques, and conclude with an evaluation of the types of service and how they can contribute to safety and efficiency of marine traffic operating within the area. The primary issues are outlined below and may need to be taken into account in determining whether a VTS is required to enhance safety and efficiency of marine traffic, a process that is described more fully in CHAPTER 6 – Determining the need for VTS.</p>
5.2 Geography, Meteorology, Hydrology and Environmental Issues
<p>The geography, meteorology, hydrology and topography of the local or regional area will determine the way in which traffic operates within the area, the type of traffic that can safely use the area and how it may be managed.</p>
5.2.1 Geography
<p>This involves an assessment of the water-space available for navigation, identification of the fairways or channels and how they might be marked. Consideration should also be given to the proximity of isolated dangers and the quality/ availability of primary and alternative methods of positioning and navigation. Guidance on assessing the criteria for safe shipping movements has been published by the Permanent International Association of Navigation Congresses (PIANC) and includes a discussion of the risks associated with, and the relationship between factors such as vessel draught, Under Keel Clearance (UKC) and channel width. The control and management of UKC is a key risk management and safety feature.</p> <p>Its calculation includes an allowance for factors such as: vessel construction, water density, squat, wave and swell allowance and bottom type.</p>
5.2.2 Meteorology
<p>Factors such as the speed and direction of the prevailing wind, direction and height of the waves, visibility and the formation of ice may impact on the assessment of the safe operating patterns in a particular area, fairway or channel and the types of vessels that may be permitted to operate within the area.</p>
5.2.3 Hydrology
<p>The establishment of safe operating areas, fairways and channels should take into account the hydrology of the area. This will include factors such as the stability of the seabed, the accuracy of surveys, tidal ranges, tidal streams, prevailing currents and swell.</p>
5.2.4 Environmental Issues
<p>There are areas where the risk of, or consequences of an incident would be such that extra safety provisions, over that normally applied, may be appropriate. These areas must be identified so that the VTS can accommodate them.</p> <p>There is an increasing awareness of the impact of emissions from vessels either when alongside, when manoeuvring, or in coastal waters. VTS and pilots may have a role in monitoring adherence to regulations and specific operational procedures may apply.</p>
5.3 Vessel Types and Traffic Density
<p>The geography, meteorology and hydrological considerations above should be closely linked with an assessment of the types of vessels, their size and manoeuvrability, traffic density, traffic patterns and the trade being conducted in the area. The inter-relationship between the environmental factors and the vessel size is self-evident but special consideration may need to be given to the type of vessels and the cargoes being carried, particularly where these incur additional risk.</p>

5.3 Vessel Types and Traffic Density *(Continue)*

International guidance provides options for some high-risk ships, and national legislation may dictate the need for additional restrictions in the management of certain cargoes. For example, the Society of International Gas Tanker and Terminal Operators (SIGTTO) document 'LNG Operations in Port Areas' gives guidance about the factors that need consideration when establishing the size of domain that should be used with liquefied gas shipping when in a narrow channel. Such guidance relies on the output obtained from a relevant risk-assessment.

5.4 Business Interests

Ports must operate in an efficient manner to meet the needs of the users but this must be done without impinging on the safety of operations and protection of the environment. Recreational activities, issues associated with oil and gas production and military operations may take place within the area to be covered by Vessel Traffic Services. A good working relationship needs to be established and maintained with other users of the area and allied services. The authority must make due allowance for any potential conflict between safety, business interests and other activities of service providers in the port and pre-empt such conflicts before they arise.

5.5 Waterspace Management

Having established the available water-space and the type of vessels that will be operating within the area, a number of techniques are available to manage traffic. These include:

5.5.1 Channel and Fairway Dimensions

Safety of navigation may be enhanced by establishing a deep-water channel within a buoyed fairway that would permit shallower draught vessels to navigate safely outside of the deep-water channel, whilst remaining within the buoyed fairway.

5.5.2 Traffic Separation Schemes

TSS may be established to organise traffic where traffic patterns and traffic flows indicate that this may be desirable.

TSS may be established by national authorities within their territorial sea but those in international waters must be adopted by IMO. Guidance for establishing a TSS is contained in the IMO Publication - 'General Provisions on Ships' Routeing'.

5.5.3 Two-Way Traffic

Within a channel, normal two-way traffic flows may be permitted. This may involve granting approval for overtaking and for encounters involving vessels carrying hazardous cargoes.

Further consideration should be given to additional restrictions involving overtaking and encounters at pinch points such as bends in the channel.

5.5.4 One-Way Traffic

Risk assessment may indicate the desirability of limiting the flow of traffic to one-way only for all vessels or for vessels of a particular size, type or cargo.

5.5.5 Point of No Return

Ports with significant tidal ranges may need to identify 'points of no return' or 'abort' points to ensure that a vessel can return to safe water, a lay-by berth or an anchorage in the event that the planned berth is unable to accept the vessels.

5.5.6 Anchorages

In establishing anchorage areas, consideration should be given to factors such as shelter, depth, holding ground and proximity to channels and fairways. Specific anchorages may be reserved for use by large vessels or those carrying dangerous goods that are unable to proceed to their planned berth.

5.5.7 Slot Management

The techniques above of 'point of no return', 'two-way and one-way traffic' management may be combined with the requirement for slot management. This is the process whereby a vessel is allocated a time window/slot or turn to make or begin its transit through all or part of a designated channel.

5.5.8 Ship Domain
An operational zone around, above or below a vessel within which an incursion by another fixed or moving object, or another domain, may trigger reactions or processes. The size of a domain may vary for the same vessel dependent on a number of circumstances such as: the dimensions of the waterway; traffic density; ship size; ship characteristics; ship speed; and aspect of encounter. A Ship Domain is widely used in traffic simulation models, encounter criteria, traffic lane design criteria, VTS planning, risk assessment, collision avoidance, and for other applications such as establishing operational procedures and the dimensions of a Ship Safety Zone.
5.5.9 Ship Safety Zone
A zone around a vessel within which all other vessels should remain clear unless authorised. The size of the Ship Safety Zone may vary depending upon such factors as: the dimensions of the waterway; ship size; ship characteristics, cargo, and the degree of risk. The dimensions selected should be determined taking into account these details and a relevant risk assessment.
5.5.10 Exclusion Zone
A geographical area, within which all other vessels should remain clear unless authorised. The size and shape of the area may vary depending on the risks involved.
5.5.11 Clearance of Ship Movements
Traffic movements may be managed within a port through the clearance of ship movements. This requires vessels to seek clearance before entering or navigating within a VTS area and may include the provision for advanced notice to enable the managing authority to assess the situation and set conditions for the movement should this be necessary.
5.5.12 Organising Arrivals and Departures
The organization of arrival and departure times to and from the berth or pilot station or port approach point is an effective way of managing traffic movements and establishing priorities for individual vessels. This is frequently achieved through negotiation with terminals and allied services.

5.6 Types of Service
Assessment of the issues above is fundamental considerations in determining the need for a VTS and in selecting the type(s) of service to be provided, appropriate to that VTS. Waterspace management such as the establishment and marking of channels and fairways and the establishment of Traffic Separation Schemes (TSS) are measures that may be used in conjunction with a VTS, but may also be used separately.
Techniques involving the closer management of vessel traffic, however, will invariably involve the establishment of a VTS. Where it is decided to establish a VTS, water-space management will be a key consideration in determining the type of service that will be required. Other measures described above are measures that would normally require a Traffic Organization Service (TOS). The complexity of the navigational environment will determine through risk assessment the additional arrangements, measures and type(s) of service required.
In all cases, the training and qualifications of VTS Operators providing the service and their authorisations should be clearly identified and clear operating procedures established VTS Operational Procedures (SOP).



Chapter 6 PROMULGATION OF VTS INFORMATION

6.1 Introduction

The purpose of this chapter is to draw attention to the requirements for promulgating information about Vessel Traffic Services and to provide advice as to the information that might be considered appropriate for publication.

There are two potential beneficiaries of this VTS information, namely, the:

- mariner, who needs to know what services and activities a specific VTS is able to provide and perform and under what circumstances; and
- VTS Authority and/or the Competent Authority, in deciding what VTS may be required to mitigate identified risks, and thereby what type and availability of VTS should be procured.

6.2 Requirement

IMO has set out the requirement for publishing VTS information in Resolution A.857(20) as follows:

- The VTS Authority should, in a timely manner, provide mariners with full details of the requirements to be met and the procedures to be followed in the VTS area;
- This information should include the categories of vessels required or expected to participate; radio frequencies to be used for reporting; areas of applicability; the times and geographical positions for submitting reports; the format and content of the required reports; the VTS Authority responsible for the operation of the service; any information, advice or instructions to be provided to participating ships; and the types and level of services available; and
- This information should be published in the appropriate nautical publications.

In setting this requirement, it was recognised that VTS information is published in a variety of nautical publications that are widely made available to the mariner, and by individual VTS Authorities. In the latter case, the data provided may refer to only the local VTS area. It is important that mariners have ready access to the range of information and procedures that they may require when entering or passing through a VTS area, this includes information about vessels that may be encountered when using a waterway.

6.3 Promulgation of Information

VTS Authorities are advised to consider the extent and means of publishing information about the services that they provide. In particular, they should ensure that all potential marine users of their services are fully informed about their services, the facilities available and the requirements to report information about their vessel and its movements when approaching or entering a VTS area.

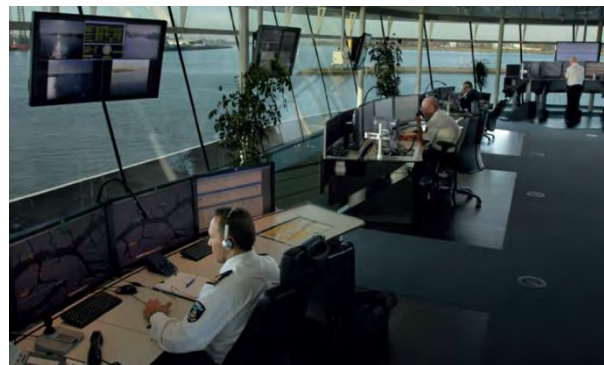
It is recommended that VTS Authorities should maintain up-to-date entries in the appropriate Lists of Radio Signals and nautical publications on ports and port entry. Additionally, it is recommended that other, more immediate means of promulgation should be considered: such as a website, Master's Guide, e-mail or other text transfer media, recognising that an appropriate degree of security may be required to avoid the possibility of malicious action resulting from the deliberate misuse of sensitive information.

6.4 Information

The following list of headings is intended as a guide to the type of information that might need to be promulgated:

VTS Authority	The name of the VTS Authority and contact details.
Title of VTS	The name of the VTS or VTS area.
Description	Brief overview of the services and whether participation is voluntary or mandatory and to which vessels it applies.
VTS area	Define the area boundaries.
VTS sectors	Where an area is sub-divided into separate operational sectors provide details of boundaries.
VTS centre	Define location(s) and details of VTS centre(s)

6.4 Information (Continue)	
Communications	(Location, Telephone, Fax and e-mail identities). VHF channels to be used. Other communications channels. Mother tongue and languages that may be used. Circumstances when SMCP is required.
Reporting	Details of reports required and when these should be made.
Reporting points	Identify geographical locations at which reports are to be made.
Callsigns	Callsigns to be used where this differs from the VTS name. Sector or local area Callsigns.
Hours of operation	Where services are not provided on a continuous basis specify hours of operation.
Traffic Image Generation	Key equipment used to generate the traffic image, coverage and, if appropriate, availability when less than 'continuous'.
Types of Service	Types of service provided (INS, NAS or TOS).
VTS Procedures	Procedures for vessels entering, transiting and departing VTS areas and/or sectors.
Accident Procedures	Procedures for vessels involved in specific accidents or emergencies.
VHF Frequencies	Details of working frequencies and authority/allied service using them.
Information Broadcasts	Details of the schedule, content and purpose of local broadcasts to shipping.
Allied Services	Availability of allied services and/or availability of VTS information to allied services.
Amplifying Notes	Local regulations and practice, and other relevant items not included above.
Diagrams	Include diagrams to indicate key features of the VTS area(s), anchorages and berths, with particular reference to dangers and areas to avoid.



CHAPTER 7 ADMINISTRATIVE REQUIREMENTS

7.1 Introduction

Effective administration and support is essential for the proper functioning of a VTS. Administrative guidance and instructions should be documented and available to all VTS staff.

The extent of the supporting activities is likely to be related directly to the size of the VTS area, the number of sub-areas and sectors, the service being provided and the hours of service of the VTS. The existing administrative infrastructure of the VTS Authority or Competent Authority may also dictate the extent to which additional VTS administrative support will be required.

7.2 Strategy and Planning

VTS Authorities will to a greater or lesser extent be involved in the strategy, planning and continuous development of VTS. This will drive the provision of administrative support required for the proper operation of vessel traffic services. This will involve:

- | | | | |
|--------------|-------------|-----------------------------|---------------|
| • Personnel; | • Legal; | • Equipment and Facilities; | • Procedures; |
| • Finance; | • Security; | • Other Activities | |

Day 8

7.3 Personnel

It is a key function of support to ensure that trained, qualified and well-motivated members of staff are available for duty, both routine and in an emergency.

Personnel administrative activities include:

- Maintenance of personnel rosters, including watch schedules and duty rosters providing assurances for adequate staff rest, working hours and vacations;
- Maintenance of training records, including: Training schedules Records of training completed Training procedures
- Recruitment;
- Management of pay and allowances, including management of overtime;
- Completion of performance evaluations;
- Development and maintenance of the VTS chain of command and organization, including job descriptions;
- Personal health monitoring; and
- Workplace health and safety management and training.

7.4 Legal Matters

Legal Framework and Guidelines for VTS obligations are normally amplified by national laws and regulations and invariably include powers derogated to VTS Authorities. Guidance should be available to VTS staff on the extent of the powers delegated to them through the VTS Authority and the limits of their liability.

One of the tasks of a VTS may be the enforcement of regulations within the VTS area. This may lead to prosecutions so it is therefore important to use formal and correct procedures. It is also important that administrative procedures are in place to ensure the accurate reporting and recording of violations and infringements that may be used as evidence.

7.5 Equipment and Facilities

This section deals with administrative support of equipment and facilities. The proper operation of VTS equipment to its designed specification is critical to ensure the continuity, reliability, integrity, and quality of vessel traffic services being provided.

Procedures should be in place for:

- Scheduled preventive maintenance;
- Agreement between maintenance and operations in case of repair/maintenance work;
- Regular monitoring of equipment against set performance targets;
- Reporting equipment defects;

7.5 Equipment and Facilities <i>(Continue)</i>
<ul style="list-style-type: none"> • Reporting repair intentions; • Reporting progress or completion of repairs; and • Acceptance that equipment is operating to the appropriate standard, by the VTS Manager or watch Supervisor.
<p>If a VTS incorporates equipment and/or facility redundancy arrangements, administrative procedures should be in place for the seamless transition to maintain operational functions.</p>

7.6 Processes and Procedures
<p>Administrative activities in support of operational procedures should include:</p> <ul style="list-style-type: none"> • Establishment, maintenance and audit of a Quality Management System (CHAPTER 10); • This may draw on the external support from a classification society. • Documentation of procedures including configuration management to capture and implement operational changes; • Liaison with allied services; • Ensuring completion of required reports and records for Competent Authority and other agencies; • Maintenance of reference library, including Notices to Mariners, tidal information, other reference data; and • Handling data storage, voice tapes/video/sensor recordings and responding to routine external requests for such data.

7.7 Finance
<p>There are two financial aspects of that may need consideration:</p>
<p>1. Internal - control of the budget of the VTS centre in terms of income and expenditure</p>
<p>2. External billing associated with use of the port or waterway services.</p>
<p>Specific tasks associated with finance include:</p> <ul style="list-style-type: none"> • Accounting/book-keeping; • Billing services - if there are charges for VTS, recordkeeping for other services (e.g. pilotage, port tariffs, etc.); • Auditing - there will be requirements for the VTS centre to account for expenditure and income to the relevant authority; • Budgeting; and • Pay and allowances.

7.8 Security
<p>IMO has established international guidance on maritime security. Many of the requirements from the International Ship and Port Facilities Code (ISPS)</p>
<p>The administration of security requirements for the VTS must consider the security of the VTS infrastructure and VTS contribution to maritime security.</p>
<p>Administrative arrangements for security of the VTS infrastructure may include:</p> <ul style="list-style-type: none"> • Physical security of the VTS centre and remote sites; • Security of information systems supporting VTS; and • Personnel security, including the security clearance of VTS staff and visitors. <p>Administrative processes that support VTS contribution to maritime security may include:</p> <ul style="list-style-type: none"> • Gathering security related data; • Validation of security related data; • Data storage; • Authorisation for access to security related data; • Liaison and agreements with other agencies; and • Exchange of data with security services.

7.9 Other Administrative Activities

Depending upon the size of the operation, other functions may need to be considered such as transportation, provision of parking facilities, firefighting arrangements, visits by VIPs or school parties and other public relations activities.

However, administrative instructions should be in place to ensure that the VTS personnel are aware of their delegated authority for the release of information gathered by the VTS.

7.10 Distractions

Care should be taken not to distract VTSOs from their primary duties of ensuring safety of navigation. Systems, processes and procedures should support the needs of VTSOs.

Distractions may be authorised/necessary or unauthorised/unnecessary

Authorised/necessary type distractions may be caused by:

- | | | | | |
|-------------|---------------|----------|-------------------|--------------|
| • Visitors; | • Phone Calls | • Emails | • Report writing; | Maintenance. |
|-------------|---------------|----------|-------------------|--------------|

Unauthorised/unnecessary type distractions are often tolerated by management or even operational colleagues and may be caused by:

- | | | | | |
|--------------------|----------------|----------------------|-------------|--------|
| • Visitors; | • Phone calls; | • Internet browsing; | Television; | Music; |
| • Eating/drinking; | • Sleeping; | • Smoking. | | |

Any type of distraction, which compromises the safety of navigation, should not be tolerated at any time.

These unwanted distractions may be controlled by:

- Standard Operating Procedures (SOPs);
- Discipline, including self-discipline;
- Prioritisation; and
- Teamwork.

It is up to the authority concerned as well as VTS management to ensure that distractions are kept to an absolute minimum.



CHAPTER 8 OPERATIONAL RECORDS, ARCHIVES AND REPLAY

8.1 Introduction

The nature of VTS operations is such that there may be a need or requirement to access, analyse and review previous events. Therefore, proper requirements and processes are needed for the capture, secure storage, retrieval and presentation of VTS related information.

Advances in data storage techniques now make possible archiving and retrieval options that may have appeared unachievable only a short period ago. For example, storage and retrieval of basic raw data may be enhanced by the added capability of recording operator actions, the Human Machine Interface (HMI), which may prove invaluable in justifying the actions of VTS Staff in post incident analysis as well as improving the efficiency of VTS operations.

This chapter provides guidance on recording, archiving and replay techniques that a VTS Authority may wish to consider in selecting systems and procedures that are appropriate to their needs.

8.2 Purpose of Recording and Replay

Recordings may be required for the following purposes:

- “Instant replay” during normal operation
- review of an accident for incident investigation;
- use as evidence following an accident or incident;
- technical evaluation and to check the function and performance of sensors etc.;
- quality monitoring of the operation of VTS as a whole and to allow for continuous improvement;
- statistical analysis of traffic patterns etc.; and
- training purposes.

8.3 Types of Data to be Recorded

The following areas may be considered for data capture (see also IALA Guideline 1111 - ‘Preparation of Operational and Technical Performance Requirements for VTS Systems’ section 1.4.2), as appropriate:

- Radio Communications;
- Telephone Communications (national privacy laws may be applicable);
- Sensor data used to generate the vessel traffic image such as:

✓ Radar	✓ VHF DF	✓ AIS	✓ CCTV
✓ Long-range sensor data		✓ Fused sensor data (track data, vessel traffic image, etc.)	
- Meteorological and hydrological data;
- Management Information Systems data, which may include:
 - ✓ Shipping information i.e. vessel and
 - ✓ cargo data, including vessel movement information;
 - ✓ Pilotage management;
 - ✓ Allied service provisions i.e. tug and line handing allocations.
- Logs and Textual records:

✓ Operator actions (HMI);	✓ System BITE and logs.
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8.4 Recording frequency and sampling rates

The frequency of sampling for recorded data sets should be defined for each specific type of data (e.g. continuously for Voice Communications, and at an appropriate rate for meteorological or hydrological data).

The relevant authority should define the period of time and temporal resolution of sensor data and other tracking performance parameters depending on traffic density and types of tracks.

While the frequency of individual data items may differ from item to item, the recording of all data sets should be continuous and time stamped to a common time frame. A VTS system should have a master time reference to which all components and recordings are aligned.

Proper care should be taken by the relevant authority when considering the recording process and data storage with regard to failure to record or inadvertent loss of recordings.

8.5 Storage of Recordings

IMO recommends a minimum of 30 days for other shore side activities (such as SAR) as the time period to allow for the full retrieval of data post incident/accident. It can be assumed that this requirement is appropriate for VTS and applies to all data sets that may be used for incident replay.

As this data will be recorded in a rolling loop of, for example the most recent 30 days data, there is a requirement to store recordings for a period of time to safeguard recorded data in case of an incident. It should be easy for a VTS operator or supervisor to export and / or archive a period of recorded data to external devices (e.g. Network Attached Storage, DVD, External hard disks tape storage or similar).

Certain data should be considered for longer term storage in support of such benefits as analysis of traffic patterns and their changes over time, waterway usage changes, input for analysis of changes to buoyage and other aids to navigation and other such strategic vessel traffic management uses. It is possible that such long term archival of data is beyond the capability or responsibility of the VTS; the capabilities of other organisations should be considered for this purpose (e.g., archival or statistical administrations).

VTS Authorities should ensure the integrity and availability of recorded data. A capability should be provided to store recordings of specific incident data beyond the minimum storage time or to produce a permanent record for legal, regulatory or analysis purposes. Consideration should be given to securing recordings from unauthorised access or tampering, particularly those to be used in accident investigation or legal action.

The large file size of some data items such as audio or CCTV images, may necessitate moving of the data to another devices (Network Attached Storage, DVD or similar) for longer term storage. This may also be a consideration in deciding whether to record and store original (raw) video, or digital (extracted) images as presented to an operator.

To ensure that records are consistent and complete, the data recording process should normally be automated and consideration should be given to the provision of a stand-alone replay system that does not interfere with the VTS function.

Consideration should be given to allow the retrieval of VTS information in standard formats (e.g. delimited text files or extensible mark-up language (XML)) and non-proprietary audio and video/image files.

8.6 Replay System

Any replay system must ensure that times are accurately identified so that the traffic situation can be rebuilt during replay. VTS Authorities may consider the integrated and synchronised replay of different data sources to aid incident review. Replay may be required for the following purposes:

- Technical replay – using previously recorded data to fine-tune the system;
- Operator replay – replay of data sets as seen by VTSSO for internal analysis or OJT training;
- External replay – ‘standalone’ replay functionality, for example when replaying to a court or official inquiry.

CHAPTER 9 PUBLIC INFORMATION (Day 9)

9.1 General

Vessel Traffic Services operate in the public interest. Therefore VTS Authorities have a *duty to inform* the public of their activities and to cooperate with stakeholders. The VTS Authority has access to a large amount of information through the VTS centre and this information can be used to inform stakeholders, either directly or through the media, and to improve public awareness of their activities and of events in the VTS area.

9.2 Information Policy

VTS Authorities should adopt an information policy. If the VTS centre is part of a larger organization, its policy will need to align with those of the parent organization.

VTS Authorities should consider appointing a staff member responsible for media liaison. This person should have a thorough knowledge of VTS operations, as well as handling the media/public, and, ideally, should not be a regular watchkeeper.

The main role is to provide a focal point for public information and to be known to the media as a point-of-contact for enquiries. Tasks should include routine contact with the local media, the arrangement of exchange visits, the provision of briefings on day-to-day or small-scale operations, and the arrangement of press facilities during largescale operations.

Where a VTS Authority does not appoint a specific member of staff to liaise with the media, a suitable person should be nominated, as necessary, on a case-by-case basis. In every case the person designated to liaise with the media should have appropriate training.

In an emergency or incident situation, the media will probably try to contact the VTS centre directly and use every means at their disposal in order to obtain information. However, VTS personnel should not express opinions, or speculate on outcomes of incidents, but direct the media to the person appointed to liaise with the media according to the procedures.

When providing information on events of immediate and/or particular interest to the media, the VTS Authority should endeavour to provide that information through the person nominated for media liaison at regular intervals during operations and/or whenever important developments occur.

The VTS Authority should ensure that information released is timely, factual, accurate and relates only to the details of the particular incident. Information should not be provided that could:

- be harmful to security in general;
- intrude on personal privacy;
- hamper or interfere with VTS operations;
- affect the outcome of any investigation or future legal action.

Due care should be taken not to release proprietary or sensitive information, unless those sources approve of the release, or the passage of time has eliminated the commercial value of the proprietary information.

9.3 Relationships with the Media

The maintenance of good working relationships with the media is of considerable potential benefit to a VTS Authority, as it keeps the public routinely informed of matters of general interest. This helps to keep the work of the VTS in the public mind and promotes an awareness of the associated benefits that are derived by the community.

Routine contact and press releases enables an authority to develop a relationship with the public on key matters such as maritime safety, port and waterways efficiency and environmental protection, particularly where other stakeholders might have shared responsibilities or concerns.

For events where the media interest is likely to be high, such as a major incident, it is advisable to have in place a pre-determined media plan, as an integral part of the VTS incident contingency plan. Such a plan should include that all media information will only be provided by the person responsible for media liaison, to help ensure that the main resources of the VTS Authority and VTSOs are devoted to the incident and are not distracted by media enquiries. At the same time, it will be necessary to ensure that the media are kept fully and accurately informed. The VTS Authority may, in cooperation with other relevant authorities, arrange for separate facilities in order to conduct press briefings. It is important to note that, whilst every assistance should be given to the media, their presence should not be allowed to interfere with VTS operations.

9.4 Provision of Information

The data collected by a VTS centre may be of great value to many stakeholders and also be of great interest to others. The increase in the ability to collect and access data with electronic systems has made this data easier to share. However, at the same time, unauthorised eavesdropping has become easier, particularly for people intent on malpractice or sabotage.

VTS Authorities should establish robust procedures for the release of different types of information to authorised stakeholders and to safeguard information, whose unauthorised use could, in the wrong hands, jeopardise safety and security.

9.5 User Education and Public Awareness Programmes

A VTS may find it beneficial to implement a programme to target members of the maritime community who desire or need knowledge of VTS operations. It should be flexible enough to adapt to the operational needs of any audience including pilots, licensed mariners, fishermen, yachting organizations and non-traditional VTS stakeholders/users such as marine construction companies, shipping agents, and transportation authorities for other modes of transportation.

The programme should include an overview of the VTS mission, geographic boundaries, equipment capabilities and limitations, and personnel duties.

It should also provide an explanation of VTS participation, communications requirements and national/local regulations for VTS users.

Public awareness programs are intended to promote the philosophy that mariners and the VTS work together to make ports and waterways safer and more efficient. The maritime community and the VTS Authority should continually discuss ways in which they can help each other achieve common goals for the benefit of all.

9.6 Ship / VTS Interaction and Related Facility Visits

Experience gained by VTS personnel aboard vessels and visits to maritime facilities operating in their VTS area can provide great benefit to the VTS and to the maritime community. Such activities serve to:

- provide information directly to VTS stakeholders;
- enable VTS stakeholders to give feedback directly to VTS personnel; and
- improve VTS personnel's understanding of the duties, responsibilities, and concerns of the VTS stakeholders.

Competent and/or VTS Authorities may consider making their facilities accessible to the general public, taking into consideration the security of the VTS centres, the impact on VTS operations and other constraints. Public visits to a VTS centre in operation helps to promote a better understanding of the VTS and fosters more positive attitudes towards the safety of navigation and the protection of the environment.

9.7 Participation in Advisory Committees

The VTS Authority should be responsive to public attitudes and interests, and execute a plan of action to promote public understanding and respect. A public relations programme might include:

- Liaison and co-operation with various associations and organizations.
- Establishing a marine industry advisory committee.
- Public visits to VTS centres.
- Participating in special events.
- Humanitarian actions.

VTS Authority representation in local maritime committee meetings, consultative groups and other public forums provides an opportunity to exchange information and discuss maritime related issues. Active participation in such committees also advances the development of strong working relationships with local stakeholders

CHAPTER 10 QUALITY MANAGEMENT IN VTS
10.1 Background
<p>Vessel Traffic Services implemented by a Competent Authority are subject to IMO Member State Audit Scheme (IMSAS).</p> <p>All IMO audits from 1 January 2016 are mandatory and should be arranged and carried out in line with the framework and procedures for the IMO Member State Audit Scheme, using the IMO Instruments Implementation Code (III Code) as the audit standard.</p>
<p>IALA has developed Guideline No. 1115 on 'Preparing for IMO Member State Audit Scheme (IMSAS) On Vessel Traffic Services' in order to provide guidance for Contracting Governments and Competent Authorities to meet the objectives of an IMO Member State Audit Scheme (IMSAS) with respect to the implementation and delivery of VTS and to demonstrate they are fulfilling their responsibilities under the general provisions of treaty law and IMO conventions for promulgating laws and regulations. They are also responsible for taking all other steps which may be necessary to give full and complete effect to SOLAS Chapter V (Safety of Navigation) Regulation 12 (Vessel Traffic Services).</p>
<p>IALA is committed to the provision of high quality services and encourages navigation authorities to adopt internationally recognised standards for the management and delivery of services as set out in IALA Recommendation O-132 - 'Quality Management for Aids to Navigation Authorities'.</p> <p>For the purposes of this Recommendation, VTS is deemed to be an Aid to Navigation. IALA Recommendation O-132 recommends that:</p> <ul style="list-style-type: none"> • Authorities responsible for aids to navigation, implement and maintain a Quality Management System (QMS); • Authorities ensure the ongoing integrity of the QMS through periodic: <ul style="list-style-type: none"> ✓ Certification by an accredited third party; and/or ✓ Assessment by a third party; and/or ✓ Self-assessment.
<p>Authorities responsible for aids to navigation use related IALA documentation, including:</p> <ul style="list-style-type: none"> • IALA Guideline 1052 on the Use of Quality Management Systems for Aids to Navigation Service Delivery;
<p>The requirement for service providing organizations to adopt quality management principles is well established throughout the world. IMO introduced a mandatory system for shipping and ship operators in 2002, the International Safety Management (ISM) Code.</p>
<p><i>The purpose of the Code is to provide an international standard for the safe management and operation of ships and for pollution prevention. (Preamble, ISM Code 2002)</i></p>
10.2 Quality Management System
<p>A Quality Management System is defined as a business management system to direct and control an organization with regard to quality, i.e. to achieve its objectives. It is not a simple set of documents but a dynamic process that brings resources, activities and behaviors together and focuses on the achievement of objectives.</p>
<p>The focus in modern quality management is to process rather than procedures. A basic but fundamental approach to quality is the four steps of the quality improvement loop:</p> <ol style="list-style-type: none"> 1. Preparing and planning; 2. Realisation of the objectives; 3. Checking of outcomes in the light of the client's expectations; and 4. Reacting to this information to improve the service.
<p>There are many ways to implement a quality management system. Some VTS Authorities may choose to use a third party assessment or audit.</p> <p>Others may opt to develop their own mechanisms for certification and review.</p>
10.3 Benefits derived from a Quality Management System
<p>An active Quality Management System provides a tool to ensure that the objectives of the VTS are met and that the standards set by the Competent Authority for service provision and operator qualifications continue to be met.</p>

10.3 Benefits derived from a Quality Management System <i>(Continue)</i>
<p>Properly conducted, a Quality Management System will ensure that a consistent quality of service is maintained to meet the demands of local maritime traffic. The benefits resulting from having a quality management system are well recognised and wide-ranging.</p> <p>Some of benefits include:</p> <ul style="list-style-type: none"> • Improved stakeholder confidence and satisfaction; • Continual process improvement; • Increased productivity and efficiency; • Prompt and effective action on faults or complaints; • Improved teamwork and communication; • Enhanced quality awareness within the whole organization; • Availability of proper documentation; and • Assurance of effective management.

10.4 Quality Management Principles
<p>The International Organization for Standardisation (ISO) defines seven quality management principles. The basic principles that need to be considered when establishing a quality management environment are:</p>
10.4.1 Principle 1 — Customer-Focused Organization
<p>Organizations depend on their customers and therefore should understand current and future customer needs, meet customer requirements and strive to exceed customer expectations.</p>
10.4.2 Principle 2 — Leadership
<p>Leaders establish unity of purpose and direction of the organization. They should create and maintain the internal environment in which people can become fully involved in achieving the organization's objectives.</p>
10.4.3 Principle 3 — Involvement of People
<p>People at all levels are the essence of an organization and their full involvement enables their abilities to be used for the organization's benefit.</p>
10.4.4 Principle 4 — Process Approach
<p>A desired result is achieved more efficiently when related resources and activities are managed as a process.</p>
10.4.5 Principle 5 — Continual Improvement
<p>Continual improvement should be a permanent objective of the organization.</p>
10.4.6 Principle 6 — Factual approach to decision making
<p>Effective decisions are based on the analysis of data and information.</p>
10.4.7 Principle 7 — Mutually beneficial service relationships
<p>An organization and its service users are interdependent, and a mutually beneficial relationship enhances the ability of both to create value.</p>

10.5 Quality Management and the Maritime Industry
<p>Although quality management systems were originally developed for the manufacturing industry, most ship management and marine service companies today have obtained quality management certification. International regulations are also under review, which may require the certification of flag state administrations.</p> <p>The Implementation of IMO Instruments (III) Subcommittee has also addressed the ability of maritime administrations to provide quality management and implement the international maritime conventions and rules properly.</p> <p>Quality certification of a maritime administration's management system can be of significant benefit in overcoming the negative connotations about open ship registries and verifying a flag state's ability to implement and administer international rules and regulations in today's evolving maritime regulatory climate. ISO 9001:2015 certification provides an opportunity for well-run ship registries and flag states to have their management operations and administrative functions documented by internationally recognised, unbiased third-party auditors, such as the Classification Societies.</p>

10.6 ISO and Quality System Management
<p>ISO is the acronym for the International Organization for Standardisation. ISO 9000 is a series of five international standards on quality management and assurance. For example, ISO 9001:2015 is the quality standard used by companies whose products or services have already been marketed, tested, improved and approved.</p> <p>These companies focus their quality efforts on maintaining and improving existing quality systems. ISO defines a quality system as: 'The organizational structure, responsibilities, procedures, processes and resources needed to implement quality management.'</p> <p>In the case of a maritime administration, this certification encompasses vessel registration, crew examination, officer licensing, seafarers' identification and qualification documents, radio authority, vessel inspections, technical assistance and investigations.</p>

10.7 Key Elements of a VTS Quality Management System								
<p>Key elements of a Quality Management System that should be considered by a VTS Authority include:</p> <table border="1" style="width: 100%;"> <tr> <td style="width: 50%;">1. Scope</td> <td style="width: 50%;">2. Policy</td> </tr> <tr> <td>5. Operational Procedures</td> <td>6. Continuous Improvement</td> </tr> <tr> <td>3. Responsibilities</td> <td>7. Audits</td> </tr> <tr> <td>7. Audits</td> <td>4 Planning and Reporting</td> </tr> </table>	1. Scope	2. Policy	5. Operational Procedures	6. Continuous Improvement	3. Responsibilities	7. Audits	7. Audits	4 Planning and Reporting
1. Scope	2. Policy							
5. Operational Procedures	6. Continuous Improvement							
3. Responsibilities	7. Audits							
7. Audits	4 Planning and Reporting							

10.8 Scope
<p>The scope of activities to be covered under a Quality Management System needs to be clearly defined at the highest management level.</p>

10.8.1 Example of a Scope Statement Port '<name>' - VTS Management System
<p>The scope of activities covered under Port '<name>' Management System is the development and administration of standards to:</p> <ul style="list-style-type: none"> • Deliver VTS that contribute to achieving the Authority's objectives of improving maritime safety and minimise the risk of ship sourced pollution and environmental damage within region; • Provide an ability to respond more quickly in the event of any safety or pollution incident; • Provide VTS capabilities to interact with and respond to developing traffic situations, including assisting with distress situations; • Improve processes and systems, and capitalise on existing and emerging technologies; • Deliver services that are relevant to current shipping management practice, user expectations, and community perceptions; • Enhance relationships with allied services, stakeholders and other interested parties; • Monitor and analyse the strategic environment to identify future directions, resource requirements etc. as the role of other agencies, allied services and client groups increasingly impact on the VTS; • Adopt best practice governance arrangements; • Provide corporate wide support for the delivery of VTS services in relation to legal, financial, human resources, contractual arrangements, business services, information technology (including records management), quality management, government liaison, public relations and corporate planning; • Provide training (both competency and course based) leading to the granting of qualifications for staff; and • Develop Disaster Recovery Procedures to ensure minimal disruption to services in unexpected or extreme circumstances.

10.9 Policy
<p>The objectives of the VTS should be clearly defined in an Authority Policy Statement that highlights the authority's commitment to good governance, best practice operations, risk management and continuous improvement and key strategies to meet these commitments.</p> <p>The policy for the conduct of an organization, and the resources allocated, can only be set at the highest management level. It is incumbent upon those at board or director level to establish clear policy objectives, particularly with regard to quality of performance and delivery, if all personnel involved in the undertaking are to operate effectively.</p>

10.9.1 Example of a Quality Policy Statement for a VTS
The Aim of the VTS is 'To Deliver a Reliable, Efficient and Cost Effective 'VTS Service' for the Benefit and Safety of all Mariners and other Stakeholders'.
VTS '<name>' - Health & Safety and Environmental Objectives Policy Statement: <ul style="list-style-type: none"> • To ensure safety at sea; • Prevention of human injury or loss of life; and Avoidance of damage to the environment. • In pursuance of these objectives, VTS is committed to: • Providing for safe practices in operations both in ships and ashore; • Providing a safe working environment; • Establishing safeguards against all identified risks; • Continuously improving health and safety management skills of employees including preparing for emergencies related both to safety and environmental protection; • Continuously improving health and safety performance by proven conformity to accepted national and international safety management standards and quality systems, recognising legal requirements as the minimum standard; • Striving to maintain a positive health and safety culture with the ultimate goal of reducing ill health and accidents to an absolute minimum, eliminating them where possible; • Minimising the consumption of non-renewable resources within practical constraints; and • Investing sufficiently in its assets and resources to meet regulatory obligations in respect of safety and the environment.
The Management System will ensure: <ul style="list-style-type: none"> • Compliance with legislation, mandatory rules and regulations; and • Applicable codes, guidelines and standards are taken into account.

10.10 Responsibilities	
The high-level responsibilities for the primary elements of the Quality Management System should be clearly defined and documented; examples are shown in the table that follows.	
Direction	Responsibility
Establish Direction (e.g. Strategic Plan)	Board
Develop and review policy documents	Board / VTS Manager
Develop overall objectives, targets and programmes Business Plan, Identify Risks	Board / VTS Manager
Monitor and review performance, Management Review	VTS Manager / Legal Advisor
Assure regulatory compliance Identify, record and report on customer expectations (e.g. VTS customer compliments/complaints process, service charter)	Board / VTS Manager VTS Manager and Staff
Policies and procedures, Develop and maintain policies and procedures, Document Control, Review and Update, as required	Document Controller(s)
Comply with defined procedures	Staff
Conduct internal audits and report on outcomes	Nominated Auditor
Identify and record opportunities for improvement	VTS Manager and Staff VTS
General awareness of the Quality Management System	Manager and Staff
10.11 Planning	
To ensure there is a robust framework to plan, prioritise and define areas of emphasis to ensure the objectives of the VTS are delivered in the best possible manner, consideration should be given to ensuring the operations and delivery of VTS are reflected in all high level documents such as:	

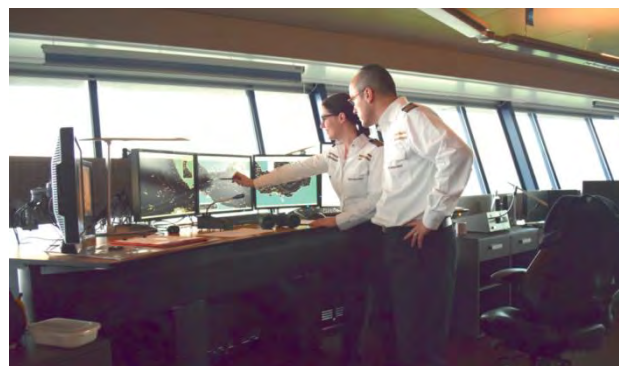
10.11 Planning (Continue)
Strategic Plan; Annual Report, Risk Management Plan and Business Continuity Planning
<i>Note: A business continuity plan enables critical services to be continually delivered to stakeholders. Instead of focusing on resuming a service after critical operations have ceased, or recovering after a disaster, a business continuity plan endeavours to ensure that critical operations continue to be available. Good business continuity planning can result in successful resumption of operations.</i>

10.12 Operational Procedures
The objectives of the VTS can only be met through co-operation and trust among users of the service, VTS personnel and allied services. This can only be achieved through the reliability of the VTS information, which is dependent on the assured availability, continuity and quality of the service provided to all stakeholders.
The responsibility for meeting the standards of an individual VTS centre will normally rest with the Manager of the VTS or a VTS Supervisor who should ensure that everything in the centre, particularly the staff, function at optimal efficiency at all times.
Adoption of a Procedures Manual prepared in line with this document and IALA Recommendation V-127 - 'Operational Procedures for VTS' is seen as an integral part of a verifiable safety management system for the VTS.
Operational procedures will evolve on a continuing basis. It is important that any changes made to operational procedures are properly documented. Temporary changes to procedures should be auditable and formally cancelled when expired or regularly incorporated into the appropriate parent document.

10.13 Continuous Improvement				
All staff / managers should be responsible for identifying opportunities for improvement within the scope of the Quality Management System (QMS).				
To facilitate this, the process for reporting and managing opportunities for improvement should be documented to ensure continuous business improvement is achieved and that there is a systematic approach to planning and taking corrective and/or preventive action.				
'Opportunities for Improvement' should apply to elements such as:				
<table border="0" style="width: 100%;"> <tr> <td style="width: 50%;">• continuous business improvement;</td> <td style="width: 50%;">• non-conforming service;</td> </tr> <tr> <td>• corrective action;</td> <td>• preventive action; • customer feedback.</td> </tr> </table>	• continuous business improvement;	• non-conforming service;	• corrective action;	• preventive action; • customer feedback.
• continuous business improvement;	• non-conforming service;			
• corrective action;	• preventive action; • customer feedback.			
When acting on 'Opportunity for Improvement' results in a change to a process, the VTS manager should ensure that:				
<ul style="list-style-type: none"> • the change is evaluated to ensure that the desired result has been achieved; and • resultant changes in relationships between the process and the service characteristics are documented and communicated. 				

10.14 Audits
Audits are an essential management tool to be used for:
<ul style="list-style-type: none"> • verifying objective evidence of processes, • assessing how successfully processes have been implemented, • judging the effectiveness of achieving any defined target levels, • providing evidence concerning reduction and elimination of problem areas.
For the benefit of the organization, quality auditing should not only report non-conformances and corrective actions, but also highlight areas of good practice. In this way other departments may share information and amend their working practices as a result, also contributing to continual improvement. See also IALA Guideline 1101 – 'Auditing and Assessing VTS' and Guideline 1115 - 'Preparing for IMO Member State Audit Scheme (IMSAS) On Vessel Traffic Services'.
VTS Authorities should ensure the ongoing integrity of the QMS through:
<ul style="list-style-type: none"> • Periodic audits; • Certification by an accredited third party; and/or • Assessment by a third party; and/or • Self-assessment.

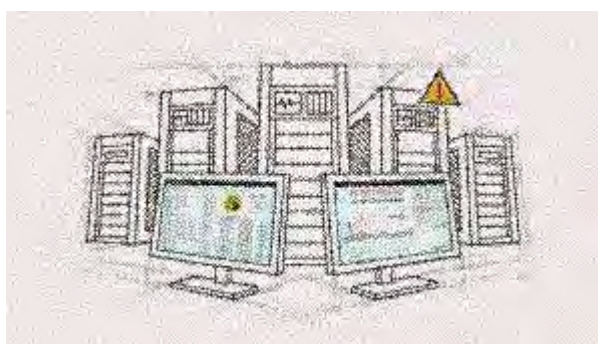
10.15 References
10.15.1 ISO
<p>References published by the International Organization for Standardisation for quality management systems are:</p> <ul style="list-style-type: none"> • ISO 9000:2005 - Quality management systems - Fundamentals and vocabulary; • ISO 9001:2008 - Quality management systems - Requirements; • ISO 9004:2009 - Managing for the sustained success of an organization - A quality management approaches.
<p>The ISO 9000 family of standards represents an international consensus on good quality management practices. It consists of standards and guidelines relating to quality management systems and related supporting standards.</p>
<p>ISO 9001:2008 is the standard that provides a set of standardized requirements for a quality management system, regardless of what the user organization does, its size, or whether it is in the private, or public sector. It is the only standard in the family against which organizations can be certified – although certification is not a compulsory requirement of the standard.</p>
<p>The other standards in the ISO 9000 family cover specific aspects such as fundamentals and vocabulary, performance improvements, documentation, training, and financial and economic aspects.</p>
10.15.2 IMO and IMSAS
<p>Reference IMO documentation on IMSAS as regards VTS include:</p> <ul style="list-style-type: none"> • Resolution A.1067 (28) on the Framework and Procedures for the IMO Member State Audit Scheme This framework describes the objective, principles, scope, responsibilities and capacity building aspect of the IMO Member State audit, which together constitute the strategy for the audit scheme. • Resolution A.1070 (28) on IMO Instruments Implementation Code (III Code) The objective of III Code is to enhance global maritime safety and protection of the marine environment and to assist States in the implementation of instruments to which the State is a Contracting Government or Party, including SOLAS Chapter V (Safety of Navigation) Regulation 12 (Vessel Traffic Services). • IMO Circular Letter No. 3425 - Auditor's Manual for the IMO Member State Audit Scheme (IMSAS) This manual has been developed as guidance to assist in the planning, conducting and reporting by auditors and to promote consistency in the delivery of the audit programme. • Resolution A.857 (20) Guidelines for Vessel Traffic Services. This Resolution describes the principles and general provisions for the operation of a VTS and participating vessels. Contracting Governments should take account of these guidelines when planning, implementing and operating vessel traffic services.





*Project on Enhancing of Vessel Traffic Service System
Management Capability Phase 2*

TEXT Book-3 (Module-3)
“EQUIPMENT”



Text Book for Vessel Traffic Services “System Equipment”



IALA V-103-1 Model-Course



INTERNATIONAL COOPERATION AGENCY



JAPAN AIDS TO NAVIGATION ASSOCIATION (JANA)

Radars

Pengertian Radar Secara Umum

Radars merupakan sebuah peralatan yang digunakan untuk memancarkan sinyal elektromagnetik dan menerima sinyal pantulan yang di sebut echo dari objek/target pada lingkup cakupannya. Keberadaan target dideteksi dari sinyal echo atau dari jawaban transponder. Informasi tambahan tentang target didapatkan dari Radars termasuk salah satu diantaranya:

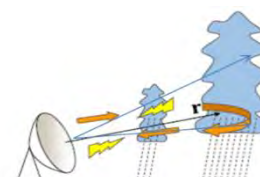
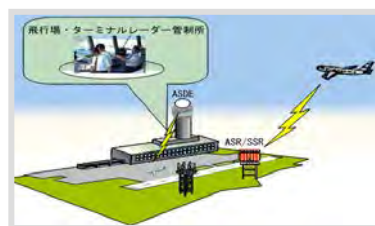
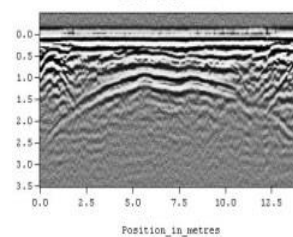
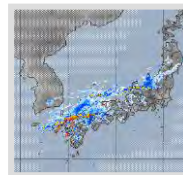
- Jarak, dengan selisih waktu antara sinyal saat ditransmisikan dan diterima.
- Arah (*azimuth*), dengan menggunakan pola antena direktif.
- Laju perubahan jarak
- Deskripsi / Klasifikasi target, dengan menganalisis sinyal echo dan variasinya dengan waktu.

Radars merupakan sistem elektromagnetik untuk deteksi dan mencari posisi objek. Radars beroperasi dengan memancarkan salah satu jenis waveform (bentuk gelombang), misalnya gelombang sinus yang dimodulasi pulsa dan mendeteksi keaslian sinyal echo. Radars digunakan untuk meningkatkan kemampuan pada pengamatan lingkungan, khususnya indera penglihatan. Radars didesain untuk melihat kondisi lingkungan dan target agar tidak terganggu oleh kegelapan, kabur, kabut, hujan, dan salju. Radars juga mempunyai kelebihan untuk dapat menghitung jarak ke objek.

Jenis Radars

Jenis-jenis radars pada saat ini :

- ◆ Air traffic control (ATC),
- ◆ Vessel traffic service system
- ◆ Radars astronomi,
- ◆ Sistem pertahanan udara,
- ◆ Sistem anti rudal;
- ◆ Radars kapal ;
- ◆ Radars cuaca ;
- ◆ Radars observasi geologi (satelit pemetaan).

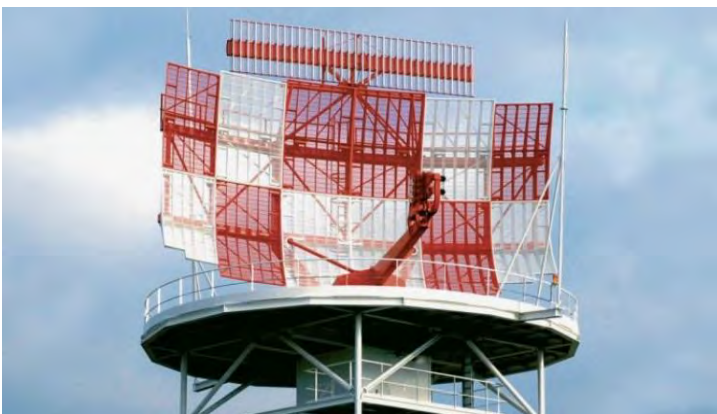




A long-range radar antenna, digunakan untuk mendeteksi dan melacak benda luar angkasa



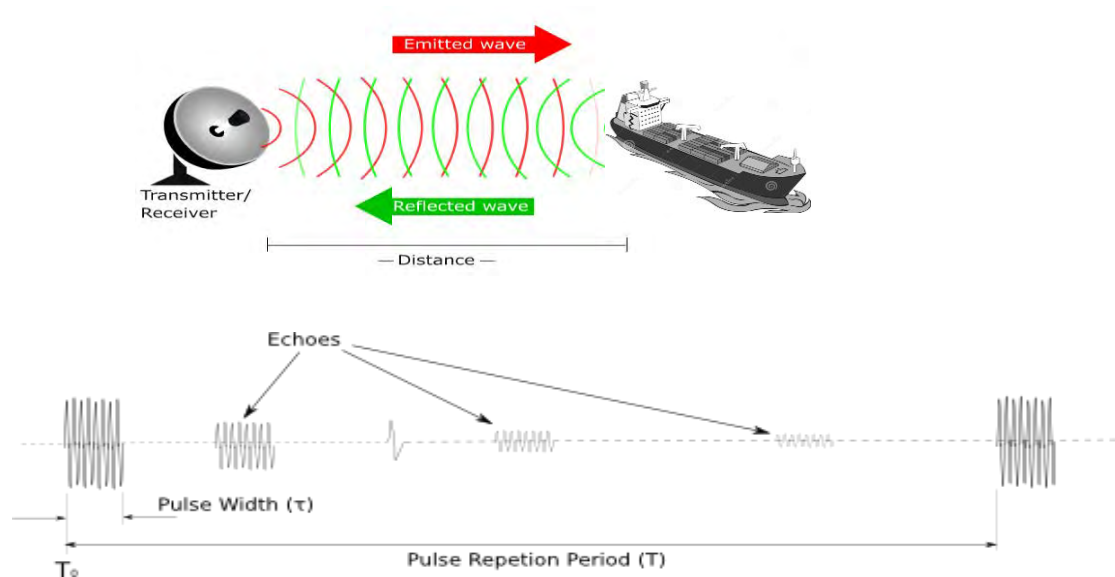
Marine radar antenna. Berupa antenna scanner yang berputar (Slotted antenna)



Air Traffic Control Antenna, digunakan untuk mengatur lalulintas pesawat udara

Prinsip dasar kerja Radar

Antena mengirimkan pulsa gelombang radio elektromagnetik frekuensi tinggi (gelombang elektromagnetik berjalan dengan kecepatan cahaya), pantulan gelombang dari target di terima kembali lagi ke antena sebagai echo, dengan adanya perbedaan waktu kirim dan terima dari gelombang tersebut, maka jarak dan arah dari target terhadap Radar tersebut dapat di ketahui.



Komponen Utama Radar

Antena

Dalam radar fungsi utama dari antena untuk mengirimkan sinyal elektromagnetik ke arah yang diinginkan, dan untuk menerima sinyal yang kembali dari target

Transmitter

Transmitter radar adalah perangkat yang menghasilkan energi pulsa magnetik berdaya tinggi yang akan di pancarkan secara terarah melalui antena

Receiver

Receiver adalah perangkat yang berfungsi untuk menerima sinyal yang kembali, menguatkan, mengkonversi frekuensi, dan melakukan filtering sedemikian rupa untuk memberikan batasan maksimum antara sinyal echo yang diinginkan dan sinyal gangguan yang tidak diinginkan.

Duplexer

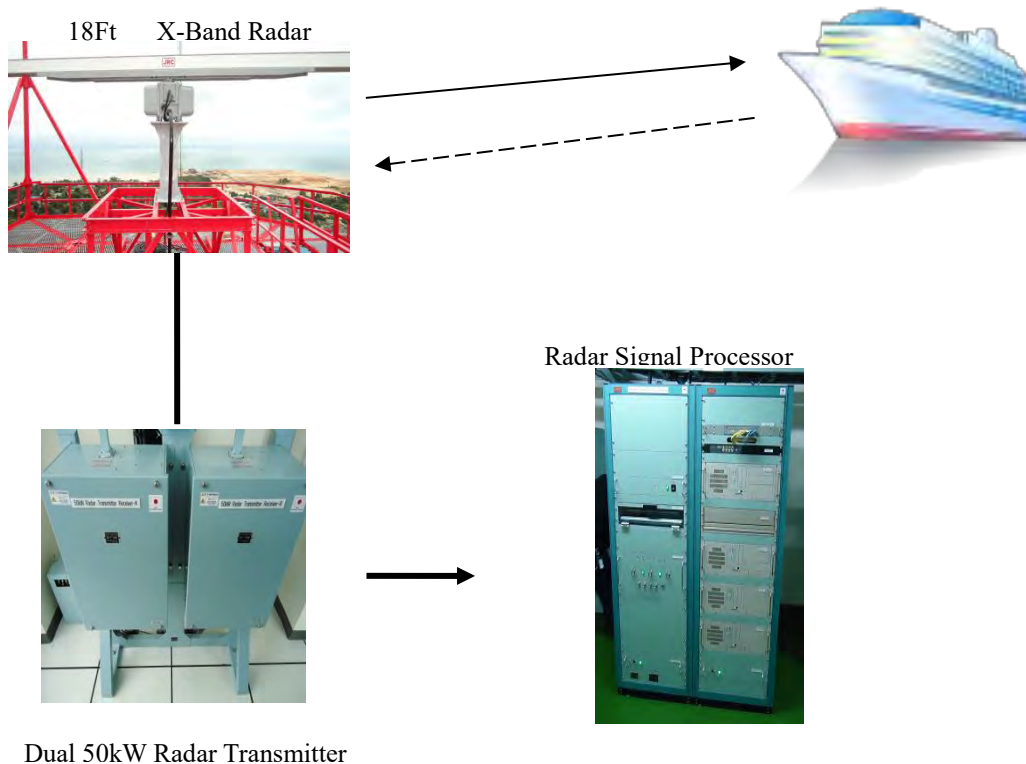
Duplexer adalah perangkat yang memanfaatkan delay terbatas antara transmisi pulsa dan echo sehingga memungkinkan koneksi dari pemancar dan penerima dengan antena. Pada saat transmisi, duplexer melindungi penerima dari kerusakan oleh kekuatan tinggi pemancar, dan pada saat penerimaan, duplexer berfungsi sebagai saluran sinyal echo ke penerima.

Display

Sebuah display radar adalah sebuah alat elektronik untuk representasi visual dari data radar, Display harus bisa diamati menerus dan mudah dipahami.

Radar pengamatan VTS sebagai sistem radar di laut, juga beroperasi dengan prinsip mengirim dan mengukur jarak dengan cara menghitung selang waktu pulsa yang dikirim dengan echo yang diterima.

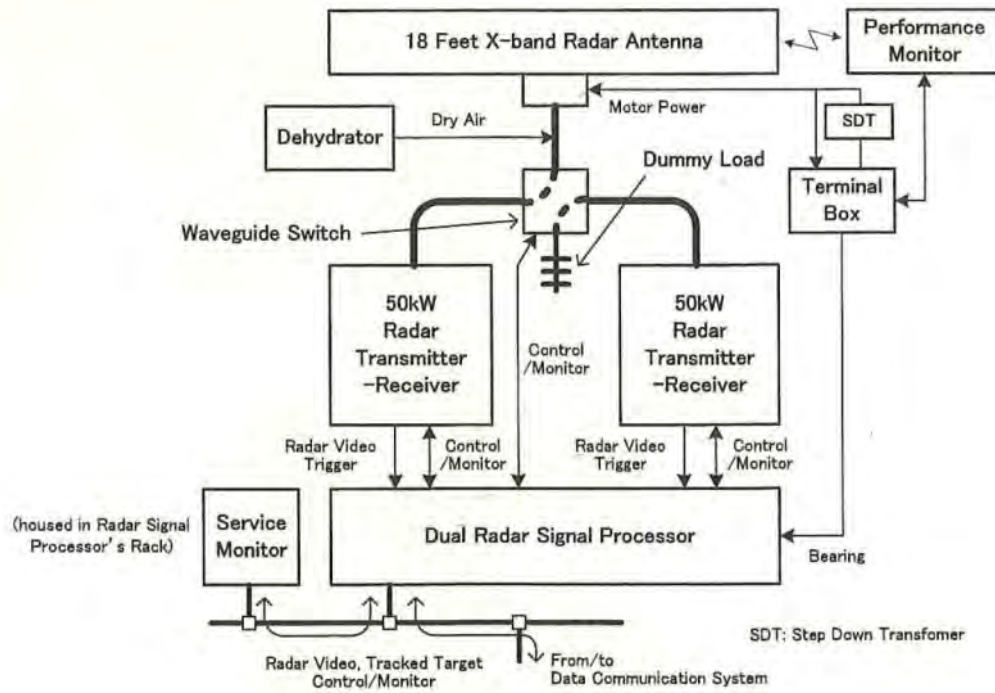
Radar Frekuensi VTS berada dalam segmen X-Band, VTS Dumai beroperasi pada frekuensi 9.375 GHz.



Dual 50kW Radar Transmitter

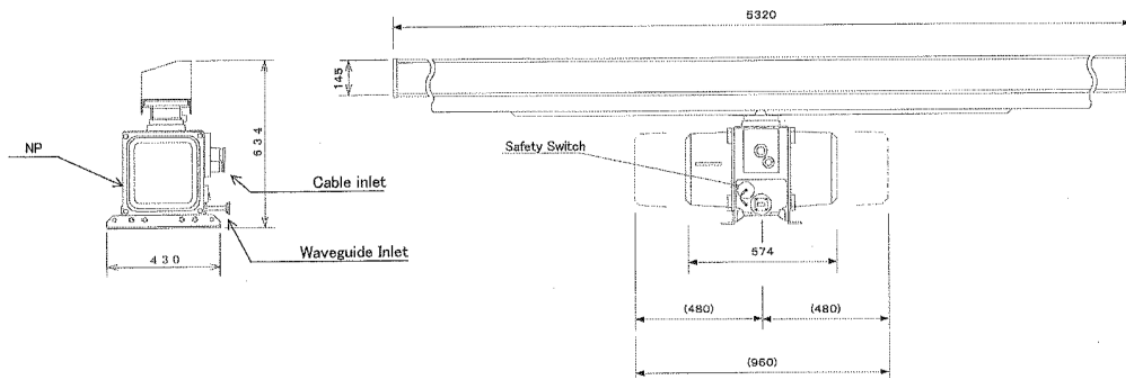
Penjelasan : Feet, X band, Dual and 50KW

1. 18-feet: 547 cm (1 feet \approx 30.4cm)
2. X band: Segmen gelombang radio, rentang frekuensi mulai dari 7 - 11.2GHz
3. Dual: Dua unit TRx radar, satu unit online satu unit standby
4. 50KW: Radar transmitter power



Antena

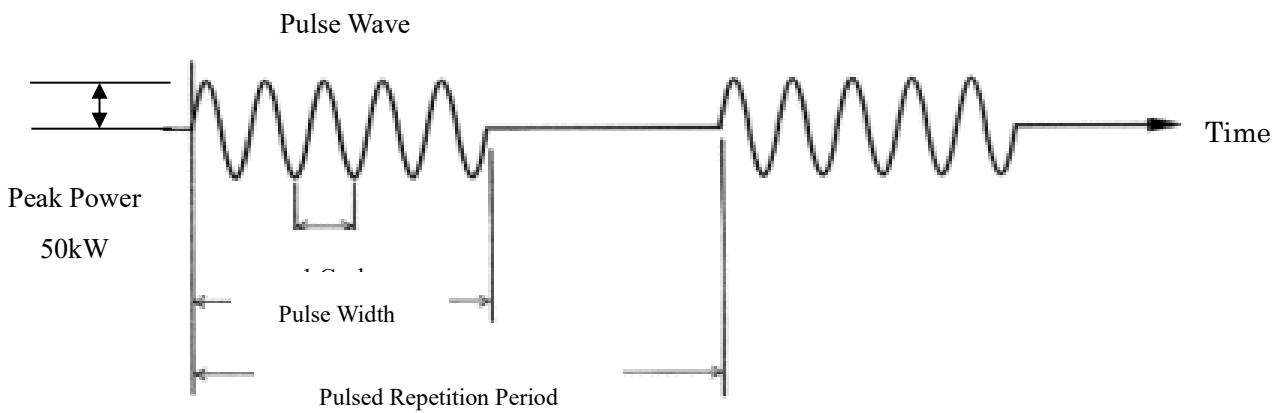
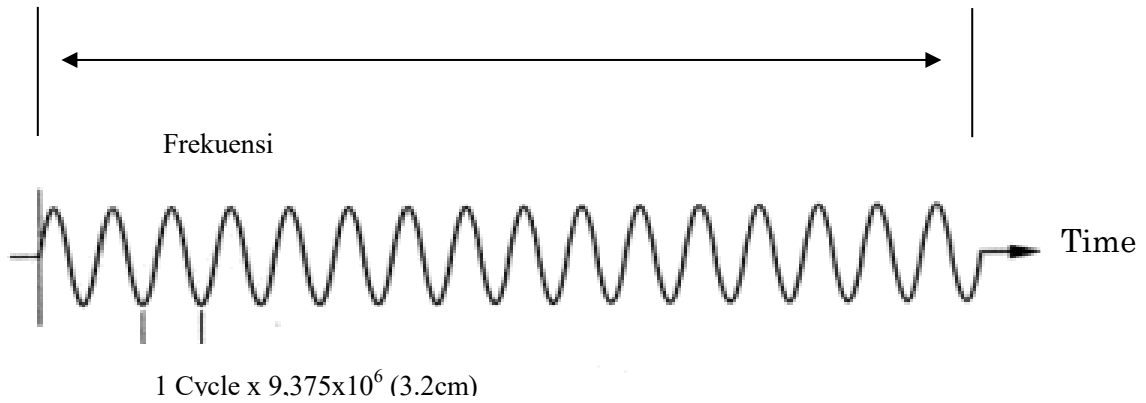
Panjang antena radar adalah 18 feet (5.5m) jenis slotted array dengan polarisasi gelombang circular polarized wae, antena berotasi penuh satu putaran dalam waktu 3.8 detik.



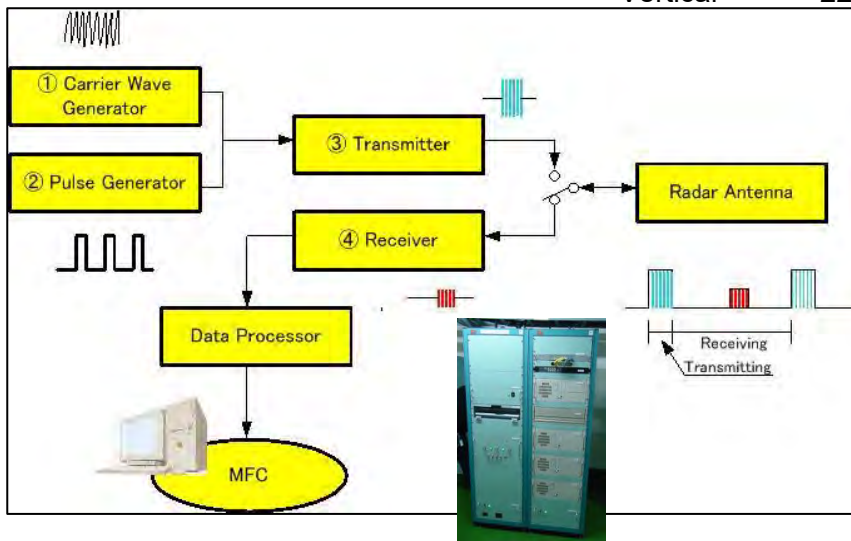
Transmitter – Receiver (TRX)

Dua unit TRX menyediakan operasi cadangan untuk menjaga operasi radar akan terus-menerus tanpa terpengaruh bahkan oleh terjadinya kegagalan dalam satu unit. Setiap TRX dapat dialihkan ke antena atau dummy load oleh switch waveguide. TRX terdiri dari magnetron, sirkuit pemancar - penerima microwave, modulator, power supply tegangan tinggi dan sirkuit menerima.

Karakteristik Pancaran Radar VTS Dumai



- 1) Transmitting Frequency : 9,375MHz ±30MHz
(Wavelength 3.2cm)
- 2) Transmitting Peak Power : 50kW±50%
- 3) Transmitting Pulse Width : 0.25µs (75m)
- 4) Pulse Repetition Frequency (PRF) : 1,900Hz
- 5) Beam Width⁽⁵⁾ (-3dB) : Horizontal 0.45°
Vertical 22°



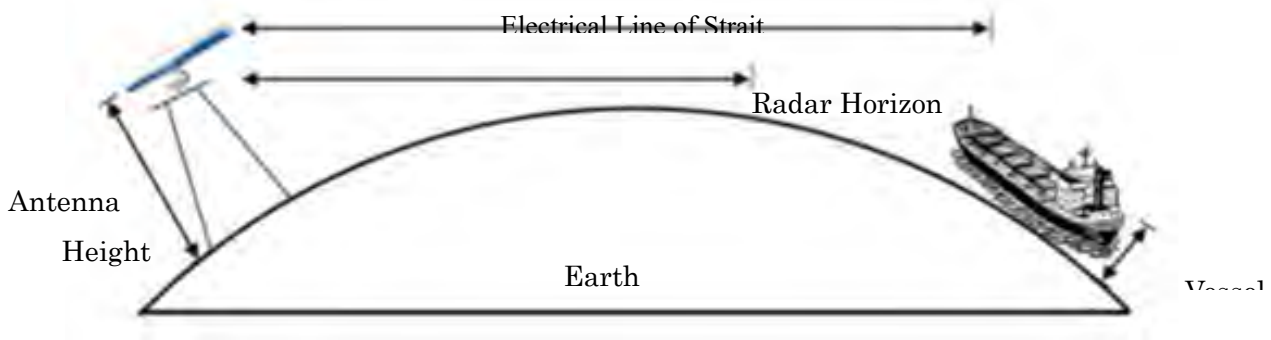
Radar Signal Processor

Processor Radar Signal (RSP) dipasang di stasiun radar dan memiliki fungsi sebagai berikut :

- 1) Pengolahan Video
- 2) Pemrosesan Plot
- 3) Pelacakan
- 4) Kontrol Radar
- 5) Komunikasi data
(Data Track, Radar video, Kontrol Radar / Data monitor)

Radar Horizon (Coverage)

Radar horizon pada dasarnya adalah garis pandang ditarik secara lurus dari radar ke cakrawala yang terbatas karena lengkungan bumi, jarak radar horizon tergantung oleh ketinggian atau posisi antenna.



Jangkauan maksimum (NM) untuk target dihitung dengan menambahkan akar tinggi antenna dengan akar ketinggian target (dalam satuan meter), kemudian hasilnya dikalikan dengan 2,23.

Persamaannya adalah adalah:

$$\text{Radar horizon (NM)} = 2.23 \times (\sqrt{h1 (m)} + \sqrt{h2 (m)})$$

dimana:

h1 = Posisi tinggi radar antenna DPL (dalam satuan meter)

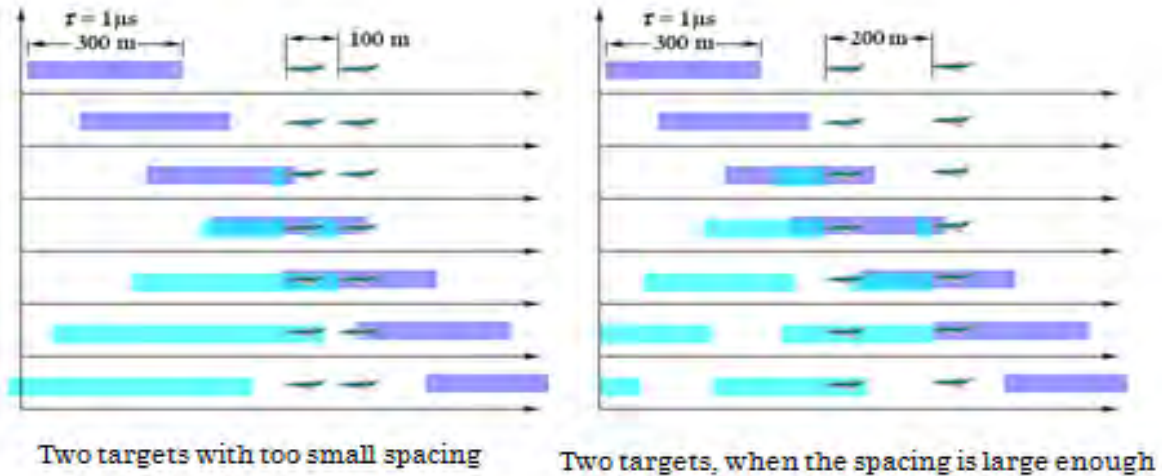
h2 = Tinggi efektif kapal (dalam satuan meter), (nilai h2 dipengaruhi oleh bobot kapal).

Tetapi jangkauan maksimum radar sedikit berbeda dari horizon radar. Hal ini dipengaruhi oleh kinerja radar, seperti ukuran target, daya output dari pemancar radar, antenna, kondisi cuaca, tingkat kebisingan atmosfer, dsb.

Oleh karena itu Radar Tanjung Medang di rancang untuk dapat mengcover area 20 NM.

Range Resolution

Adalah kemampuan sistem radar untuk membedakan antara dua sasaran pada arah yang sama tetapi pada rentang yang berbeda.



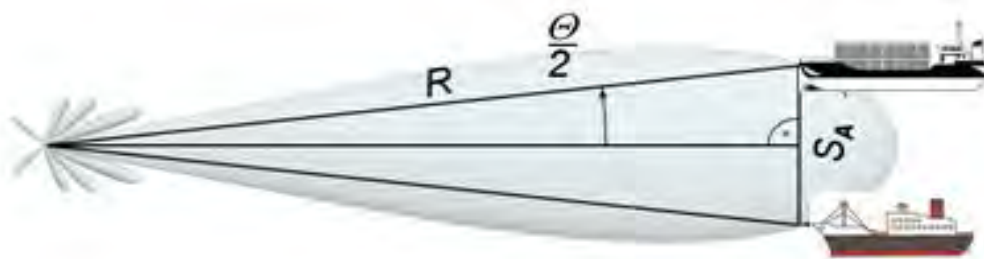
Tingkat “range resolution” tergantung pada lebar pulsa transmisinya, didefinisikan dengan mengikuti persamaan.

(“pulse width” dalam sistem radar VTS Dumai adalah tetap senilai 0.25 μ s.)

$$\begin{aligned} \text{Range Resolution} &= \text{Pulse Width} \div 2 \\ &= 0.25 \mu\text{s} (75\text{m}) \div 2 \\ &= 37.5 \text{ m} \end{aligned}$$

Bearing (Azimuth) Resolution

Adalah kemampuan sistem radar untuk membedakan antara dua sasaran pada jarak yang sama tetapi berbeda arah.



Tingkat Bearing Resolution tergantung pada lebar pancaran horisontal dari sinyal transmisi dan jarak jangkauan radar. Bearing resolution didefinisikan dengan persamaan.
(Pancaran horisontal VTS Dumai adalah 0,45 derajat.)

Rumus persamaanya :

$$\text{Bearing Resolution (m)} = \tan(\text{Beam Width} / 2) \times 1,852 \times \text{Range (NM)} \times 2$$

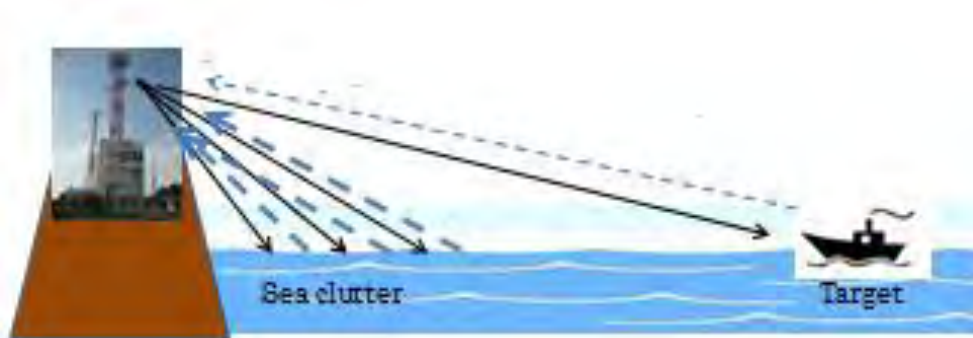
$$\text{Range 1 NM} \quad \tan(0.45/2) \times 1,852 \times 1 \times 2 = 14.5\text{m}$$

$$\text{Range 3 NM} \quad \tan(0.45/2) \times 1,852 \times 3 \times 2 = 43.6\text{m}$$

$$\text{Range 5 NM} \quad \tan(0.45/2) \times 1,852 \times 5 \times 2 = 72.75\text{m}$$

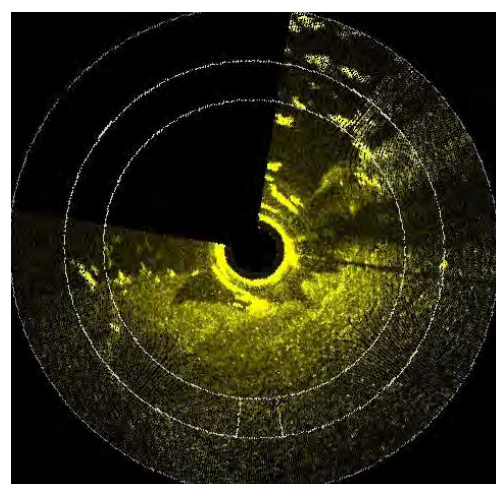
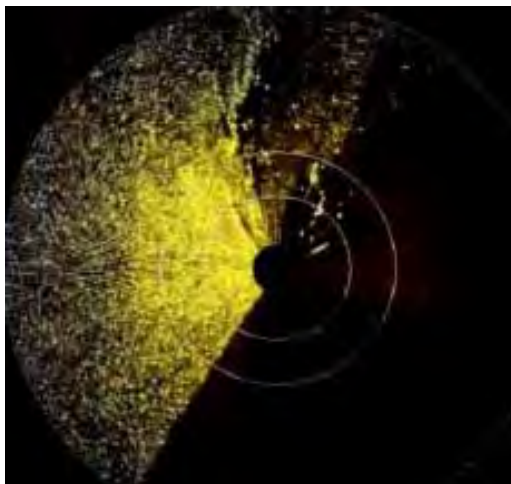
Sea Clutter

Pada laut yang bergelombang echo dari puncak gelombang air akan kembali ke antena dengan sangat kuat, menghasilkan sinyal echo yang sangat banyak dan menutupi bagian tengah dari layar radar, kejadian ini disebut "Sea Clutter".



Setiap echo dalam Clutter akan mengaburkan layar sebagian atau secara seluruhnya. Untuk menekan efek sea clutter, STC (Sensitive Time Control) biasanya disediakan untuk sistem radar, dan fungsi (STC) ini akan disesuaikan untuk mengurangi efek sea clutter tersebut.

Pengaturan STC harus tepat sedemikian rupa sehingga sea clutter bisa di bedakan antara sea clutter dan echo yang dari target. Jika kontrol diatur terlalu tinggi maka sea clutter dan echo akan hilang dari layar.



Rain Clutter

Pada radar X band, karena panjang pulsa gelombangnya pendek, echo dari target akan hilang karena terhalang oleh echo dari hujan. Hal ini disebut rain clutter.



Rain control, juga disebut FTC (Fast Time Constant), akan menekan echo yang tercermin dari hujan agar layar radar menjadi bersih.

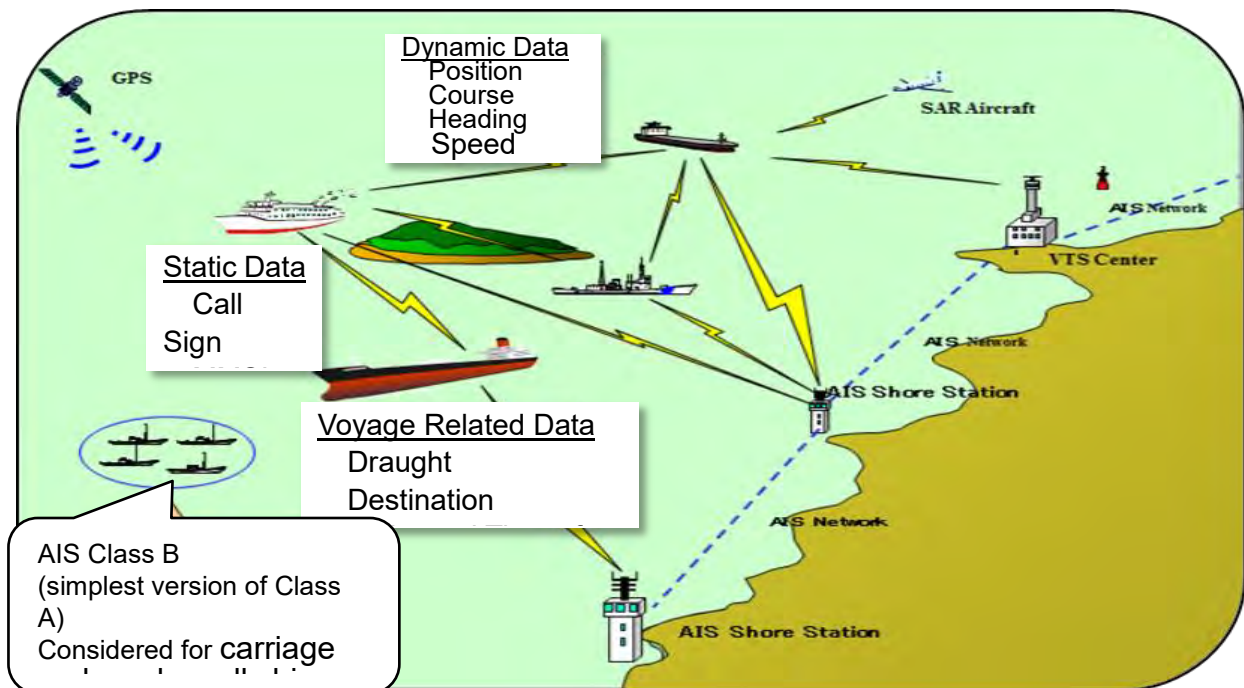
FTC dirancang untuk mengurangi efek yang terus menerus berasal dari hujan. pengolahan ini membutuhkan kekuatan sinyal kembali harus diubah dengan cepat selama durasi itu. Sejak hujan terjadi maka akan menghasilkan sinyal yang kembali sangat lama dan stabil. Proses FTC akan menyaring sinyal tersebut dari layar. Hanya pulsa yang naik dan turun dengan cepat yang akan ditampilkan di layar.

Automatic Identification System

Pengertian AIS secara umum

AIS (Automatic Identification System) adalah sistem komunikasi broadcast, yang beroperasi di VHF band maritim yang mampu mengirimkan informasi kapal seperti identifikasi, posisi, arah, kecepatan, ukuran kapal, draft, jenis kapal, dan informasi kepada kapal-kapal dan radio pantai atau VTS center.

International Convention for the Safety of Life at Sea (SOLAS) mewajibkan penggunaan AIS pada pelayaran kapal internasional dengan Gross Tonnage (GT) lebih dari sama dengan 300 GT, dan semua kapal penumpang tanpa memperhatikan ukuran.



Informasi AIS terbagi menjadi 3 jenis :

- Data statis
- Data dinamis
- Data Perjalanan

Data statis (di input manual)

- Nomor MMSI : *Maritime Mobile Service Identity*
- Tanda panggilan (call sign) dan nama kapal
- Nomor IMO
 - Panjang dan lebar kapal (Length and beam)
- Jenis kapal

Data dinamis (otomatis di input oleh sistem)

- Posisi kapal : latitude / longitude
- Position time stamp (UTC)
- Waktu (UTC : Coordinated Universal Time)
- Course over ground (COG): Relative terhadap true north
- Speed over ground (SOG): 1 - 102 knots
- Heading: 0° to 359° (input dari gyrocompas)
- Navigational status : ((not under command (NUC), at anchor -manual input))
- Rate of turn: 0 to 720 derajat per menit

Informasi pelayaran

- Draft kapal
- Muatan berbahaya
- Tujuan dan perkiraan waktu tiba (ETA):
- Nama pelabuhan tujuan (20 karakter), ETA : bulan, hari, jam dan menit (UTC)

Nomor MMSI : (untuk kapal dan AIS VTS) kependekan dari Maritime Mobile Service Identity. Nomor untuk mengidentifikasi stasiun AIS semua kapal yang dilengkapi dengan AIS (identitas stasiun kapal) oleh ITU (international Telecommunication Union), MMSI terdiri dari sembilan (9) digit angka, tiga digit pertama merupakan kode negara, MMSI juga di alokasikan untuk stasiun sensor AIS dan VTS Center

Contoh : 525; Indonesia (Republic of), 431, 432; Japan, 533; Malaysia

Data AIS memperbarui dan transmit secara otomatis berdasarkan tingkat pembaruan yang berbeda.

Kecepatan update berbeda tergantung kepada jenis informasi AIS, seperti terlihat di bawah ini :

- Informasi statis dan informasi pelayaran : setiap 6 menit
- Informasi dinamik : kelas A perubahan tingkat pembaruan tergantung kepada kecepatan kapal :

Kondisi olah gerak kapal	Interval	
Labuh jangkar atau berlabuh dan tidak bergerak lebih cepat dari 3 knot	3 menit	AIS kelas B update data : setiap 30 detik atau kurang
Labuh jangkar atau berlabuh dan bergerak lebih cepat dari 3 knot	10 detik	
Berlayar 0-14 knot	10 detik	
Berlayar 0-14 knot dan mengubah arah haluan	3 1/3 detik	
Berlayar 14-23 knot	6 detik	
Berlayar 14-23 knot dan mengubah arah haluan	2 detik	
berlayar > 23 knot	2 detik	
berlayar > 23 knot dan mengubah arah haluan	2 detik	

AIS Kelas B, AIS AtoN (Aids to Navigation), AIS SART (Search and Rescue.)

Selain AIS kelas A, ada AIS yang lebih sederhana yaitu AIS kelas B yang tidak diwajibkan bagi kapal.

AIS juga dimanfaatkan untuk bantuan navigasi pemantauan AtoN AIS dan untuk pesawat terbang yang terlibat dalam aktivitas pencarian dan penyelamatan (SAR) AIS SART, operator VTS harus mengetahui semua AIS ini untuk ditampilkan pada MFC.

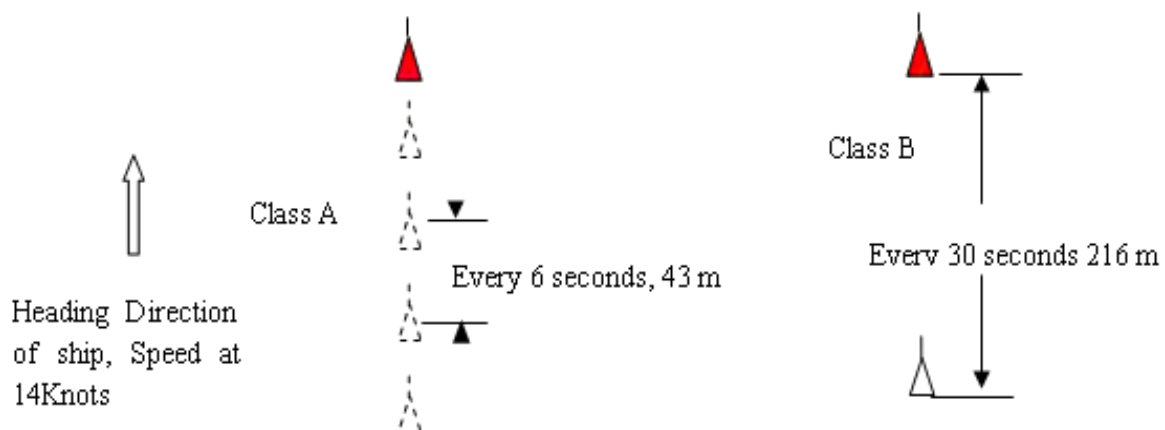
Penerapan AIS kelas B, AtoN dan SART seperti berikut :

AIS Kelas B :

- untuk kapal non SOLAS, dengan sistem lebih sederhana dan harga tidak semahal versi class A, untuk kapal-kapal kargo dengan bobot kurang dari 300GT, kapal tunda atau kapal kecil lainnya.
- Tidak diwajibkan untuk kapal Non SOLAS,
- Tidak disediakan fungsi receive, hanya fungsi broadcast.

informasi dikirim secara dinamik setiap 30 detik apabila kapal bergerak dengan kecepatan lebih dari 2 knots.

Ilustrasi berikut menggambarkan perbedaan antara AIS kelas A dan AIS kelas B :



Ketika dua kapal (class A dan class B) bergerak dengan kecepatan 14 knot, kapal dengan AIS class A transmit setiap 43m (6 detik) dan kapal kelas B setiap 216 m (30 detik).

AIS AtoN

Real AtoN AIS, adalah alat atau sistem external yang dirancang untuk di pasang pada AtoN seperti pada buoy, menara lampu suar. Di tujukan untuk meningkatkan keamanan kapal dalam bernavigasi.

Tujuan utama dari real AtoN adalah sebagai berikut :

- Menyediakan AtoN di segala cuaca
- Melengkapi dari alat yang sudah terpasang ((contoh : melengkapi buoy for Racon (radar beacon))
- Memantau status posisi AtoN yang ada (keluar posisi, terseret)

Virtual AtoN AIS, menyediakan tambahan AtoN ketika pemasangan real AtoN apabila dilihat dari aspek operasional atau teknis dianggap sulit

AIS SART

Untuk menunjukkan lokasi alat penyelamat (contoh : sekoci, life raft dsb) atau kapal yang memerlukan pertolongan (distress vessel)

Kenggunaan AIS Dalam Operasi VTS

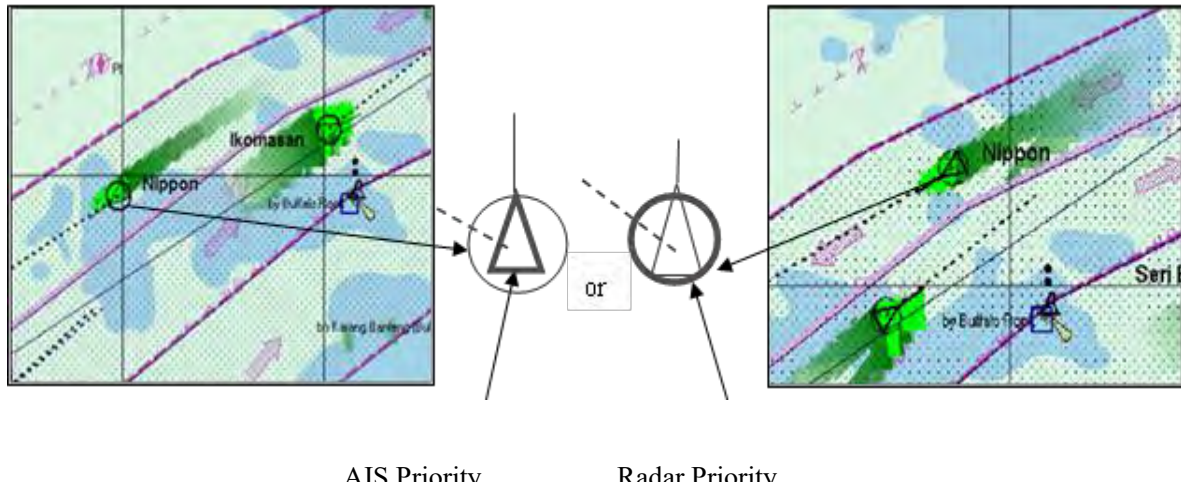
- VTS Center dapat memantau dan melacak pergerakan kapal yang membawa AIS (AIS class A dan class B) melalui stasiun sensor AIS.
- VTS center menerima sinyal AIS AtoN dan AIS SART
- AIS dapat memfasilitasi komunikasi (pesan AIS) antara kapal ke kapal atau kapal ke stasiun darat (VTS center)
- AIS dapat meningkatkan kemungkinan untuk mendeteksi kapal-kapal lain, bahkan ketika sedang berada dibalik selat, sungai ataupun pulau.
- AIS memecahkan masalah pada Radar dari keadaan atau gangguan cuaca (sea clutter, rain clutter, cloud clutter)

Tampilan Simbol AIS

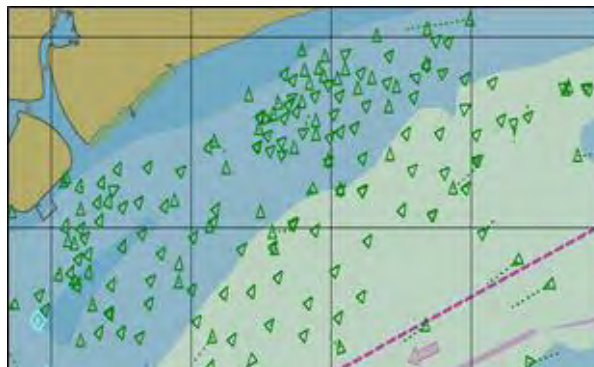
Sinyal AIS yang akan ditampilkan pada Electronic Navigation Chart (ENC) di MFC dengan bentuk simbol mandiri atau sebagai simbol yang dikombinasikan dengan sinyal radar.

Jika target secara bersamaan terdeteksi oleh AIS dan radar, maka simbol pada MFC merupakan gabungan dari keduanya





Dari display AIS, VTS operator dapat menilai kondisi kepadatan lalu lintas perairan tersebut.



Perairan padat



Perairan tidak padat

Penyediaan Informasi Kenavigasian_

AIS memungkinkan VTS Center untuk memberikan informasi pesan keamanan melalui AIS dalam bentuk pesan singkat keamanan dan pesan biner (pesan text telegram) Informasi AIS yang diberikan oleh VTS harus tepat waktu, relevan dan akurat.

Short Safety-related Messages (Safety Related Message)

Format teks bersifat bebas. Bisa di tujukan kepada satu MMSI atau disiarkan ke semua kapal yang berada di daerah cakupan AIS. Isi teks harus relevan dengan keselamatan navigasi. (contoh : buoy tidak pada posisinya) jumlah karakter maksimal sebanyak 158-162 karakter dan teks pesan harus sependek mungkin.

Pesan Biner (Text Telegram Message)

Pesan tambahan dapat ditujukan untuk khusus (MMSI) atau disiarkan kepada semua kapal di area tersebut, pesan biner diterapkan untuk, misalnya :

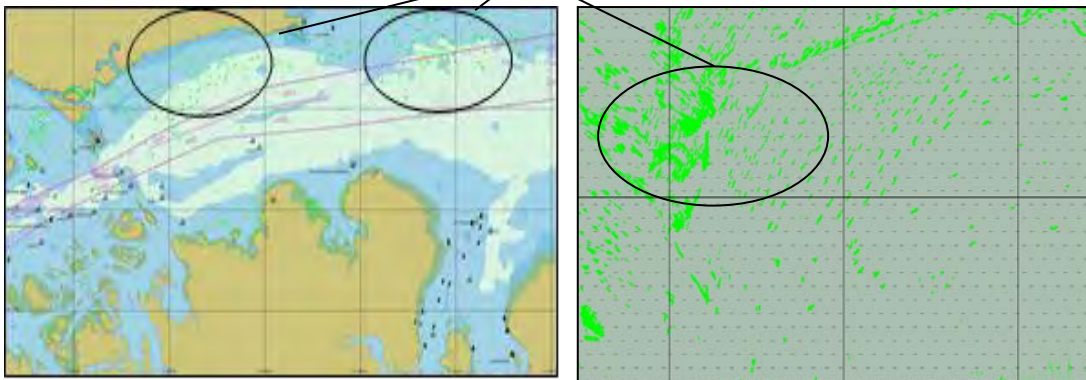
- Data Meteorologi and hidrologi
- Indikasi muatan berbahaya
- Fairway ditutup

Alat Untuk Menampilkan Data

Pola Tampilan layar MFC

Layar MFC menampilkan 4 jenis pola yang berbeda dari informasi lalu lintas kapal (Radar/AIS data) :

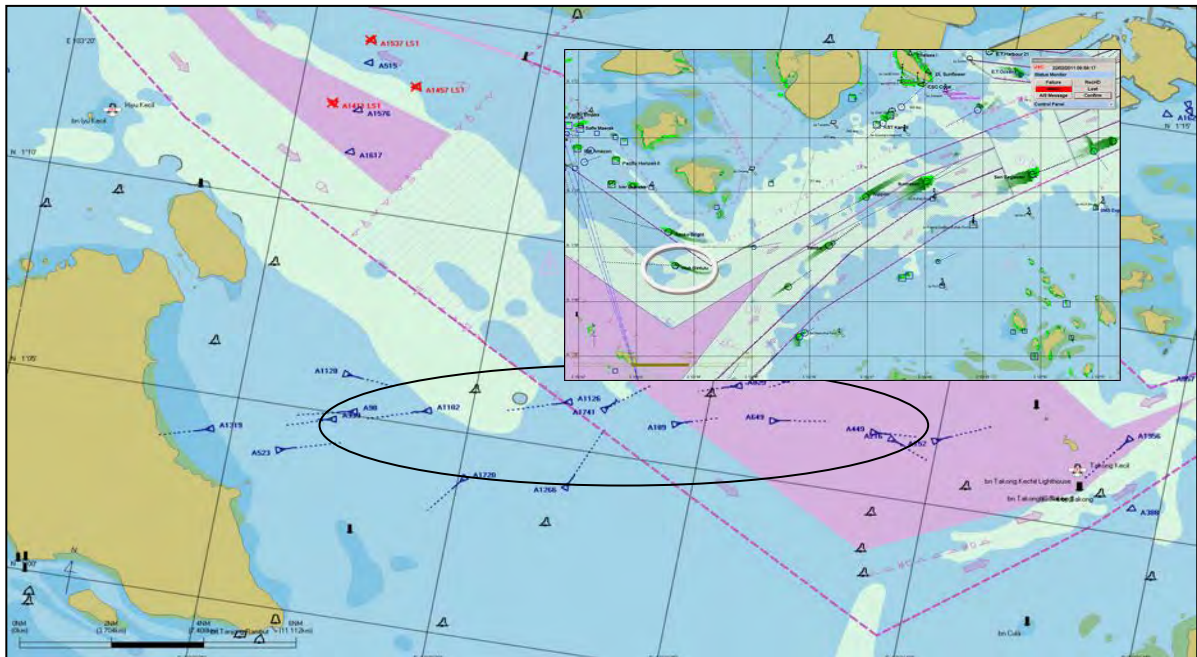
Tanda hijau menunjukkan target



Tampilan radar video yang telah di proses dengan dilengkapi

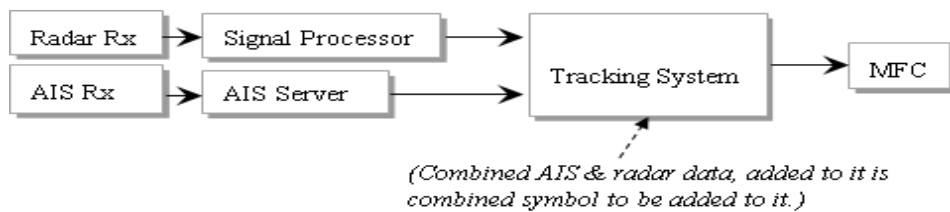
.

Tampilan raw radar video



Tampilan AIS target dengan
ditambahkan simbol AIS

Tampilan target yang telah dilacak oleh Radar
dan AIS dengan gabungan simbol



Simbol Radar, AIS dan Simbol Kombinasi Radar/AIS

Bagi operator VTS yang melaksanakan tugasnya, sangat penting untuk memahami informasi apa yang ditampilkan oleh simbol-simbol Radar, AIS atau kombinasi radar/AIS. Berbagai simbol digunakan untuk sistem VTS Dumai

Simbol Radar

Sinyal Raw radar secara digital di proses di “signal processor” dan di ditampilkan pada MFC dengan simbol-simbol yang telah ditentukan. Bentuk simbol radar adalah berbentuk lingkaran, namun ukuran bisa berubah menjadi besar atau kecil sesuai dengan ukuran targetnya.

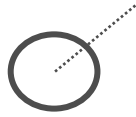
Lingkaran besar : kapal besar

Lingkaran kecil : kapal kecil

Bentuk lingkaran bervariasi sesuai dengan status target



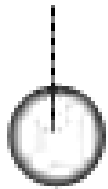
Lingkaran kecil menunjukkan bahwa kapal target adalah kapal kecil



Lingkaran besar menunjukkan bahwa kapal target adalah kapal besar

- Titik pusat lingkaran menunjukkan posisi tengah dari kapal
- Garis putus-putus memanjang dari tengah lingkaran menunjukkan arah haluan dan kecepatan kapal

➤ Lingkaran dengan tambahan ID



AA.xxx

AA. Setiap huruf, contoh pengelompokan kapal berdasarkan jenis atau negara .xxx : barisan nomor

➤ Lingkaran dengan garis putus-putus



menunjukkan bahwa kapal sedang dalam proses dilacak

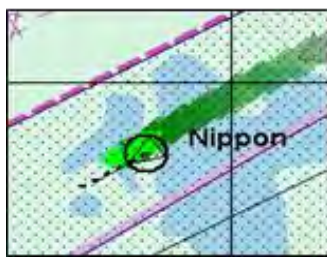
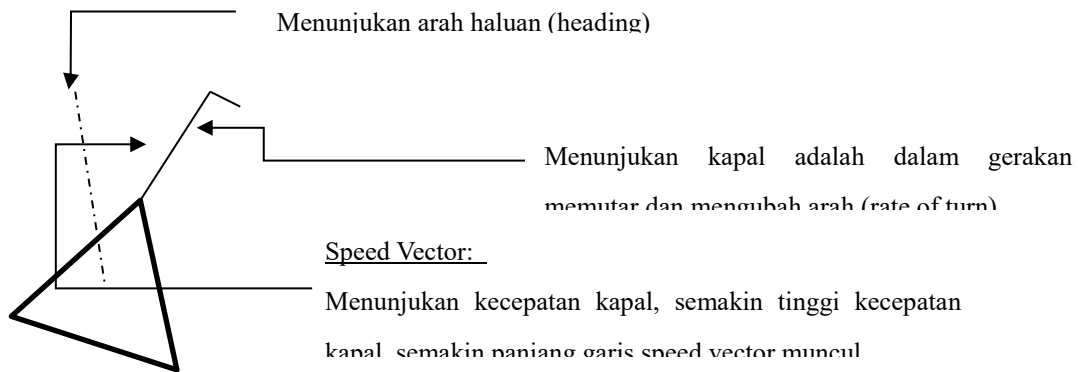
➤ Bentuk kotak



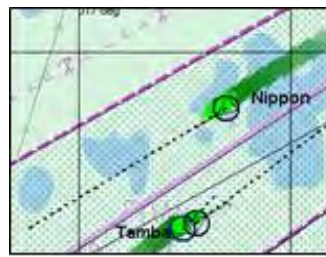
Menunjukkan bahwa kapal tersebut bergerak dengan kecepatan kurang dari 2 knot atau tidak bergerak

Simbol AIS

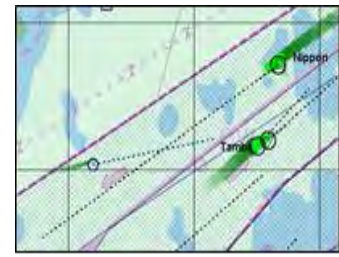
Seperti data radar, data AIS diproses pada AIS Server dan akan di tampilkan. Disepakati secara internasional simbol AIS kelas A dan B bentuk segitiga seperti di tunjukan di bawah ini :



Speed vector 1 menit



Speed vector 5 menit



Speed vector 10 menit

Penerapan speed vector bertujuan untuk pencegahan tabrakan, di ilustrasikan sebagai berikut :

Dalam keadaan speed vector 1 menit, belum diketahui secara pasti apakah dua kapal akan bertemu dan berada dalam bahaya tabrakan atau tidak.

Posisi prakiraan yang di capai dalam 1



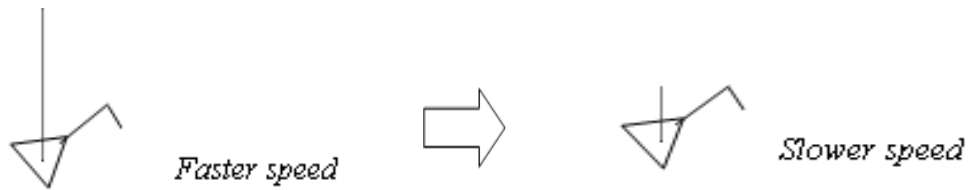
Ubah ke 10 menit

Posisi prakiraan yang di capai dalam 10



Jika tampilan ENC dipilih ke skala besar, bentuk simbol AIS menjadi dikelilingi oleh bentuk kapal target (bentuk kapal).

Dua kapal yang dilengkapi AIS berlayar ke arah Utara dalam kecepatan normal dan berbelok ke arah Timur. kapal mana yang berlayar dengan kecepatan yang lebih tinggi, kapal di posisi kanan atau di kiri?



- **AIS kelas A dan Kelas B dalam posisi diam**



Menunjukkan kapal dalam posisi diam, sedang labuh jangkar, atau bersandar. Ketika kapal mulai bergerak, arah haluan dan speed vector akan ditambahkan dan muncul pada layar

- **AIS SART**



Menunjukkan lokasi “survival craft” dan “distressed vessel”

- **AIS AtoN**



Menunjukkan AtoN secara fisik terletak pada posisinya (Real Aton AIS).



Untuk menunjukkan buoy atau AtoN lain yang secara fisik tidak ada (Virtual Aton AIS)

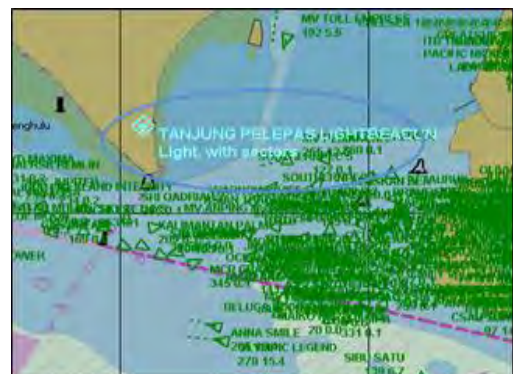
- **AIS Base Station**



Simbol AIS base station



Menampilkan real AtoN AIS dan Base Station AIS



Menampilkan Virtual AtoN AIS

Real AtoN AIS,

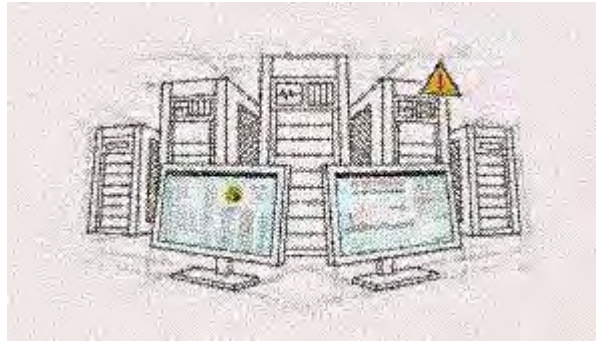
Adalah sebuah AIS secara fisik terletak di AtoN, unit ini mengirimkan sinyal AIS untuk:

- Identifikasi AtoN dan status posisi geografisnya
- Meyampaikan data Meteorologi and hydrograpi
- Tanda bahaya

Virtual AtoN AIS

Sebuah Virtual AtoN mentransmitkan pesan untuk AtoN yang secara fisik tidak ada. Digunakan untuk ditempat yang secara nyata tidak mungkin atau tidak layak, seperti pada bangkai kapal atau tempat berbahaya.

- Digunakan sebagai pengganti buoy atau penambahan buoy untuk meningkatkan keselamatan pelayaran
- Menyediakan AtoN baru ketika AtoN fisik di angkat
- Menandai tempat bahaya baru



*Project on Enhancing of Vessel Traffic Service System
Management Capability Phase 2*

TEXT Book- 4 (Module-4/a)

“Nautical Knowledge” “Seaman Ship”



TEXT Book for Nautical Knowledge & Seaman Ship





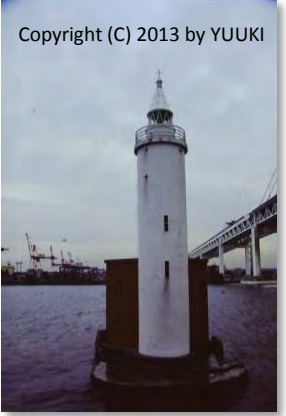
IALA V-103-1 Model-Course



INTERNATIONAL COOPERATION AGENCY



NAIDS TO NAVIGATION ASSOCIATION (JANA)

Nautical Knowledge Module 4		
General		
Introduction		
<p>Instructors for this module should have a good knowledge of ship bridge activities as well as a recognized marine qualification.</p> <p>If this cannot be achieved, then the appropriate expert should cover certain sections of this module.</p> <p>Every instructor should have full access to simulation equipment. In addition, if possible arrangements should be made for trainees to visit operational VTS centers. (From IALA Rec. V103)</p>		
Subject Frameworks		
Scope		
<p>This syllabus covers the requirement for VTS Operators to be able to carry out certain navigational functions and to have sufficient knowledge of ships to understand limitations of maneuverability or the need for special treatment caused by multifunction of shipboard systems or the type of cargo be carried.</p> <p>This course covers the theory and practice of chart works, provides knowledge of the collision regulations, buoyage and electronic aids to navigation systems as well as ship board navigational equipment. It also provides an understanding of ship design matters, certain shipboard systems and some circumstances external to a ship which might influence its behavior.</p> <p>Buoyage and electronic aids to navigation systems as well as ship board navigational equipment. It also provides an understanding of ship design matters, certain shipboard systems and some circumstances external to a ship which might influence its behavior.</p> <p>This course also provides knowledge of port operations as well as other services provided to shipping by ports, harbors and offshore installations.</p>	 <p>Copyright (C) Yuuki</p>	
Aims		
<ul style="list-style-type: none"> • Read information from chart, and fix the position of ships on a chart. • Read information form tide tables and carry out course, speed and distance calculations. Taking into account any set, drift or leeway 		
Chart works		
<ul style="list-style-type: none"> • Chart information and terminology • Plotting positions on paper charts • Course/speed/distance/time • True and magnetic course 	<ul style="list-style-type: none"> • Passage planning • Tides and tidal streams • Correcting paper charts and publications 	
Collision regulations		
International Regulations for Preventing Collisions at sea (COLREGS)		
<p>Cite (<i>Quote</i>) and explain the International Regulations for Preventing Collisions at Sea.</p> <p>Definition of specific terms in the Collisions Regulation.</p> <p>Application of the Collision Regulations for Ships and VTS.</p>		 <p>Copyright (C) Yuuki</p>
Aids to Navigation		
<ul style="list-style-type: none"> • International Maritime buoyage • Radar beacons • Satellite and differential satellite position fixing • Terrestrial position fixing systems • Virtual aids to navigation 	 <p>Copyright (C) 2013 by YUUKI</p>	
<ol style="list-style-type: none"> 1. Describe international maritime buoyage 2. Introduction to the International Maritime Buoyage system 3. Lateral systems (IALA A & B) 4. Cardinal systems 5. Implications of various systems 6. Regulations pertaining to buoyage 7. Characteristics of floating aids (Types of buoys, Placement of buoys, Fundamental rules for safe navigation) 		

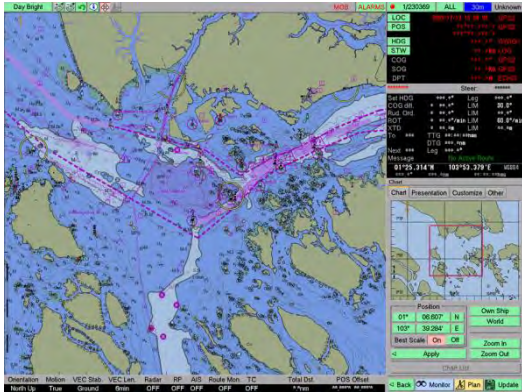
Aids to Navigation	
<p>8. Characteristics of fixed aids (Day beacons, Light stations, sector lights, Leading lights, Fog signals)</p> <p>9. Explain the function of radar beacons</p> <p>10. Introduction to radar beacons</p> <p>11. Implications of radar beacons</p> <p>12. Explain the theory and use of satellite and differential satellite position fixing systems</p> <p>13. Explain the theory and use of virtual aids to navigation</p>	
Navigational Aids (Ship borne)	
<ul style="list-style-type: none"> • Radar • Gyro and magnetic compasses • Other navigational aids 	
<p>1. Explain the theory of radar and demonstrate its operation</p> <p>2. Explain the theory and using of gyro and magnetic compasses</p> <p>3. Explain the theory and use of other navigational aids</p>	
<p>4. AIS base stations continue to be installed in congested sea areas and major harbors throughout the world in increasing numbers, as a tool for Vessel Traffic Services (hereafter "VTS") which perform navigation management of vessels, and as a means to vessel tracking that is used in port management and port services.</p> <p>JRC was developing AIS base stations based on the recommendation issued by IALA (International Association of Marine Aids to Navigation and Lighthouse Authorities), even before international standards for AIS base stations were issued. However, upon the issuance of International Standard IEC62320-1, JRC developed a new type AIS base station, JHF-307, in order to compact size, incorporate redundancies, enable IP communication, and improve maintainability. This document introduces the JHF-307.</p>	
Shipboard Knowledge	
<ul style="list-style-type: none"> • Ship terminology – Technical • Ship terminology – Nautical phrases • Types of vessels • Ship stability • Propulsions system • External forces • Vessel bridge procedures 	
<p>1. List and explain the ship terminology- technical</p> <p>2. List and explain the ship terminology –nautical phrases</p> <p>3. List and describe the types of vessels</p> <p>4. List and describe the type of cargo</p>	
<p>5. Explain ship stability</p> <p>6. Explain the theory and practical of ship handling</p> <p>7. List and describe different propulsion systems</p> <p>8. Explain the list of external forces on vessels</p> <p>9. Describe vessel bridge procedures</p>	
Port Operations and other allied services	
<p>1. Pilotage operations</p> <p>Explain pilotage operations</p> <p>Introduction to pilot operations, pilotage waters, Responsibilities of pilots</p> <p>Master/pilot VTS relationship</p>	
<p>2. Port operations, including contingency plans</p> <p>2.1 Overview of port operations</p> <p>Interaction of all agencies within port, Responsibilities of harbour masters and Berthing masters, Clearance procedures, Intermodal transport</p>	
<p>2.2 Regulations and acts in effect within harbour limits</p> <p>Contingency plans, Pollution, SAR, Grounding, Salvage, Fire, Security, Health</p>	
<p>Copyright (C) Yuuki</p>	

Port Operations and other allied services (Continue)	
3. Cite and explain the ISPS code with relation to ship and port security. Overview of ISPS code, Port policing, Interaction with municipal, national and international security	4. Explain the Organization of tugs and towing The organization of tugs within a port 5. Explain the role of ships agents General duties of ships agents, The role of ships agents

International Regulations for Preventing Collisions at Sea
General Steering and sailing

Summary of the rules: The rules can be summarized as follows. However this summary must not ever be used for legal interpretation purposes. Only the actual, proper regulations ARE the regulations in law.

Electric chart and ECDIS From mlit.go.jp







Singapore Strait



From <http://homepage2nifty.com/go¥tokyo/index.htm>

Part A – General
1. Application

(a)	These Rules shall apply to all vessels upon the high seas and in all waters connected therewith navigable by seagoing vessels	
(b)	Nothing in these Rules shall interfere with the operation of special rules made by an appropriate authority for roadsteads, harbours, rivers, lakes or inland waterways connected with the high seas and navigable by seagoing vessels. Such special rules shall conform as closely as possible to these Rules	
(c)	Nothing in these Rules shall interfere with the operation of any special rule made by the Government of any State with respect to additional station or signal lights, shapes or whistle signals for ships of war and vessels proceeding under convoy, or with respect to additional station or signal lights or shapes for fishing vessels engaged in fishing as a fleet. These additional station or signal lights, shapes or whistle signals shall, so far as possible, be such that they cannot be mistaken for any light, shape or signal authorised elsewhere under these Rules	
(d)	Traffic separation schemes may be adopted by the Organization for the purpose of these Rules.	
(e)	Whenever the Government concerned shall have determined that a vessel of any special construction or purpose cannot comply with the provisions of any of these Rules with respect to the number, position, range or arc of visibility of lights or shapes, as well as to the disposition and characteristics of sound-signaling appliances, such vessel shall comply with such other provisions in regard to the number, position, range or arc of visibility of lights or shapes, as well as to the disposition and characteristics of sound-signaling appliances, as her Government shall have determined to be the closest possible compliance with these Rules in respect of that vessel.	

2. Responsibility		
(a)	<i>Nothing in these Rules shall exonerate any vessel, or the owner, master or crew thereof, from the consequences of any neglect to comply with these Rules or of the neglect of any precaution which may be required by the ordinary practice of seamen, or by the special circumstances of the case.</i>	
(b)	<i>In construing and complying with these Rules due regard shall be had to all dangers of navigation and collision and to any special circumstances, including the limitations of the vessels involved, which may make a departure from these Rules necessary to avoid immediate danger.</i>	
<i>[Rule 2 is sometimes referred to as the "General Prudential" rule and provides for non-conformance with stated rules in order to prevent a collision, because what is paramount is the avoiding or minimizing the damaging effects of a collision, as opposed to blindly following the rules to the letter. The overall intent is to minimize actual collision taking place rather than rule compliance in and of itself, per se.]</i>		
<i>For the purpose of these Rules, except where the context otherwise requires:</i>		
(a)	<i>The word "vessel" includes every description of water craft, including non-displacement craft, WIG craft and seaplanes, used or capable of being used as a means of transportation on water.</i>	 
(b)	<i>The term "power-driven vessel" means any vessel propelled by machinery.</i>	
(c)	<i>The term "sailing vessel" means any vessel under sail provided that propelling machinery, if fitted, is not being used.</i>	
(d)	<i>The term "vessel engaged in fishing" means any vessel fishing with nets, lines, trawls or other fishing apparatus which restrict manoeuvrability, but does not include a vessel fishing with trolling lines or other fishing apparatus which do not restrict manoeuvrability.</i>	
(e)	<i>The word "seaplane" includes any aircraft designed to manoeuvre on the water.</i>	
(f)	<i>The term "vessel not under command" means a vessel which through some exceptional circumstance is unable to manoeuvre as required by these Rules and is therefore unable to keep out of the way of another vessel.</i>	
3. General Definitions		
(g)	<i>The term "vessel restricted in her ability to manoeuvre" means a vessel which from the nature of her work is restricted in her ability to manoeuvre as required by these Rules and is therefore unable to keep out of the way of another vessel. The term "vessels restricted in their ability to manoeuvre" shall include but not be limited to:</i>	
<i>The term "vessels restricted in their ability to manoeuvre"</i>		
(i)	<i>a vessel engaged in laying, servicing or picking up a navigation mark, submarine cable or pipeline;</i>	
(ii)	<i>a vessel engaged in dredging, surveying or underwater operations;</i>	
(iii)	<i>a vessel engaged in replenishment or transferring persons, provisions or cargo while underway;</i>	
(iv)	<i>a vessel engaged in the launching or recovery of aircraft;</i>	
(v)	<i>a vessel engaged in mine clearance operations;</i>	
(vi)	<i>a vessel engaged in a towing operation such as severely restricts the towing vessel and her tow in their ability to deviate from their course.</i>	
(h)	<i>The term "vessel constrained by her draught" means a power-driven vessel which, because of her draught in relation to the available depth and width of navigable water, is severely restricted in her ability to deviate from the course she is following.</i>	 
(i)	<i>The word "underway" means that a vessel is not at anchor, or made fast to the shore, or aground</i>	
(j)	<i>The words "length" and "breadth" of a vessel mean her length overall and greatest breadth.</i>	
(k)	<i>Vessels shall be deemed to be in sight of one another only when one can be observed visually from the other.</i>	
(l)	<i>The term "restricted visibility" means any condition in which visibility is restricted by fog, mist, falling snow, heavy rainstorms, sandstorms or any other similar causes.</i>	

3. General Definitions	
(m)	The term "Wing-In-Ground (WIG) craft" means a multimodal craft which, in its main operational mode, flies in close proximity to the surface by utilizing surface-effect action.
(n)	a rowing vessel shall be considered as a power driven vessel



Part B - Steering and sailing
Section I (for any visibility)

4. Application
The rules apply in any visibility (e.g. in sight or in restricted visibility).

5. Look-out

Every vessel must at all times keep a proper look-out by sight (day shape or lights by eyes or visual aids), hearing (sound signal or Marine VHF radio) and all available means (e.g. Radar, ARPA, AIS, GMDSS.....) in order to make a full assessment of the situation and risk of collision.



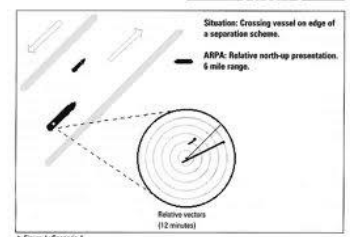
6. Safe speed

Any vessel must proceed at a safe speed at which she can take action to avoid collision and be able to stop within a distance suitable to the prevailing conditions. These conditions include the visibility; traffic density; her manoeuvrability (e.g. stopping distance and turning ability); background lights on shore, dazzle and backscatter from her own lights; the state of the wind, sea, current and nearby hazards; and draft in relation to the available water.

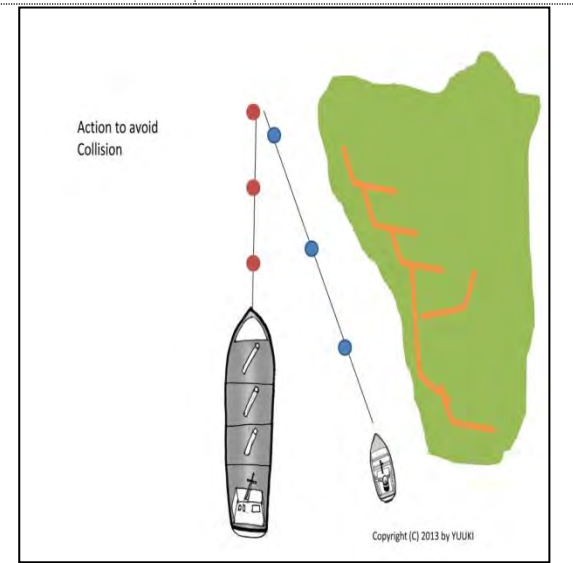
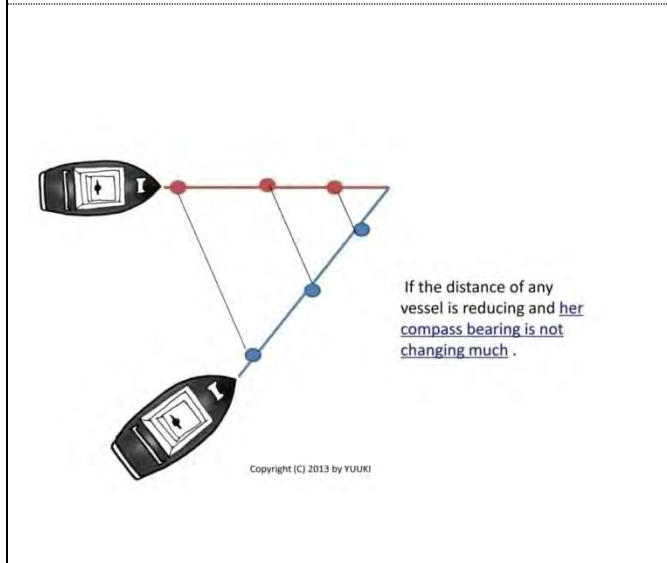
When radar is in use also consider: limitations of the equipment; range scale in use; sea-state, weather and other interference; possible weak targets; the number of targets and their movement; that the use of radar may help to judge the visibility.[4]

7. Risk of Collision

Vessels must use all available means to determine the risk of a collision, including the use of radar (if available) to get early warning of the risk of collision by radar plotting or equivalent systematic observation of detected objects. (e.g. ARPA, AIS).



If the distance of any vessel is reducing and her compass bearing is not changing much or it is a large vessel or towing vessel at close distance, or if there is any doubt, then a risk of collision shall be deemed to exist.[4]



8. Action to avoid collision
Actions taken to avoid collision should be: ➔

- positive
- obvious
- made in good time

9. Narrow channels

- A vessel proceeding along a narrow channel must keep to starboard.
- Small vessels or sailing vessels must not impede (larger) vessels which can navigate only within a narrow channel.
- Ships must not cross a channel if to do so would impede another vessel which can navigate only within that channel.

10. Traffic separation schemes

Ships must cross traffic lanes steering a course "as nearly as practicable" at right angles to the direction of traffic. This reduces confusion and enables that vessel to cross the lane as quickly as possible.

11. Application

Section II (for vessels in sight of one another)

The following "rules 11-18" applies to vessels in sight of one another. (Section III has specific requirements for restricted visibility)

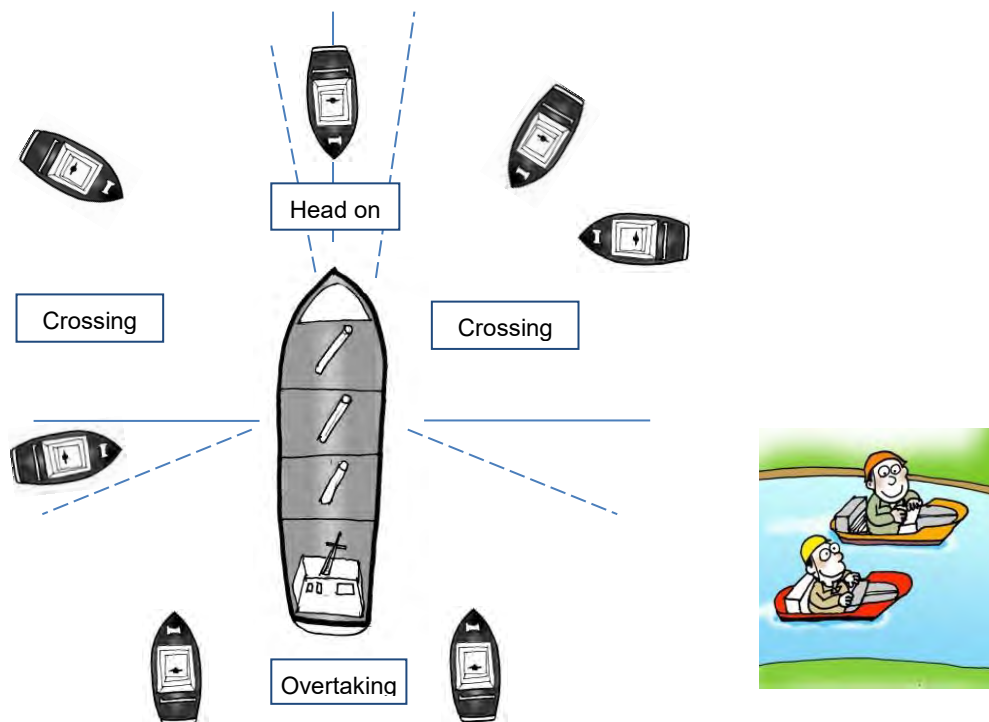
12. Sailing vessels

Two sailing vessels approaching one another must give-way as follows:

- Port gives way to Starboard. When each has the wind on a different side, the vessel which has the wind to port must give way;
- Windward gives way to leeward. When both have the wind on the same side, the vessel which is windward must give way to the vessel which is leeward;
- Unsure port gives way. If a vessel, with the wind on the port side, sees a vessel to windward and cannot determine whether the other vessel has the wind on the port or the starboard side, they must give way.

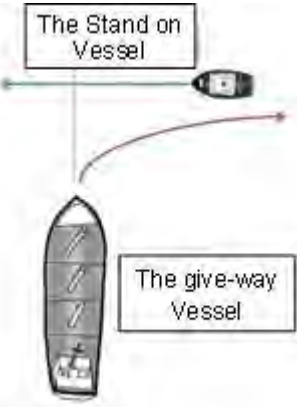

13. Overtaking


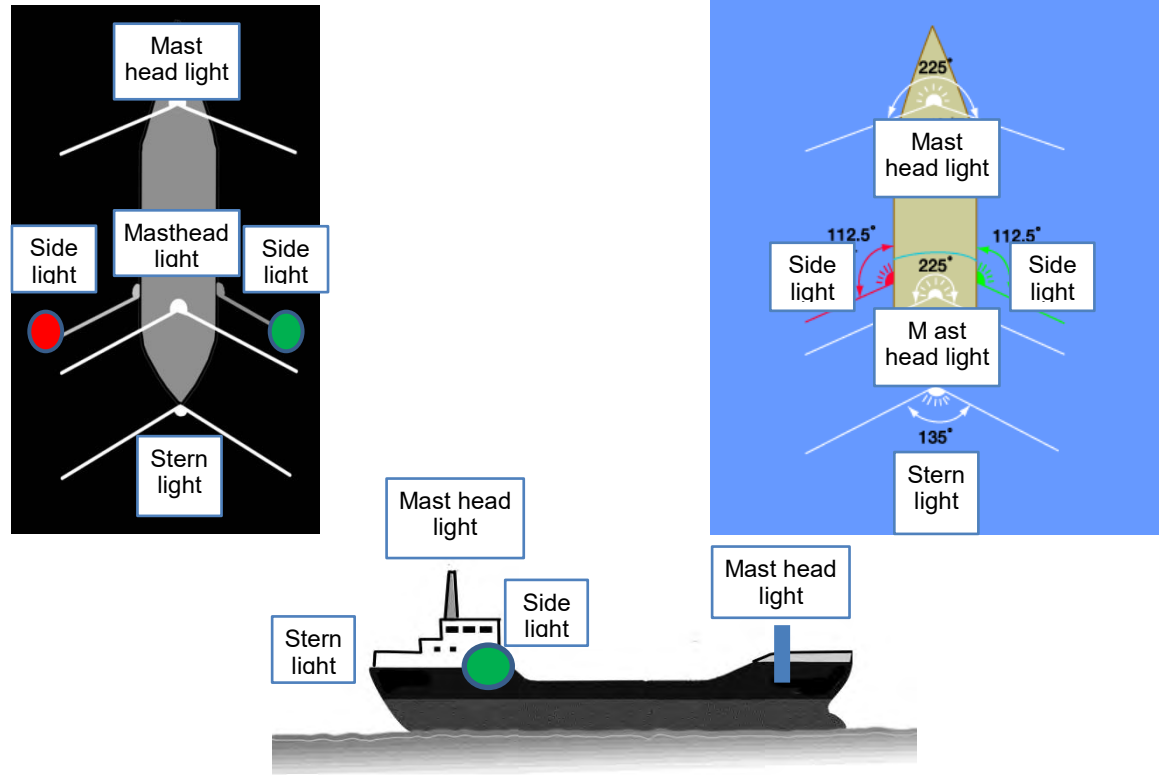
An overtaking vessel must keep out of the way of the vessel being overtaken. 'Overtaking' means approaching another vessel at more than 22.5 degrees abaft her beam, i.e. so that at night, the overtaking vessel would see only the stern light and neither of the sidelights of the vessel being overtaken.








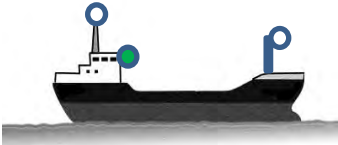
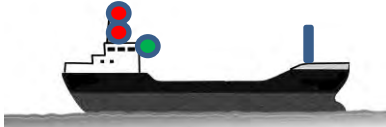
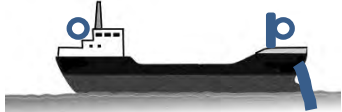
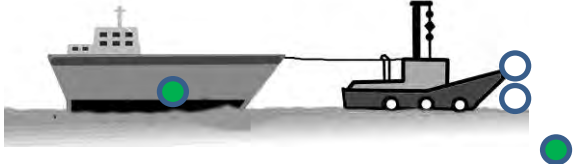
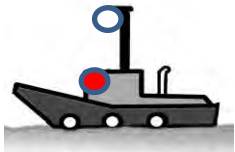


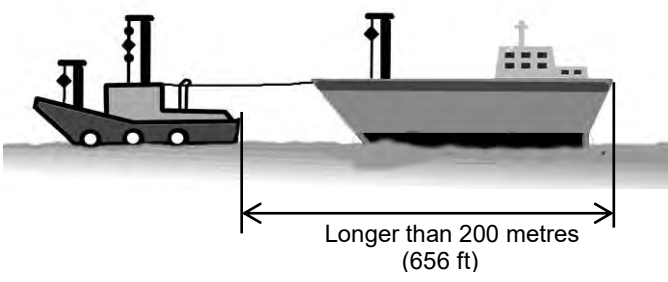
14. Head-on situations

When two power-driven vessels are meeting head-on both must alter course to starboard so that they pass on the port side of the other. 'Head-on' means seeing the other vessel ahead or nearly ahead so that by night her masthead lights are actually or nearly lined up and/or seeing both her sidelights, or by day seeing a similar aspect of her.

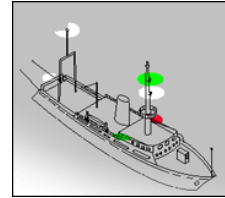
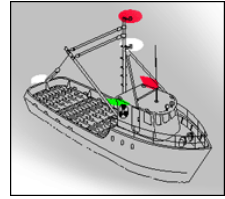
15. Crossing situations	
When two power-driven vessels are crossing, the vessel which has the other on the starboard side must give way and avoid crossing ahead of her. The saying is "If to starboard red appear, 'tis your duty to keep clear".	
16. The give-way vessel	
The give-way vessel must take early and substantial action to keep well clear.	
	17. The stand-on vessel
The stand-on vessel shall maintain her course and speed, but she may take action to avoid collision if it becomes clear that the give-way vessel is not taking appropriate action, or when so close that collision can no longer be avoided by the actions of the give-way vessel alone. In a crossing situation, the stand-on vessel should avoid turning to port even if the give-way vessel is not taking appropriate action. These options for the stand-on vessel do not relieve the give-way vessel of her obligations under the rules.	
18. Responsibilities between vessels	
Except in narrow channels, traffic separation schemes, and when overtaking (i.e. rules 9, 10, and 13)	
A power-driven vessel must give way to:	
<ul style="list-style-type: none"> • a vessel not under command; • a vessel restricted in her ability to maneuver (this may include vessels towing one another); • a vessel engaged in fishing; • a sailing vessel. 	
A sailing vessel must give way to:	 ClipArt WEB
<ul style="list-style-type: none"> • a vessel not under command; • a vessel restricted in her ability to maneuver; • a vessel engaged in fishing. 	
A vessel engaged in fishing when underway shall, so far as possible, keep out of the way of:	
<ul style="list-style-type: none"> • a vessel not under command; • a vessel restricted in her ability to maneuver. 	
Any vessel other than a vessel not under command or a vessel restricted in her ability to manoeuvre shall, if possible, not impede the safe passage of a vessel constrained by her draft, exhibiting the signals in Rule 28.	
A vessel constrained by her draft shall navigate with particular caution having full regard to her special condition.	
19. Restricted visibility	
(a)	Rule 19 applies to vessels (not in sight of one another) in or near restricted visibility.
(b)	All ships shall proceed at a safe speed for the condition of visibility (see Rule 6). A power-driven vessel shall have her engine(s) on stand-by for immediate manoeuvre.
(c)	All ships shall comply with Section I of this Part e.g. Rules 5 (lookout), 6 (safe speed), 7 (risk of collision), 8 (action to avoid collisions), 9 (narrow channels) and 10 (TSS) with due regard for the visibility conditions.
(d)	If another vessel is detected by radar alone, and a close-quarters or collision risk is suspected, a vessel should take early and substantial action to avoid the other, but:
(i)	avoid any turn to port for a vessel detected forward of the beam, except for a vessel being overtaken,
(ii)	avoid any change of course toward a vessel abeam or abaft the beam.
When the fog signal of another vessel is heard, apparently forward of the beam, a vessel should reduce speed to the minimum at which she can maintain her course, or if necessary stop, and navigate with extreme caution until there is no risk of collision.	
Note:	

<i>International Regulations for Preventing Collisions at Sea</i>			
<i>Part C – Lights and shapes</i>			
<i>Application</i>			
<p><i>Rules concerning lights apply from sunset to sunrise, in conditions of restricted visibility, and in all other circumstances when it is deemed necessary. Rules concerning shapes apply during the day.</i></p> <p style="text-align: center;">Picture from WEB</p>			
<i>Definitions</i>			
<i>"Masthead light"</i>	<i>means a white light on the centreline of the vessel showing from right ahead to 22.5 degrees abaft the beam on either side of the vessel.</i>		
<i>"Sidelights"</i>	<i>means a green light on the starboard side and a red light on the port side each showing from right ahead to 22.5 degrees abaft the beam on its respective side. If the vessel is less than 20 metres (66 ft) long, the sidelights may be combined in one fixture carried on the centreline of the vessel.</i>		
<i>"Sternlight"</i>	<i>means a white light placed as nearly as practicable at the stern showing 67.5 degrees from right aft on each side of the vessel.</i>		
<i>"Towing light"</i>	<i>means a yellow light having the same characteristics as a "sternlight" defined above.</i>		
<i>"All-round light"</i>	<i>means a light visible from 360 degrees of the horizon.</i>		
<i>"Flashing light"</i>	<i>means a light flashing faster than 120 flashes per minute.</i>		
			
<i>Visibility of lights</i>			
Lights must be bright enough to be visible as follows			
Light type	Vessels 50 meters or more in length	Vessels between 12-50 meters in length	Vessels less than 12 meters in length
Mast head light	6 nautical miles	5 miles; except for vessels less than 20 meters, 3miles	2 miles
Sidelight	3 miles	2 miles	1 mile
Towing light	3 miles	2 miles	2 miles
White, red, green or yellow all-around light	3 miles	2 miles	2 miles

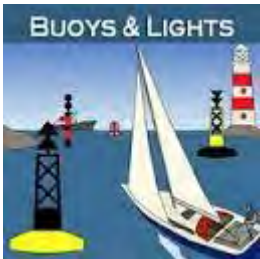
Shapes							
							
	ball		cylinder		cone		diamond
							0.6 meters is the base unit used in determining the size and measurement of shapes
Lights displayed by power-driven vessels underway							
<p>A power-driven vessel underway must display:</p> <ul style="list-style-type: none"> • a masthead light forward; • If over 50 metres (164 ft) length, then also a second masthead light aft and higher than the forward one; except that a vessel of less than 50 metres in length shall not be obliged to exhibit such light but may do so; • sidelights; • a sternlight. <p>A hovercraft must also display an all-round flashing yellow light.</p>							
A power-driven vessel underway		A Vessel not under command (Making way through the water)			A vessel at anchor over 50 meters in length		
							
Lights for vessels towing and pushing							
<p>A power driven vessel when towing must show</p> <ul style="list-style-type: none"> • two masthead lights on top of each other, instead of the masthead(s) prescribed in Rule 23; • sidelights; • a sternlight; • a towing light vertically above the sternlight; • a diamond shape if the tow is longer than 200 metres (656 ft). <p>if a pushing vessel and the vessel it is pushing are rigidly connected, they count together as a power driven vessel and must show the light prescribed by Rule 23.</p>							
A power driven vessel when towing. A towing vessel is less than 50m and tow is less than 200							
A power-driven vessel of less than 12 metres (39.4 ft) may display only an all-round white light and sidelights. However, in the case of a skiff a wooden clinker rowing boat which falls into this category only needs to be capable of showing a white light.							
A power-driven vessel of less than 7 metres (23.0 ft) whose maximum speed does not exceed 7 knots (13 km/h; 8 mph) must be capable of showing a white light							

. Lights for vessels towing and pushing The tow is longer than 200 metres (656 ft)	
	
. Lights for vessels towing and pushing	
<p>If the pushing vessel and vessel being pushed are not rigidly connected, they must instead show:</p> <ul style="list-style-type: none"> • two masthead lights on top of each other, instead of the masthead(s) prescribed in Rule 23; • sidelights and asternlight. <p>Power driven vessels larger than 50 metres (164 ft) which are towing or pushing and are not part of a composite unit must also show:</p> <ul style="list-style-type: none"> • a second masthead abaft of and higher than the forward one (vessels smaller than 50 metres may also show this light). 	
<p>Vessels being towed that are not inconspicuous or partly submerged must show:</p> <ul style="list-style-type: none"> • sidelights, a sternlight and a diamond shape if the tow is longer than 200 metres (656 ft). <p>Any number of vessels being towed or pushed together shall be lit as one vessel, and</p> <ul style="list-style-type: none"> • a vessel being pushed ahead must show sidelights at its forward end if it is not part of a composite unit; • a vessel being towed alongside must show a sternlight and sidelights at its forward end. 	
<p>A vessel being towed that are inconspicuous or partly submerged must show:</p> <ul style="list-style-type: none"> • if it is narrower than 25 metres (82 ft), one all-round white light near the forward end (except if it is a dracone) and one near the after end; • if it is wider than 25 metres (82 ft), then also two all round white lights at the extremities of its breadth; • if it is longer than 100 metres (328 ft), then in a series of such all round white lights spaced no further than 100 metres (328 ft) apart; • a diamond shape near the end of the last vessel, and, if the tow is longer than 200 metres (656 ft), another diamond shape as far forward as possible. • If for any reason it is not possible to light the vessel according to these rules, all possible measures must be taken to light the vessel and indicate its presence. • If the towing vessel is not normally engaged in towing operations and it is impractical to light it correctly, it is not obliged to show these lights if it is towing a vessel in distress or in need of assistance. All possible measures must be taken to show that it is towing; in particular the towline should be illuminated. 	
Lights for sailing and rowing vessels	
Sailing vessels underway and vessels under oars (padlles)	
(a)	A sailing vessel underway shall exhibit sidelights and a sternlight.
(b)	In a sailing vessel of less than 20 metres (66 ft) in length the lights prescribed in paragraph (a) of this Rule may be combined in one lantern carried at or near the top of the mast where it can best be seen.
(c)	A sailing vessel underway may, in addition to the lights prescribed in paragraph (a) of this Rule, exhibit at or near the top of the mast, where they can best be seen, two all-round lights in a vertical line, the upper being red and the lower green, but these lights shall not be exhibited in conjunction with the combined lantern permitted by paragraph (b) of this Rule.
(d)	1. A sailing vessel of less than 7 metres (23.0 ft) in length shall, if practicable, exhibit the lights prescribed in paragraph (a) or (b) of this Rule, but if she does not, she shall have ready at hand an electric torch or lighted lantern showing a white light which shall be exhibited in sufficient time to prevent collision.
	2. A vessel under oars may exhibit the lights prescribed in this Rule for sailing vessels, but if she does not, she shall have ready at hand an electric torch or lighted lantern showing a white light which shall be exhibited in sufficient time to prevent collision.
(e)	A vessel proceeding under sail when also being propelled by machinery shall exhibit forward where it can best be seen a conical shape, apex downwards.

Lights for fishing vessels	
(a)	A vessel engaged in fishing, whether underway or at anchor, shall exhibit only the lights and shapes prescribed in this Rule.
(b)	A vessel when engaged in trawling, by which is meant the dragging through the water of a dredge net or other apparatus used as a fishing appliance, shall exhibit:
	1. two all-round lights in a vertical line, the upper being green and the lower white, or a shape consisting of two cones with their apexes together in a vertical line one above the other;
	2. a masthead light abaft of and higher than the all-round green light; a vessel of less than 50 metres (164 ft) in length shall not be obliged to exhibit such a light but may do so;
3.	when making way through the water, in addition to the lights prescribed in this paragraph, sidelights and a sternlight.
(c)	A vessel engaged in fishing, other than trawling, shall exhibit:
	1. two all-round lights in a vertical line, the upper being red and the lower white, or a shape consisting of two cones with apexes together in a vertical line one above the other;
	2. when there is outlying gear extending more than 150 metres horizontally from the vessel, an all-round white light or a cone apex upwards in the direction of the gear;
3.	when making way through the water, in addition to the lights prescribed in this paragraph, sidelights and a sternlight.
(d)	The additional signals described in Annex II to these Regulations apply to a vessel engaged in fishing in close proximity to other vessels engaged in fishing.
(e)	A vessel when not engaged in fishing shall not exhibit the lights or shapes prescribed in this Rule, but only those prescribed for a vessel of her length.
Lights for vessels not under command or restricted in their ability to manoeuvre	
Vessels not under command or restricted in their ability to manoeuvre	
(a)	A vessel not under command shall exhibit:
	1. two all-round red lights in a vertical line where they can best be seen;
	2. two balls or similar shapes in a vertical line where they can best be seen;
3.	when making way through the water, in addition to the lights prescribed in this paragraph, sidelights and a sternlight.
(b)	A vessel restricted in her ability to manoeuvre, except a vessel engaged in mine-clearance operations, shall exhibit:
	1. three all-round lights in a vertical line where they can best be seen. The highest and lowest of these lights shall be red and the middle light shall be white;
	2. three shapes in a vertical line where they can best be seen. The highest and lowest of these shapes shall be balls and the middle one a diamond;
	3. when making way through the water, a masthead light or lights, sidelights and a sternlight, in addition to the lights prescribed in sub-paragraph (i);
4.	when at anchor, in addition to the lights or shapes prescribed in sub-paragraphs (i) and (ii), the light, lights or shape prescribed in Rule 30.
(c)	A power-driven vessel engaged in a towing operation such as severely restricts the towing vessel and her tow in their ability to deviate from their course shall, in addition to the lights or shapes prescribed in Rule 24(a), exhibit the lights or shapes prescribed in sub-paragraphs (b)(i) and (ii) of this Rule.
(d)	A vessel engaged in dredging or underwater operations, when restricted in her ability to manoeuvre, shall exhibit the lights and shapes prescribed in sub-paragraphs (b)(i), (ii) and (iii) of this Rule and shall in addition, when an obstruction exists, exhibit:
	1. two all-round red lights or two balls in a vertical line to indicate the side on which the obstruction exists;
	2. two all-round green lights or two diamonds in a vertical line to indicate the side on which another vessel may pass;
3.	when at anchor, the lights or shapes prescribed in this paragraph instead of the lights or shape prescribed in Rule 30.



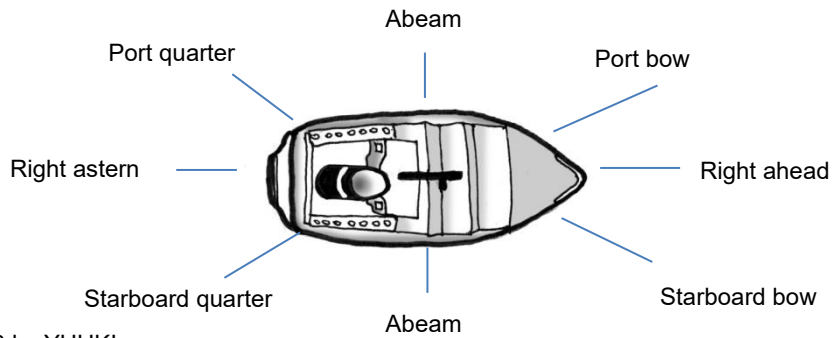
Lights for vessels not under command or restricted in their ability to manoeuvre <i>(Continue)</i>	
Whenever the size of a vessel engaged in diving operations makes it impracticable to exhibit all lights and shapes prescribed in paragraph (d) of this Rule, the following shall be exhibited:	
(e)	1. three all-round lights in a vertical line where they can best be seen. The highest and lowest of these lights shall be red and the middle light shall be white;
	2. a rigid replica of the International Code flag "A" not less than 1 metre (3.3 ft) in height. Measures shall be taken to ensure its all-round visibility.
(f)	A vessel engaged in mine clearance operations shall in addition to the lights prescribed for a power-driven vessel in Rule 23 or to the lights or shape prescribed for a vessel at anchor in Rule 30 as appropriate, exhibit three all-round green lights or three balls. One of these lights or shapes shall be exhibited near the foremast head and one at each end of the fore yard. These lights or shapes indicate that it is dangerous for another vessel to approach within 1,000 metres (0.62 mi) of the mine clearance vessel.
(g)	Vessels of less than 12 metres (39.4 ft) in length, except those engaged in diving operations, shall not be required to exhibit the lights and shapes prescribed in this Rule.
(h)	The signals prescribed in this Rule are not signals of vessels in distress and requiring assistance. Such signals are contained in Annex IV to these Regulations.

. Lights for vessels constrained by their draught	
A vessel constrained by her draft may, in addition to the lights prescribed for power-driven vessels in Rule 23, exhibit where they can best be seen three all-round red lights in a vertical line, or a cylinder.	
Lights for pilot vessels	
A vessel engaged on pilotage duty shall exhibit:	
(a)	(i) at or near the masthead, two all-round lights in a vertical line, the upper being white and the lower red;
	(ii) when underway, in addition, sidelights and a sternlight;
	(iii) when at anchor, in addition to the lights prescribed in subparagraph (i), the light, lights, or shape prescribed in Rule 30 for vessels at anchor.
(b)	A pilot vessel when not engaged on pilotage duty shall exhibit the lights or shapes prescribed for a similar vessel of her length.
Lights for vessels anchored and aground	
A vessel at anchor must display an all-round white light or one black ball in the fore part and another all-round white light at or near the stern at a lower level than the light in the fore part. BUT if the vessel is less than 50 meters in length it may exhibit an all-round white light where it can best be seen instead of the lights foresaid.	
Note:	
	

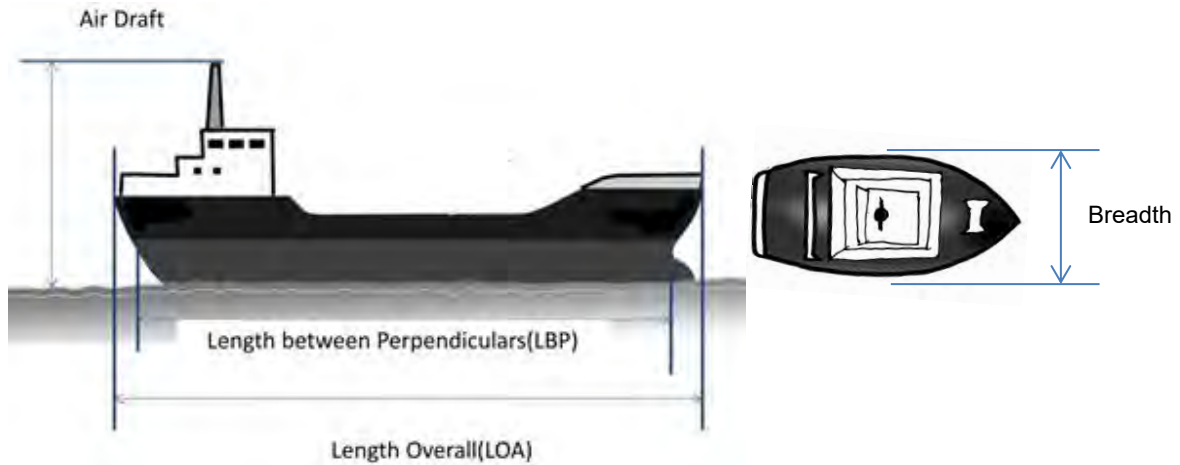
Seamanship for VTS training Contents. The ship in relations to its surroundings	
1.	Seamanship terminology
2.	Ship Maneuvering: Maneuvering capability of ship
3.	Ship handling in restricted waters
4.	Anchor in water
5.	Wind effects on maneuver ability
6.	Ship stability



Seamanship Terminology



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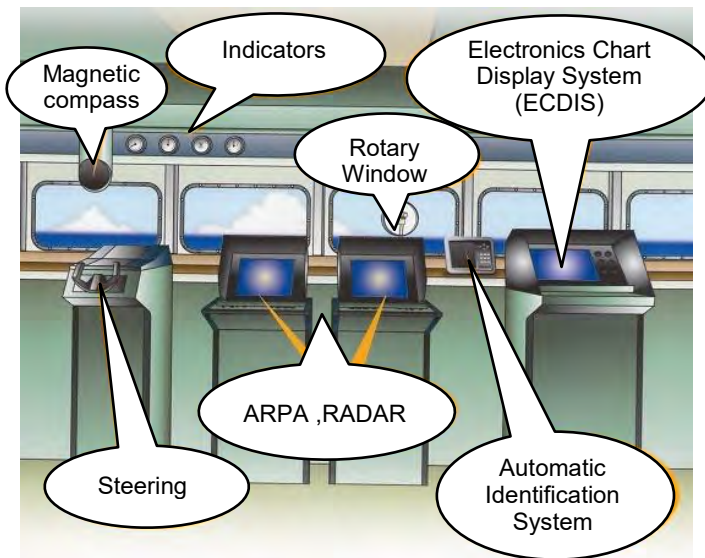
LOA: The maximum length of the vessel

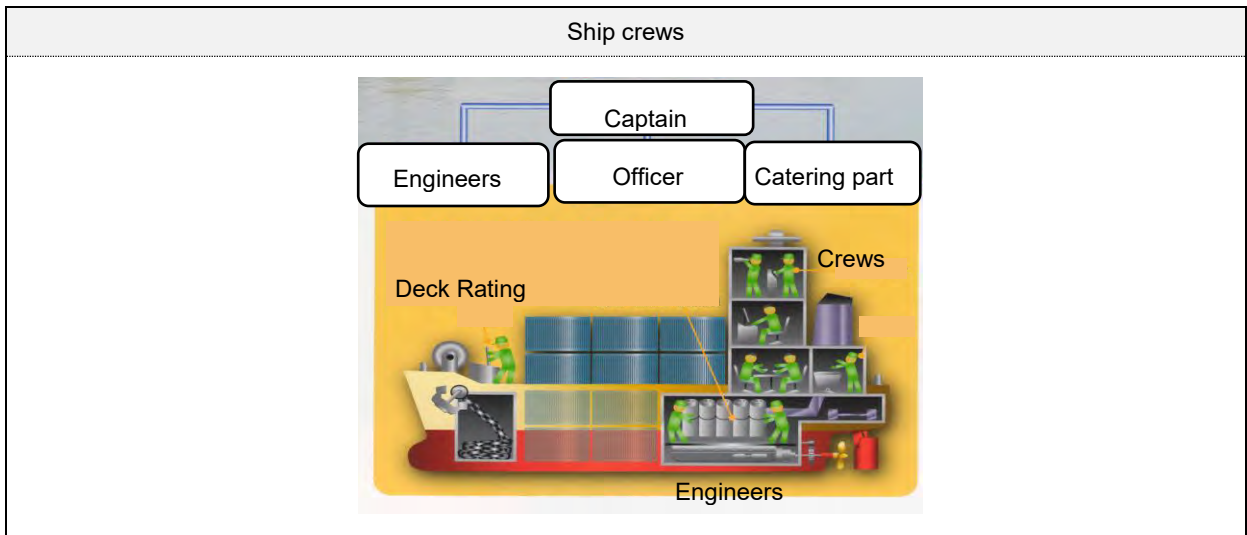
Breadth: The maximum beam of the vessel.

Depth: The extreme depth of the vessel.

Draft: The extreme depth of the vessel.

Ship Bridge



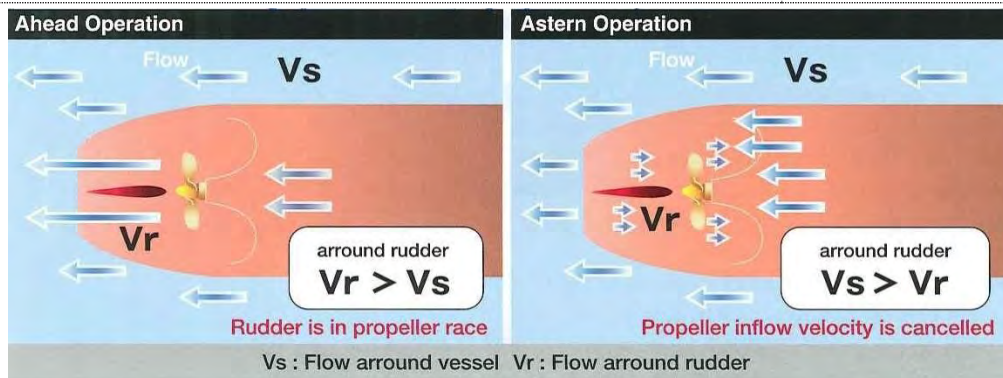


2.Ship Maneuvering

Maneuvering capability
Fundamental maneuvering characteristics

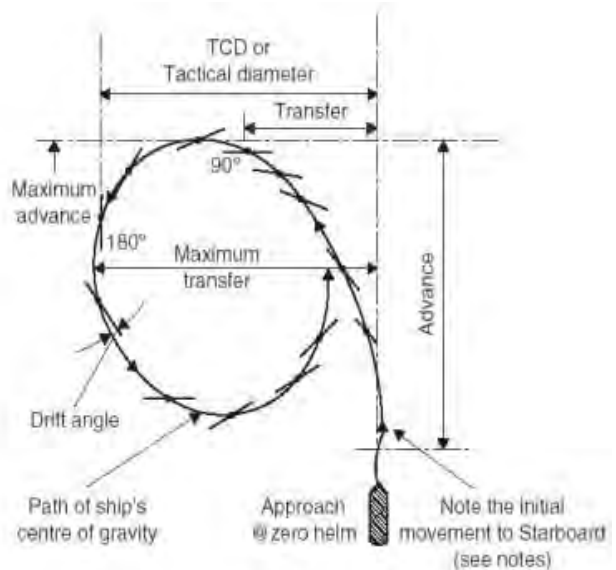


In the stopping maneuver using full reverse power, the rudder effectiveness is extremely poor. The propeller discharge jet cancels the inflow speed to the rudder.
The propeller's powerful discharge jet is indispensable for the rudder effectiveness.



Turning ability

Turning ability is the measure of the ability to turn the ship using hard-over rudder.
“Advance at 90° change of heading”, “Transfer at 90° change of heading”, and “Tactical diameter (= Transfer at 180° change of heading)” are main factors.
Ships manoeuvring- Factors affecting Turning circle
External forces affecting the drift angle



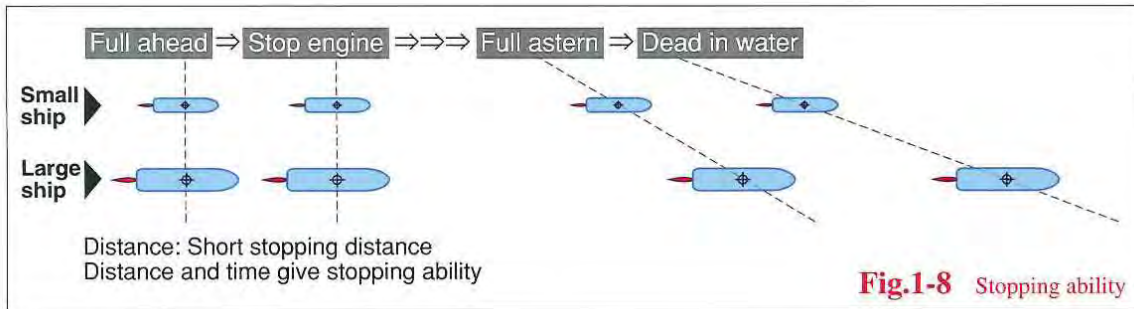
IMO Standards :

- Advance < 4.5 L
- Tactical diameter < 5 L

Stopping ability

Stopping ability is measured by the “track reach” and “time to dead in water” realized in a stop engine – full astern maneuver performed after a steady approach at full test speed.

IMO Standard : Track reach < 15 L



Stopping distance

This is the minimum distance that a vessel needs to come to rest over the ground. Speed trials for new tonnage normally include test runs to provide information to watch officers showing the time and distance a vessel will take to stop a from full ahead after ordering main engines to stop and from crush astern(emergency stop)

Forces acting on propeller blades.

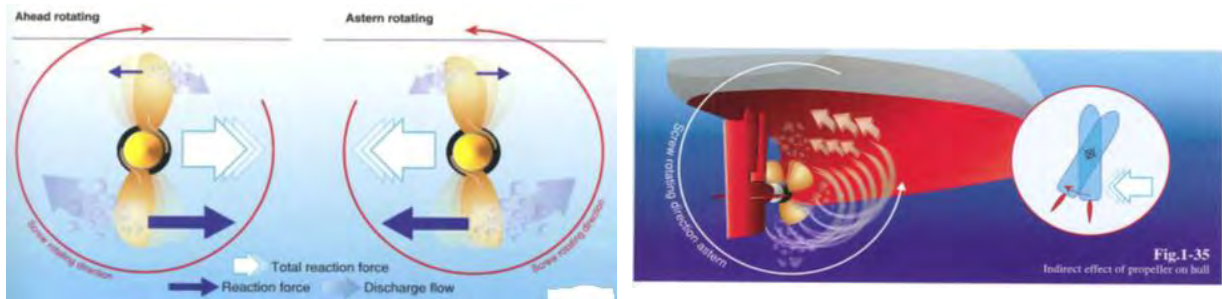
Right hand fixed

Ahead; Stern cants to starboard, bow moves to port

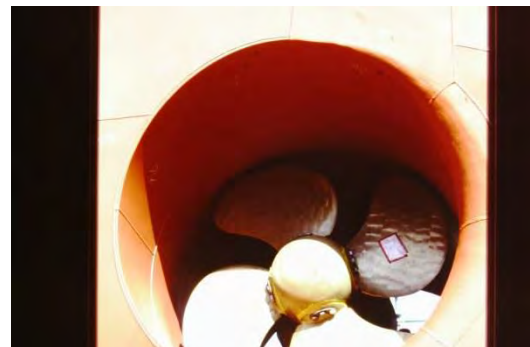
Astern; Stern cants to port, bow moves to starboard

As shown in Fig.1-34, when the propeller is reversing, the difference in reaction force exerted between the upper blade and the bottom blade results in a net force to port that tends to cause the ship to turn to starboard. (known as “the direct effect of propeller”)

Also, as shown in fig.2, the interactions between hull (stern) and propeller discharge currents produces the strong to port that tends to cause the ship to turn to starboard. (known as “the indirect effect of propeller on hull.”)



Bow thruster



Ship A and Ship D belong to types where steady turning ability and initial turning (responsiveness to the helm) ability are either good or poor, and ships belonging to the above patterns are very scarce.

Ship B has good initial turning ability but poor steady state turning ability. Fine high-speed cargo ships, such as container ships, belong to this pattern.


Ship C has poor initial turning ability. Fat ships, such as full-loaded VLCCs and bulk carriers, belong to this pattern.

Forces acting on propeller blades.


Four patterns of maneuvering characteristics

K: ○ → large → good steady turning ability
 T: ○ → small → good initial turning ability


Merchant Vessel




Pilot boat (small)



PCC (slim)



Bulk (fat)



Bulk with crane (fat)

- Some large vessels such as VLCCs are required to use more than 20 deg rudder angle at the beginning.
- Turning rate should be maintained within 10 deg/min for safe ship handling except in special cases.
- Ship-handlers are required to review their own ship's actual distance to new course in every condition.

Stopping ability

Stopping is a maneuver of interest primarily from the point of view of avoiding collision. When decelerating the ship by use of full backing power from "full ahead sea-speed" until the ship comes to rest, the length of the track is called "crash stopping distance" or "short stopping distance"

Table shows the results of sea trials on short stopping distance “s”

Ship Type	DWT	Lpp(m)	Draft(m)	Eng	V(Knot)	S(m)	S/Lpp
Ore Carrier	55,700	211	11.8	Diesel	16.0	1,875	8.9
Car Carrier	21,443	190	10.3	Diesel	20.0	2,568	13.5
Container Ship	81,171	284	14.0	Diesel	25.0	3,620	12.7
LNG Carrier	11,000	124	6.5	Turbine	15.0	1,441	11.6
LNG Carrier	72,571	276	11.4	Turbine	19.5	2,580	9.3
Product Tanker	48,658	180	12.6	Diesel	15.1	2,280	12.6
Product Tanker	105,084	233	14.7	Diesel	15.5	3,658	15.7
VLCC	209,000	326	17.7	Turbine	16.6	4,750	14.6
VLCC	279,989	319	20.3	Diesel	15.5	4,593	14.4
VLCC	310,309	333	21.1	Diesel	15.6	3,600	10.8
VLCC	332,000	320	24.8	Turbine	14.8	3,241	10.1

Fluid (Froude number)

The dimensionless quantity $U(gL)^{-1/2}$, where U is a characteristic velocity of flow, g is the acceleration of gravity, and L is a characteristic length. The Froude number can be interpreted as the ratio of the inertial to gravity forces in the flow. This ratio may also be interpreted physically as the ratio between the mean flow velocity and the speed of an elementary gravity (surface or disturbance) wave traveling over the water surface.

When the Froude number is equal to one, the speed of the surface wave and that of the flow is the same. The flow is in the critical state. When the Froude number is less than one, the flow velocity is smaller than the speed of a disturbance wave traveling on the surface. Flow is considered to be subcritical (tranquil flow). Gravitational forces are dominant. The surface wave will propagate upstream and, therefore, flow profiles are calculated in the upstream direction. When the Froude number is greater than one, the flow is supercritical (rapid flow) and inertial forces are dominant. The surface wave will not propagate upstream, and flow profiles are calculated in the downstream direction.

The Froude number is useful in calculations of hydraulic jump, design of hydraulic structures, and ship design, where forces due to gravity and inertial forces are governing. In these cases, geometric similitude and the same value of the Froude number in model and prototype produce a good approximation to dynamic similitude. See also Dimensional analysis; Dimensionless groups; Hydraulics; Ship design.

From : answer.com: Read more: <http://www.answers.com/topic/froude-number#ixzz1PmrDY8DZ>

Froude number : $F_n = V / (g L)^{1/2}$

V : ship's speed (m/s), g : 9.8 m/s^2 L : ship length (m)

Ship speed(kts)	Ship speed (m/s)	Froude number L=200m	Froude number, L=100m
3	1.54	0.03	0.05
5	2.57	0.06	0.08
10	5.14	0.12	0.16
15	7.72	0.17	0.25
20	10.29	0.23	0.33

Bank effect

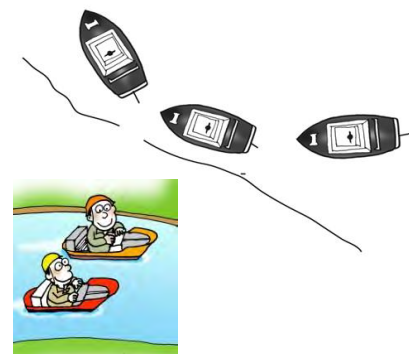
Interaction occurring between a ship and a bank, sometimes referred to as a bank cushion effect. A vessel with helm amidships may create an area of increased pressure between hull and the bank.



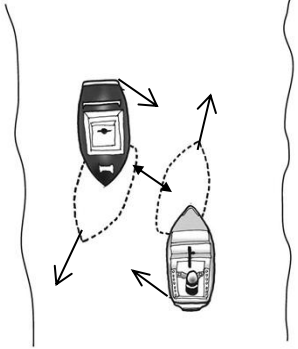


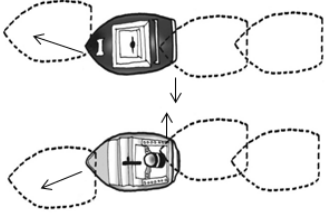
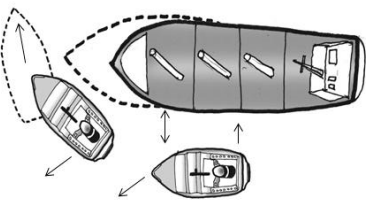
The result is that the vessel appears to be repelled from the bank while her stern is apparently sucked into the bank with obvious dangers to rudder and propellers.

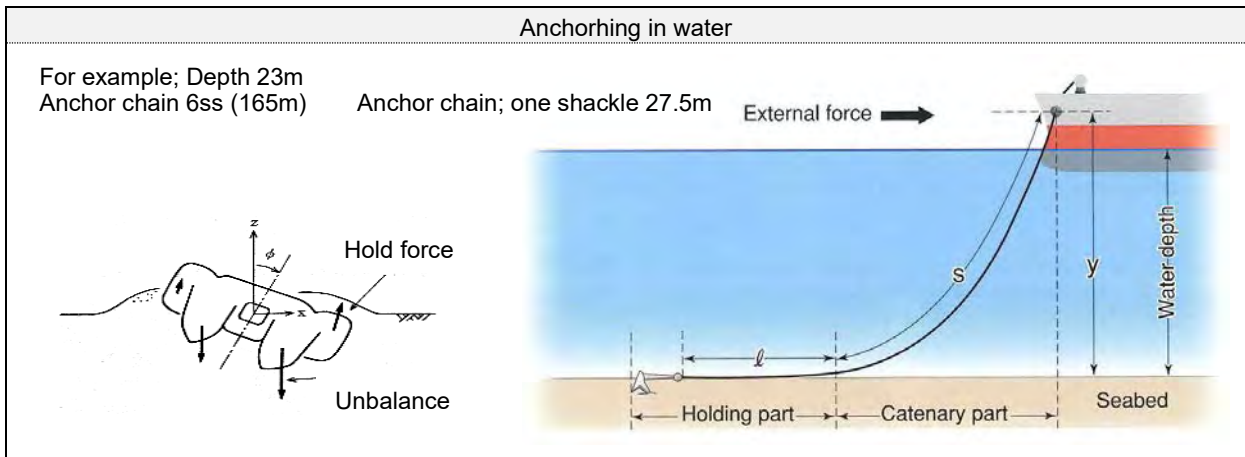
Area of bank cushion effect ship experiences a massive sheer , away from bank. Area of bank suction effect.

Interaction in narrow channels

Vessels navigating in narrow channels may also see telltale signs of interaction. e.g. when passing another vessel which is moored fore and aft. The interaction between the vessels will often cause the moored vessel to 'range on her moorings'. A prudent watch keeper on that vessel would ensure that all moorings were tended regularly and kept taut. The experienced ship-handler would reduce speed when passing the moored vessel to eliminate the possibility of parting her mooring lines.



Interaction in narrow channels (<i>Continue</i>)	
<p>Another telltale sign, again in narrow channel such as a canal, may be noticed when a vessel is navigating close to the bank. As the vessel proceeds, a volume of water equal to the ship's displacement is pushed ahead and to the sides of the vessel. The water reaches the bank and rides up it. Once the vessel has passed, the water falls back into the cavity in the ship's wake. The interaction in this case is between the hull of the ship and sides of the bank. A increase in squat may be experienced because of the loss of water under the vessel's keel. This may even bring about the vessel grounding. The effects may be reduced by a reduction in speed, provided steering is not impaired by such action.</p> <p>Attention is drawn to Merchant Shipping Notice (Notice of Mariner) regarding Interaction between ships.</p>	 
<p>As the vessel proceeds, a volume of water equal to the ship's displacement is pushed ahead and to the sides of the vessel. The water reaches the bank and rides up it. Once the vessel has passed, the water falls back into the cavity in the ship's wake..</p> <p>Attention is drawn to Merchant Shipping Notice (Notice of Mariner) regarding Interaction between ships.</p>	
Interaction between two vessels on reciprocal courses and over taking	
<p>Recommended positions when rounding a bent or overtaking another vessel in narrow channels</p> <p>Stern attract</p> <p>Bow, foreparts repelled</p> <p>Reciprocal course: Repel and Attract:</p>	
 	
Interaction between two vessels on reciprocal courses and over taking	
<p>Overtaking , when two ships are passing too close to each other on parallel courses. Interaction may occur when the ships are abeam , resulting in deflection of the bow and attraction of stern quarters, with dangerous consequences.</p>	
Interaction between large vessel and tug	
<ol style="list-style-type: none"> 1 As the tug approaches the larger vessel to collect the towline, its bow is repelled by the shoulder of the larger vessel. 2 Counter helm is applied to correct the outward motion of the tug. 3 As the tug moves ahead under the bow of the larger vessel, it experiences an attraction to the larger vessel accentuated by the tug carrying the counter helm. 4 Unless prompt action is taken by the helmsman on passing in front and under the larger vessel's bow. 	
<p>Tug's bow being repelled by pressure cushion at shoulder of large vessel.</p>	



Wind effects on maneuverability Hull structure properties of PCCs

PCC has an enormous area of hull and superstructure above water as compared to the underwater hull.



Length over all (LOA)	190m	
Breadth extreme (B)	32.26m	
Depth moulded (D)	37.41 (Cargo deck top)	
Draft	Summer draft	10.325m
	Designed draft	8.325m
	Ballast condition	7.50m
Anchor weight (AC14 type)	8,325 kg	
Cable	Weight	143.7 kg/m
	Length	687.5 m (12/13 shackles)

	Ship	Front ratio (Aa/Aw)	Side ratio (Ba/Bw)
PCC is highly susceptible to the effects of wind.	PCC (6,400-unit capacity)	3.1	2.9
	Container ship (6,000-TEU)	2.6	1.9
	Tanker (230,000-DWT)	1.2	0.8

Wind effects on PCC while underway

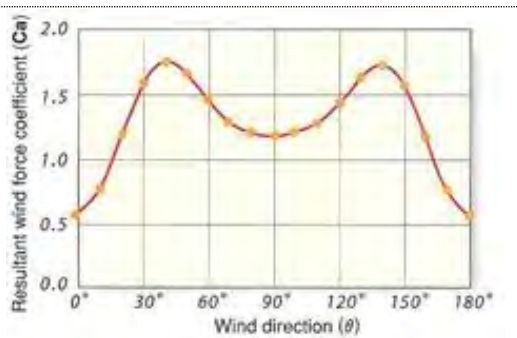
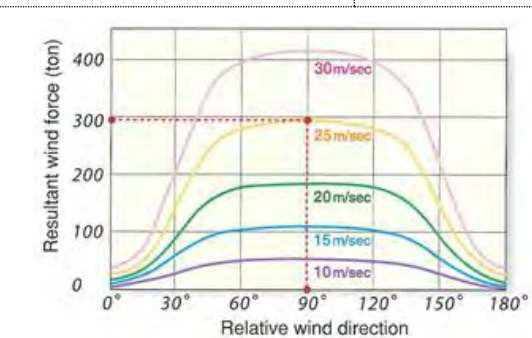
Wind force on PCC

Simplified formula of wind resultant force (F)

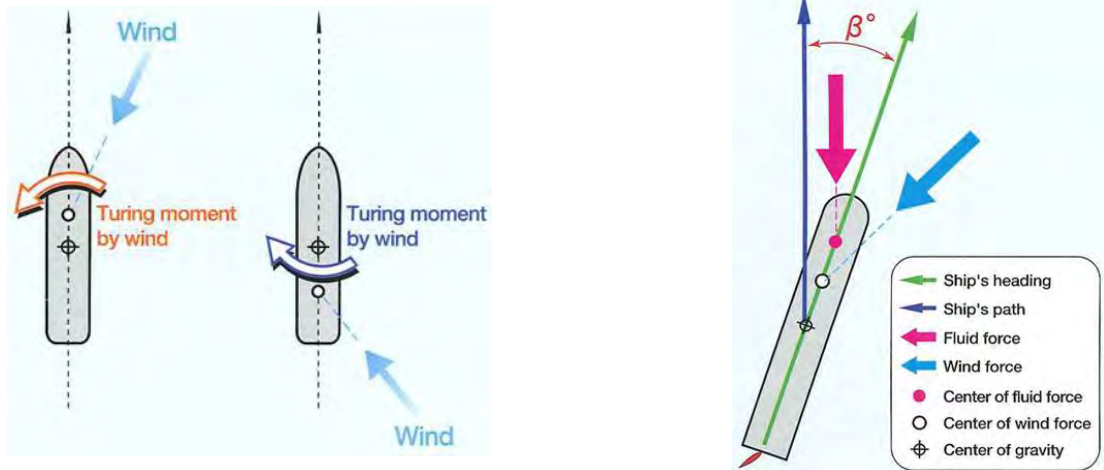
$$F = 1/2 \cdot \rho \cdot C_a \cdot V^2 (A_a \cdot \cos^2 \theta + B_a \cdot \sin^2 \theta)$$

ρ : Specific density of air (0.125)
 C_a : Resultant wind force coefficient
 a : Distance of the center of wind force from bow (m)
 C : Center of the wind force
 A_a & B_a : Projection of above-water portion (m²)

Fig.6-12 Simplified formula of wind resultant force and related elements



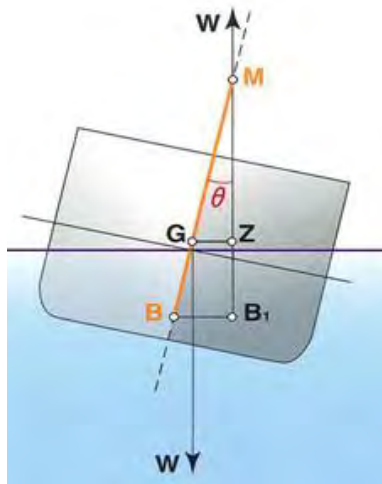
Leeway and check helm for maintaining straight course



Ship stability

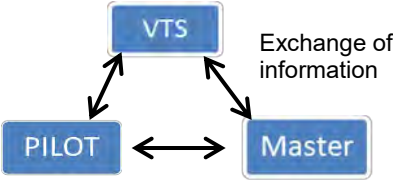


Transverse metacenter and transverse metacentric height

In most ships, for small angles of heel of up to about 10 degrees, the line of action of the force of buoyancy B_1 will intersect the middle line of the ship at a fixed point M (Fig.4-1). The point M is called the transverse metacenter. The span between the metacenter M and the center of gravity G , GM , is called the metacentric height; it gives a measure of the initial stability of the ship, i.e. its stability at small angles of heel. The greater the metacentric height, (i.e. the lower the position of G), the greater the stability. In Fig.4-1, the angle θ is equal to the angle of heel, and the righting lever GZ is equal to $GM \cdot \sin \theta$ (provided that θ is small and GM is positive [G is below M]). If the metacentric height is known, the righting moment can be found by multiplying the righting lever GZ by the ship's displacement W :



$$\text{Righting moment} = W \cdot GZ = W \cdot GM \cdot \sin \theta$$

- B: Center of buoyancy
- G: Center of gravity
- M: Metacenter (Transverse)

Port Operations and other allied services	
<ul style="list-style-type: none"> • Pilotage waters • Responsibilities of pilots • Master/pilot/VTS relationship • Overview of port operations • Regulations and acts in effect within harbor limits • Overview of ISPS code • The organization of tugs within a port • The role of ships agents 	
Master/Pilot/VTS relationship	
  	
Master/pilot/VTS relationship	
Masters responsibility	
Responsibilities	Authority
<ul style="list-style-type: none"> • Implementing and Maintaining the Safety Policy on his ship • Verification and monitoring • Periodically reviewing the SMS • Reporting deficiencies to shore-based management • Issuing orders and instructions • Motivating the crew to observe the policy 	<ul style="list-style-type: none"> • Requesting shore assistance whenever required • Overriding authority
Overview of port operations	
<ul style="list-style-type: none"> • Safety port • Immigration, customs and quarantine service • Crews care (medical , repatriation etc.) 	<ul style="list-style-type: none"> • Good security port • Supply provision, ship goods, fuel and waters
Port State Control	
Objective:	Tools:
<ul style="list-style-type: none"> • Improvement of safety and environmental protection • Elimination of substandard ships 	<ul style="list-style-type: none"> • Systematic control of every vessel in port • Control of adherence by owners to all rules and regulations • Controlling the correction of non-conformities • Detention or banning of unsafe ships
ISPS code	
<p>The International Ship and Port Facility Security Code (ISPS Code) is a comprehensive set of measures to enhance the security of ships and port facilities, developed in response to the perceived threats to ships and port facilities in the wake of the 9/11 attacks in the United States. The ISPS Code is implemented through chapter XI-2 Special measures to enhance maritime security in the International Convention for the Safety of Life at Sea (SOLAS), 1974. The Code has two parts, one mandatory and one recommendatory.</p> <p style="text-align: right;">http://www.imo.org/outwork/security/instruments/pages/ispscode.aspx</p>	
Rules background: Accident driven development	
Titanic	SOLAS 1914
Argo Merchant	MARPOL, SOLAS Protocol 78
Herald of Free Enterprise	SOLAS 74/ II-1
Scandinavian Star	ISM Code
Prestige	MARPOL, Oil Tanker, Double Hull
WTC 9/11	ISPS Code

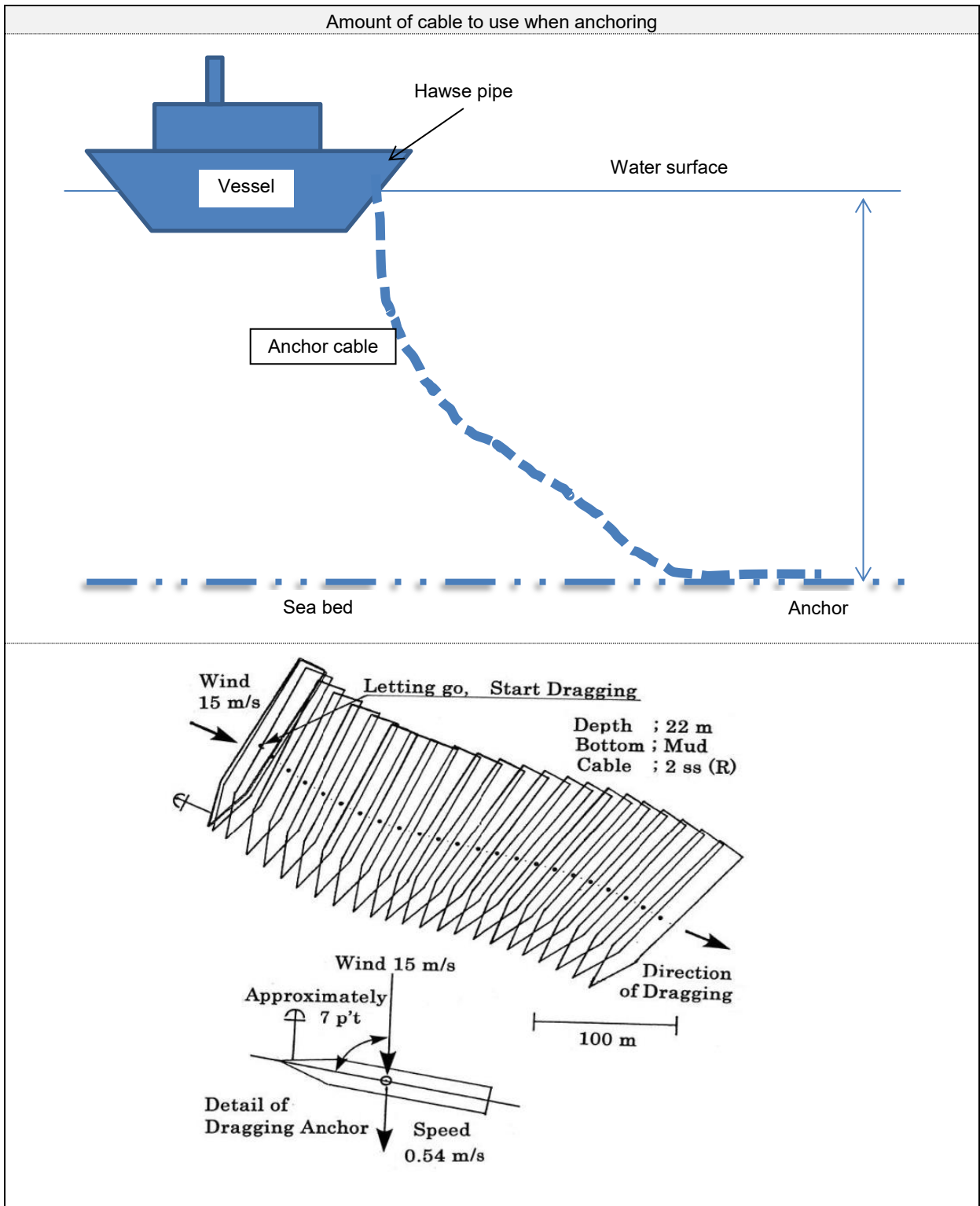
VTS environment
<ul style="list-style-type: none"> • Area limits, boundaries, separation zone • Shipping lanes and channels • Prohibited or dangerous areas • Safety zones • Anchorages and restricted areas • Traffic separation schemes • Traffic separation criteria • Geographical constraints

Bridge Resource Management
<p style="text-align: center;">Introduction</p> <p>Bridge Resource Management or Bridge Team Management as it is now often described, should be a concept known and understood by all officers who keep watch at the navigational bridge. The STCW Code makes specific reference to bridge resource management in its 'Guidance on keeping a navigational watch'.</p>
<p style="text-align: center;">Professionalism</p> <p>Some Masters tell stories where only their individual actions achieved an objective or prevented dangerous occurrences. The best captains do not have these stories because the team is the source of their success.</p>
<p style="text-align: center;">Passage Planning</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>For the bridge team the objective is getting to the next destination in a safe and efficient manner. How this is done will be communicated by way of the passage plan.</p> </div> <div style="width: 45%; text-align: center;"> <pre> graph LR Monitoring --> Appraisal Appraisal --> Planning Planning --> Execution Execution --> Monitoring </pre> </div> </div>
<p style="text-align: center;">Teamwork</p> <ul style="list-style-type: none"> • Teamwork is fundamental to achieving consistently safe navigation. • Identifies five skills that are required in a team • Team leadership • Mutual monitoring • Back-up behavior • Adaptability • Term orientation
<p style="text-align: center;">Summary</p> <ul style="list-style-type: none"> • Bridge resource management is a skill that is achieved by being technically competent and having a good understanding of the people you are working with. • Like all skills, it can be improved by conscious effort, practice and self appraisal.
<p style="text-align: center;">Reference</p> <ul style="list-style-type: none"> • P & I Loss Prevention bulletin :Japan P&I Club Vol.21 November 2011 • Bridge Procedures Guide : International Chamber of Shipping • Bridge Team Management-A Practical Guide: Nautical Institute • Bridge Recourse Management : Akira Hirosawa Seizando, Japan

Master pilot Relationship
<ul style="list-style-type: none"> • The master has the ultimate responsibility for the safe navigation of his ship. • The master must be cooperative with the pilot. • The master remember that hi is in command not the pilot. • Preparation for pilotage. • Conduct of passage in pilotage waters • Berthing and un-berthing • Others

Master pilot information exchange	
<ul style="list-style-type: none"> The pilot and the master should exchange information regarding the pilot's intentions, the ship's characteristics and operational parameters as soon as possible after the pilot has boarded the ship. The ICS Master/Pilot Exchange Forms or the company equivalent format, should be completed by both the master and pilot to help ensure ready availability of the information and that nothing is omitted in error. 	
Duties and responsibilities	
<ul style="list-style-type: none"> The pilot, master and bridge personnel share a responsibility for good communications and mutual understanding of the other's role for the safe conduct of the ship in pilotage waters. They should also clarify their respective roles and responsibilities so that the pilot can be easily and successfully integrated into the normal bridge management team. 	
Conduct of passage in pilotage water	
<ul style="list-style-type: none"> It is essential that a face to face master/pilot exchange (MPX) described before results in clear and effective communication and willingness of the pilot, master and bridge personnel to work together as part of a bridge management team. English language or a mutually agreed common language or the IMO Standard Marine Communication Phrases should be used, and all members of the team share a responsibility to highlight any perceived errors or omissions by other team members, for clarification. 	
Berthing and unberthing	
<ul style="list-style-type: none"> The necessity of co-operation and a close working relationship between the master and pilot during berthing and unberthing operations is extremely important to the safety of the ship. In particular, both the pilot and the master should discuss and agree which one of them will be responsible for operating key equipment and controls (such as main engine, helm and thrusters). 	
Reference	
<ul style="list-style-type: none"> The Standard "Master's Guide to: Berthing": Charles Taylor Consulting www.standard-club.com P&I Loss Prevention Bulletin : Japan P&ICLUB http://piclub.or.jp 	

Anchor works	
Anchor terminology	
Anchor Aweigh	The anchor is said to be 'A-Weigh' at the moment it is broken out of the ground and clear of the sea bed.
Anchor A-Cockbill	When the anchor is hanging vertically from the hawse pipe, with the flukes turned into the ship's side. In this position it will not stow correctly in the hawse pipe.
Anchor Buoy	A buoy used to indicate the position of the ship's anchor when on the bottom.
Anchor Dragging	The anchor is said to be dragging when it is not held in the sea bed. It is said to bite well when it has a good hold in the ground. The vessel is 'dragging her anchor' if she moves her position while dragging the anchor over the sea bed.
Brought Up	A vessel is said to be brought up when her way has stopped and she is riding to her anchor, with the anchor holding. The terms 'come to' and 'got her cable' are sometimes used to mean the same thing. The officer in charge of an anchor party will know when the vessel is brought up, by the cable rising up from the surface towards the hawse pipe when the brake is holding it. The vessel should then move towards the anchor, causing the cable to drop back and make a catenary.
Shackle of Cable	The length of shackle of cable is 15 fathoms(90ft; 27.5m). It is defined by the length of cable between the joining shackles.
Up and Down	The cable is said to be up and down when the angle the cable makes with the water surface is 90 degree, usually just before anchor aweigh.
Walk Bach the Anchor	To lower the anchor under power.
Yaw	A vessel is said to 'yaw' when at anchor when she moves to port and starboard of the anchor position under the influence of wind and /or tide. Yawing should not be confused with sheering.





*Project on Enhancing of Vessel Traffic Service System
Management Capability Phase 2*

TEXT Book-4 (Module-4/6)

“Nautical Knowledge” “Nautical Chart”



Text Book for Chart Knowledge and Chart work



IALA V-103-1 Model-Course



INTERNATIONAL COOPERATION AGENCY



JAPANESE AIDS TO NAVIGATION ASSOCIATION (JANA)

§1 General
1. Preface
<p>It is quite understandable that fishermen going fishing in the sea every day and sailors sailing within the same limited range are interested in nothing but how to maneuver their ships, and they do not always need nautical charts as aid to navigation. They can easily know their own position at sea by using peculiar topographic features such as mountain tops or capes as land-marks, and know how to avoid dangerous shoals and to find safe anchorages.</p>
<p>On the other hand, navigation near the coast might be very dangerous to those who are unfamiliar with the area. Navigation in old days was limited only to sailing along the coast, and only when coastal navigation requiring information based on experiences was needed in a distant area, did the sailors themselves prepared hydrographic charts and publications.</p>
<p>In our modern age, when large sized ships carrying a huge amount of cargo navigate at high speed, one can take the shortest course in the ocean thanks to the development of various nautical instruments. However, where one has to pass through a strait, approach a port, or leave a port, he cannot sail his ship safely and quickly to the destination along the coast or in the port without information from nautical charts.</p> <p>Nautical charts, which are prepared as navigational aids, show geography and water depths of coastal areas, quality of the bottom, positions of dredged channels, reefs, shoals, obstructions, conspicuous marks, aids to navigation and other information useful to sailors.</p>
<p>A land map shows configuration of the land as contours and indicates topographical conditions including rivers, vegetation, land utilization, roads, communities and so forth. This information is common with those on nautical charts. A nautical chart, however, gives the shoreline and a low water line in more detail than on a land map, and thus geography of coastal areas on the nautical chart is treated differently from that on the land map. A nautical chart is different from a land map in terms of contents, compilation and drawing, having the following characteristics.</p>
1.1 Updating of nautical charts
<p>One of the important characteristics of a nautical chart is updating of its content after the publication. Any items which have become changed from the charted conditions, such as dredged portions of a harbor, alteration of aids to navigation, discovery of a new shoal or newly discovered underwater obstructions, change in water depths and others, should be relayed to mariners as soon as possible. Accordingly, the nautical chart should be corrected and up-to-date all the time. For this purpose, a nautical chart is corrected through weekly Notices to Mariners so that its contents may accord with the actual situation.</p>
<p>When a lot of corrections or complicated corrections are necessary, a small drawing with the same scale as the nautical chart covering the portion to be corrected is prepared to be pasted on the nautical chart. This drawing is called a block correction or a Chartlet. This procedure, which is not applied to any kinds of land map, characterizes nautical charts.</p>
1.2 Various scales/overlapping of various charts
<p>Various scales/overlapping of various charts unlike land maps, nautical charts are not uniform in scale, and charts with various scales are available depending on the usage. Being different from land maps, they are not divided with sheet lines, but two neighboring charts overlap each other to a great degree, because both of them should cover landmarks and others for the sake of continuation of voyage.</p>
1.3 Internationality of nautical charts
<p>No matter which country may publish nautical charts, they are internationally valid over the entire sea area of marine traffic. Therefore, international standards to draw nautical charts have been provided so that formulas of nautical charts in different countries may be unified as much as possible. The International Hydrographic Organization (I.H.O, in Monaco) serves to coordinate formats and contents of nautical charts among different countries.</p>
2. Nature of Nautical Charts
<p>A nautical chart which indicates precise hydrographic information mainly of oceans including objects on the coast necessary for navigation is a thematic map of the sea for the purpose of navigation.</p>
2.1 Kinds of Nautical Charts and Projections
<p>The nautical charts are broadly grouped into nautical charts used for general navigation and miscellaneous charts used for navigation reference, academic study and production.</p>

2.1 Kinds of Nautical Charts and Projections (Continue)

A kind of Nautical charts are,
 General charts (scale smaller than 1:4,000,000),
 Sailing charts (scale smaller than 1:1,000,000),
 General charts of coast (scale smaller than 1:300,000),
 Coast charts (scale smaller than 1: 50,000),
 Harbour plan charts, approach charts, charts for passing channels and charts for taking shelter (all of them have scales more than 1:50,000).
 The scale ranges from a small one such as 1: 17,500,000 to a large one such as 1:2,000.

These charts are used in combination with one another depending on the purpose.
 The miscellaneous charts include charts of ocean currents, charts of tidal streams, great circle navigation charts, territory charts and magnetic variation charts, charts showing the position of set net fisheries, and chart symbols and abbreviations The projection adopted internationally for nautical charts is the Mercator projection.

Nautical charts of 1:50,000 or larger scale may adopt plan projections other than the Mercator projection. Nautical charts for high latitude areas adopt projections other than the Mercator projection.

2.2 The chart projection

2.2.1 Map projection

When projects the geographical of the earth surface on a paper, as the earth is not developable surface like a cone shape or cylindrical shape, cannot express without distortion by any projection.
 Example, the distance is not expressed exactly, the ratio of area is unequal or the direction is different between the real world.

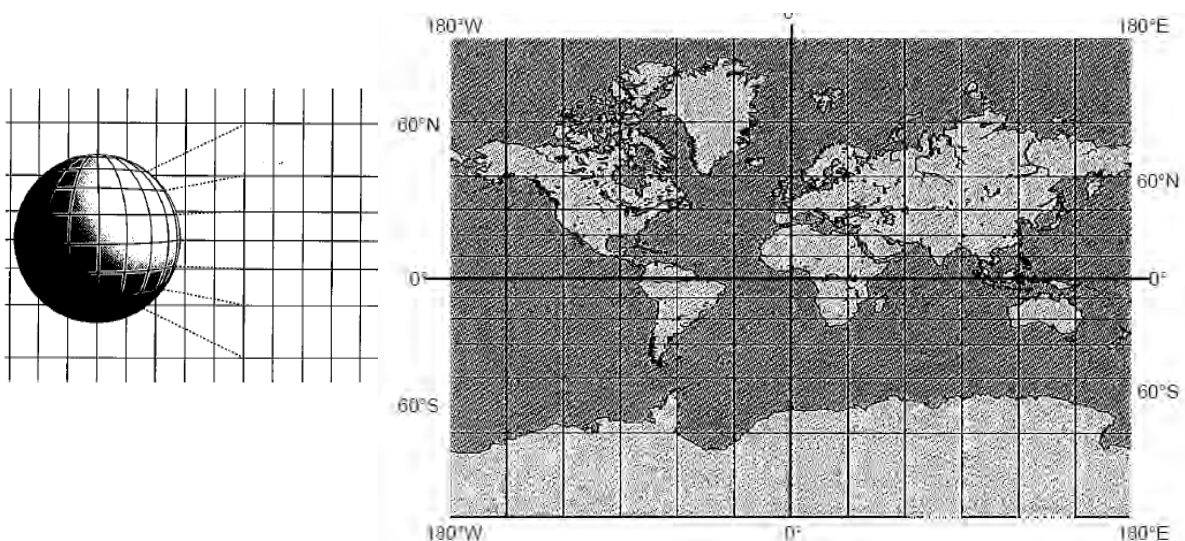
The methods which express the position on the earth surface to plane is map projection.
 It is no problem in the small area, but it is not able to ignore in the large area. Therefore it must be selected the best projection for the utilization purpose to the map.

2.2.2 Characteristics of the Mercator's projection

The space of latitude increases in accordance with move away from the equator. The areas which locate at high latitude is expanded than low latitudes.
 It is explained the Mercator's projection in the navigation. The meridian is indicated with parallel line of equal intervals, the parallel of latitude is indicated as intersecting line to this.

The Mercator's projection is the projection which the angle is indicated accurately. The rhumb line which is keeping the fixed direction is indicated as the strait line on the chart.
 1 minute of latitude is 1 sea mile.

The Mercator's projection is the best projection in the navigation field. In case of high latitude zone and large scale, this projection is recommended in technical resolution of IHO that this projection is adopted by each nation Most countries follow this projection.



2.3 Reading of Nautical Charts

2.3.1 Measurement of position and distance on a nautical chart

The unit of distance in the sea is a nautical mile. A nautical mile refers to one minute of latitude (Lat. 1') and provides a very convenient unit. Since on the nautical chart based on the Mercator projection the distance of one minute (1') of latitude is longer with higher latitude from the equator, a proper scale in accordance with the latitude has to be used to measure a distance between two points.

In the sea where there are no marks such as roads, railroads and streets which indicate a position on land, the direction and distance from a certain mark are used to show a position.

A nautical chart gives accurate description of a mark which provides a datum point to show a position. Furthermore, a position is given by geographical latitude and longitude in the sea where no marks are available.

2.3.2 Datum level of soundings/height

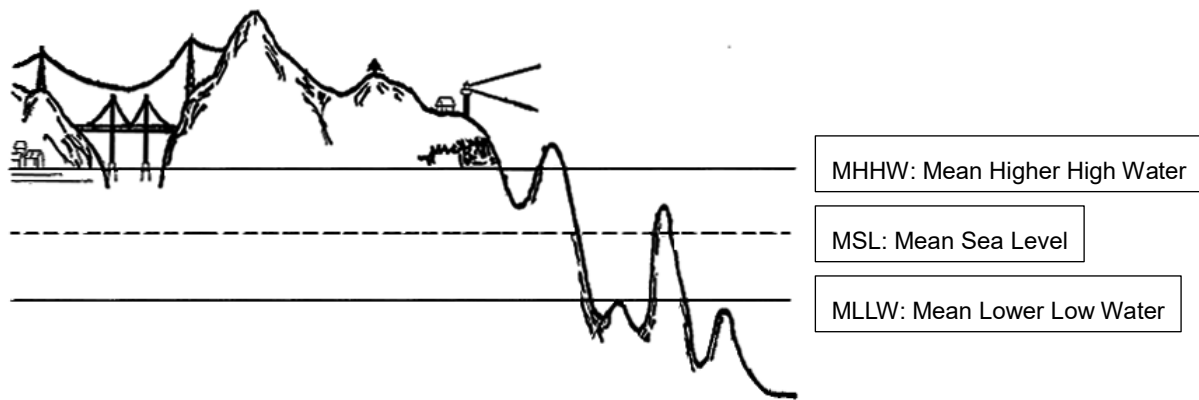
When one spreads a nautical chart, he/she would immediately notice numerous figures written in small letters all over the chart. These figures show the depth of the sea where they are, giving some of the most information on the chart. Tides in the sea cause a continual change in water depths (called soundings). As nautical charts are made for safe navigation, a level below which the sea surface hardly lowers is taken for the sake of the safety, and such a level is used as a standard to show soundings. This level is called a datum level, and many charts adopt the nearly lowest low water level as the datum level.

Figures shown on the land, small islands and rocks indicate heights, which are measured from the mean sea level at that place. The mean sea level is a sea surface on the assumption of no tidal actions, and is calculated from observations of the fluctuating sea surface for a period of at least longer than one year.

About "Datum's and benchmarks", IHO resolves as follows;

- (1) It is resolved that heights on shore shall be referred to mean sea level.
- (2) It is resolved that mean sea level shall be retained as the datum above which heights of lights shall be given.

Mutual relationship between datum level and nautical chart



(Indication on the nautical chart)

Mutual relationship between datum level and nautical chart

2.3.3 Chart symbols and abbreviations
<p>A nautical chart, like a land map, uses a variety of symbols and abbreviations. One has to fully memorize these symbols and abbreviations to read a nautical chart. Of these abbreviations, important ones are explained below :</p>
(a) Depth contours
<p>Depth contours which show relief of the seabed clearly for convenience are equivalent to contours of mountains. Depth contours were conventionally shown in solid lines designated for depths of 2m, 5m, 10m, 20m and 200m. They were so drawn that when the designation is not understood, the soundings nearby the line (on both sides of the line) may indicate it.</p>
(b) Soundings
<p>The position of a certain depth shown on a chart is considered to be in the centre of the written figures. For water depth shallower than 31m, the depth down to the first decimal place is described, the decimal figure being one point smaller than the integral figure.</p>
<p>0₁ . . . 0₂ . . . 9₉ . . . 10 . . . 10₈ . . . 20₉ . . . 21 . . .</p> <p>21₅ . . . 22 . . . 30 . . . 30₅ . . . 31 . . . 32 . . . 55</p>
(c) Quality of the bottom
<p>The quality of the bottom refers to rocks and sediments constituting the seabed. This information is an important element to determine suitability of the bottom for anchorage. The information is usually shown under the number of soundings, or singly at the place where the sample was taken.</p>
(d) Coastal geography
<p>Natural/artificial marks, conspicuous trees, stacks, towers, tanks and others which serve as landmarks for navigation are shown by their chart symbols.</p>
(e) Coastline
<p>The coastline indicates a boundary between the sea and the land at the highest high water level (a level above which the sea level hardly rises throughout a year). Cliff, shore, sand beach, rocky seashore and others are shown separately.</p>
(f) Rock/awash/sunken rock
<p>Both of them are hidden under the sea, and very dangerous in navigation.</p>
(g) Rock covers and uncovers
<p>Rocks which are exposed over the sea surface at the lowest low water, but hidden under the sea level at a higher water.</p>
(h) Buoy
<p>Mooring buoys are those for mooring a ship, and light buoys are lighted ones to indicate a fairway. They are painted in black, red or green.</p>
(i) Lighthouse
<p>There are various types of lighthouses, ranging from large ones which are used by ships to access the coast from the ocean, to smaller ones which are used for departure from and entry into a port or a harbor. Lighthouses for access from the ocean or for coastal navigation are firmly constructed with a longer range of visibility. Those used for departure/entry require a different character of light from that of light buoys and lighting in general.</p>

3. Future of nautical charts

- (a) Emphasis on expression
- (b) Multi-colour printing
- (c) Adoption of standard international symbols and abbreviations,
- (d) Issue concerning expression of water depth near quay in harbor charts.
- (e) Issue concerning control depth in ports and harbors on harbor charts.
- (f) Updating – immediate correction of nautical charts – frequent reproduction of a smaller number of copies.

§ 2. Outline of Nautical Publications and Their Relations with Navigation

When one travels on the land, he naturally needs a map. But he would not be exposed to urgent peril, because he can identify features by his own eyes.

In the case of navigating at sea, on the other hand, one has no means to know where the ocean is shallow or deep, or where there is a sunken reef, because he cannot see under the water.

In addition, navigation is exposed to higher risks beyond comparison over travelling on the land; for example a ship, when it stops, may be drifted away with currents and tidal streams.

Nautical publications are a kind of guidebook where phenomena and conditions in the sea omitted in nautical charts are all covered, and they are used jointly with nautical charts.

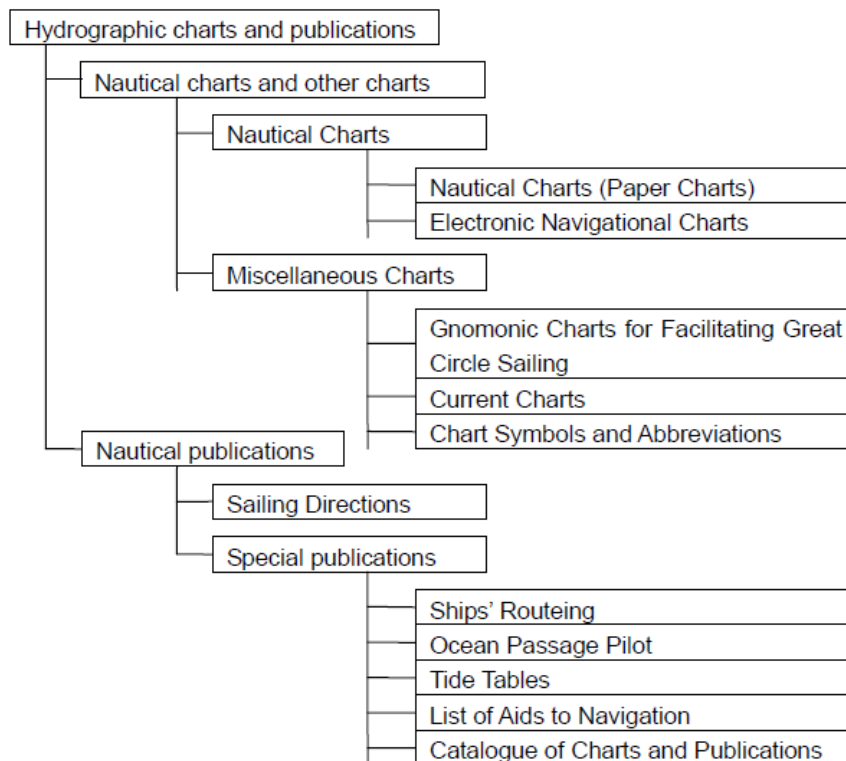
Therefore, they are indispensable for mariners.

Relations between navigation and nautical publications and others are explained below.

1. Nautical Publications/Hydrographic Charts and Conformity among Them

1.1 Concept of Nautical Publications

Nautical publications refer to hydrographic charts and publications from which nautical charts and other hydrographic charts are excluded. They are grouped into Sailing Directions and special publications. This is summarized as follows:



Nautical publications mentioned here are mainly for navigation, and they require the following characters, which are fully taken into consideration in compiling these publications.

1.1.1 Reliability (Accuracy)	
<p>The following measures are taken to ensure reliability.</p> <p>(a) Results from surveys, observations and research conducted by the agency are used as compiling data.</p> <p>(b) Information which has been acquired from other sources are used as data only after strict evaluation and confirmation.</p> <p>(c) Strict review and proof reading are conducted throughout the compilation/printing process.</p> <p>(d) When any changes in collected materials occur, correction is made through Notices to Mariners or supplements.</p> <p>However, this is not applied to some publications.</p>	
1.1.2 Clearness (Easy Understanding)	
<p>The following items are taken into consideration, so that information necessary for mariners are immediately and clearly provided even in a special condition such as night time and rough weather.</p>	
(a) Expression (text, figures, tables and their layout)	(b) Arrangement
(c) Letters and terms	(d) Index/index charts
1.1.3 Usefulness (Pertinence)	
<p>Since each nautical publication is used for a specific purpose, the contents to be covered have to be all useful and meet necessarily and satisfactorily the specific purpose.</p>	
1.1.4 Mutual complementarity	
<p>Any nautical publications used for navigation can never exert their comprehensive effect, until they are used in combination with other publications and charts.</p> <p>Therefore, the contents of each nautical publication have to complement contents of other nautical charts.</p> <p>In particular, mutual complementarity between nautical charts and Sailing Directions/ List of Aids to Navigation.</p>	
1.1.5 Adaptability	
<p>Any fields where nautical publications are used are subjected to continual technological progress and changes. These trends have to be correctly understood for adaption.</p>	
1.1.6 Availability	
<p>As issue of nautical publications is managed by the central government, any nautical publications have to be available to any user at any time.</p>	
1.2 Sailing Directions	
<p>Sailing Directions is a kind of guidebook for mariner s which includes various phenomena in the sea, conditions of traffic routes, coastal and harbor/port features, facilities, rules, etc. and they are essential for safe navigation of ships in combined use with nautical charts.</p>	
1.3 Special Publications	
<p>Special publications are categorized as follows:</p> <p>(1) Those which are used for safe navigation in combination with Sailing Directions to supplement things which are not described in nautical charts --- Passage Pilot and others.</p> <p>(2) Those which have no relation to nautical charts and are used independently ---Tide Tables and others.</p> <p>(3) Those which have no direct relation to nautical charts and are used by the shipping community as reference --- Port and Harbour Information and others.</p>	
1.4 Updating	
<p>Because all nautical publications and charts are utilized for navigation in the sea, the contents have to be updated. Any old information of the contents may cause a disaster at sea.</p> <p>Therefore, it is very essential to keep nautical publications and charts up-to-date, and this is called "updating." The "updating" is done as follows:</p>	
<p>(1) New edition</p> <p>Items described in each publication are totally rewritten based on various information collected after the issue.</p>	

1.4 Updating <i>(Continue)</i>	
(a) Original Sailing Directions	(b) Supplements to original Sailing Directions
(c) Oversea Sailing directions	(d) Supplements to overseas Sailing Directions
(e) Special publications	
(2) Additions to List of Aids to Navigation	
(3) Ships' routing (IMO) ----- (see attached pdf)	
(4) Notices to Mariners	

2. Relations between Navigation and Nautical Charts and Publications
2.1. Navigation Planning
<p>In normal navigation of a ship, she leaves the port at the planned time, sails along the coastline, and fixes her position through the last visible landmark.</p> <p>Using this fixed point as the second starting point, she proceeds to ocean navigation, identifies a conspicuous landmark near the destination, again makes coastal navigation, and finally arrives at the destination at the planned time.</p> <p>During this period, she may encounter foggy or rough weather depending on the conditions of sea area and season, or a special traffic condition.</p> <p>Therefore, a very precise navigation plan has to be made before departure.</p> <p>In planning a navigation schedule, the first priority should be given to safe navigation, and reduction of sailing days and economy of fuel should be considered next.</p>
2.2. Survey Items and Data concerning Navigation Planning
2.2.1. Survey on port/harbour conditions of the destination
<p>Depending on availability of Sailing Directions, and Port and Harbour information, the followings are surveyed;</p> <p>(a) topography, (b) condition of roadstead, (c) loading/unloading facility, (d) transportation communication with the land, (e) availability of fuels and provisions to be supplied, (f) repair ability, (g) pilot tugboat, (h) port regulations, and others.</p>
2.2.2 Selection of a traffic route
<p>A traffic route is decided based on information such as;</p> <p>(a) Traffic route Latest nautical charts, Coastwise/Ocean Passage Pilots, related Sailing Directions, and others.</p> <p>(b) Meteorology Coastwise/Ocean Passage Pilots, related Sailing Directions and others.</p> <p>(c) Oceanography Chart of Tidal Current, Tide Tables, Coastwise/Ocean Passage Pilots, related Sailing Directions, and others.</p> <p>(d) Aids to navigation List of Aids to Navigation. Namely, the above listed materials are used to survey traffic route, meteorology, oceanography and aids to navigation, then deciding the supposedly best traffic route and the routes from and to ports.</p>
2.2.3 Works after this include:
<p>(a) The decided route is traced on small scale nautical charts.</p> <p>(b) The sailing distance is roughly estimated.</p> <p>(c) Speed to be used is decided and actual speed is assumed.</p> <p>(d) The roughly estimated distance and the assumed actual speed are used to determine a navigation schedule, and then the passing times at major points are assumed and noted on the charts.</p> <p>(e) The traffic route from and to ports is traced on large scale nautical charts covering the ports, and the course line on a large scale nautical charts covering the coast along which the course is planned, in order to determine the accurate sailing distance.</p> <p>Along with this, the altering point of course, clearing marks and objects for departure and arrival are decided.</p>

2.2.4. Hydrographic Charts and Publications and International Relations
(1) IHO (International Hydrographic Organization)
The organization was established in 1970 and currently covers 80 countries.
The head office is located in Monaco. The organization aims at contributing to easier and safer navigation all over the world by improving nautical charts and publications.
(2) IMO (International Maritime Organization)
The organization established in 1959 covers 169 member countries at present and belongs to the United Nations.
The organization aims at promoting inter-governmental consultation and cooperation on technical/legal issues in the field of safe navigation in the sea and the protection of marine environment.
More concrete relations of the organization with nautical charts and publications include decision on the matters of traffic route designation and distribution of these related documents to member countries.
(3) IALA (International Association of Lighthouse Authorities)
IALA established in 1957 currently covers 74 member countries.
The purpose of the organization is to improve aids to navigation in the world for more efficient navigation.
(4) United Nations Convention on the Law of the Sea
The convention covers various basic systems concerning utilization, development and conservation of the sea to form unified order of the sea. Presently, 161 countries have signed (as of November 2011).
The convention is to become effective 12 months after ratification by the 60th country, and the Article 94-4 (a)* provides that each ship, before registration and thereafter at appropriate Intervals, is surveyed by a qualified surveyor of ships, and has on board such charts, nautical publications and navigational equipment and instruments as are appropriate for the safe navigation of the ship.
(5) International Convention for the Safety of Life at Sea 1974
The Regulation 8 of Chapter V** of the convention (safety of navigation) provides that the practice of following, particularly in converging areas, routes adopted for the purpose of separation of traffic including avoidance of passage through areas designated as areas to be avoided by ships or certain classes of ships, or for the purpose of avoiding unsafe conditions, has contributed to the safety of navigation and is recommended for use by all ships concerned.
Furthermore, the Regulation 20*** of the same convention provides that all ships shall carry adequate and up-to-date charts, Sailing Directions, Lists of Aids to Navigation, Notices to Mariners, Tide Tables and all other nautical publications necessary for the intended voyage.
Hydrographic charts and publications need to be internationally unified in the light of their contents, character and purpose. Generally speaking, all countries are cooperative for the purpose of improving hydrographic charts and publications toward the safety of navigation all over the world, through ratifying the above mentioned conventions and taking part in the organizations concerned.
Notes:
* The each ship, before registration and thereafter at appropriate intervals, is surveyed by a qualified surveyor of ships, and has on board such charts, nautical publications and navigational equipment and instruments as are appropriate for the safe navigation of the ship.
** The practice of following, particularly in converging areas, routes adopted for the purpose of separation of traffic including avoidance of passage through areas designated as areas to be avoided by ships or certain classes of ships, or for the purpose of avoiding unsafe conditions, has contributed to the safety of navigation and is recommended for use by all ships concerned.
*** All ships shall carry adequate and up- to-date charts, Sailing Directions, Lists of Lights, Notices to Mariners, Tide Tables and all other nautical publications necessary for the intended voyage.

§ 3 Chart Symbols and Abbreviations
1. Arrangement/Indication of Date
The process of charting includes certain inherent work in addition to classification and measurement of phenomena. Firstly, the actual features are reduced so that a wide range of area can be accommodated in a visual field. Secondly, a spherical surface is converted to a plane in order to ensure the geometrical fidelity of a map. Thirdly, elements in the actual situation are expressed by various symbols in order to characterize and distinguish them (cartographic expression). Fourthly, data are acquired and transferred onto appropriate positions on the map to indicate the spatial relationship among them (cartographic compilation).
1.1 Arrangement of Spatial Data
1.1.1 Classification of phenomena
Spatial phenomena include four basic categories; positional phenomenon, linear phenomenon, areal phenomenon, and volumetric phenomenon.
(1) Positional data
A point indicates a non-dimensional position/place, and conceptually positional data exist at each point, such as a sounding point in the sea to a crossing point of roads. When the degree of abstraction becomes higher, a city can be regarded as a point. The city, although it occupies a fairly large area, may be treated as a city being in a different place from other cities. Data which indicate a summary of characteristics of a fairly large area, such as per capital annual income, can be represented as a central point. Positional data are largely characterized by the existence of individual data at one point regardless of the degree of abstraction.
(2) Linear data
Certain geographical phenomena have a linear, namely one-dimensional character. A road or a river, even having a certain width, can be treated as a line, where its direction or length is the common feature. Linear data include a variety of information, ranging from an administrative border, the coastline dividing the sea and the land, and a route of propagation of thought.
(3) Areal data
Conceptually areal data are two dimensional, and have a spread in area. A region where a certain language or religion is predominant, a climatological region and a soil region are a few examples.
(4) Volumetric data
Conceptually, geographical volumetric data are three dimensional. Volumetric data range from conceptual ones (for instance, a population of a city is regarded as a quantity) to really volumetric ones (for instance, precipitation in a certain area, and a volume of cargo transported by train). There is another way of understanding a geographical volume. An urban population or a national gross production is a sum of the quantity. On the other hand, many geographical volumes are considered to cover a certain base level and extend both above and below the level as in cases of the land and sea water relative to the sea surface. Generally, the concept of a volume, that is, a geographical density or an unit number of a certain phenomenon per unit area, is very difficult to understand due to its abstract character. Our treatment of spatial data is not so much systematized, because different persons may place a same item in different categories depending on their own ideas. For example, New York City may be regarded as positional data (in contrast with Philadelphia), areal data (because New York City has a specific administrative area different from neighbouring cities), or as volumetric data with regard to population. In any case, geographical data (phenomenon) falls in one of these four categories. However, depending on how to consider the phenomenon, the geographical data may move among the categories.
1.2 Methods of Expression
Generally speaking, a map provides a visual expression of selected spatial phenomena. Kinds of figures and patterns used to indicate data are almost infinite. Appropriate correspondence of a characteristic of data to the cartographic character of the figure gives qualitative and quantitative meanings, thus making a symbol. On top of that arrangement of the figure on a map adds a geographical meaning.

1.2.1 Classification of expressions
It is very useful in symbolizing data to classify cartographic expressions from a functional viewpoint. Symbols include three types; "point symbol", "line symbol", and "area symbol".
(a) Point symbol: A point symbol is an independent cartographic figure which is used to indicate positional data, such as a city, a value of water depth, and the centre of a certain distribution, or a conceptual volume at a certain place, such as an urban population. A cartographic figure which occupies a fairly large area in a map is a point symbol, if it indicates conceptually the geographical position.
(b) Line symbol: A line symbol is an independent cartographic figure which is used to indicate various geographical data. A linear cartographic figure does not always indicate linear data. For instance, an isogram is a line used to indicate altitude or water depth (positional data), but can provide a volume.
(c) Area symbol: An area symbol is a cartographic figure consisting of colour, light/shade and pattern, and is used to indicate an administrative area or an area which has a certain character in common. An area symbol covers uniformly an entire region indicated by the symbol.
2 Symbolization of Qualitative Data
2.1 Symbolization of Qualitative Positional Data
Nominally divided positional data are subjected to charting through three types of symbols; pictorial symbol, associative symbol and geometric symbol.
(1) Pictorial symbol: Where one makes the maximum use of the function of a pictorial symbol, communication is achieved without any legends, but the majority of maps carry legends. A map where qualitative positional data are indicated by pictorial symbols tends to make two mistakes; (a) Symbols which cannot be easily distinguished from one another are used, and (b) too many similar size symbols are used. When symbols circled with a similar size frame are too often used, then (b) tends to occur. In such a case, the use of symbols with totally different shapes or the use of colour, if possible, is very effective. Symbols of a same type may be used by changing the direction.
(2) Associative symbol: An associative symbol is a combination of picture and geometrical pattern for easy identification. An associative symbol which is much more schematic than a pictorial symbol strongly requires a legend on the map.
(3) Geometric symbol: Of the many geometrical symbols used to indicate qualitative positional data, the most widely used ones are circle, triangle, rectangle, diamond and star. When any geometric symbol is used, a legend is always necessary.

2.2 Symbolization of Qualitative Linear Data
The majority of maps contain a tremendous amount of qualitative linear information. Nevertheless, both cartographers and users do not fully understand this fact. Qualitative linear information include neat lines to delimit the area in question, parallels of latitude and meridian, the coastline, administrative border, rivers, roads and others. The following factors may influence the appearance of a linear symbol:
(1) Size: A difference in "size" has at least two meanings in symbolizing qualitative data: Firstly, the thicker one out of two similarly colored lines is more noticeable, and secondly, a gradual change in the thickness can indicate its direction.
(2) Continuity: Continuity is given by many ways, ranging from a solid line to points arranged to look like a continual line due to their closeness and directionality, although originally it is a point symbol. Linear phenomena existing on the land are very often indicated by solid lines. On the other hand, phenomena which do not exist (administrative border line, parallels of latitude and meridians, and distance plot) may be indicated by broken lines, dotted lines, or chain lines. Such a technique is adopted for convenience, but not yet accepted as a custom except for roads and railroads.
(3) Brightness contrast: Brightness contrast, based on brightness of colour, influences sensory perception of a line symbol. A line with different brightness can indicate a different degree of significance. Generally, a darker tone suggests a higher degree of significance.

2.2 Symbolization of Qualitative Linear Data <i>(Continue)</i>
(4) Visual closure: Visual closure is seen in a group of similar cartographic figures. As a result, a series of short lines or a group of small points looks continual. A higher degree of the visual closure of symbols tends to make them more conspicuous. A solid is the most prominent symbol in this sense.
(5) Complexity: Complexity carries a variety of meanings. Here, complexity means an arrangement of individual cartographic figures constituting line symbols. A higher degree of complexity tends to indicate greater visual importance, where other conditions are the same.
(6) Compactness: Compactness means an intensity of regularity of symbols. A higher degree of the compactness may indicate greater visual importance. A solid line is the most compact symbol among all other symbols. A degree of the compactness can be quantified by comparing separately, various line symbols with a solid line. A perfect command of these six variables can lead to appropriate selection of various line symbols so that the visual importance is at the same level, or has a stratum structure depending on the purpose of the chart.

2.3 Symbolization of Qualitative Areal Data
When one wants to indicate areas classified based on some standard on a map, such as forestry, grassland, territory and cultural region, area symbols which can clearly be distinguished are required. Symbolization of qualitative areal data are mainly conducted using colour tones or patterns.
A difference in brightness suggests an order of significance. Colour brightness can provide a similar effect, although the effect is not as clear as that of the brightness. Generally, a darker tone indicates "richness", thinner tone means "scarceness."
A qualitative distribution may be indicated on a chart by two stage classification. In such a case, grand classification is made through hues, while sub classification through patterns.
Firstly, a difference in hue makes a basic structure of the distribution easily understandable. The effect of pattern is slightly weaker in comparison with that of hue. Therefore, a map user who wants to understand a much finer distribution structure can read effectively a result of the sub-classification by pattern.

2.4 Expression of Topography
A technique in which a line symbol called "hachure" is systematically used has been widely adopted to express topography in large scale maps. A cluster of many hachures drawn very close to each other expresses a topographical feature of the earth's surface.
Since then, "contour" which was originally created for larger scale maps has been used in a markedly generalized manner for small scale maps.
Along with the contour technique, layer tinting lead to the creation of a relief map. Needless to say, a layer tinting colour is an area symbol indicating a certain elevated zone sandwiched with two contours. On the other hand, a technique to express hue (concentration) in a continual manner has been developed. Using this new technique, shading which is a topographical expression has been widely adopted.
Some recent topographical maps are unprecedentedly effective, which are an outcome of efforts to study how to combine each technique (the contour technique, hachures technique, shading technique and others) in order to achieve both measurability and high visual effects.
One of the recent efforts has produced a type of map in which topography is pictorially expressed by looking down slant ways from above in a perspective way like a bird's eye view.

3. Outline of Chart Symbols and Abbreviations
Before using a chart, one has to memorize symbols and abbreviations indicating the information contained on the chart.
A chart, which is a thematic map, uses symbols different from those on a land map. A list of these symbols and abbreviations specially prepared is called Chart Symbols and Abbreviations.
The chart symbols and abbreviations may be partly changed for a compelling reason. In case where, for instance, one of the symbols has to be changed to a more rational one, this new symbol is adopted for actual nautical charts and at the same time the column pertinent to the symbol has to be corrected.
Therefore, the chart symbols and abbreviations are subjected to minor amendments (correction through Notices to Mariners) like general nautical charts. (The IHO recommends as follows: “It is recommended that the sheet of symbols and abbreviations be carefully kept up-to-date by means of Notices to Mariners, particularly as far as the adoption of new symbols is concerned.”
Any nautical chart does not carry chart symbols and abbreviations for each sheet, unlike land maps.

3.1. Symbols on Charts
One has to use charts which are made using various designated symbols and abbreviations, as is explained below, with full understanding of them. Currently used chart symbols and abbreviations are based on the policy adopted by IHO standard list. The list classifies each item to A through U, and the contents of each item are further classified and their sub-items are numbered. For example, C-6 is the symbol for sandy shore, F-53.1 the symbol for crane, and M-4 the symbol for recommended tracks. Since these letters and numbers are commonly adopted by all countries, one can understand the symbol of sandy shore used in nautical charts published by any other country, by checking C-6 of the chart symbols and abbreviations, and know the symbols of and the majority of the member countries adopt the IHO’s system.
(1) Standard list of new symbols and abbreviations
In January 1953, the IHO prepared the Standard List of Symbols and Abbreviations and agreed upon arranging chart symbols and abbreviations in accordance with the crane and recommended tracks by checking F-53.1 and M-4, respectively. This provides user with great convenience, since he can use nautical charts published by any country by referring to the chart symbols and abbreviations of that country and the Japanese ones, even if he does not understand the language of that country. The internationality of nautical charts is thus ensured.

(2) Classification of chart symbols and abbreviations	
A: Chart Number, Title, Marginal Notes	B: Distances, Directions, Compass
C: Natural Features	D: Cultural Features
E: Landmarks	F: Ports
G: Topographic Terms	H: Tides, Currents
I: Depths	J: Nature of the Seabed
K: Rocks, Wrecks, Obstructions	L: Offshore Installations
M: Tracks, Routes	N: Areas, Limits
O: Hydrographic Terms	P: Lights
Q: Buoys, Beacons	R: Fog Signals
S: Radar, Radio, Electronic Position Fixing Systems	T: Services
U: Small Craft Facilities	

3.2 Contents of Chart Symbols and Abbreviations

The coastline is drawn in various symbols which indicate its essential characteristics. Traditionally, different countries adopted different symbols, but the adoption of the nautical chart specification standards by the IHO has led to an internationally unified symbol system.

Symbols for land topography, structures in port and harbour, port and harbour facilities, port and harbour nautical information, structures (marks), dangers and various limits were standardized with pictorial symbols.

With respect to colour, the principle concerning the use of magenta was provided and currently magenta is used in accordance with the following rules:

(1) When a certain phenomenon is effective in a wide range from the position of its symbol written on a chart, the colour is used to draw attention to the symbol indicating the phenomenon.

(2) The colour is used to distinguish information placed on an actually existing phenomenon. The colour cannot be used for any permanent physical obstacles.

As to (1), pilot station and notes on it, flare or patch of light, the symbol indicating tidal current observation station, the large circle and abbreviation indicating radio station or radar station, and others are included.

As to (2),

(a) Phenomenon which mean temporary physical danger: For example, areas exposed to potential danger of firing and other military exercise areas, gravel pits, sea ice limits, and others.

(b) Phenomena which indicate restriction on work on the seabed (including anchoring):

For example, submarine cables and submarine pipes, and their areas.

(c) Phenomena which indicate control and rules over the movement of a ship: For example, restricted areas, prohibited areas, separated traffic route systems, deep sea traffic routes, radar guiding lines, designated anchorages and berths.

(d) Legal marine limits: For example, territorial limit lines, harbour limits.

(e) Certain kinds of information in the margin or information which should be distinguished or stressed: For example, compass rose, equal magnetic curves, references to other charts and their limits.

4. Aids to navigation

The term "Aids to navigation" means facilities to assist the navigation of vessels by means of "lights", "shapes", "colours", "sound signals" and "radio waves".

The following are the explanations of these facilities in the descriptive order of the List of Aids to Navigation.

4.1. Types

(1) Lighthouses and light staffs

These facilities are structures established along coasts to permit vessels to confirm land mass, major altering points or their position and established in ports and harbours to indicate the locations or entrance of these ports and harbours.

A structure with a lighting system in a shape of a tower is named a "lighthouse" and in a shape of a staff a "light staff".

(2) Light beacons and unlighted beacons

These facilities are structures established on rocky reefs or shoals to inform the existence of obstructions to ships or to indicate the location of passages.

A structure with a lighting system is named a "light beacon" and without a lighting system an "unlighted beacon".

(3) Projectors

These are to illuminate submerged reefs, rocky reefs or the extremities of breakwaters to inform vessels of the existence of these obstacles.

(4) Leading lights and leading marks

A structures consisting of two units provided on the extended line of a passage, to indicate the Passage route in such as a difficult to navigation water or narrow harbor entrances.
A structure with a lighting system is named a “leading light” and without a lighting system a “leading mark”.

(5) Directional lights

These are facilities established on the land situated in the extension line of the navigating route to indicate fairways in difficult channels or narrow harbor entrances.
Seen from the vessels, a fairway is indicated by a white light. A dangerous area on the port side of vessels is indicated by a green (red) light and on the starboard side by a red (green) light.

(6) Bridge light and marks

These facilities are lights and marks installed bridge piers and girders to indicate navigable water or the center of a fairway under the bridge, the locations of ends and piers of the bridge.
The port side and starboard side refer to the left and right side toward the conventional direction of buoyage respectively.

(7) Light buoys and unlighted buoys

These are floating and moored structures at sea to inform vessels of the existence of obstacles such as rocky reefs and shoals.
A structure with a lighting system is named a “light buoy” and without a lighting system an “unlighted buoy”.

(8) Other lights

These are lights to indicate fixed offshore structure such as sea berths, wave observation towers and oil rigs.

(9) Aerodrome beacons

These are beacons established at airfields and their adjacent areas to indicate the locations of these airfields to aero planes.

4.2 Characteristics of lights

The characteristic of a light means specified conditions of the light in which the light is emitted to facilitate the discrimination between general and navigational lights, and to avoid busing mistaken for other lights of aids to navigation in the vicinity.

In broad sense, the characteristic of a light includes the colour and period of the light.

(1) In general, four types are used in the colours of lights; white (W), red (R), green (G), and yellow (Y).

(2) The period of light is the time between the start of a phase and the start of the successive phase.

4.3 Range of light

Range of light is the maximum distance at which a light from a lighthouse or a light beacons etc., can be seen. There are two range of light, it is a nominal range of light or geographic range of light.

Nominal range of light determined by the effective intensity of a light etc conventionally the luminous intensity of a flashing light (a rhythmic light) was determined by that of a fixed light.

However, it is obviously lower than the latter in proportion to the lighted duration. Also a flashing light travels a shorter distance than a fixed light.

The nominal range of light is the value determined by the luminous intensity of a rhythmic light (an effective intensity), i.e. the intensity by which the light can actually be seen, and 0.74 in atmospheric permeability (corresponding to 10M in meteorological visibility).

4.4 Arc of visibility and sector light

Arc of visibility is a range within which lights are exhibited from an aid to navigation. In that scope, a part from which light is emitted to indicate dangerous reefs, etc., with different light colours (in general, red or green when the passage light is white) is called sector light.

4.5 Buoyage System

The Buoyage system is a system which specifies type, meanings, colours, shape, and characters of light buoys, unlighted buoys, light beacons and unlighted beacons established at sea.

The Buoyage system in use in Japan is the IALA Maritime Buoyage System "B".

The Buoyage system in use in Indonesia is the IALA Maritime Buoyage System "A".

4.6 Conventional direction of buoyage

The "conventional direction of buoyage" is defined as follows.

(1) The conventional direction of buoyage in a fairway which leads from a main sea route to a port or a harbor is on the side of the port or harbor.

The conventional direction of buoyage in a fairway within a port or a harbor is on the side which is close to an area where vessels are usually berthed for cargo work.

(2) The conventional direction of buoyage, which becomes the direction of port or starboard hand marks, and a mark for a preferred channel to port or starboard is adopted by the IALA Maritime Buoyage System.

4.7 IALA maritime buoyage system

During the IALA conference in November 1980 two navigation marking systems, ie the System A (red colour for the left hand of the ship) and the System B (red colour for the right hand of the ship), were combined into one – the IALA System.

(1) Region A & Region B

In the IALA System the regional (of the systems A and B) principle of painting of the lateral signs was maintained. The countries that accepted the red colour for the left hand lateral signs were included in the region A. The countries that use the green colour for the left hand lateral signs were indicated in the region B. In the both regions, the fairway direction is the one leading from the sea (when a different manner is used than an adequate notice is provided).

The IALA System has five types of signs that are used in various associations. The signs have specific identification elements that make them easily recognizable to the sailors. The lateral signs in the Regions A and B are different, but the other four signs are common for these both regions.

Region A: Europe, Australia, New Zealand, Africa, the Gulf and some Asian countries Region B: North, Central & South America, Japan, North & South Korea and the Philippines.

(2) Types of Marks

The different types of marks used in the pilotage of vessels at sea are easily distinguished by their shape, colour, topmark by day and the colour and rhythm of the light by night. The five types of marks are:

Lateral Marks: indicate the edge of a channel

Cardinal Marks: indicate the position of a hazard and the direction of safe water Isolated Danger Marks: indicate a hazard to shipping Safe Water Marks: indicates the end of a channel and deep, safe water is ahead Special Marks: indicate an area or feature such as speed restrictions or mooring area.

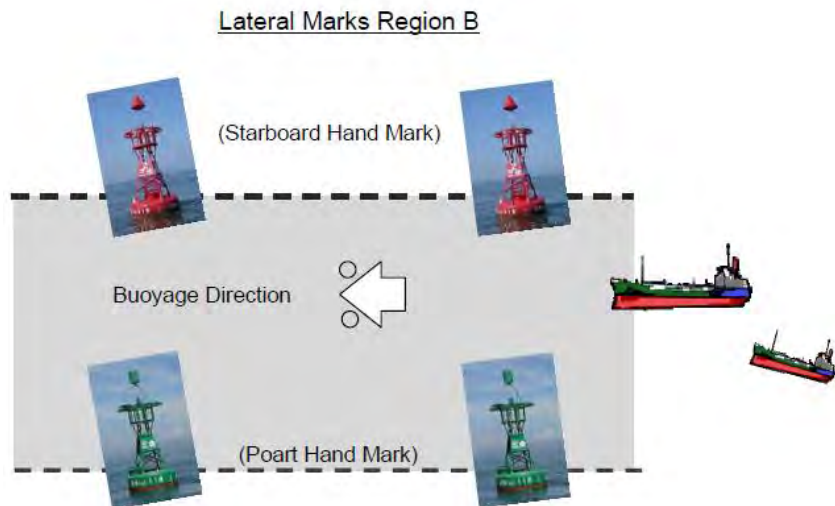
(3) Lateral Marks

Lateral marks define a channel and indicate the port and starboard sides of the navigation route to be followed into a waterway such as a harbour, river or estuary from seaward. The vessel should keep port marks to its left and keep starboard marks to its right.

(3) Lateral Marks (Continue)

If lateral marks are unable to be represented by a can or cone shaped buoy they should carry the appropriate topmark.

At the point where a channel divides, a modified lateral mark is used to indicate a 'preferred' channel (often a deep channel suitable for heavy commercial vessels) on one side and a secondary channel on the other. A preferred channel is indicated by red and green horizontal bands on the lateral marker. If a vessel wants to use the 'preferred' channel they observe the top colour of the mark while a vessel wishing to use the secondary channel observes the bottom colour. See 'Preferred Channel to Starboard/Port' in Table 1.1 and Table 1.2.



(4) Cardinal Marks

A cardinal mark is used to signify a danger and show where the safest water can be found.

Cardinal marks indicate the direction of safety as a compass direction relative to the mark.

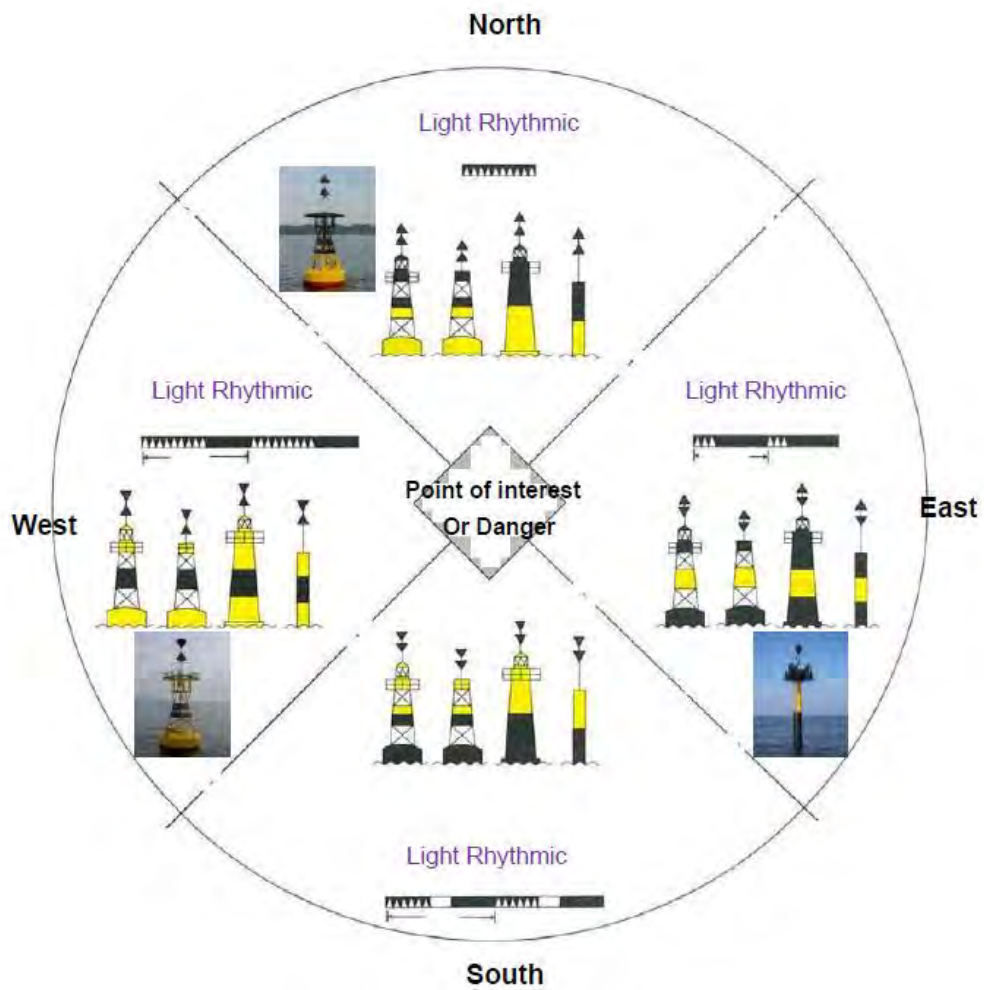
A cardinal mark is named after the quadrant in which it is placed. Due to the unique way cardinal marks use the points of a compass to signal safety it makes them meaningful regardless of the direction of the approaching vessel.

Cardinal marks have distinctive black and yellow markings and topmarks.

Cardinal marks can be used to show the following:

- The deepest water on an area on the named side of the mark
- The safe side on which to pass a danger
- Draw attention to a feature in a channel such as a bend, junction or end of a shoal

Cardinal Marks



(5) Isolated Danger Marks

An isolated danger mark is used to indicate a hazard to shipping such as a submerged rock or wreck which has navigable water all around it. It is erected or moored above the hazard. The double sphere topmark is an important feature and needs to be visible by day. The topmarks should be as large as possible with the spheres clearly separated.



(6) Safe Water Marks

Safe water marks indicate there is navigable water all around the mark including the end of a channel or mid channel, however, this mark does not mark a danger. They are the only mark to have vertical stripes.





(7) Special Marks

Special marks do not usually assist navigation but are used to indicate a feature such as recreation zones, speed limits, mooring areas or cable and pipe lines including outfall sewerage pipes.

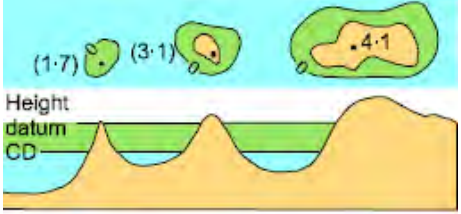
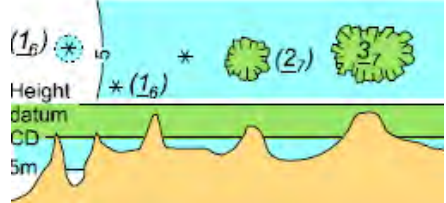
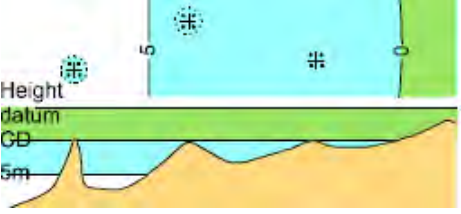
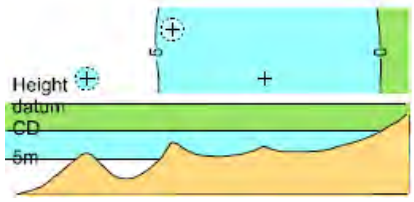
Symbols and abbreviations found on International charts into ENC objects and attributes
(S-57 Appendix B.1 (Annex D - INT to S-57/52))

IK Rocks, Wrecks, Obstructions

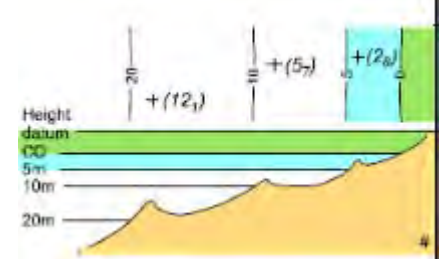
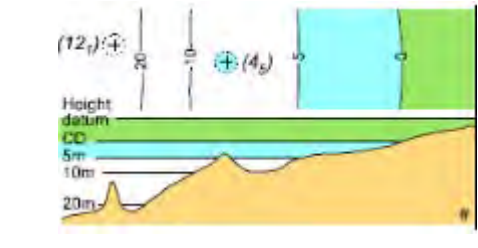
General

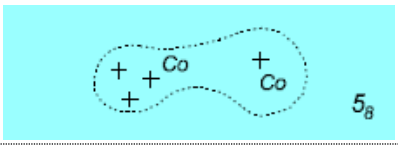
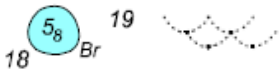
<p>1</p>  <p>Danger line</p>	<p>2</p>  <p>Depth cleared by wire drag sweep</p>
---	--

Rocks Plane of Reference for Depths. IH: Plane of Reference for Height

<p>10.</p>  <p>Rock which does not cover; height above chart datum</p>	<p>11</p>  <p>Rock which covers and uncovers, height above Chart Datum, where known</p>
<p>12</p>  <p>Rock awash at the level of Chart Datum</p>	<p>13</p>  <p>Underwater rock over which the depth is unknown</p>

14. Dangerous underwater rock of known depth

<p>14.1</p>  <p>Inside the corresponding depth area</p>	<p>14.2</p>  <p>Outside the corresponding depth area</p>
--	--

<p>15</p> <p>30 R</p> <p>Underwater rock not dangerous to surface navigation</p>	<p>16</p>  <p>Coral reef which is always covered</p>	<p>17</p>  <p>Breakers</p>
--	--	---

Wrecks Plane of Reference for Depths > IH Historic Wreck >N

<p>Wreck which does not cover, height above chart datum</p>	<p>Wreck which covers and uncovers, height above chart datum</p>
---	--

Project on Enhancing of Vessel Traffic Service System Management Capability Phase 2

Wrecks Plane of Reference for Depths > IH Historic Wreck >N (Continuer)			
22		23	
	Submerged wreck, depth known		Submerged wreck, depth unknown
24		25	
	Wreck showing any part of hull or superstructure		Wreck of which only the mast(s) only are visible at Chart Datum
26		27	
	Wreck, obtained by sounding		Wreck, swept by wire
28		29	
	Dangerous wreck, depth unknown		Non-dangerous wreck, depth unknown
30		31	
	Wreck, depth unknown with safe clearance at depth shown		Foul ground

Obstructions Plane of Reference for Depths > IH Kelp, Sea Weed > IJ Wells > IL			
40		41	
	Obstruction, depth unknown		Obstruction, depth known
42		43.1	
	Obstruction swept by wire drag		Stump of posts or piles, wholly submerged
43.2		44.1	
	Submerged, pile, stake etc.		Fishing stakes
44.2		45	
	Fish trap, fish weir, tunny nets		Fish trap area, tunny nets area
46.1		46.2	
	Fish haven		Fish haven, depth known
47		48.1	
	Shellfish beds		Marine farm (large-scale charts)
48.2		--	
	Marine farm (small-scale charts)		

Project on Enhancing of Vessel Traffic Service System Management Capability Phase 2

IP Lights					
Light Structures, Major Floating Lights Beacons> IQ			Colour of Lights		
No.	Abbreviation	Class of light	No.	Abbreviation	Class of light
10.1	F	Fixed	11.1	W	White (may be omitted)
10.2	Oc	Single occulting	11.2	R	Red
	Oc(2)	Group occulting	11.3	G	Green
	Oc(2+3)	Composite group occulting	11.4	Bu	Blue
10.3	Iso	Isophase	11.5	Vi	Violet
10.4	Fl	Single flashing	11.6	Y	Yellow
	Fl(3)	Group flashing	11.7	Or	Orange
	Fl(2+1)	Composite group flashing	11.8	Am	Amber
10.5	LFI	Long flashing(flash 2sec or longer)	Period		
			12	90s	Period in seconds
10.6	Q	Continuous quick	Elevation		
			13	12m	Elevation of light given in metres
	IQ	Interrupted quick	Range		
10.7	VQ	Continuous very quick	14	15/M	Light with single range
	VQ(3)	Group very quick		15/10M	Light with two different ranges
	IVQ	Interrupted very quick		15-7M	Light with three or more ranges
10.8	UQ	Continuous ultra-quick	Disposition		
	IUQ	Interrupted ultra-quick	15	(hor)	horizontally disposed
10.9	Mo(K)	Morse Code		(vert)	horizontally disposed
10.10	FFI	Fixed and flashing	Example of a full Light Description		
10.11	Al.WR	Alternating	16	Fl(3)WRG. 15s13m7-5M	

Lights marking Fairways Note: Quoted bearings are always from seaward					
Leading Lights and Lights in line					
20.1			20.2		
	<p>Leading lights with leading line and arcs of visibility. The bearing may be shown in degrees and tenths of degrees</p>			<p>Leading lights</p>	
20.3			21		
	<p>Leading lights on small scale charts</p>			<p>Leading lights on small scale charts</p>	
22	Rear Lt or Upper Lt		23	Frontr Lt or Lower Lt	

Direction Lights	
30.1	<p>Dir 269° Fl(2)5s10m11M</p>
	Direction light with narrow sector
30.2	<p>DirWRG 15-5M</p>
	Direction light with course to be followed
30.3	<p>DirWRG 15-5M</p>
	Direction light with narrow fairway
31	<p>Dir 286°</p>
	Moiré effect light

Sector Lights	
40	<p>Fl.WRG.4s21m 18-12M</p>
	Sector light on standard charts
41	<p>Oc.WRG. 10-6M</p>
	Sector light on standard charts, the white sector limits marking the sides of the fairway
42	<p>Fl(3)10s62m25M F.R.55m12M</p>
	Main light visible all-round with red subsidiary light seen over danger
43	<p>Fl.5s41m30M</p>
	All round light with obscured sector
44	<p>Iso.WRG</p>
	Light with arc of visibility deliberately restricted
45	<p>Q.14m5M</p>
	Light with faint sector
46	<p>Oc.R.8s</p>
	Light with intensified sector
51	<p>Fl.10s40m27M (F.37m11M by day)</p>
	Daytime light (charted only where the character shown by day differs from that shown at night)

Project on Enhancing of Vessel Traffic Service System Management Capability Phase 2

Lights with limited Times of Exhibition			
50	F.R(occas)	52	Q.WRG.5m10-3M Fl.5s(in fog)
	Lights exhibited only when needed (for fishing vessels, ferries) and some private lights		Fog light (exhibited only in fog, or character changes in fog)
53	# Fl.5s(U)	54	# (temp)
	Unwatched (unmanned) light with no standby or emergency arrangements		Temporary
55	# (exting)	---	-----
	Extinguished		-----

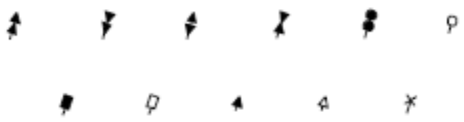
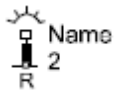

Special Lights Flare Stack (at Sea)>IL Flare Stack (at Land) >IE Signal Stations > IT			
60	F.R(occas)	61.1	AeroF.R.353m11M RADIO MAST (353)
	Lights exhibited only when needed (for fishing vessels, ferries) and some private lights		Air obstruction light of high intensity
61.2	(89) (R Lts)	62	Fog Det Lt
	Air obstruction light of low intensity		Fog detector light
63	(illuminated)	64	Iso
	Floodlit, floodlighting of a structure		Strip light
65	# F.R (priv)	-----	-----
	Private light other than one exhibited occasionally		-----








IQ Buoys, Beacons	
Buoys and Beacons IALA Maritime Buoyage System, which includes Beacons	
General	
1	Position of buoy or beacon

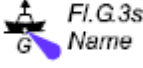
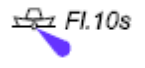
Colors of Buoys and Beacon Top marks	
2	
	Single colour: green (G) and black (B)
3	
	Single colour other than green and black
4	
	Multiple colors in horizontal bands: the colour sequence is from top to bottom
5	
	Multiple colours in vertical or diagonal stripes; the darker colour is given first.
6	Retroreflection material

Lighted Marks. Marks with Fog Signals >IR	
7,8	Encode as appropriate as shown in section IP

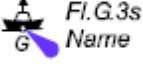
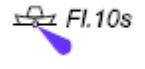
Project on Enhancing of Vessel Traffic Service System Management Capability Phase 2



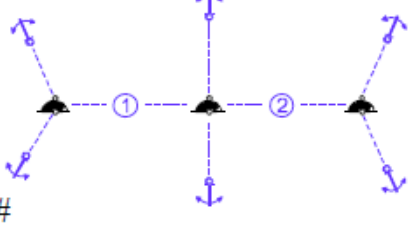


Topmarks and Radar Reflectors For application of Topmarks within the IALA System Radar reflector > IS			
9	 <p>IALA System topmarks (beacon topmarks shown upright)</p>	10	 <p>Beacon with topmark, colour, radar reflector and designation</p>
11	 <p>Buoy with topmark, colour, radar reflector and designation</p>		<p>-----</p> <p>-----</p>









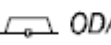




Buoys Features Common to Buoys and Beacons>IQ 1-11: Shapes			
20	 <p>Conical buoy, nun buoy, oval buoy</p>	21	 <p>Can buoy, cylindrical buoy</p>
22	 <p>Spherical buoy</p>	23	 <p>Pillar buoy</p>
24	 <p>Spar buoy, spindle buoy</p>	25	 <p>Barrel buoy, tun buoy</p>
26	 <p>Superbuoy</p>		











Minor Light Floats			
30	 <p>Light float (IALA) 76</p>	31	 <p>Light float (non IALA)</p>









IQ 30/31 INFORMS must be used to indicate the IALA status. MARSYS is not a legitimate attribute of LITFLT at present and will not be included until the next NE of the standard.

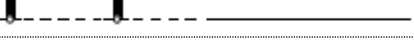
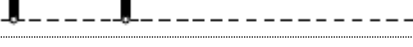
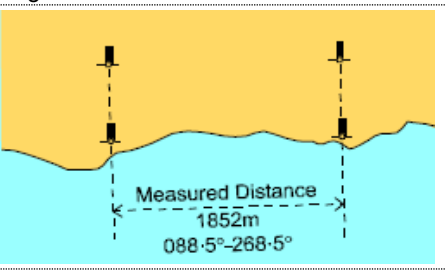

Minor Light Floats			
30	 <p>Light float (IALA) 76</p>	31	 <p>Light float (non IALA)</p>




Mooring Buoys			
40	 <p>Mooring buoy</p>	41	 <p>Lighted mooring buoy 84</p>
42	 <p>Trot, mooring buoy with ground tackle and berth numbers</p>	43	 <p>Mooring buoy with communications</p>
		44	 <p>Numerous moorings</p>

Special Purpose Buoys			
50	 DZ	51	 Target
	Firing danger area (Danger Zone) buoy		Target
52	 Marker Ship	53	 Barge
	Marker Ship		Barge
54		55	
	Degaussing Range buoy		Cable buoy
56		57	
	Spoil ground buoy		Buoy marking outfall
58	 ODAS	59	
	Data collection buoy		Buoy marking wave recorder or current meter
60		61	
	Seaplane anchorage buoy		Buoy marking traffic separation scheme
62			-----
	Buoy marking recreation zone		-----

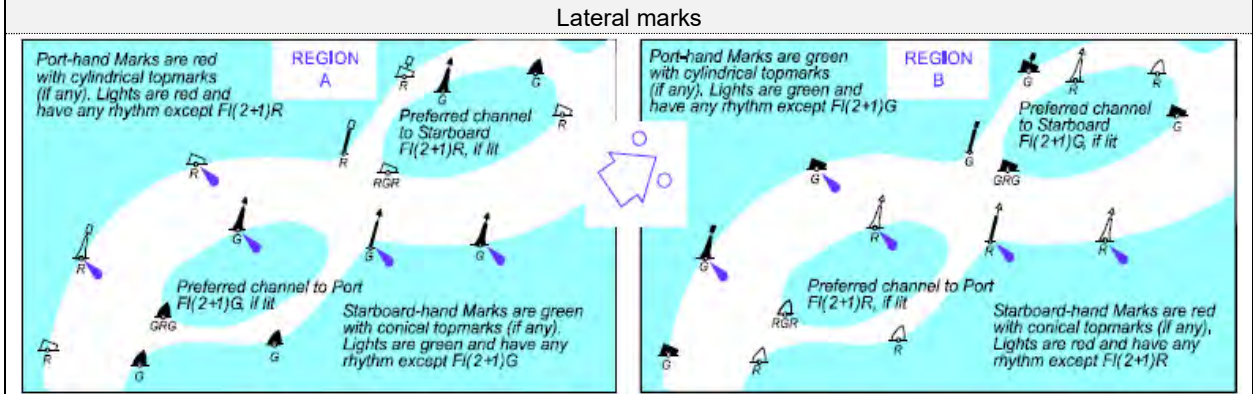
Beacons Lighted Beacons > IP Features Common to Beacons and Buoys > IQ 1-11			
General			
80	  Bn	81	 BW  Bn
	Beacon in general, characteristics unknown or chart scale too small to show		Beacon with colour, no distinctive topmark
82	 R  BY  BRB	83	 #  BRB  BRB
	Beacon with colour and topmark		Beacon on submerged rock


Beacon Towers			
110	 R  G  R  G  BY 	111	 # 
	Beacon tower		Lattice beacon

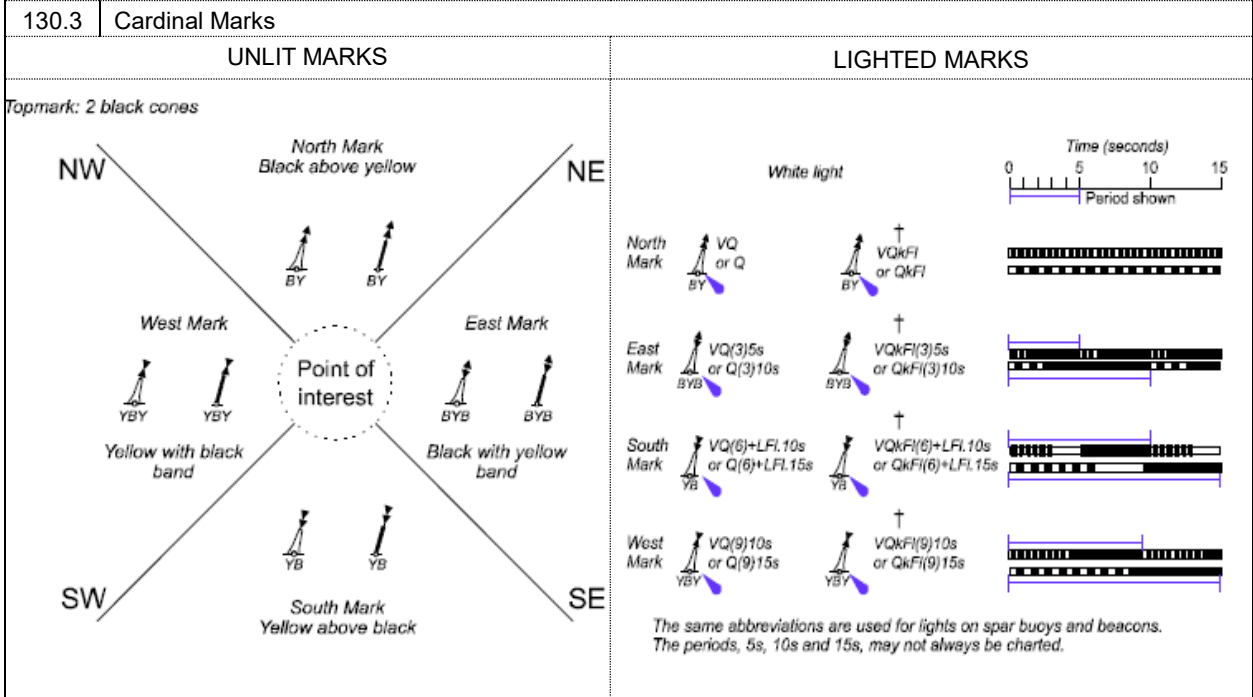
Special Purpose Beacons. Leading Lines, Clearing Lines > IM			
120		121	
	Leading beacons		Beacon marking a clearing line or transit
122		123	
	Beacon marking measured distance		Cable landing beacon



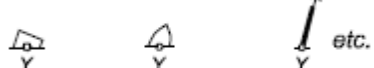
Special Purpose Beacons. Leading Lines, Clearing Lines > IM (Continue)			
124			125 Firing practice area beacons
	Refuge beacon		
			126 
			Notice board


130 IALA Maritime Buoyage Systems



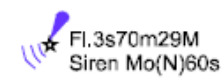

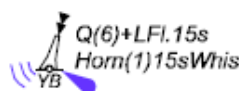
130.1	IALA buoyage system	
130.2	 Symbol showing direction of buoyage where not obvious	Direction of buoyage
130.3	Cardinal Marks	








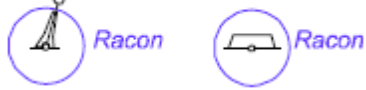






North Mark, East Mark, South Mark, West Mark		
130.4		Isolated Danger Marks
130.5		Safe Water Marks
130.6		Special Marks

IR Fog Signals	
General Fog Detector Light > IP Fog Light > IP	
1	 <p>Position of fog signal: Type of fog signal not given</p>






Types of Fog Signals, with Abbreviations								
10	Explos	Explosive	11	Dia	Diaphone	12	Siren	Siren
13	Horn	Horn	14	Bell	Bell	15	Whis	Whistle
		Nautophone	16	Gong	Gong			
		Reed						





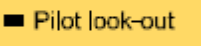


Examples of Fog Signal Descriptions			
20	 <p>Siren</p>	21	 <p>Wave actuated bell buoy</p>
22	 <p>Horn with whistle</p>		






IS Radar, Radio, Electronic Position-Fixing Systems			
Radar. Radar Structures Forming Landmarks > IE Radar Surveillance Systems> IM			
1	 <p>Coast radar station</p>	2	 <p>Ramark</p>
3.1	 <p>Radar transponder beacon (3cm)</p>	3.2	 <p>Radar transponder beacon (10cm)</p>
3.3	 <p>Radar transponder beacon (3 & 10cm)</p>	3.4	 <p>Radar transponder beacon with sector of obscured reception</p> <p>Radar transponder beacon with sector of reception</p>
3.5	 <p>Leading radar transponder beacons</p>	3.6	 <p>Floating marks with radar transponder beacon</p>
4	 <p>Radar reflector</p>	5	 <p>Radar conspicuous feature</p>


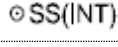

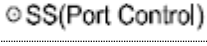
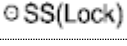
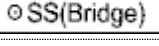
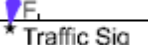


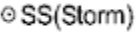
Radio. Radio Structures Forming Landmarks > IE Radio Reporting (Calling-in or Way) Points > IM			
10	 <p>Non-directional radio beacon</p>	11	 <p>Directional radio beacon</p>

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Radio. Radio Structures Forming Landmarks > IE Radio Reporting (Calling-in or Way) Points > IM (Continue)			
12		13	
	Rotating pattern radio beacon		Consol beacon
14		15	
	Radio direction-finding station		Coast radio station
16		Aeronautical radio beacon	

IT Services			
Pilotage			
1.1		1.2	
	Pilot boarding place		Pilot boarding place, with name
1.3		1.4	
	Pilot boarding place, with note		Pilot transferred by helicopter
2		3	
	Pilot look-out		Pilot office
4		Port with pilot service	

Coastguard, Rescue			
10		11	
	Coastguard station		Coastguard station with Rescue station
12		13	
	Rescue station; Lifeboat station; Rocket station		Lifeboat lying at a mooring
14		Refuge for shipwrecked mariners	

Stations			
20		21	
	Signal station in general		Signal station, International Port Traffic Signals
22		23	
	Traffic signal station		Port control signal station
24		25.1	
	Lock signal station		Bridge passage signal station
25.2		26	
	Bridge lights including traffic signals		Distress signal station
27		28	
	Telegraph station		Storm signal station

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Stations			
29	⊙SS(Weather)	30	⊙SS(Ice)
	Weather signal station		Ice signal station
31	⊙SS(Time)	32.1	# 
	Time signal station		Tide scale
32.2	⊙Tide gauge	33	⊙SS(Tide)
	Tide gauge		Tide gauge
34	⊙SS(Stream)	35	⊙SS(Danger)
	Tidal stream signal station		Danger signal station
36	⊙SS(Firing)	Firing practice signal station	



*Project on Enhancing of Vessel Traffic Service System
Management Capability Phase 2*

TEXT Book-5 (Module-5)

“COMMUNICATION CO-ORDINATION”



Text Book for Vessel Traffic Services “COMMUNICATION CO-ORDINATION”



IALA V-103-1 Model-Course



INTERNATIONAL COOPERATION AGENCY



JAPAN AIDS TO NAVIGATION ASSOCIATION (JANA)

Project on Enhancing of Vessel Traffic Service System Management Capability Phase 2

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Chapter 1. COMMUNICATION CO-ORDINATION	
MODULE 5 (From Recommendation V-103/1)	
1.1 INTRODUCTION	Keyword
Instructors for this module should have knowledge, comprehension and the ability to apply communication techniques as well as qualifications in the VTS/Maritime fields. Every instructor should have full access to simulated VTS. In addition, arrangements should be made, if practicable, for trainees to visit operational VTS Centres.	<ul style="list-style-type: none"> • <i>communication techniques</i> • <i>VTS/Maritime fields</i>

1.2 SUBJECT FRAMEWORK	
1.2.1 Scope	
<p>This syllabus covers the requirement for VTS Operators to be able to <i>co-ordinate communications</i> between the VTS centre, participating shipping, allied services and other marine related agencies.</p> <p>This course covers the theory and practice of co-coordinating communications in a VTS area, including the requirements for and means of providing communications to <i>support an information service, navigational assistance service or traffic organisation service</i>. It also provides an understanding of communication co-ordination <i>requirements in emergency situations</i>.</p>	<ul style="list-style-type: none"> • <i>co-coordinating communications</i> • <i>emergency situations</i> • <i>See also Module 8</i>
1.2.2 Aims	
<p>On completion of the course trainees will possess a thorough <i>knowledge of the basic principles of communication co-ordination and a good knowledge of international and national regulations relating to communication co-ordination requirements for VTS areas in the country concerned</i>.</p> <p>The trainees will also have a sufficient understanding and practice of the subject to enable them to prioritize, relay and co-ordinate various types of communication between <i>marine and marine related agencies both on board ships and in shore facilities</i>. These communications follow IALA's list of situations and their associated responses using SMCP in VTS areas.</p> <p>If a simulator is available it is possible to give the trainees realistic exercises on the role of VTS in co-coordinating communications within a VTS area. Integrated exercises on handling emergency situations could also be carried out.</p>	<ul style="list-style-type: none"> • <i>basic principles of communication co-ordination</i> • <i>regulations relating to communication co-ordination</i> • <i>SMCP in VTS areas.</i>

1.3 SUBJECT OUTLINE OF MODULE 5		
Subject Area (Recommended hours 7h)		Keyword
General communication skills	<ul style="list-style-type: none"> • Inter personal communication • Procedures to enhance effective communication • Verbal and non-verbal communications • Cultural aspects and common understanding of messages communicated 	<ul style="list-style-type: none"> • <i>Verbal and non-verbal</i> • <i>Cultural aspects</i> • <i>common understanding</i>
Communications	<ul style="list-style-type: none"> • Collection • Evaluation • Dissemination (Distribution) 	<ul style="list-style-type: none"> • <i>Distribution</i>
Log and record keeping	<ul style="list-style-type: none"> • Objective • Manual log keeping • Electronic log keeping • Statement and report writing 	<ul style="list-style-type: none"> • <i>report writing</i>



Project on Enhancing of Vessel Traffic Service System Management Capability Phase 2

1.4 Detailed teaching syllabus - Communication co-ordination	
1.4.1 Detailed teaching syllabus –General communication skills	
Possess the knowledge of the basic principles of communication and coordination.	
Describe active listening skills	The process of interpersonal communication
	Effective team communications
	Empathy
State the importance of clear, concise, accurate, timely and meaningful communications,	Reading-back received message Breaking message into smaller components Rephrasing message
Demonstrate verbal and non-verbal communications	Voice inflection Non-verbal signals or symbols – internal Non-verbal signals or symbols – external
Identify words that have multiple interpretations and could negatively impact communications	Identify words that have multiple interpretations and could negatively impact communications

1.4.2 Detailed teaching syllabus communications				
Demonstrate and explain data collection	Formal messages - ship reporting			
	Ship-ship	Ship-shore	Shore-ship	Shore-shore
	Electronic data exchange			
Explain the use of a communications plan of action	Ship-ship	Ship-shore	Shore-ship	Shore-shore
	Define	as routine / non-routine		
		emergencies – incidents / accidents		
	resources			
Demonstrate the use of messages and reports	Formal messages		to vessels	
	information		to allied services	
	Phrasing, Timing, Content		of waterway information	
	Special reports and Informal messages		/warning/advice/instruction	
Special reports and Informal messages		Phrasing, Timing, Content		

1.4.3 Log and record keeping	
List and describe logs and records used by VTS	Accuracy of logs & records

Competence Area	Response to contingency plans
Knowledge understanding and proficiency	<p>Knowledge of related national and international regulations concerning distress, pollution prevention and special circumstances and demonstrate the ability to:</p> <ol style="list-style-type: none"> 1. prioritize and respond to situations; 2. commence alerting procedures; 3. co-ordinate with allied services; and 4. record activities. <p>While continuing to maintain a safe waterway in all aspects.</p>
Methods for demonstrating competence	Assessment of evidence obtained from approved simulated and on the job training.
Criteria for evaluating competence	<p>Type and scale of emergency properly identified.</p> <p>Activate the relevant contingency plan appropriate.</p> <p>Actions undertaken ensure the protection of the VTS area and, as far as practicable, maintain a safe flow of marine traffic</p>

Chapter 2 Communicate with stakeholders		
Elements	2.1	General communication skills
	2.2	Effective communications
	2.3	Log and record keeping

2.1 Scope of this unit	
Element 1 General Communication Skills	
This element concerns the ability of VTS Operators to understand the basics of communication.	
Element 2 Effective Communications	
This element enables VTS Operators to communicate effectively.	
Element 3 Log and Record Keeping	
This element enables VTS Operators to differentiate between logs and records and to maintain effective logs and records.	

2.2.1 Element 1. General communication skills	
Communication between VTS Operators and	<ul style="list-style-type: none"> • Other VTS personnel in the VTS Centre or other VTS Centres. • Masters and/or watchkeeping officers on participating vessels. • Pilots on participating vessels. • Allied services. • Port services. • Other stakeholders.

(1) What you must do	
1. Consider the various aspects of interpersonal communications.	
2. Take account of problems that can block or impede the communications process.	
3. Identify the differences between verbal and non-verbal communications.	
4. Recognise cultural aspects that can hinder the acquisition of a common understanding of messages communicated.	
5. Use effective questioning techniques.	
6. Contribute to a discussion about a direct subject. Evidence must show you can: <ul style="list-style-type: none"> • Make clear and relevant contributions in a way that suits your purpose and situation. • Listen and respond appropriately to what others say. • Help to move the discussion forward. 	
7. Give a short talk about a direct subject, using an image. Evidence must show you can: <ul style="list-style-type: none"> • Speak clearly in a way that suits your subject, purpose and situation. • Keep to the subject and structure your talk to help listeners follow what you are saying. • Use an image to clearly illustrate your main points. 	
8. Read and summarise information from at least two extended documents about a straightforward subject. One of these documents should include at least one image. Evidence must show you can: <ul style="list-style-type: none"> • Select and read relevant material; • Identify accurately the lines of reasoning and main points from texts and images; and • Summarise the information to suit your purpose. 	
9. Write at least two different types of documents about straightforward subjects. One piece of writing should be an extended document and include at least one image. Evidence must show you can: <ul style="list-style-type: none"> • Present relevant information in an appropriate form. • Use structure and style of writing to suit your purpose. • Ensure text is legible and that spelling, punctuation and grammar are accurate, so your meaning is clear. 	

(2) What you need to know:	
Health and Safety	
<ul style="list-style-type: none"> • Hazards and risks of the workplace affecting people and the environment. • How to make and apply decisions based on the assessment of risk. • How to apply practices that maximise the health, safety and welfare of yourself and others in the workplace. 	
Personal and Interpersonal	
<ul style="list-style-type: none"> • How to communicate clearly and effectively with the range of people involved. • Lines and methods of communication /reporting in the workplace. 	
Technical	
<ul style="list-style-type: none"> • Theory of interpersonal communications. • Procedures to enhance effective communications. • Cultural aspects and common understanding of messages communicated. 	<ul style="list-style-type: none"> • Verbal and non-verbal communications.
In discussions, you need to know, how to:	
<ul style="list-style-type: none"> • Use varied vocabulary and expressions to suit your purpose (e.g. to present an argument (disagreement), express ideas or opinions, exchange information). • Adapt your contributions to suit different situations (e.g. the amount you say, your manner and tone of voice). • Show you are listening closely (e.g. by body language) and respond appropriately (e.g. make tactful comments, ask questions to show interest). • Identify the speaker's intentions (e.g. by manner, tone of voice, vocabulary). • Move the discussion forward (e.g. summarise, develop points, focus on purpose). 	
In giving a short talk you need to know, how to:	
<ul style="list-style-type: none"> • Prepare for the talk (e.g. research the topic, make notes, chose images). • Adapt your language to suit the subject, purpose and situation (e.g. use STANDARDS English, avoid or explain technical terms, keep attention by varying tone of voice, give examples). • Structure what you say help listeners follow a line of thought or series of events (e.g. by signaling new points: firstly, secondly, and finally). • Use images to help others understand the main points of your talk (e.g. charts, pictures, sketches, plans, diagrams or models to show what you mean). 	
In reading and summarizing information you need to know, how to:	
<ul style="list-style-type: none"> • Use different sources to obtain relevant information (e.g. to obtain and compare facts, opinions or ideas, obtain instructions or directions). • Skim materials to gain a general idea of content and scan text to identify the information you need from straightforward, extended documents, (e.g. text books, articles of more than three pages with key points easily identified). • Recognise the writer's intentions (e.g. by tone, vocabulary, structure of text). • Identify main lines of reasoning (e.g. by signal words such as 'therefore', 'so', 'whereas') and main points from text and images (e.g. pictures, charts, diagrams). • Summarise information for a purpose (e.g. a talk or written report). 	
In writing documents you need to know, how to:	
<ul style="list-style-type: none"> • Present written information in different forms (e.g. letters, memos, extended documents such as essays or reports of more than three pages) including images (e.g. pictures, sketches, charts, diagrams). • Structure your material to help readers follow what you have written and understand the main point (e.g. use paragraphs, headings and sub-headings). • Use different styles of writing to suit different purposes (e.g. persuasive techniques to present arguments technical vocabulary, supporting evidence for reports). • Make meaning clear by writing, proof-reading and re-drafting documents so that: • Words most often used in your work or studies are spelled correctly and spelling of irregular words is checked (e.g. use a dictionary or spell checker). • Complex sentences are formed correctly (e.g. use of 'but', 'then', 'because', consistent use of tense). • Punctuation is accurate (e.g. use of commas, apostrophes, inverted commas). 	

2.2.2 Element 2. Effective communications	
Communication between VTS Operators and	Other VTS personnel in the VTS Centre or other VTS Centres.
	Masters and/or watchkeeping officers on participating vessels.
	Pilots on participating vessels.
	Allied services.
	Port services.
	Other stakeholders.

(1) What you must do
<p>1. Collect data from all available sources and consider the influence of the regulations and the statutory authority of VTS.</p> <p>2. Evaluate data in order to prioritise and formulate a plan of action for communications. Identify objectives, define resources and take account of contingency plans. Consider 'worst case' and 'what if' scenarios when developing an action plan. Execute plan, evaluate progress and modify plan or objectives as necessary.</p> <p>3. Distribute essential information to stakeholders and consider the phrasing, timing and content of message.</p>

(2) What you need to know:
Health and Safety
<ul style="list-style-type: none"> • Hazards and risks of the workplace affecting people and the environment. • How to make and apply decisions based on the assessment of risk. • How to apply practices that maximise the health, safety and welfare of yourself and others in the workplace.
Organisational
<ul style="list-style-type: none"> • Applicable legislation. • Sources and availability of information. • Record systems and their use.
Technical
<ul style="list-style-type: none"> • Data collection methods. • Standard operating procedures. • Data evaluation methods.
Contingency Plans.
<ul style="list-style-type: none"> • Relevant regulations and statutory authority of VTS. • Data dissemination methods.

2.2.3 Element 3. Log and record keeping	
Communication between VTS Operators and	Other VTS personnel in the VTS Centre or other VTS Centres.
	Masters and/or watchkeeping officers on participating vessels.
	Pilots on participating vessels.
	Allied services. Port services. Other stakeholders.

(1) What you must do
<p>1. Know the objectives, purpose, legislative requirements and legal implications of log and record keeping.</p> <p>2. Know the difference between logs and records.</p> <p>3. Know the purpose, benefits and difficulties of electronic log keeping.</p> <p>4. Know the methods by which information (voice, radar/video, and data) is recorded in electronic logs.</p> <p>5. Keep an accurate, factual, complete, chronological, understandable and standardised log of events, hand written, manual typewritten or electronic, as required by the standard operating procedures.</p> <p>6. Retain logs and records, hand written or manual typewritten, in a secure environment as per national statutory requirements and standard operating procedures.</p>

(1) What you must do (<i>Continue</i>)
7. Retain electronic logs and records, with back-up arrangements, in a secure environment as per national statutory requirements and standard operating procedures.
8. Know that data contained in logs and records may be used for statistical process control or to input into local / national / international databases for accident investigation.
9. Know the purpose, statutory requirements and legal implications of statement and report writing.
10.. Know the difference between statements and reports.

(2) What you need to know:
Health and Safety
<ul style="list-style-type: none"> • Hazards and risks of the workplace affecting people and the environment. • How to make and apply decisions based on the assessment of risk. • How to apply practices that maximise the health, safety and welfare of yourself and others in the workplace.
Organisational
<ul style="list-style-type: none"> • Applicable legislation. • Record systems and their use. • Sources and availability of information. • Job description/specification.
Technical
<ul style="list-style-type: none"> • Data collection methods. • Data evaluation methods. • Standard operating procedures. • Contingency Plans. • Relevant regulations and statutory authority of VTS. • Data dissemination methods.

Chapter 3 Functions of a VTS (*From VTS manual 2016*)

The benefits of implementing a VTS are that it allows identification and monitoring of vessels, strategic planning of vessel movements and provision of navigational information and assistance. It can also assist in prevention of pollution and co-ordination of pollution/emergency response.

The efficiency of a VTS will depend on the reliability and continuity of communications and on the ability to provide accurate and unambiguous information.

A VTS may help prevent such accidents occurring or developing into disasters. It can also be used by the emergency services in the event of marine associated emergencies, which necessitate the coordination of all activities within the area concerned.

Incidental co-operation with emergency services, such as Search and Rescue and Pollution Response Control should be conducted in accordance with pre-established contingency plans in which the procedures for such co-operation are laid down and responsibilities established.

3.1 Emergency and Incident Management

Configuration of a VTS centre should take into account the need to manage incidents and emergencies. Issues that should be addressed include:

- Workstation(s) - Provision should be made for additional staff to manage the specific incident whilst the VTS continues with the primary traffic management function; this may be in the form of dormant workstations or a plan to reconfigure existing positions to make best use of the facilities available.
- Planning - Contingency plans and action sheets should be prepared;
- Liaison - Consideration should be given to the links that may be necessary with emergency services;
- Training - Contingency plans should be exercised.

3.2 Decision Support

Decision Support helps to assess situations, to plan and to provide timely and necessary information for taking decisions.

For example, CPA/TCPA is a commonly used tool in a VTS, delivering TOS, and helps in maintaining traffic separation.

Note that decision support in VTS is under continuous development, resulting in tools that will support an increasing number of aspects of the operation, planning and management of VTS.

IALA Guideline No. 1110 gives further guidance on the use of decision support tools for VTS personnel when considering decisions on evolving or emergency situations in a harmonised way.

- Take appropriate actions in emergency situations and other special circumstances defined for the VTS area. Where appropriate, co-ordinate communications for such situations and/or circumstances; and
- Maintain a log of all incidents/accidents and all other relevant events occurring within the area of responsibility.

In an emergency or incident situation, the media will probably try to contact the VTS centre directly and use every means at their disposal in order to obtain information. However, VTS personnel should not express opinions, or speculate on outcomes of incidents, but direct the media to the person appointed to liaise with the media according to the procedures

CHAPTER 4 OPERATIONAL PROCEDURES (1) *(From VTS Manual Edition 6)*

4.1 Introduction

Operational Procedures are an integral part of a verifiable safety management system for VTS. A properly implemented quality control system, approved by the Competent Authority, can ensure that the standards set for the types of service are consistently maintained and that the service is delivered safely and effectively.

The development and maintenance of VTS centre specific operational procedures is a continuous process. To ensure the safe and efficient management of the service, it is critical that:

- ✓ VTS Staff are made aware of changes and amendments; and
- ✓ Auditable and documented processes are developed that enable the early and effective update of operational procedures.

Best practice indicates that new or changed procedures should be communicated at the watch handover and incorporated into the operational procedures handbooks/manual. This chapter summarizes the key points in developing operational procedures for VTS centres.

4.2 Overview

IALA Recommendation V-127 - 'Operational Procedures for VTS', has been prepared to assist VTS Authorities in identifying key aspects that should be considered when developing operational procedures for a VTS centre.

4.3 Communications and VTS Procedures

Recommendation V-127 provides a checklist for preparing operational procedures and this chapter provides guidance in developing recommended procedures. To assist a common and consistent approach to the development of operational procedures, key terminology utilized by the maritime sector has been defined. The key terminology includes:

- ✓ Result Oriented Messages;
- ✓ Standard Phrases; and
- ✓ Types of Communication Messages and Message Markers.

4.4 Result Oriented Messages

A fundamental principle of VTS communications is that advice and instructions should be 'result oriented' only; leaving the execution to the master or pilot onboard the vessel. The execution, such as courses to be steered or engine maneuvers to be ordered, remains the responsibility of the person on board accountable for navigational decision making at that time. The interpretation of 'Result Oriented' will depend on the situation and context. Phrases that are used for vessel conning, such as, 'Stop Engine', 'Hard to Starboard' or 'Steer Course 'XXX"' should not be used.

4.5 Standard Phrases

Attention is drawn to the importance of using standard terminology, including message markers. Guidance on standard phrases and maritime communications can be found in:

- ✓ IMO Resolution A.918(22) - 'IMO Standard Marine Communication Phrases (SMCP)', where standard phrases for ship-to-shore communications are defined;
- ✓ IMO Resolution A.851 (20) - 'General Principles for Ship Reporting Systems and Ship Reporting Requirements', where standard reporting procedures are described; and
- ✓ IMO Resolution A.954 (23) - 'Proper use of VHF channels at sea'.

4.6 Types of Communication Messages and Message Markers

To facilitate shore-to-ship and ship-to-shore communication in a VTS environment, one of the following eight message markers should be used to increase the likelihood of the message being properly understood. It is recommended that message markers are used when a VTS communicates with vessels. The contents of all messages directed to a vessel should be clear; IMO Standard Marine Communication Phrases (SMCP) should be used where practicable. When language difficulties exist, the VTS operator should ask the officer of the watch of the vessel concerned to use SMCP.

2.7 Message Markers

There are eight message markers as defined in SMCP. Seven of them are frequently used by the VTS to emphasize the content of the message or to ensure that the message will be properly understood, particularly when language difficulties are apparent between the VTS and the vessel.

The message marker is to precede the message or the corresponding part of the message.

The message markers are:

INFORMATION	WARNING	ADVICE	INSTRUCTION	QUESTION	ANSWER	REQUEST	INTENTION
-------------	---------	--------	-------------	----------	--------	---------	-----------

The message markers INSTRUCTION and ADVICE may need authorization by the appropriate authority. However, it is at the discretion of the VTSSO which marker is applicable to the situation.

The message marker INTENTION should not be used by the VTS as it is intended for messages announcing navigational actions by a vessel.

Detailed information on the use of message markers and examples thereof can be found in IALA Guideline No. 1089 – ‘Provision of Vessel Traffic Services (INS, TOS & NAS)’.

2.8 Developing Operational Procedures

To achieve standardized operations/performance within the VTS centre, clearly defined operating procedures, particularly those relating to external communications are paramount. VTS Authorities should therefore develop and document procedures for all operations within a VTS. The operating procedures should be documented in manuals, available to all VTS personnel.

A clear distinction is made between Internal and External Operational Procedures:

- ✓ Internal Procedures – procedures that cover the day-to-day running of a VTS centre or sub-centre, including the operation of systems and sensors, interactions among the staff and the internal management of data.
- ✓ External Procedures – procedures that govern the interaction with participating vessels and allied services (defined as services actively involved in the safe and efficient passage of the vessel through the VTS area).

A further distinction is made between routine procedures and those related to incidents such as search and rescue and environmental protection. The latter are generally referred to as emergency procedures. Examples of procedures are shown below.

Internal Procedures	External Procedures
Routine Procedures	
Gathering and Recording of information Operational staff Equipment operation, maintenance, calibration and updating Interaction with allied services Public Relations Security, Training, Watch handover Vessel handover Maintenance of marine publications	Pre-Arrival Information Vessels Entering VTS Area Vessels Transiting VTS Area Vessels at Anchor Vessels at Berth Vessels Departing the VTS Area Transition between Adjacent VTS Areas Environmental conditions Waterway conditions
Emergency Procedures	
System Failure Internal emergencies, for example fire and Flood, Forced evacuation of VTS centre Personnel medical emergencies, Security incidents.	Collision, Capsize, Sinking, Grounding, Fire On Vessel, Man Overboard Pollution Places of Refuge, Medical Emergency Vessel Not Under Command (NUC) Security incident, Protest Action, Natural Disaster

Note

Recommendation V-127 provides a reference list to assist VTS Authorities to identify key aspects that should be considered when developing operational procedures for a VTS centre. The list is neither mandatory nor exhaustive and should be adapted to suit individual needs.

Recommendation V-127 recognizes that the nature of the tasks and activities to be performed will depend on the capability of the VTS, the VTS area and the types of services to be provided. In general, these tasks and activities all involve collecting, processing, evaluating and disseminating information.

The collection and dissemination of this information will involve both internal and external communications, while information will be processed within the VTS centre itself. The level of decision-making that can be taken within the VTS centre should be clearly identified and promulgated. It is important that a change or update of the operating procedures is communicated clearly and unambiguously to the VTS personnel concerned, particularly to operational personnel (VTSOs) who will be following set procedures.

CHAPTER 5 OPERATIONAL PROCEDURES (2) (From IALA Recommendation V-127)

5.1 INTRODUCTION

The purpose of vessel traffic services (VTS) is to improve the safety and efficiency of navigation, and protect the marine environment and/or the adjacent shore area, work sites and offshore installations from possible adverse effects of maritime traffic. Some VTS centres may also have a role to play in other activities such as maritime security.

VTS authorities are responsible for ensuring that the objectives of a VTS are met. This includes ensuring that the standards set by the competent authority for levels of service and operator qualifications are adhered to. The authority delegated to VTS staff should be clearly identified in the documented operational procedures of a VTS. Such procedures should be an integral part of a verifiable safety management system for the VTS. A properly implemented quality control programme approved by the competent authority can ensure that the standards set for the type and level of service are consistently maintained, and that the service is delivered accurately, efficiently and effectively.

This Recommendation has been prepared as to assist VTS authorities in identifying key aspects that should be considered when developing operational procedures for a VTS centre. The list is neither mandatory nor exhaustive and should be adapted to suit individual needs. In preparing this Recommendation it is recognized that:

- ✓ The nature of the tasks and activities to be performed will depend on the capability of the VTS, the VTS area and the type and level of services to be provided. In general, these tasks and activities all involve collecting, processing, evaluating and disseminating information. The collection and dissemination of this information will involve both internal and external communications, while information will be processed within the VTS centre itself. The level of decision-making that can be taken within the VTS centre should be clearly identified.
- ✓ The objectives of the VTS can only be met through co-operation and trust among users of the service, VTS personnel and allied services. This can only be achieved through the reliability of the VTS information, which is dependent on the assured availability, continuity and quality of the service provided to all stake-holders.

A clear distinction is made in this document between internal and external procedures.

Internal Procedures – procedures that cover the day-to-day running of a VTS centre or sub-centre, including the operation of systems and sensors, interactions among the staff and the internal management of data.

External Procedures – procedures that govern the interaction with participating vessels and allied services (defined as services actively involved in the safe and efficient passage of the vessel through the VTS area).

A further distinction is made between routine and emergency procedures.

To achieve a standardized operations/performance within the VTS centre, clearly defined operating procedures, particularly those relating to external communications are paramount. This will assist the user in understanding information or instructions given by the VTS.

It is recommended that the operating procedures are documented in manuals. The responsible authority should assign a person responsible to keep the procedures up to date. These procedures should be available to all VTS personnel in all applicable locations (e.g. head office, VTS centre, training centre, etc.) in, both electronic and printed version. The electronic version facilitates searching within the document and keeping it up to date. These standard operating procedures should be an integral part of regular training and adherence to procedures should be monitored.

Consideration may be given to distributing these procedures (or part of them) to allied services. This could increase efficient collaboration.

It is important to communicate updates to everyone who has access to the operating procedures.

Primarily all operational VTS personnel should be aware of any changes made to the procedures and it should be ensured that these changes are well understood and properly implemented. In keeping the procedures up to date, particular attention should be given to the printed copies.

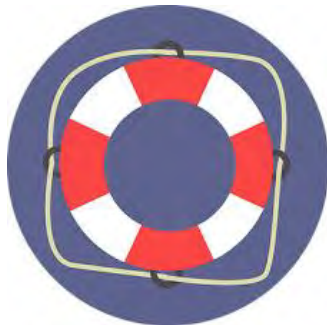
Updating the procedures is a continuous process.

5.2 INTERNAL VTS PROCEDURES
VTS authorities should develop and document procedures for all operations, both routine and emergency, internal to the VTS. The following are examples of the type of operational activities for which procedures should be developed; the list is neither mandatory nor exhaustive.
5.2.1 Routine Procedures
5.2.1.1 Gathering and Recording of Information
The period of time for which information gathered by a VTS is required to be stored should be identified in internal procedures. This time period should be such that it allows for the full retrieval of data post-incident/accident, in compliance with national requirements and those of the incident/accident investigation procedures of the VTS authority and other interested parties. This type of information may include:
<ul style="list-style-type: none"> ✓ Communications (internal and/or external); ✓ Sensor data (i.e. data used to generate the traffic image such as radar, CCTV, AIS); ✓ Shipping information data (e.g. vessel and cargo data, including vessel movement information); ✓ Meteorological and hydrological data; and

CHAPTER 6 LOG AND RECORD KEEPING
<i>Operational Records, Archives and Replay (From Chapter 16, VTS Manual Edition 6)</i>
6.1 Introduction
The nature of VTS operations is such that there may be a need or requirement to access, analyze and review previous events. Therefore, proper requirements and processes are needed for the capture, secure storage, retrieval and presentation of VTS related information. Advances in data storage techniques now make possible archiving and retrieval options that may have appeared unachievable only a short period ago. For example, storage and retrieval of basic raw data may be enhanced by the added capability of recording operator actions, the Human Machine Interface (HMI), which may prove invaluable in justifying the actions of VTS Staff in post incident analysis as well as improving the efficiency of VTS operations. This chapter provides guidance on recording, archiving and replay techniques that a VTS Authority may wish to consider in selecting systems and procedures that are appropriate to their needs.
6.2 Purpose of Recording and Replay
Recordings may be required for the following purposes: <ul style="list-style-type: none"> ✓ “Instant replay” during normal operation ✓ review of an accident for incident investigation; ✓ use as evidence following an accident or incident; ✓ technical evaluation and to check the function and performance of sensors etc; ✓ quality monitoring of the operation of VTS as a whole and to allow for continuous improvement; 9 statistical analysis of traffic patterns etc.; and ✓ training purposes.
6.3 Types of Data to be Recorded
The following areas may be considered for data capture (see also IALA Guideline 1111 - ‘Preparation of Operational and Technical Performance Requirements for VTS Systems’ section 1.4.2), as appropriate: <ul style="list-style-type: none"> ✓ Radio Communications; ✓ Telephone Communications (national privacy laws may be applicable); ✓ Sensor data used to generate the vessel traffic image such as: <ul style="list-style-type: none"> • Radar • AIS • CCTV • VHF DF • Long-range sensor data ✓ Meteorological and hydrological data; ✓ Management Information Systems data, which may include: <ul style="list-style-type: none"> • Shipping information i.e. vessel and cargo data, including vessel movement information; • Pilotage management; • Allied service provisions i.e. tug and line handing allocations.

6.3 Types of Data to be Recorded (Continued)
<p>✓ Logs and Textual records:</p> <ul style="list-style-type: none"> • Operator actions (HMI); • System BITE and logs.
6.4 Recording frequency and sampling rates
<p>The frequency of sampling for recorded data sets should be defined for each specific type of data (e.g. continuously for Voice Communications, and at an appropriate rate for meteorological or hydrological data).</p> <p>The relevant authority should define the period of time and temporal resolution of sensor data and other tracking performance parameters depending on traffic density and types of tracks.</p> <p>While the frequency of individual data items may differ from item to item, the recording of all data sets should be continuous and time stamped to a common time frame. A VTS system should have a master time reference to which all components and recordings are aligned.</p> <p>Proper care should be taken by the relevant authority when considering the recording process and data storage with regard to failure to record or inadvertent loss of recordings.</p>
6.5. Storage of Recordings
<p>IMO recommends a minimum of 30 days for other shore side activities (such as SAR) as the time period to allow for the full retrieval of data post incident/accident. It can be assumed that this requirement is appropriate for VTS and applies to all data sets that may be used for incident replay. As this data will be recorded in a rolling loop of, for example the most recent 30 days data, there is a requirement to store recordings for a period of time to safeguard recorded data in case of an incident. It should be easy for a VTS operator or supervisor to export and / or archive a period of recorded data to external devices (e.g. Network Attached Storage, DVD, External hard disks tape storage or similar).</p> <p>Certain data should be considered for longer term storage in support of such benefits as analysis of traffic patterns and their changes over time, waterway usage changes, input for analysis of changes to buoyage and other aids to navigation and other such strategic vessel traffic management uses. It is possible that such long term archival of data is beyond the capability or responsibility of the VTS; the capabilities of other organizations should be considered for this purpose (e.g., archival or statistical administrations).</p> <p>VTS Authorities should ensure the integrity and availability of recorded data. A capability should be provided to store recordings of specific incident data beyond the minimum storage time or to produce a permanent record for legal, regulatory or analysis purposes. Consideration should be given to securing recordings from unauthorized access or tampering, particularly those to be used in accident investigation or legal action.</p> <p>The large file size of some data items such as audio or CCTV images, may necessitate moving of the data to another devices (Network Attached Storage, DVD or similar) for longer term storage. This may also be a consideration in deciding whether to record and store original (raw) video, or digital (extracted) images as presented to an operator.</p> <p>To ensure that records are consistent and complete, the data recording process should normally be automated and consideration should be given to the provision of a stand-alone replay system that does not interfere with the VTS function. Consideration should be given to allow the retrieval of VTS information in standard formats (e.g. delimited text files or extensible mark-up language (XML)) and non-proprietary audio and video/image files.</p>
6.6 Replay System
<p>Any replay system must ensure that times are accurately identified so that the traffic situation can be rebuilt during replay. VTS Authorities may consider the integrated and synchronized replay of different data sources to aid incident review. Replay may be required for the following purposes:</p> <ul style="list-style-type: none"> ✓ Technical replay – using previously recorded data to fine-tune the system; ✓ Operator replay – replay of data sets as seen by VTSO for internal analysis or OJT training; ✓ External replay – ‘standalone’ replay functionality, for example when replaying to a court or official inquiry.

ANNEX A	
Communication Coordination OF VTS OPERATIONAL PROCEDURES	
Check item your SOP for Communication Coordination	OK or No
Internal Procedures	
External Procedures	
Routine Procedures	
Non-Routine Procedures	
Gathering and Recording of information	
Operational staff	
Equipment operation, maintenance, calibration and updating	
Interaction with allied services	
Public Relations	
Security	
Training	
Watch handover	
Vessel handover	
Maintenance of marine publications	
Pre-Arrival Information	
Vessels Entering VTS Area	
Vessels Transiting VTS Area	
Vessels at Anchor	
Vessels at Berth	
Vessels Departing the VTS Area	
Transition between Adjacent VTS Areas	
Environmental conditions	
Waterway conditions	
Emergency Procedures	
System Failure	
Internal emergencies, for example fire and flood	
Forced emptying of VTS centre	
Personnel medical emergencies	
Security incidents.	
Collision, Capsize, Sinking, Grounding, Fire	
On Vessel, Man Overboard	
Pollution	
Places of Refuge	
Medical Emergency	
Vessel Not Under Command (NUC)	
Security incident	
Protest Action	
Natural Disaster	



*Project on Enhancing of Vessel Traffic Service System
Management Capability Phase 2*

TEXT Book-6 (Module-6)

“VHF RADIO”



Text Book for Vessel Traffic Services “VHF RADIO”



IALA V-103-1 Model-Course



JAPAN INTERNATIONAL COOPERATION AGENCY



JAPAN AIDS TO NAVIGATION ASSOCIATION (JANA)

Project on Enhancing of Vessel Traffic Service System Management Capability Phase 2

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VHF RADIO (MODULE 6) (Source: Recommendation V-103/1)	
CHAPTER 1 GUIDELINE	
1.1 INTRODUCTION	Keyword
Instructors for this module should have the knowledge, comprehension and the ability to apply VHF radio communication techniques in a VTS environment. Every instructor should have full access to simulation equipment. In addition, arrangements should be made, if practicable, for trainees to visit operational VTS centres.	<ul style="list-style-type: none"> • <i>VHF radio</i>

1.2 SUBJECT FRAMEWORK	
1.2.1 Scope	
This syllabus covers the requirement for VTS Operators to be able to transmit voice and data messages using radio sub-systems and equipment for the purpose of fulfilling the functional requirements of VTS centres. This course covers the theory and practice of using basic VHF radio equipment to transmit and receive calls, messages and information by radiotelephony, the Digital Selective Calling (DSC) system and VHF Automatic Identification System (AIS).	<ul style="list-style-type: none"> • <i>Transmit voice & messages</i>
1.2.2 Aims	
On completion of the course the trainees will have the ability to transmit and receive, efficiently and effectively, voice and data radio communications by all radio sub-systems used in VTS provided by the Competent Authority concerned, in accordance with international regulations and procedures. They will also know the procedures used in radiotelephone and radio data communications and be able to use radiotelephones and radio data equipment, particularly with respect to VTS, distress, safety and navigational messages. Trainees will also have the skills to ensure that English language messages (SMCP) relevant to VTS are correctly handled. If suitable facilities are available it is possible to give the trainees realistic exercises on the transmission and reception of radio traffic within a VTS area. Integrated exercises involving several radio stations could also be carried out.	<ul style="list-style-type: none"> • <i>Procedures</i> • <i>SMCP</i>

1.3 SUBJECT OUTLINE OF MODULE 6		
Subject Area (Recommended hours 57)		
Radio operator practices and procedures	GMDSS Restricted Operator's Certificate (ROC) or internationally recognized radio certification	<ul style="list-style-type: none"> • <i>GMDSS (ROC)</i>
VHF radio systems and their use in VTS	<ol style="list-style-type: none"> 1) Frequencies in the VHF maritime mobile band (ITU RR Appendix S18) 2) National frequency assignments to VTS 	<ul style="list-style-type: none"> • <i>International Channels for VTS</i>
Operation of radio equipment	<ol style="list-style-type: none"> 1) Introduction to basic VTS VHF radio telephone, DSC and AIS equipment 2) Controls and operation of VHF radiotelephone equipment 3) Controls and operation of VHF DSC equipment 4) Controls and operation of VHF AIS equipment 	<ul style="list-style-type: none"> • <i>VHF</i> • <i>DSC</i> • <i>AIS</i>
Communication procedures, including SAR	<ol style="list-style-type: none"> 1) VHF radiotelephone procedures 2) VHF DSC communication procedures 3) VHF AIS communication procedures 4) Equipment failure and channel saturation 	

1.4 DETAILED TEACHING SYLLABUS OF MODULE 6	
Subject/Learning Objects	
1.4.1 Radio operator practices and procedures	
<i>Describe and perform exercises on radio operator practices and procedures General introduction to the maintenance of good public relations.</i>	
1) GMDSS Restricted Operator's Certificate (ROC) 2) Internationally recognized radio certification	

1.4.2 VHF radio systems and their use in VTS	
<i>Describe VHF radio systems and their use in VTS</i>	
Frequencies in the international VHF maritime mobile band	1) Single frequency and two frequency channels
	a. Simplex working b. Semi duplex c. Duplex working
	2) Port operation and ship movement frequencies
	3) Distress, safety and calling frequencies
	a. Radiotelephone b. DSC
	4) Automatic Identification Systems (AIS)
	a. Introduction to AIS b. Application of AIS to VTS
Restrictions on the use of Radio Regulations (RR) Appendix S18 frequencies	
National frequencies assigned to VTS	1) Assignment and use of single and two frequency channels for VTS purposes 2) National restrictions on the use of RR Appendix S18 frequencies

1.4.3 Operation of radio equipment	
<i>Describe and demonstrate the operation of radio equipment</i>	
Introduction to basic VTS VHF radiotelephone, DSC and equipment	1) Principles, controls and operation of VHF a. Channel spacing b. Modulation c. Range
1. Principles, controls and operation of DSC	1) Format of a transmission sequence 2) Message composition 3) Error checks
2. Principles, controls and operation of AIS	1) Format of a transmission sequence 2) Message composition 3) Automatic and manual modes

1.4.4 Communication procedures, including SAR	
<i>Describe and demonstrate the communication procedures, including SAR</i>	
VHF Radiotelephone procedures	Distress, urgency, safety and calling
DSC communication procedures using VHF	
AIS communication procedures using VHF	
Equipment failure and channel saturation	

CHAPTER 2 RADIO OPERATORS FOR GMDSS AND VTS
2.1 Licenses for GMDSS and VTS
2.1.1 Radio Regulations, ITU
<p>1) <u>No transmitting station</u> may be established or operated by a private person or by any enterprise <u>without a license</u> issued in an appropriate form and in conformity with the provisions of <u>these Regulations</u> by or on behalf of the government of the country. (Article 18.1 of RR)</p> <p>2) There are four categories of certificates, shown in descending order of requirements, for personnel of ship stations and ship earth stations using the frequencies and techniques prescribed in Chapter VII. An operator meeting the requirements of a certificate automatically meets all of the requirements of lower order certificates. (WRC-12) (Article 47 of RR)</p> <ul style="list-style-type: none"> a) First-class radio electronic certificate. b) Second-class radio electronic certificate. c) General operator's certificate. d) <u>Restricted operator's certificate.</u>

2.2 Licenses for GMDSS and VTS in Indonesia
2.2.1 Telecommunication Regulations, MOT, Indonesia (Article 60, Feb.23,2011)
<p>1) Certificate of education and training for Shipping Telecommunications consists of:</p> <ul style="list-style-type: none"> a. <u>radio operator</u> certificate for Global Maritime Distress and Safety System radio electronics; b. <u>radio technician</u> certificate for Global Maritime Distress and Safety System; c. <u>Vessel Operator</u> Certificate for Traffic Services (VTS); d. <u>Radio Inspector</u> certificate. <p>2) <u>Radio operator</u> certificate for Global Maritime Distress and Safety System radio electronics as referred to in paragraph (1) letter a consists of:</p> <ul style="list-style-type: none"> a. radio electronics certificate class I (SRE I); b. radio electronic certificate class II (SRE II); c. general operator certificate (SOU); d. limited operator certificate (SOT). ("ROC"?) <p>3) <u>Radio technician</u> certificate for Global Maritime Distress and Safety System as referred to in paragraph (1) letter b consists of:</p> <ul style="list-style-type: none"> a. Telecommunications - Shipping Technician Level III (TTP- III); b. Telecommunications - Shipping Technician Level II (TTP- II); c. Telecommunications - Shipping Technician Level I (TTP- I). <p>4) <u>Vessel Operator Certificate for Traffic Services (VTS)</u> as referred to in paragraph (1) letter c consists of:</p> <ul style="list-style-type: none"> a. Vessel Traffic Services Operator Basic and Advance b. Vessel Traffic Services Supervisor; c. Vessel Traffic Services On- the- Job Training; d. Vessel Traffic Services Instructor. <p>5) Education and training certificate is valid for 5 (five) years from issuance and may be extended.</p>

CHAPTER 3 VHF RADIO SYSTEMS AND THEIR USE IN VTS

3.1 Frequencies in the VHF maritime mobile band (ITU RR Appendix S18)

The following channel numbering for maritime VHF communications based on 25 kHz channel spacing and use of several duplex channels.

Channel Designator	Notes	Transmitting Frequencies (MHz)		Internships	Port Operations and Ship Movement		Public correspondence	
		Ship Stations	Coast Stations		Single frequency	Two frequency		
01	60	156.025	160.625					
		156.050	160.650					
02	61	156.075	160.675					
		156.100	160.700					
03	62	156.125	160.125					
		156.150	160.750					
04	63	156.175	160.775					
		156.200	160.800					
05	64	156.225	160.825					
		156.250	160.850					
06	65	156.275	160.875					
	<i>f</i>	156.300		x				
07	66	156.325	160.925			x	x	
		156.350	160.950			x	x	
08	67	156.375	156.375	x	x			
	<i>h</i>	156.400		x				
09	68	156.425	156.425		x			
	<i>l</i>	156.450	156.450	x	x			
10	69	156.475	156.475	x	x			
	<i>f</i>	156.500	156.500	x	x			
11	70	156.525	156.525	Digital selective calling for distress, safety and calling				
	<i>j</i>	156.550	156.550		x			
12	71	156.575	156.575		x			
		156.600	156.600		x			
13	72	156.625		x				
	<i>i</i>	156.650	156.650	x	x			
14	73	156.675	156.675	x	x			
	<i>k</i>	156.700	156.700		x			
15	74	156.725	156.725		x			
	<i>g</i>	156.750	156.750	x	x			
16	75	156.775			x			
	<i>n</i>	156.800	156.800	DISTRESS, SAFETY AND CALLING				
17	76	156.825			x			
	<i>n</i>	156.850	156.850	x	x			
18	77	156.875		x				
	<i>m</i>	156.900	161.500		x	x	x	
19	78	156.925	161.525			x	x	
		156.950	161.550			x	x	
20	79	156.975	161.575			x	x	
		157.000	161.600			x	x	
21	80	157.025	161.625			x	x	
		157.050	161.650			x	x	
22	81	157.075	161.675			x	x	
		157.100	161.700			x	x	
23	82	157.125	161.725		x	x	x	
	<i>m</i>	157.150	161.750			x	x	
24	83	157.175	161.775		x	x	x	
	<i>m</i>	157.200	161.800			x	x	

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Channel Designator	Notes	Transmitting Frequencies (MHz)		Internships	Port Operations and Ship Movement		Public correspondence
		Ship Stations	Coast Stations		Single frequency	Two frequency	
84	<i>m</i>	157.225	161.825		x	x	x
25		157.250	161.850			x	x
85	<i>m</i>	157.275	161.875		x	x	x
26		157.300	161.900			x	x
86	<i>m</i>	157.325	161.925		x	x	x
27		157.350	161.950			x	x
87		157.375			x		
28		157.400	162.000			x	x
88		157.425			x		
AIS 1	<i>l</i>	161.975	161.975				
AIS 2	<i>l</i>	162.025	162.025				

NOTES REFERRING TO THE TABLE

General notes

- a. Administrations may designate frequencies in the inter-ship, port operations and ship movement services for use by light aircraft and helicopters to communicate with ships or participating coast station in predominantly maritime support operations under the conditions specified in Nos. S51.69, S51.73, S51.74, S51.75, S51.76, S51.77 and S51.78. However, the use of the channels which are shared with public correspondence shall be subject to prior agreement between interested and affected administrations.
- b. The channels of the present Appendix, with the exception of channels 06, 13, 15, 16, 17, 70, 75 and 76, may also be used for high speed data and facsimile transmissions, subject to special arrangement between interested and affected administrations.
- c. The channels of the present Appendix, but preferably channel 28 and with exception of channels 06, 13, 15, 16, 17, 70, 75 and 76, may be used for direct-printing telegraphy and data transmission, subject to special arrangement between interested and affected administrations.
- d. The frequencies in this table may also be used for radio communications on inland waterways in accordance with the conditions specified in No. S5.226.
- e. Administrations having an urgent need to reduce local congestion may apply 12.5 kHz channel interleaving on a non-interference basis to 25 kHz channels, provided:
 1. Recommendation ITU-R M.1084-2 shall be taken into account when changing to 12.5 kHz channels;
 2. It shall not affect the 25 kHz channels of the Appendix S18 maritime mobile distress and safety frequencies, especially the channels 6, 13, 15, 16, 17, and 70, nor the technical characteristics mentioned in Recommendation ITU-R M.489-2 for these channels;
 3. Implementation of 12.5 kHz channel interleaving and consequential national requirements shall be subject to prior agreement between the implementing administrations and administrations whose ship station or services may be affected.

Specific notes

- f. The frequency 156.300 MHz (channel 06) (see Appendix S13, Appendix S15 and S51.79) may also be used for communication between ship stations and aircraft stations engaged in coordinated search and rescue operations. Ship stations shall avoid harmful interference to such communications on channel 06 as well as to communications between aircraft stations, ice-breakers and assisted ships during ice seasons.
- g. Channels 15 and 17 may also be used for on-board communications provided the effective radiated power does not exceed 1 W, and subject to the national regulations of the administration concerned when these channels are used in its territorial waters.
- h. Within the European Maritime Area and in Canada these frequencies (channels 10, 67, 73) may also be used, if so required, by the individual administrations concerned, for communication between ship stations, aircraft stations and participating land stations engaged in coordinated
- i. search and rescue and anti-pollution operations in local areas, under the conditions specified in Nos. S51.69, S51.73, S51.74, S51.75, S51.76, S51.77 and S51.78.

CHAPTER 4 GUIDELINE ON THE USE OF VHF AT SEA <i>(Source : IMO Resolution A.954(23))</i>
4.1 VHF Communication technique
4.1.1 Preparation
Before transmitting, think about the subjects who have to be communicated and, if necessary, prepare written notes to avoid unnecessary interruptions and ensure that no valuable time is wasted on a busy channel.
4.1.2 Listening
Listen before commencing to transmit to make certain that the channel is not already in use. This will avoid unnecessary and irritating interference.
4.1.3 Discipline
VHF equipment should be used correctly and in accordance with the Radio Regulations. The following in particular should be avoided: 1) calling on channel 16 for purposes other than distress, urgency and very brief safety communications when another channel is available; 2) communications not related to safety and navigation on port operation channels; 3) non-essential transmissions, e.g. needless and superfluous signals and correspondence; 4) transmitting without correct identification; 5) occupation of one particular channel under poor conditions; and 6) use of offensive language.
4.1.4 Repetition
Repetition of words and phrases should be avoided unless specifically requested by the receiving station.
4.1.5 Power reduction
When possible, the lowest transmitter power necessary for satisfactory communication should be used.
4.1.6 Automatic Identification System (AIS)
AIS is used for the exchange of data in ship-to-ship communications and also in communication with shore-based facilities. The purpose of AIS is to help identify vessels; assist in target tracking; simplify information exchange (e.g. reduce verbal reporting); and provide additional information to assist situation awareness. AIS may be used together with VHF voice communications. AIS should be operated in accordance with resolution A.917 (22), as amended by resolution A.956 (23) on Guidelines for the onboard operational use of shipborne automatic identification systems (AISs).
4.1.7 Communications with coast stations
1) On VHF channels allocated to port operations service, the only messages permitted are restricted to those relating to the operational handling, the movement and the safety of ships and, in emergency, to the safety of persons; as the use of these channels for ship-to-ship communications may cause serious interference to communications related to the movement and safety of shipping in port areas.
2) Instructions given on communication matters by shore stations should be confirmed.
3) Communications should be carried out on the channel indicated by the coast station. When a change of channel is requested, this should be acknowledged by the ship.
4) On receiving instructions from a coast station to stop transmitting, no further communication should be made until otherwise notified (the coast station may be receiving distress or safety messages and any other transmissions could cause interference).
4.1.8 Communications with other ships
1) VHF channel 13 is designated by the Radio Regulations for bridge-to-bridge communications. The ship called may indicate another working channel on which further transmissions should take place. The calling ship should acknowledge acceptance before changing channels.
2) The listening procedure outlined in paragraph 1.2 should be followed before communications are commenced on the chosen channel.

4.1.9 Distress communications
<p>1) Distress calls/messages have absolute priority over all other communications. When receiving them all other transmissions should cease and a listening watch should be kept.</p> <p>2) Any distress call/message should be recorded in the ship's log and passed to the master.</p> <p>3) On receipt of a distress message, if in the vicinity, immediately acknowledge receipt. If not in the vicinity, allow a short interval of time to elapse before acknowledging receipt of the message in order to permit ships nearer to the distress to do so.</p>
4.1.10 Calling
<p>1) In accordance with the Radio Regulations channel 16 may only be used for distress, urgency and very brief safety communications and for calling to establish other communications which should then be conducted on a suitable working channel.</p> <p>2) Whenever possible, a working frequency should be used for calling. If a working frequency is not available, VHF channel 16 may be used for calling, provided it is not occupied by a distress and urgency call/message.</p> <p>3) In case of a difficulty in establishing contact with a ship or a coast station, allow adequate time before repeating the call. Do not occupy the channel unnecessarily and try another channel.</p>
4.1.11 Changing channels
If communications on a channel are unsatisfactory, indicate change of channel and await confirmation.
4.1.12 Spelling
If spelling becomes necessary (e.g. descriptive names, call signs, words that could be misunderstood) use the spelling table contained in the International Code of Signals, the Radio Regulations and the IMO Standard Marine Communication Phrases (SMCP).
4.1.13 Addressing
<p>The words "I" and "YOU" should be used prudently. Indicate to whom they refer.</p> <p>Example: "Seaship", this is Port Radar, Port Radar, do you have a pilot? Port Radar, this is Seaship, I do have a pilot."</p>
4.1.14 Watch keeping
Every ship, while at sea, is required to maintain watches (Regulation on Watches in Chapter IV of SOLAS, 1974, as amended). Continuous watch keeping is required on VHF DSC channel 70 and also when practicable, a continuous listening watch on VHF channels 16.
4.2 VHF Communication procedures
4.2.1 Calling
<p>When calling a coast station or another ship, say the name of that coast station once (twice if considered necessary in heavy radio traffic conditions) followed by the phrase "THIS IS" and the ship's name twice, indicating the channel in use.</p> <p>Example: CH16; "Port City, this is Seastar, Seastar, on Channel 14."</p>
4.2.2 Exchange of Messages
<p>1) When communicating with a ship whose name is unknown but whose position is known, that position may be used. In this case the call is addressed to "All ships". Example: "Hello all ships, this is Pastoria, Pastoria."</p> <p>2) Where a message is received and only acknowledgement of receipt is needed, say "received" Where a message is received and acknowledgement of the correct message is required, say "received, understood", and repeat message if considered necessary. Example: "Message: Your berth will be clear at 08.30 hours." Reply: Received, understood. Berth clears at 08.30 hours."</p>

4.2.2 Exchange of Messages *(Continued)*

3) Where appropriate, the following message should be sent:

"Please use/ I will use / the IMO Standard Marine Communication Phrases".

When language difficulties exist which cannot be resolved by use of the IMO Standard Marine Communication Phrases, the International Code of Signals should be used.

In this case, the word **"INTERCO"** should precede the groups of the International Code of Signals.

Example: "Please use/I will use/ the International Code of Signals".

4) Where the message contains instructions or advice, the substance should be repeated in the reply.

Example: "Message: Advise you pass astern of me.

Reply: I will pass astern of you."

5) If a message is not properly received, ask for it to be repeated by saying "Say again".

6) If a message is received but not understood, say "Message not understood".

7) If it is necessary to change to a different channel say "Change to channel" and wait for acknowledgement before carrying out the change.

8) During exchange of messages, a ship should invite a reply by saying "over".

9) The end of a communication is indicated by the word "out".

4.3 STANDARD MESSAGES

1) Since most ship-to-shore communications are exchanges of information, it is advisable to use standard messages which will reduce transmission time.

2) Commonly used standard messages are given in the IMO Standard Marine Communication Phrases (SMCP) which should be used whenever possible.

CHAPTER 5 RADIO COMMUNICATIONS
5.1 Radio Communications (1) <i>(Source: Chapter 11 TECHNIAL EQUIPMENT OF VTS SYSTEMS, IALA Manual Edition 6)</i>
VHF Radio communication is the primary means through which Vessel Traffic Services are delivered. It provides the VTSO with a means to deliver timely services and a real-time assessment of the situation in the VTS area.
The Maritime VHF band comprises a number of internationally defined channels which are used for voice and data communication. Most of the channels are used for voice communication; however, the potential expansion of VHF digital communications is increasing. Digital Selective Calling (DSC) and AIS already provide the means to exchange data such as VHF call handling, ship identification, positions and short messages. Digital communication has a number of advantages such as more efficient use of available bandwidth and less prone to errors. Developments in digital data exchange are expected to improve overall maritime communications capabilities.
At the World Radio Conference 2015 the International Telecommunications Union (ITU) identified 6 frequencies in the VHF maritime mobile band for the use of digital data transfer. These frequencies form part of the developing VHF Data Exchange System (VDES). With the ability to group the new frequencies together to provide a larger band for data transfer, the VDES will encompass AIS and provide enhanced digital data functionality in the future. IALA is working within an international framework to ensure the development of the VDES meets the needs of IALA members, which includes support for VTS use cases.

5.2 Radio Communications (2) <i>(Source: Chapter 8 Radio Communication in IALA Guideline 1111, Edition 1.0, May 2015)</i>
5.2.1 INTRODUCTION
Radio communication equipment is typically integrated into VTS applications to provide the VTSO with areal time assessment of the situation in the VTS area of responsibility as well as means to deliver timely services to VTS participants. Information collected and disseminated via this equipment can assist in assembling the traffic image and in supporting safe navigation of the VTS area.

5.2.2 DEFINITIONS AND REFERENCES
5.2.2.1 DEFINITIONS
For general terms used throughout this section, please, refer to references.
5.2.2.2 REFERENCES
<p>[1] Convention on Safety of Life at Sea (SOLAS) Chapter IV (Radio Communications).</p> <p>[2] Convention on Safety of Life at Sea (SOLAS) Chapter V (Safety of Navigation) – Regulation 12.</p> <p>[3] Convention on Safety of Life at Sea (SOLAS) Chapter V (Safety of Navigation) - Regulation 19.</p> <p>[4] IMO Resolution A.666 (17) Code on Alarms and Indicators (and MSC.39(63) Adoption of amendments to the Code on Alarms and Indicators.</p> <p>[5] IMO Resolution A.694 (17) General Requirements for Equipment forming Part of the Global Maritime Distress and Safety System (GMDSS) and for Electronic Navigational Aids.</p> <p>[6] IALA World Maritime Radio Communications Plan.</p> <p>[7] IEC 60945 Maritime navigation and radio communication equipment and systems (General requirement, methods of testing and required test results.</p> <p>[8] IEC 61162 - Digital Interfaces for Navigation Equipment within a Ship.</p> <p>[9] ETSI EN301 929 2 v1.2.1 - Electromagnetic compatibility and radio spectrum matters (ERM): VHF transmitters and receivers as Coast Stations for GMDSS and other applications in the maritime mobile service.</p> <p>[10] ITU - R M.493 - 11 - Digital selective - calling system for use in the maritime mobile service.</p> <p>[11] ITU - R M.541 - 9 - Operational procedures for the use of Digital Selective Calling equipment in the Maritime Mobile Service.</p>

5.2.2.2 REFERENCES (Continued)

- [12] ITU - R M.689 - 2 - International maritime VHF radiotelephone system with automatic facilities based on DSC signaling format.
- [13] ITU - R M.1082 - 1 - International maritime MF/HF radiotelephone system with automatic facilities based on DSC signaling format.
- [14] ITU - R M.1084 - 5 - Interim solutions for improved efficiency in the use of the band 156 - 174 MHz by stations in the maritime mobile service.
- [15] ITU - R M.1842 - 1 - Characteristics of VHF radio systems and equipment for the exchange of data and electronic mail in the maritime mobile service.
- [16] IMO Resolution A.801(19) – Provision of Radio Services for the GMDSS.

5.2.3 CHARACTERISTICS OF RADIO COMMUNICATION EQUIPMENT

Radio communications links are used to collect position, safety, and general information from shipboard personnel and remote sensing devices. These links are also the primary means through which services are delivered to VTS participants.

5.2.3.1 COVERAGE

Radio communication equipment is adapted to guarantee the coverage of the GMDSS [16]:

- ✓ Area A1 - Within range of VHF coast stations with continuous DSC (digital selection calling) alerting available (about 20-30 nautical miles);
- ✓ Area A2 - Beyond area A1, but within range of MF coastal stations with continuous DSC alerting available (about 100 nautical miles);
- ✓ Area A3 - Beyond the first two areas, but within coverage of geostationary maritime communication satellites (in practice this means INMARSAT). This covers the area between roughly 70°North and 70°South. A
- ✓ Area A4 - The remaining sea areas. The most important of these is the sea around the North Pole (the area around the South Pole is mostly land). Geostationary satellites, which are positioned above the equator, cannot reach this far.

5.2.3.2 VTS RADIO COMMUNICATION

VTS radio communication comprises both voice and data services and potentially video applications using equipment consistent with the GMDSS Sea Areas indicated above.

5.2.3.2.1 Very High Frequency (VHF)

The Maritime VHF band comprises a number of channels within the frequency range of 156 MHz to 162.025 MHz. These are mainly used for voice communication except channel 70 (DSC) and the channels allocated specifically for AIS. The VTS Authority may require VHF Channels to be designated / licensed by the National Radio Authority for specific types of operations (e.g. Coast Station Radio License) Specific channels are determined to provide safety watch, DSC and VTS information.

The VHF equipment should comply with national and international regulations, particularly with the Master Plan of shore based facilities for GMDSS. The use of simplex, duplex and semi-duplex channels as well as 25 kHz channels can be used in accordance with the appropriate ITU-R and national regulations. Additionally, 12.5 kHz channels are also allowed under Appendix 18 of the Radio Regulations in accordance with ITU- R M.1084 [14].

VTS Centres require a means of clear and easy to use voice communication for interacting with ships. Within the VHF band, the VTS Centre will require the availability of a number of radio channels relative to the number of ship movements and the size of the VTS area. In addition to distress calling, DSC provides a means of direct calling to vessels through the use of the MMSI and other routine call functions.

5.2.3.2.1 Very High Frequency (VHF) (Continued)
As it evolves, e- will rely more and more on data communication between ship and shore. Such data communication between ship and shore or ship to ship can be implemented within the VHF Marine Band in accordance with ITU-R M.1842-1 [15].
Navigation Following the introduction of this regulation, it is anticipated that a digital infrastructure over Maritime VHF will become available.

5.2.4 OPERATIONAL REQUIREMENTS
5.2.4.1 RADIO COMMUNICATIONS COVERAGE
The VTS Authority should ensure that the VTS radio infrastructure provides adequate coverage for the VTS area. VHF radio reception is generally dependent upon the line of sight distance between VTS receive site and the ship antenna heights. As a minimum requirement, the radio communications range should facilitate VTS ship communications before the ship enters a VTS area of responsibility.

5.2.4.2 RECORDING AND PLAYBACK OF DATA
The VTS Authority should have the facility to automatically record radio communications and play back these recordings in synchronisation with the recorded traffic situation.

5.2.5 FUNCTIONAL REQUIREMENTS
Shipborne equipment should meet the functional requirements of the relevant IMO performance standards and the ITU- Radio Regulations (see Section 8.2). Shore based equipment should also conform to the appropriate local technical standards.
5.2.5.1 DIGITAL SELECTIVE CALLING
Routine calls using DSC can be initiated by the VTS in order to direct a VHF call to a specific vessel through MMSI based addressing. DSC is a standard feature of the GMDSS. The use of DSC makes more efficient use of the available bandwidth. In addition, DSC is also used for distress calling. Further details are provided in ITU - R M.541 - 9 and ITU - R M.689 - 2.
5.2.5.2 MALFUNCTIONS, WARNINGS, ALARMS AND INDICATIONS
Please refer to the relevant requirements of IMO Resolution A.686 (17).

(Reference) OPERATION OF RADIO EQUIPMENT	
(Source: Extracted IMO Resolution A.803(19) amended in 1998)	
1 INTRODUCTION	
The VHF radio installation, in addition to meeting the requirements of the Radio Regulations, the relevant ITU-R Recommendations and the general requirements set out in resolution A.694(17), should comply with the following performance standards.	
2 GENERAL	
2.1	The installation, which may consist of more than one piece of equipment, should be capable of operating on single-frequency channels or on single- and two-frequency channels.
2.2	The equipment should provide for the following categories of calls using both voice and digital selective calling (DSC): <ol style="list-style-type: none"> 1) distress, urgency and safety; 2) ship operational requirements; and 3) public correspondence.
2.3	The equipment should provide for the following categories of communications using voice: <ol style="list-style-type: none"> 1) distress, urgency and safety; 2) ship operational requirements; and 3) public correspondence.

2 GENERAL (Continued)	
2.4	The equipment should comprise at least: 1) a transmitter/receiver including antenna; 2) an integral control unit or one or more separate control units; 3) a microphone with a press-to-transmit switch, which may be combined with a telephone in a handset; 4) an internal or external loudspeaker; 5) an integral or separate digital selective calling facility; and 6) a dedicated DSC watch keeping facility to maintain a continuous watch on channel 70.
2.5	The installation may also include additional receivers.
2.6	A distress alert should be activated only by means of a dedicated distress button. This button should not be any key of an ITU-T digital input panel or an ISO keyboard provided on the equipment.
2.7	The dedicated distress button should: 1) be clearly identified; and 2) be protected against inadvertent operation.
2.8	The distress alert initiation should require at least two independent actions.
2.9	The equipment should indicate the status of the distress alert transmission.
2.10	It should be possible to interrupt and initiate distress alerts at any time.

3 CLASS OF EMISSION, FREQUENCY BANDS AND CHANNELS	
3.1	The equipment may be designated for operation on one or more channels selected from and in accordance with Appendix 18 of the Radio Regulations.
3.2	The radiotelephone facility should be capable of operating as follows: 1) in the band 156.3 MHz to 156.875 MHz on single-frequency channels as specified in Appendix 18 to the Radio Regulations; and 2) in the band 156.025 MHz to 157.425 MHz for transmitting and the band 160.625 MHz to 162.025 MHz for receiving on two-frequency channels as specified in Appendix 18 to the Radio Regulations. 3) The digital selective calling facility should be capable of operating on channel 70. 4) Class of emission should comply with Appendix 19 of the Radio Regulations.

4 CONTROLS AND INDICATORS	
4.1 General	
4.1.1	Change of channel should be capable of being made as rapidly as possible, but in any event within 5 s.
4.1.2	The time taken to switch from the transmit to the receive condition, and vice versa, should not exceed 0.3 s.
4.1.3	An on/off switch should be provided for the entire installation with a visual indication that the installation is switched on.
4.1.4	A visual indication that the carrier is being transmitted should be provided.
4.1.5	The equipment should indicate the channel number, as given in the Radio Regulations, to which it is tuned. It should allow the determination of the channel number under all conditions of external lighting. Where practicable, channels 16 and 70 should be distinctively marked.
4.1.6	Control of the equipment should be possible at the position from which the ship is normally navigated. Control from that position should have priority if additional control units are provided. When there is more than one control unit, indication should be given to the other units that the equipment is in operation.

4 CONTROLS AND INDICATORS	
4.1 General (Continued)	
4.1.7	The equipment should not be able to transmit during a channel switching operation
4.1.8	Operation of the transmit/receive control should not cause unwanted emissions.

4.2 Radiotelephone facility	
4.2.1	Provision should be made for changing from transmission to reception by use of a press-to-transmit switch. Additionally, facilities for operation on two-frequency channels without manual control may be provided.
4.2.2	The receiver should be provided with a manual volume control by which the audio output may be varied.
4.2.3	A squelch (mute) control should be provided on the exterior of the equipment.

5 PERMISSIBLE WARMING-UP PERIOD	
The equipment should be operational within 1 min of switching on.	
6 SAFETY PRECAUTIONS	
The equipment, when operating, should not be damaged by the effects of open-circuited or short-circuited antenna terminals.	
7 TRANSMITTER OUTPUT POWER	
7.1	The transmitter output power should be between 6 and 25 W.
7.2	Provision should be made for reducing the transmitter output power to a value of between 0.1 and 1 W. However, this reduction of the power is optional on channel 70.
8 RECEIVER PARAMETERS	
8.1	Radiotelephone facility The sensitivity of the receiver should be equal to or better than 2 μ V e.m.f. for a signal-to-noise ratio of 20 dB.
8.2	Digital selective calling facility With a DSC modulated input signal having a level of 1 μ V e.m.f. to its associated VHF receiver, the DSC equipment should be capable of decoding the received message with a maximum permissible output character error rate of 10 ⁻² .
8.3	Immunity to interference The immunity to interference of the receiver should be such that the wanted signal is not seriously affected by unwanted signals.
9 ANTENNA SYSTEM	
The VHF antenna or antennae should be vertically polarized and, as far as practicable, be omnidirectional in the horizontal plane. The installation should be suitable for efficient radiation and reception of signals at the operating frequencies.	

10 LOUDSPEAKER AND TELEPHONE HANDSET (radiotelephone facility)	
10.1	The receiver output should be suitable for use with a loudspeaker or a telephone handset. The audio output should be sufficient to be heard in the ambient noise level likely to be encountered on board ships.
10.2	It should be possible to switch off the loudspeaker without affecting the audio output of the telephone handset, if provided.
10.3	In the transmit condition during simplex operation, the output of the receiver should be muted.
10.4	In the transmit condition during duplex operation, only the telephone handset should be in circuit. Care should be taken to prevent any electrical or acoustic feedback, which could cause singing.

11 DIGITAL SELECTIVE CALLING FACILITY	
11.1	The facility should conform to the provisions of the relevant ITU-R Recommendations pertaining to the DSC system.
11.2	The DSC facility should comprise: .1 means to decode and encode DSC messages; .2 means necessary for composing the DSC message; .3 means to verify the prepared message before it is transmitted; .4 means to display the information contained in a received call in plain language; .5 means for the manual entry of the position information; additionally, automatic entry may be provided; and .6 means for the manual entry of the time at which the position was determined;
11.3	Distress message storage
11.3.1	If the received messages are not printed immediately, sufficient capacity should be provided to enable at least 20 received distress messages to be stored in the DSC facility.
11.3.2	These messages should be stored until readout.
11.4	It should be possible to initiate and make distress and safety calls from the position from which the ship is normally navigated. The means for initiating a distress call should be as prescribed in 2.6.
11.5	Initiation of DSC distress calls should supersede any other operation of the facility.
11.6	Self-identification data should be stored in the DSC unit. It should not be possible for the user easily to change these data.
11.7	Means should be provided to enable routine testing of the DSC facilities without radiation of signals
11.8	Provision should be made for: .1 a specific aural alarm and visual indication to indicate receipt of a distress or urgency call or a call having distress category. It should not be possible to disable this alarm and indication. Provision should be made to ensure that they can be reset only manually; and .2 aural alarms and visual indication for calls other than distress and urgency.
12 POWER SUPPLY	
The VHF radio installation should be powered from the ship's main source of electrical energy. In addition, it should be possible to operate the VHF installation from an alternative source of electrical energy.	



*Project on Enhancing of Vessel Traffic Service System
Management Capability Phase 2*

TEXT Book-7 (Module-7)

“PERSONAL ATTRIBUTES”



Text Book for Vessel Traffic Services “PERSONAL ATTRIBUTES”



IALA V-103-1 Model-Course



INTERNATIONAL COOPERATION AGENCY





JAPAN AIDS TO NAVIGATION ASSOCIATION (JANA)

Project on Enhancing of Vessel Traffic Service System Management Capability Phase 2

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Chapter 1 PERSONAL ATTRIBUTES		
MODULE 7 (From Recommendation V-103/1)		
1.1 INTRODUCTION		Keyword
Instructors for this module should have experience of human relationships in the VTS field. In addition, instructors of other modules should continuously monitor the personal attributes of trainees and, when appropriate, draw their attention to the need to meet the learning objectives of this module.		<ul style="list-style-type: none"> • <i>human relationships</i> • <i>personal attributes</i>
1.2 SUBJECT FRAMEWORK		
1.2.1 Scope		
This syllabus addresses the requirement for VTS Operators to perform their duties properly under all conditions including emergencies and stressful situations. It is recommended that the contents of this module be presented to the trainees in the early stages of the course.		<ul style="list-style-type: none"> • <i>perform their duties</i> • <i>emergencies</i> • <i>stressful situations</i>
1.2.2 Aims		
On completion of the course trainees will have the knowledge and ability to conduct their duties in a manner which conforms to accepted principles and procedures established by the Competent Authority concerned.		<ul style="list-style-type: none"> • <i>duties in a manner</i> • <i>principles and procedures</i>
1.3 SUBJECT OUTLINE OF MODULE 7		
Subject Area (Recommended hours 10)		Keyword
Interaction with others and human relation skills	Public relations, Establishing and sustaining a good working with VTS stakeholders and negotiations with VTS stakeholders Successful conflict resolution and team working skills	<ul style="list-style-type: none"> • <i>stakeholders</i> • <i>negotiations</i> • <i>negotiations</i> • <i>team working skills</i>
Responsibility and reliability	Safety awareness and Health awareness Timekeeping and Concentration Importance of maintaining the trust of all VTS stakeholders	<ul style="list-style-type: none"> • <i>Safety</i> • <i>Health</i> • <i>Timekeeping</i> • <i>Trust</i>

<i>human relationships</i>	
<p><i>An interpersonal relationship is a strong, deep, or close association or social contact between two or more people that may range in duration from brief to permanent. This association may be based on suggestion, team spirit, regular business interactions or some other type of social promise. Interpersonal relationships are formed in the situation of social, cultural and other influences. The situation can and may and perhaps will vary from family or connection relations, friendship and relations with associates, work, clubs, neighborhoods, and places of respect. They may be regulated by law, custom, or mutual agreement, and are the basis of social groups and society as a whole.</i></p>	
<i>Personal attributes, Stressful situations, Duties in a manner</i>	
<p><i>An attribute is a quality or characteristic of a person, place or thing. Personal attributes are character or personality.</i></p>	
<p><i>Stressful situations: Good pressure, such as having a lot of assignments to work on, or an upcoming deadline, helps me to stay motivated and productive. Of course, there are times when too much pressure can lead to stress;</i></p>	
<p><i>We expect all employees and entities to work together in a respectful and open manner</i></p>	
<i>stakeholders</i>	
<p><i>A person, group or organization that has interest or concern in an organization. Stakeholders can affect or be affected by the organization's actions, objectives and policies.</i></p>	
	

1.4 DETAILED TEACHING SYLLABUS OF MODULE 7	
Interaction with others and human relation skills	
Have the knowledge and ability to conduct their duties in a manner which conforms to accepted principles and procedures.	
Describe public relations policy	<ul style="list-style-type: none"> • General introduction to the maintenance of good public relations. • The media and press and their requirements. • Information that can be provided to others and the manner of its release. • Dealing with traumatized individuals.
Describe how to establish and sustain working relationships	Importance of maintaining the trust of all <i>VTS stakeholders, Ship masters, Pilots Other authorities and organizations, Allied services and Other services, both Internal and External.</i>
Identify methods of conflict resolution	When and how to interfere both <i>Internal and External</i>
Describe the benefits of team working skills	Characteristics of leaders and followers: Adaptability/ flexibility: Negotiation Ability to analyze the role of VTS: Decision making process, <i>Taking initiative Prioritizing tasks, Thinking critically, Communicating with team members and Assertiveness.</i>

Responsibility and reliability	
Explain the role of health and safety performing the VTS mission	Personal safety: Safety of VTS stakeholders Personal health: <i>Causes of stress, Managing work related stress, Managing personal stress and Substance abuse (taking advantage or mishandling)</i>
Refer to the reasons for time management	<i>Relief of watch, Planning, Reducing fatigue</i>
Describe how professionalism and mission focus is important	<i>Working climate, Team spirit, Awareness of personal circumstances</i>



YOU WILL RESPECT YOUR NATIONAL AUTHORITY! VTS AUTHORITY!



MANAGER

The VTS Manager is responsible for managing and co-ordinating the activities of the VTS centre. In some cases, a VTS Manager may have the responsibility for more than one VTS centre



SUPERVISOR

The VTS Supervisor is responsible for assisting, managing and/or co-ordinating the operational activities of the VTS Operators.



OPERATOR

The key person in any VTS operation is the VTS Operator, who is responsible for establishing and maintaining a vessel traffic image, which will enable interaction with the vessel traffic.

What does personal attributes mean and why are they important?

Best Answer - Chosen by Voters

Personal attributes basically means characters that make up your personality, which define who you are as a person.

For example these could be personal attributes to describe someone: outgoing, friendly, open. They are important because they are what makes you who you are, what other people find in you that they may like or dislike.



CHAPTER 2 VTS PERSONNEL (From VTS Manual 2016)			
2.1 Introduction			
VTS Operators Ship Masters and Watchkeeping personnel Pilots	share	responsibility for good communications effective co-ordination understanding of each other's role	For safe conduct of vessels in VTS areas.
They are all part of a team and share the same objective with respect to the safe movement of vessel traffic.			
Depending on the size and complexity of the VTS area, service type provided as well as traffic volumes and densities, a VTS centre includes VTS Operators, VTS Supervisors and a VTS Manager. It is for the Competent/VTS Authority to determine the appropriate levels in order to meet its obligations and to ensure that appropriately trained and qualified personnel are available.			
VTS Authorities should develop detailed job descriptions for VTS personnel at each VTS centre, based on the service type(s) to be provided, the equipment available and the co-ordination needed with other internal departments and allied services.			
Examples of job descriptions are shown in 'Roles and Responsibilities' below. These job descriptions can be expanded as necessary.			

2.2 Roles and Responsibilities
2.2.1 VTS Operator
The key person in any VTS operation is the <i>VTS Operator</i> , who is responsible for establishing and maintaining a vessel traffic image, which will facilitate interaction with the vessel traffic thus ensuring the safety of navigation within the VTS area of responsibility. The VTS Operator is also required to decide on actions to be taken in response to developing traffic situations.
The job description for the VTS Operator should include the aims and objectives of the operational work carried out by the Operator, the tasks and responsibilities involved together with the skills and knowledge required to carry out the work efficiently and effectively.

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2.2.1 VTS Operator (Continue)	
The following list provides examples of activities carried out by a VTSO:	
Maintain	situational awareness and monitor the vessel traffic image with all available sensors within the area of responsibility
	communication with ships as appropriate to the service type provided by the VTS using all available communication facilities
Operate	equipment for communications, data collection, data analysis and establishment of a vessel traffic image
Information Service (INS)	Provide relevant information at appropriate times
Traffic Organization Service (TOS)	Organise and plan the vessel traffic movements within a waterway to prevent congestion, groundings, collisions and other dangerous situations
Navigational Assistance Service (NAS)	Assist and provide such information as may be required to aid a ship in difficult navigational or meteorological circumstances or in case of defects or deficiencies. NAS may be given on request by a vessel or when deemed necessary by the VTS
Communicate	with allied services and other agencies as appropriate
Ensure	all adopted SOP and relevant waterway regulations are followed to
Take appropriate actions	in emergency situations and other special circumstances defined for the VTS area.
Maintain a log	All incidents/accidents and all other relevant events occurring within the area of responsibility.

2.2.2 VTS Supervisor	
The VTS Authority establishes the post of VTS Supervisor. The VTS Supervisor is responsible for managing and/or co-ordinating and assisting the operational activities of the VTS Operators. A VTS Supervisor should hold a current VTS Operator qualification together with the appropriate endorsements.	
The job description for the VTS Supervisor	should include the aims and objectives of the operational work carried out by the Supervisor.
The tasks and responsibilities	Involved together with the skills and knowledge required to carry out the work efficiently and effectively.
The job description	Should clearly state the management responsibilities delegated by the VTS Authority or Manager.
Detailed job descriptions	VTS Authorities should develop for VTS Supervisors, based on the services to be provided. VTS Supervisor includes the following activities
Supervising	VTS Operators;
Ensuring that	proper co-ordination takes place between the VTS, allied and emergency services; the service provided meets the requirements of both the stakeholders and the VTS Authority;
	a log of all incidents/accidents occurring within the area of responsibility is maintained;
Assisting	in training and assessing the VTS Operators as defined by the VTS Authority and/or VTS Manager;
Performing	administrative tasks as defined by VTS Manager;
In the absence of a VTS Manager, ensuring that the duties and activities normally carried out by the Manager.	

2.2.3 VTS Manager	
The VTS Authority establishes the post of a VTS Manager. The VTS Manager is responsible for managing and co-ordinating the activities of the VTS centre on behalf of the VTS Authority. The VTS Manager also possesses a VTS Operator/Supervisor qualification.	
Basic knowledge of VTS functions and the tasks are beneficial to good management. It is important for the VTS Manager to understand the needs of stakeholders and vessels using the VTS and to determine their requirements and expectations.	
VTS Authorities should develop detailed job descriptions for VTS Managers, to reflect the services provided by the VTS centre. In addition to having knowledge of the job description for the VTS Manager includes the following responsibilities:	
Ensuring that	the aims and objectives of the VTS are met at all times;
	all VTS operations follow current rules, regulations and legislation;
	the standards set by the Competent/VTS Authority for operator qualifications and training are met – and that the training programme is in compliance with the safety and quality management system for the VTS;
	the training and certification of VTS Operators and Supervisors are appropriate to the service types being provided;
	all adopted standard operating procedures are reviewed and amended as required
	any such events are properly recorded and readily available for examination by the Competent/VTS Authority
Maintaining	awareness of continuing development for the VTS centre(s);
	a safe working environment by, for instance: <ul style="list-style-type: none"> • Establishing safety awareness; • Promoting the Safety Culture of the VTS (or overarching organisation).
• Developing and maintaining	a Quality Management System and ensuring that periodic assessments and if relevant, certifications, are being performed
	a good public information and relations programme;
• Managing and coordinating	financial, technical and human resources;
• Planning and developing emergency procedures as appropriate to the VTS area of responsibility;	
• Being prepared to provide evidence in the event of incidents or accidents occurring in the VTS area	

2.2.4 On-the-Job Training Instructor (OJT Instructor)	
The VTS Authority should ideally provide for an OJT Instructor who is responsible for managing and coordinating the OJT for the VTS Operator or VTS Supervisor.	
The OJT Instructor should have the basic skills and appropriate instructional techniques in order to be able to fulfil the training requirements as defined in IALA Recommendation V-103 and Model Course V-103/4. The OJT Instructor should be fully conversant with the processes and procedures required to meet the OJT requirements of the VTS centre in which the training takes place.	
The job description for the OJT Instructor should include the aims and objectives of the operational work carried out by the instructor, the tasks and responsibilities involved together with the skills and knowledge required to carry out the work efficiently and effectively.	
The job description for the OJT Instructor includes the following activities:	
Prepare and provide	The OJT programme taking into account the requirements of the Competent Authority
Review and update	the contents of the OJT programme
Assess	the trainee's personal ability and adapt the OJT programme accordingly
Continuously monitor and assess	the trainee's progress and document this in the trainee's task book
Provide feedback	about the trainee's performance to the VTS Supervisor and/or Manager
Report	all pre-OJT training deficiencies to the VTS Supervisor and/or Manager.

2.3 Technical Support Personnel


The VTS Authority uses internal technical personnel and/or external technical service providers for support and/or maintenance regarding VTS equipment. The VTS Authority should also be mindful of the need to include emergency 24 hours cover.


2.3.1 Internal technical personnel


The job description for the own technical support personnel should include the aims and objectives of the technical work carried out as well as the tasks and responsibilities involved together with the skills and knowledge required to carry out the work efficiently and effectively.

2.3.2 External technical service providers

The VTS Authority should ensure that the external technical service providers have the necessary skills and knowledge required to carry out the work efficiently and effectively.

CHAPTER 3 Personal attributes Elements	
From: "Port Skills and Safety". <i>London ECIM 6EZ</i>	
3.1 Working with others	
This element concerns the ability of VTS Operators to work effectively and co-operatively with others. Also to build effective team-working skills.	
<ul style="list-style-type: none"> • Other VTS Operators, personnel in the VTS Centre or adjacent VTS Centres. • Masters and/or watch keeping officers on participating vessels. • Pilots on participating vessels. • Allied services. • Port services. • Other VTS Stakeholders. 	

3.2 Personal interaction and human relations	
This element concerns the ability of VTS Operators to form good relations, negotiate and resolve conflicts with stakeholders.	



3.3 Responsibility	
This element concerns the ability of VTS Operators to identify the need for safety awareness, personal health (including mental and physical fatigue), timekeeping, attentiveness and compliance with the relevant health and safety at work regulations.	

3.3.1 Excessive stress may be indicated by:		
<ul style="list-style-type: none"> • Tunnelling of attention. • Reduced flexibility of approach. 	<ul style="list-style-type: none"> • Loss of situational awareness. • Poor decision-making. 	<ul style="list-style-type: none"> • Ignoring others.

3.3.2 Mental and/or physical fatigue may be indicated by:		
<ul style="list-style-type: none"> • Excessive tiredness. • Stress symptoms. • Satisfaction with lower level of performance. 	<ul style="list-style-type: none"> • Irritability. • Failure to correct errors. • Decreased powers of concentration. 	


3.3.3 Factors that affect attention include:		
<ul style="list-style-type: none"> • Background noise or chatter. • Routine jobs or low workload that induce boredom. • Interruption by other simultaneous tasks. 	<ul style="list-style-type: none"> • Fatigue. • Morale. • Substance abuse. 	

3.3.4 Concentration may be affected by:		
<ul style="list-style-type: none"> • Boredom. • Stress. 	<ul style="list-style-type: none"> • Previous and future tasks. • Fitness. 	<ul style="list-style-type: none"> • Distractions.

3.4. Respond to the needs of team members	
This element concerns the ability of VTS Operators to respond promptly to the needs of, monitor the performance of, and provide assistance to team members.	
<ul style="list-style-type: none"> • Providing fatigue relief. • Sharing the workload. • Requesting assistance from team members. 	

3.5. Ensure workload is within individual capabilities		
This element concerns the ability of VTS Operators to ensure that the workload is within individuals' capabilities, monitor the workload, give assistance where necessary and identify variations and deviations in tasks.		
Medical condition.	Medicines.	Fatigue.
Stress.	Shift work.	Substance abuse.

3.6. Improving own learning and performance	
This element concerns the ability of VTS Operators to agree and meet targets, take responsibility for learning and review progress.	
Identifying individual aims and desires.	Goal setting.
Time management.	

3.7. Problem solving	
This element concerns the ability of VTS Operators to explore a complex problem and come up with solutions, plan and implement at least one option for solving a problem, and apply agreed methods to check if a problem has been solved.	

3.7.1 Provide at least two examples of meeting the standard For 3.7.2, 3.7.3 and 3.7.4.	SAMPLE
<p><u>Health and Safety</u></p> <ul style="list-style-type: none"> Hazards and risks of the workplace affecting people and the environment. How to make and apply decisions based on the assessment of risk. How to apply practices that maximise the health, safety and welfare of yourself and others in the workplace. 	<i>Workplace make and apply decisions</i>
<p><u>Organisational</u></p> <ul style="list-style-type: none"> Applicable legislation. Record systems and their use. Sources and availability of information. Job description/specification. 	<i>Legislation. Record systems</i>
<p><u>Technical/theoretical</u></p> <ul style="list-style-type: none"> Problem solving methodology. Clarity and organisation of communication – oral and written. Portfolio development. Continuous professional development. Lifelong learning. 	<i>solving methodology oral and written Portfolio</i>
<p><u>In identifying problems and options:</u></p> <ul style="list-style-type: none"> Identify when there is a problem and describe its main features (e.g. focus on different parts of the problem, check if the problem changes at different times or places). Identify how you will know that the problem has been solved (e.g. how will you tell if something is working well, or a service meets the STANDARDS expected). 	<i>problem and describe its main features</i>

3.7.2 Identify a problem and come up with two options for solving it.
<p><u>Evidence must show you can:</u></p> <ul style="list-style-type: none"> Identify the problem, accurately describing its main features and how to show success in solving it. Come up with different ways of tackling the problem. Decide which options have a realistic chance of success, using help from others when appropriate.

3.7.3 Plan and try out at least one option for solving the problem, obtaining support and making changes to your plan when needed. Evidence must show that you can:
<ul style="list-style-type: none"> • Confirm with an appropriate person the option you will try for solving the problem and plan how to carry it out. • Use your plan, organising the relevant tasks and making changes to your plan when needed when needed. • Obtain and effectively use any support needed.

3.7.4 Check if the problem has been solved by applying given methods, describe results and explain your approach to problem solving. Evidence must show you can:
<ul style="list-style-type: none"> • Check if the problem has been solved by accurately applying the methods you have been given.

Chapter 4 From Standard Operation procedure	
CHAPTER III IMPLEMENTATION OF VTS	
Article 5	Conformation
1) Vessel Traffic Service (VTS) Station is managed by personnel consisting of 1 (one) VTS Manager, 1 (one) or more VTS Supervisor, and 1 (one) or more VTS Operator.	
2) Personnel in a Vessel Traffic Service (VTS) Station must meet the requirements of education, skills and health.	
3) VTS Manager is appointed by relevant authority of VTS station and must be provided by training which is related with aspects of VTS to be able to handle responsibilities and task assigned.	
4) VTS Manager as referred to in paragraph (1) above has the responsibilities:	
a. Ensure the Vessel Traffic Service (VTS) station which is under its management have sufficient resources to give services as determined by National Competent Authority; and	
b. Realizing and developing the opportunity to improve the services that could be given by the VTS station management.	
5) VTS Supervisor as referred to in paragraph (1) above has responsibilities:	
a. To supervise activities which are implemented in the Vessel Traffic Service (VTS) Station that under its responsibility in accordance with kind of services which has been determined for station referred.	
b. To supervise the group that responsible to implement the Vessel Traffic Service (VTS) services to fulfill provision of authority station and meet needs of ships and other users.	
c. Ensure the fulfillment of standard that determined by Station Authority about the continuity of operator qualification.	
d. Ensure the sustainability of coordination between intended station, other cooperation services, facilities and other port services.	
6) VTS Operator as referred to in paragraph (1) above has responsibilities:	
a. Provide information and instruction which has been given by authorized to ships (and allied services) in accordance with kind of services that determined on Vessel Traffic Service (VTS) station intended also (do) decide actions that should be taken in response to shipping traffic data which has been received.	
b. To communicate with ships as required in the work area on the region of the scope of work Vessel Traffic Service (VTS) station intended.	

<p>ANEX 1 BOSTON UNIVERSITY PERFORMANCE ASSESSMENT FOR EMPLOYEES REPRESENTED BY LOCAL 2324, UAW</p>
<p>PURPOSE OF PERFORMANCE ASSESSMENTS</p>
<p>The written performance appraisal is a formal assessment of your job performance based on performance expectations previously identified and shared with you. Informal and formal performance assessment is an on-going aspect of effective management and communication and the written performance appraisal should not replace the day to day communication of expectations.</p>
<p>1. JOB KNOWLEDGE</p>
<p>The extent to which you understand your position duties and responsibilities and adhere to the policies and the procedures of the department.</p>
<p><u>Exceptional: (Excellent)</u> You demonstrate a superior and comprehensive knowledge and understanding of the applicable skills, tasks, and the use of equipment/software required of the position. In addition, you always take the initiative to expand your knowledge of the position and adhere to the policies and procedures of the department and the University.</p>
<p><u>Exceeds Expectations:</u> You demonstrate a thorough knowledge and understanding of the applicable skills, tasks, and the use of equipment/software required of the position. In addition, you regularly seek to increase or expand your position knowledge. You adhere to the policies and procedures of the department and the University.</p>
<p><u>Meets Expectations:</u> You consistently demonstrate sufficient knowledge and understanding of the applicable skills, tasks and the use equipment/software required of the job classification to complete your assigned duties in an accurate and proficient manner. You consistently adhere to the policies and procedures of the department and the University.</p>
<p><u>Below Expectations:</u> You exhibit deficiencies in your knowledge and understanding of the applicable skills, tasks, and the use equipment/software required of the job classification to the degree that it impairs your ability to consistently perform in an accurate and proficient manner. You fail to consistently adhere to the policies and procedures of the department and the University.</p>
<p><u>Unacceptable:</u> Your knowledge and understanding of the applicable skills, tasks, and abilities to use equipment/software required of the position is deficient to the extent that you are unable to perform the essential duties of the job. You do not adhere to the policies and procedures of the department and the University.</p>

<p>2. QUALITY OF WORK & PRODUCTIVITY</p>
<p>Extent to which your work is thorough, effective, timely and accurate, and of appropriate volume.</p>
<p><u>Exceptional:</u> You are always thorough, accurate, efficient and meticulous in performing your job duties, and adhere to all prescribed departmental/university policies & procedures. You always produce the volume of work necessary to meet or exceed the University's operational objectives.</p>
<p><u>Exceeds Expectations:</u> You are always accurate, efficient and detail oriented, and comply with prescribed departmental / university policies and procedures; you efficiently utilize work time in a way that meets the University's operational objectives and consistently permits the completion of assignments in a timely manner.</p>
<p><u>Meets Expectations:</u> You are consistent accurate and efficient in performing position duties, and almost always comply with prescribed departmental/university policies and procedures; you almost always perform the volume of work necessary to meet or exceed the University's operational objectives.</p>

2. QUALITY OF WORK & PRODUCTIVITY (Continue)
Extent to which your work is thorough, effective, timely and accurate, and of appropriate volume.
<u>Exceptional:</u> You are always thorough, accurate, efficient and meticulous in performing your job duties, and adhere to all prescribed departmental/university policies & procedures. You always produce the volume of work necessary to meet or exceed the University's operational objectives.
<u>Below Expectations:</u> You are not accurate, efficient, or detail oriented, and often fail to comply with prescribed departmental/university policies and procedures; your inefficient use of work time often results in an inability to complete assignments in a timely manner.
<u>Unacceptable:</u> You are careless or inattentive to the details of the job responsibilities; you do not make effective or efficient use of your time; you rarely follows prescribed departmental/university policies and procedures; you regularly fail to complete routine assignments in a timely manner.
Comments:

3. DECISION MAKING & PROBLEM SOLVING
Extent to which you demonstrate sound judgment in making position-related decisions and solving problems; gather and analyze relevant data, develop and implement constructive solution.
<u>Exceptional:</u> You always make excellent position related decisions and successfully solve problems independently. When making decisions, you always demonstrate an exemplary ability to process information and implement solutions
<u>Exceeds Expectations:</u> You regularly make sound position related decisions and solve problems independently. When making decisions, you always demonstrate the ability to process information and implement solutions.
<u>Meets Expectations:</u> You make sound position related decisions or solve problems without assistance or guidance. When making decisions, you consistently demonstrate the ability to process information and implement appropriate solutions.
<u>Below Expectations:</u> You rarely make position related decisions or solve problems without assistance or guidance. When making decisions, you have difficulty processing information and implementing acceptable solutions.
<u>Unacceptable:</u> You make poor position related decisions and require assistance with even common problems.
Comments:

4. COMMUNICATION SKILLS
Extent to which you effectively convey information and ideas to others; clarity of your oral and written communications.
<u>Exceptional;</u> You are an exemplary communicator who always conveys necessary job related information and ideas in a timely and effective manner that enhances departmental efficiency and your effectiveness.
<u>Exceeds Expectations:</u> You are a skilled communicator who regularly conveys necessary job related information and ideas in a timely and effective manner which promotes departmental efficiency.
<u>Meets Expectations:</u> You convey job related information and ideas in a clear, concise, and effective manner orally or in writing.
<u>Below Expectations:</u> You are rarely able to effectively communicate job related information either orally or in writing.
<u>Unacceptable:</u> You fail to convey job related information either orally or in writing.

5. INTERPERSONAL SKILLS
Extent to which you are professional, courteous, respectful, and cooperative during workplace interactions in accordance with applicable department and University policies and procedures.
<u>Exceptional:</u> You are always professional, courteous, respectful and cooperative during all workplace interactions and your behavior is always exemplary regardless of the circumstances.
<u>Exceeds Expectations:</u> You are regularly professional, courteous, respectful and cooperative during all workplace interactions and your behavior is appropriate regardless of the circumstances.
<u>Meets Expectations:</u> You are sufficiently professional, courteous, respectful and cooperative during workplace interactions promoting a pleasant and productive work environment and you address workplace disagreements or discord in an appropriate manner.
<u>Below Expectations:</u> Your interpersonal skills are deficient enough to occasionally impair the orderly and efficient operation of the department.
<u>Unacceptable:</u> You are unable or unwilling to observe reasonable standards of courtesy or professionalism when interacting with others while at work.

6. ATTENDANCE AND TIMEKEEPING
Extent to which you are present and adhere to applicable department and policies and procedures regarding attendance, commitments and obligations in accordance with prescribed schedules and deadlines.
<u>Exceptional:</u> You are always punctual and present and always follow the policies and procedures with regards to accrued vacation and personal time. You are never absent except for the pre-arranged use of accrued vacation or personal time. You always fulfill your job commitments and obligations regardless of the circumstances.
<u>Exceeds Expectations:</u> You are almost always in good time and always follow the policies and procedures with regard to accrued vacation and personal time. You only occasionally use a sick day and always follow department procedures when notifying your Supervisor of a sick day. You almost always fulfill your job commitments and obligations regardless of the circumstances.
<u>Meets Expectations:</u> You are consistently punctual and present and always follow the policies and procedures with regards to accrued vacation and personal time. You always follow department procedures when notifying your supervisor of a sick day and never use more sick time than what has been accrued unless dictated by a medical emergency. You consistently fulfill your job commitments and obligations even under challenging circumstances.
<u>Below Expectations:</u> You are frequently late or absent and usually follow the policies and procedures with regards to accrued vacation and personal time. You follow his/her department procedures when notifying your supervisor of a sick day and sometimes exceed accrued sick time. You often fail to fulfill job commitments and obligations and cannot be counted on in emergencies.
<u>Unacceptable:</u> You are regularly late or absent and have difficulty following the policies and procedures with regards to accrued vacation and personal time. You do not follow department procedures when notifying your supervisor of a sick day and often exceed accrued sick time. You regularly fail to fulfill job commitments and obligations and are not dependable under even ordinary circumstances.

ANNEX 2			
Questioner About Module 7 "Personal Attribute"			
What you must do:		Sufficient (Yes) or Insufficient (No)?	
No	In helping to set targets you need to know. How to.....	Yes	No
1	Work with an appropriate person (e.g. supervisor, mentor, line manager, trainer, specialist) to:		
1-a	Provide accurate information to help set realistic targets that can be met in a few weeks or less:		
1-b	Give examples of what you have done before and what you want to achieve (e.g. in your learning, personal life, work).		
1-c	Identify what might affect your chances of success (e.g. time, cost, health and safety, motivation, other commitments).		
1-d	Identify clear action points for each target (e.g. tasks you will do, people you will see).		
1-e	Identify the support you will need (e.g. teaching, coaching, guidance) and how to get it, including arrangements for reviewing progress.		

2	In using your plan you need to know. how to:		
2-a	Use your action points to help manage your time well (e.g. look at them regularly and think ahead about what you need to organise).		
2-b	Revise your plan when needed (e.g. to deal with unexpected problems, tasks completed more quickly than expected).		
2-c	Identify when support from others would be helpful and use this to help you meet targets (e.g. information about, trouble-shooting advice).		
2-d	Select and use different ways of learning, working at times without close supervision, including:		
2-d1	Studying a straightforward subject (e.g. in teaching or training sessions, self-supported study such as reading and making notes).		
2-d2	Learning through straightforward practical activities (e.g. following demonstrations, finding out for yourself by doing tasks).		
2-e	Use methods that suit different learning styles (e.g. by using pictures, words, listening, watching or doing something).		

3	In reviewing progress and achievements, you need to know how to: Work with an appropriate person (e.g. supervisor, mentor, line manager, trainer, specialist) to:		
3-a	Identify what you have learned (e.g. knowledge of subjects, skills, including key skills, new ways of working, personal qualities, interests).		
3-b	Identify how you have learned (e.g. materials used, learning styles, where you learned best).		
3-c	Provide information on what has gone well and what has gone less well.		
3-d	Identify targets you have met (e.g. look through your action points, ask others who have seen your work, obtain test results).		
3-e	Identify evidence of your achievements (e.g. pieces of work, statements from people who have seen your work, records, reports, photographs, awards), including examples of how you have used you're learning to meet new demands.		
3-f	Identify ways to further improve your performance (e.g. quality of your work, the way you work).		

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No	In helping to set targets you need to know. how to.....	Yes	No
4	In identifying problems and options:		
4-a	Identify when there is a problem and describe its main features (e.g. focus on different parts of the problem, check if the problem changes at different times or places).		
4-b	Identify how you will know that the problem has been solved (e.g. how will you tell if something is working well, or a service meets the STANDARDS expected).		
4-c	Come up with different ways of tackling the problem (e.g. brainstorming ideas with others, by using written materials, pictures, methods involving numbers, by making a simple model).		
4-d	Decide which options have a realistic chance of success by:		
4-d-1	Identifying possible risks (e.g. health and safety issues, obstacles, side-effects) and other factors that may affect your approach (e.g. time, resources, expertise needed).		
4-d-2	Decide and justify the option selected to solve the problem.		

5	In planning and implementing options:		
5-a	Obtain the go-ahead for either your chosen option (e.g. from your supervisor or line manager) or, if necessary, an alternative option (e.g. a set way of dealing with the problem).		
5-b	Plan what you will do (e.g. the sequence of tasks, working methods, time, resources and help needed, how to get around possible obstacles).		
5-c	Organise and carry out tasks (e.g. use your specialist knowledge, obtain resources, make best use of the time available, keep track of steps you take in tackling the problem).		
5-d	Make changes to your plan (e.g. when you see a better method, need to respond to unforeseen difficulties, others show you how changes will help).		
5-e	Obtain and use support when you need it for tackling the problem (e.g. from your supervisor, mentor, line manager, trainer, specialist, people affected by the problem).		

6	In checking if problems have been solved:		
6-a	Make sure you understand given methods for checking is a problem has been solved (e.g. get clarification, watch a demonstration, practice).		
6-b	Apply these methods accurately (e.g. test, observe, measure, sample, inspect, ask others).		
6-c	Describe the results of your checks (e.g. draw conclusions about how well you solved each part of the problem).		
6-d	Explain the reasons for the decisions you took at each stage of the problem solving approach (e.g. the reasons for your choice of options and methods of working, why you made the changes to your plan).		
6-e	Identify the strengths and weaknesses of your approach to problem solving at each stage (e.g. whether you stayed with the limits of time and resources).		
6-f	Describe what you would do differently if you met a similar problem.		

Please describe your opinion about communication in the workplace

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Check List for Personal attributes (*What you need to know*)

No	Do you know following (Health and Safety)	Yes	No
1	Hazards and risks of the workplace affecting people and the environment.		
2	How to make and apply decisions based on the assessment of risk.		
3	How to apply practices that maximise the health, safety and welfare of yourself and others in the workplace.		

No	Do you know following (Organisational)	Yes	No
1	Applicable legislation.		
2	Standard Operating Procedures.		
3	Record and storage systems and their use.		
4	Sources and availability of information.		
5	Job description/specification.		

No	Do you know following (Personal and Interpersonal)	Yes	No
1	How to communicate clearly and effectively with the range of people involved.		
2	Lines and methods of communication/reporting in the workplace.		
3	Portfolio (collection) development.		
4	Continuous professional development.		
5	Lifelong learning.		

No	Do you know following (Technical)	Yes	No
1	Theory of interpersonal relationships.		
2	Theory of team working.		
3	Theory of public relations.		
4	Roles and responsibilities of VTS stakeholders.		
5	Individual duties and responsibilities with respect to Health & Safety at Work legislation.		
6	Risk management.		
7	Human factors.		
8	Stress management.		
9	Time management.		
10	Team working.		
11	Problem solving methodology.		
12	Clarity and organisation of communication – oral and written.		
13	Portfolio development.		
14	Continuous professional development.		
15	Lifelong learning.		

<p>Crew resource management or cockpit resource management (CRM) is a set of training procedures for use in environments where <u>human error</u> can have shocking effects. Used primarily for improving <u>air safety</u>, CRM focuses on <u>interpersonal communication</u>, <u>leadership</u>, and <u>decision making</u> in the cockpit.</p>
<p>Crew resource management grew out of the 1977 <u>Tenerife airport disaster</u> where two Boeing 747 aircraft collided on the runway killing 583 people. A few weeks later, NASA held a workshop on the topic, endorsing this innovative training. United Airlines was the first airline to provide CRM training for its cockpit crews in 1981. By the 1990s, it had become a global standard.</p>
<p>CRM training encompasses a wide range of knowledge, skills, and attitudes including communications, situational awareness, problem solving, decision making, and teamwork; together with all the attendant sub-disciplines which each of these areas entails. CRM can be defined as a management system which makes optimum use of all available resources—equipment, procedures and people—to promote safety and enhance the efficiency of operations.</p>
<p>CRM is concerned with the cognitive and interpersonal skills needed to manage resources within an organized system, not so much with the technical knowledge and skills required to operate equipment. In this context, cognitive skills are defined as the mental processes used for gaining and maintaining situational awareness, for solving problems and for making decisions. Interpersonal skills are regarded as communications and a range of behavioral activities associated with teamwork. In many operational systems as in other walks of life, skill areas often overlap with each other, and they also overlap with the required technical skills. Furthermore, they are not confined to multi-crew craft or equipment, but also relate to single operator equipment or craft as they invariably need to interface with other craft or equipment and various other support agencies in order to complete a mission successfully.</p>
<p>CRM training for crew has been introduced and developed by aviation organizations including major airlines and military aviation worldwide. CRM training is now a mandated requirement for commercial pilots working under most regulatory bodies worldwide, including the FAA (U.S.) and JAA (Europe). Following the lead of the commercial airline industry, the U.S. Department of Defense began formally training its air crews in CRM in the mid-1980s. Presently, the U.S. Air Force and U.S. Navy require all air crew members to receive annual CRM training, in an effort to reduce human-error caused mishaps. The U.S. Army has its own version of CRM called Aircrew Coordination Training Enhanced (ACT-E).</p>
<p>United Airlines Flight 232 Captain Al Haynes, pilot of United Airlines Flight 232, credits Crew Resource Management as being one of the factors that saved his own life, and many others, in the Sioux City, Iowa, crash of July 1989.</p> <p>...the preparation that paid off for the crew was something ... called Cockpit Resource Management... Up until 1980, we kind of worked on the concept that the captain was THE authority on the aircraft. What he said, goes. And we lost a few airplanes because of that. Sometimes the captain isn't as smart as we thought he was. And we would listen to him, and do what he said, and we wouldn't know what he's talking about. And we had 103 years of flying experience there in the cockpit, trying to get that airplane on the ground, not one minute of which we had actually practiced [under those failure conditions], any one of us. So why would I know more about getting that airplane on the ground under those conditions than the other three. So if I hadn't used [CRM], if we had not let everybody put their input in, it's a cinch we wouldn't have made it.[17</p>

<p>Air France Flight 447</p>
<p>One analysis blames failure to follow proper crew resource management procedures as being a contributing factor that led to the 2009 fatal crash into the Atlantic of Air France Flight 447 from Rio de Janeiro to Paris.</p>
<p>Following resolution of an earlier incident with a faulty pitot tube that lasted a few minutes,[not in citation given] the pilot-in-command left to take a rest break, leaving control in the hands of the copilots. When the two copilots were operating the Airbus around 02:11:21, it was not clear which one of the two was in charge of the plane, nor did the copilots communicate with each other about who was in control of the plane.</p>



*Project on Enhancing of Vessel Traffic Service System
Management Capability Phase 2*

TEXT Book-8 (Module-8)

“EMERGENCY SITUATIONS”



Text Book for Vessel Traffic Services “EMERGENCY SITUATIONS”



IALA V-103-1 Model-Course



INTERNATIONAL COOPERATION AGENCY



JAPAN AIDS TO NAVIGATION ASSOCIATION (JANA)

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Chapter 1 EMERGENCY SITUATIONS		
MODULE 8 (From Recommendation V-103/1)		
1.1 INTRODUCTION		Keyword
<p>Instructors for this module should have the knowledge, comprehension and the ability to apply emergency practices and procedures in a VTS environment. Every instructor should have full access to simulated VTS. In addition, arrangements should be made for trainees to visit operational VTS centres and Rescue co-ordination centres, if conditions allow it.</p>		<ul style="list-style-type: none"> • <i>emergency practices</i> • <i>procedures in a VTS</i>
1.2 SUBJECT FRAMEWORK		
1.2.1 Scope		
<p>This syllabus covers the requirement for VTS Operators to be able to respond rapidly and effectively to emergency situations that arises within a VTS area. This course covers the theory and practice of responding to emergency situations and wherever practicable, maintaining an efficient flow of marine traffic while the emergency situation is being dealt with. It also provides knowledge and comprehension of the co-ordination necessary to minimize the effect of any emergency situation.</p>		<ul style="list-style-type: none"> • <i>respond rapidly and effectively</i> • <i>emergencies</i> • <i>maintaining an efficient flow</i>
1.2.2 Aims		
<p>On completion of the course trainees should have knowledge of related national and international regulations and procedures relating to emergency situations, security alerts pollution response and other special circumstances. They should also have the ability to identify properly the type and scale of an emergency, activate the relevant contingency plan, ensure the protection of the VTS area and, as far as practicable, maintain a safe flow of marine traffic. The trainees should also have sufficient understanding and practice to be able to co-ordinate effectively with allied services, particularly search and rescue authorities.</p> <p>Trainees should be given realistic exercises on the role of VTS during emergency situations within a VTS area. Integrated exercises on handling emergency situations should also be carried out.</p>		<ul style="list-style-type: none"> • <i>emergency situations</i> • <i>security alerts</i> • <i>pollution response</i>
1.3 SUBJECT OUTLINE OF MODULE 8		
1.3.1 Subject Area		Keyword
International, national, regional and local regulations	Scope of responsibility and authority to act Local regulations, bye laws	<ul style="list-style-type: none"> • <i>authority to act</i> • <i>Local regulations</i>
Contingency plans	Introduction, preparation and implementation of contingency planning Preparation and use of checklists	<ul style="list-style-type: none"> • <i>use of checklists</i>
Priorities and respond to situations	Ascertain nature of incident Commence alerting procedures Navigational warnings Co-ordination with, and support to, allied services Maintaining communications Updating of situation reports	<ul style="list-style-type: none"> • <i>nature of incident</i> • <i>Updating of situation</i>
Record activities concerning emergencies	Objective of recording activities during emergency situations Introduction to methods of recording activities during emergency situations Information which should be recorded security of recorded information	<ul style="list-style-type: none"> • <i>recording activities</i>



1.3.1 Subject Area (Continue)		
Maintain a safe waterway throughout emergency situations	Maintaining traffic management and monitoring procedures	• <i>Maintaining traffic</i>
Internal/external emergencies	Procedures for individual emergencies Maintenance of VTS Operations	• <i>individual emergencies</i>



1.4 DETAILED TEACHING SYLLABUS OF MODULE 8			
1.4.1 Detailed teaching syllabus – Emergency situations			
International, regional and local regulations	Explain national and international regulations and procedures relating to emergency situations, security alerts, pollution response and special circumstances		
	Scope of responsibilities and authority to act in emergency situations (local/regional/national/international)		
	Local regulations, bye laws Supporting and allied services		
	Define	the supporting and allied services which are available Define the assets which are available for deployment	
Contingency plans	Describe and Introduces the preparation and implementation of contingency plans		
	Collisions	Groundings	Marine pollution (air/water)
	Hazardous cargoes	SAR incidents	man overboard
	Other contingency plans including, but not limited to the following:		
	medical	casualty	evacuation
	Organizations to be alerted		Simultaneous emergencies
	Describe the preparation and use of checklists Introduction and use of checklists Description of a checklist Authority to prepare, implement, issue and update checklists		
prioritize and respond to incidents	Explain the steps in classification of an emergency situation and explain the activation of the relevant contingency plans prioritize incident:		
	- Data collection	- Evaluation	- Classification of incident
Response planning and action:	- Commence alerting procedures		
	- Maintaining safe and efficient flow of traffic		
	- Co-ordination with, and support to, allied services		
	- Updating of situation reports - Navigational warnings (if required)		
May include but not be limited to:	- Collisions	- Groundings	- Marine Pollution
	- Hazardous cargoes	- Fire	
	- Other special circumstances	- SAR incidents	
Record activities concerning emergencies	Describe objectives and procedures for recording activities during emergency situations, including methods, the information recorded and security of information		
	Objective of recording activities during emergency situations		
	Introduction to methods of recording activities during emergency situations		
	Information which should be recorded Security of recorded information		

1.4.1 Detailed teaching syllabus – Emergency situations (<i>Continue</i>)	
Maintain a safe waterway throughout emergency situations	Describe the actions required to ensure the protection of the VTS area and, as far as practicable, maintain a safe and efficient flow of traffic
	Maintaining traffic management and monitoring procedures Alternative routing arrangements Diversionary procedures (traffic in immediate incident area) Anchorage areas Introduction of emergency speed restrictions Emergency alterations to VTS sailing/route plans and passage plans
Internal/external emergencies	Describe the procedures for dealing with internal/external emergencies affecting normal operations of a VTS centre
	Procedures for individual emergencies Checklists Maintenance of VTS Operations Communications Traffic image


Competence Area	1.4.2 Response to contingency plans
Knowledge understanding and proficiency	Knowledge of related national and international regulations concerning distress, pollution prevention and special circumstances and demonstrate the ability to: 1. prioritize and respond to situations; 2. commence alerting procedures; 3. co-ordinate with allied services; and 4. record activities. While continuing to maintain a safe waterway in all aspects.
Methods for demonstrating competence	Assessment of evidence obtained from approved simulated and on the job training.
Criteria for evaluating competence	Type and scale of emergency properly identified. Activate the relevant contingency plan appropriate. Actions undertaken ensure the protection of the VTS area and, as far as practicable, maintain a safe flow of marine traffic




Chapter 2 Respond to emergency situations Elements	
Elements	<p>Act in accordance with local, national and international regulations.</p> <p>Make Priority and how to respond to accidents and incidents.</p> <p>Use possibility plans.</p> <p>Co-ordinate and support with allied services</p> <p>Maintain a safe waterway throughout emergency situations</p> <p>Respond effectively to internal emergencies within the VTS Centre</p>
	<div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 5px;"> <p>1.) What could happen? 2.) What will we do in response? 3.) What can we do in advance to prepare?</p>  </div> <div style="border: 1px solid black; padding: 5px;">  </div> </div>


2.1 Element I: Comply with local, national and international regulations	
<p>This element concerns the ability of VTS Operators to be aware of and comply with local, national and international regulations relevant to emergency situations in the VTS area.</p>	
<p>1. Recognise the various types of emergencies that may arise in a VTS area. These may include, but not be limited to the following:</p>	
<ul style="list-style-type: none"> • Collision. • Fire. • Grounding. • Hazardous cargoes. • Environmental Pollution. • SAR incidents. • Emergency involving • Other special circumstances. 	
<p>2. Know the significant local, national and international regulations applicable to emergency situations in a VTS Area.</p>	
<p>3. Know the regulations governing transit of vessels in special circumstances.</p>	
<p>4. Know your responsibilities and your authority to act in an emergency situation.</p>	
<p>5. Know the chain of command for emergency situations.</p>	
<p>6. Know the supporting and allied services that might be available.</p>	
<p>7. Identify the assets that might be available for deployment.</p>	

2.2 Element II: Prioritise and respond to incidents															
<p>This element concerns the ability of VTS Operators to prioritise and respond quickly to internal / external emergency situations in the VTS area.</p>	<table border="1"> <thead> <tr> <th>Process Priority Flag</th> <th>Priority Assigned</th> </tr> </thead> <tbody> <tr> <td>Realtime</td> <td>24</td> </tr> <tr> <td>High</td> <td>13</td> </tr> <tr> <td>Above Normal</td> <td>9</td> </tr> <tr> <td>Normal</td> <td>8</td> </tr> <tr> <td>Below Normal</td> <td>7</td> </tr> <tr> <td>Low</td> <td>4</td> </tr> </tbody> </table>	Process Priority Flag	Priority Assigned	Realtime	24	High	13	Above Normal	9	Normal	8	Below Normal	7	Low	4
Process Priority Flag	Priority Assigned														
Realtime	24														
High	13														
Above Normal	9														
Normal	8														
Below Normal	7														
Low	4														
<p>1. Correctly ascertain the nature of incident using all available means to collect and evaluate essential and relevant data.</p>															
<p>2. Commence alerting procedures.</p>															
<p>3. Establish and maintain communications with concerned individuals or units if possible.</p>															
<p>4. Broadcast navigational warnings.</p>															
<p>5. Maintain a record of activities relating to emergency situations.</p>															
<p>6. Identify the objective of recording activities during emergency situations.</p>															
<p>7. Follow standard operating procedures to record essential and reliable data during emergency situations.</p>															
<p>8. Keep the recorded information in a safe and secure environment in accordance with standard operating procedures.</p>															

2.3 Element III Use contingency plans	
This element concerns the ability of VTS Operators to correctly select and use the appropriate contingency plan in the event of an emergency.	
1. Identify individual(s) who have the authority to prepare, implement, issue and update checklists.	
2. Select the correct contingency plan for the emergency.	
3. Implement the contingency plan correctly.	
4. Use checklists appropriately.	

2.4 Element IV Co-ordinate with and support allied services	
This element concerns the ability of VTS Operators to co-ordinate with and support allied services during emergency situations in the VTS area.	
1. Maintain communications with emergency response units during emergency situations.	
2. Maintain communications with vessel traffic during emergency situations.	
3. Maintain communications with allied services during emergency situations.	
4. Update situation reports as appropriate.	

2.5 Element V Maintain a safe waterway throughout emergency situations	
This element concerns the ability of VTS Operators to maintain a safe waterway throughout emergency situations.	
1. Maintain a traffic image throughout the emergency situation.	
2. Maintain a safe waterway throughout the emergency situation in accordance with standard operating procedures and contingency plans. Maintaining a safe waterway will require that you maintain traffic management and monitoring procedures that could involve but not be limited to the following:	
<ul style="list-style-type: none"> • Alternative routing arrangements. • Diversionary procedures (traffic in immediate incident area). • Anchorage areas. • Introduction of emergency speed restrictions. • Emergency alterations to VTS Sailing Plans and Passage Plans. • Exclusion zones. • Safety control zones. 	
3. Inform adjacent VTS Centres / Statutory Harbour Authorities, if appropriate, in accordance with standard operational procedures.	

2.6 Element VI: Respond effectively to internal emergencies within the VTS Centre	
This element concerns the ability of VTS Operators to respond to emergencies within the VTS Centre demanding the continuity or resumption of services if interrupted by incidents that impact the safety and security of the personnel and/or operation.	
1. Observe safety and security procedures and regulations.	
2. Relocate and resume operations as required by your standard operating procedures, with Minimal loss of services and with as short an interruption as possible in response to events such as, but not limited to:	
<ul style="list-style-type: none"> • Bomb threats. • Fire. • Building evacuation (emptying). • Flood. • Prolonged loss of power or other essential services. 	

2.7 Element VII: Equipment in use and source information available	
Equipment:	Mandatory – VHF, Manual-plotting-capability, telephone, facsimile. Optional – Marine radar, Marine radar + tracking system, VTS radar + tracking system, ENC / GIS, VHF / DF, AIS, CCTV.
Sources of information	<p>Watch hand over briefing.</p> <p>Visual lookout.</p> <p>Reports from vessels.</p> <p>Information obtained from vessels.</p> <p>Information obtained from shipping agents and others.</p> <p>Emergency / contingency plans.</p> <p>International Aeronautical and Maritime Search and Rescue Manual</p>

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Chapter 3 Functions of a VTS (From VTS manual)	
<p>The benefits of implementing a VTS are that it allows identification and monitoring of vessels, strategic planning of vessel movements and provision of navigational information and assistance. It can also assist in prevention of pollution and co-ordination of pollution/emergency response.</p> <p>The efficiency of a VTS will depend on the reliability and continuity of communications and on the ability to provide accurate and unambiguous information.</p>	
<p>A VTS may help prevent such accidents occurring or developing into disasters. It can also be used by the emergency services in the event of marine associated emergencies, which necessitate the coordination of all activities within the area concerned.</p>	
<p>Incidental co-operation with emergency services, such as Search and Rescue and Pollution Response Control should be conducted in accordance with <u>pre-established contingency plans</u> in which the procedures for such co-operation are laid down and responsibilities established.</p>	

3.1 Emergency and Incident Management	
<p>Configuration of a VTS centre should take into account the need to manage incidents and emergencies. Issues that should be addressed include:</p>	
Workstation(s)	<p>Provision should be made for additional staff to manage the specific incident whilst the VTS continues with the primary traffic management function; this may be in the form of dormant workstations or a plan to reconfigure existing positions to make best use of the facilities available.</p>
Planning	<p>Contingency plans and action sheets should be prepared;</p>
Liaison	<p>Consideration should be given to the links that may be necessary with emergency services;</p>
Training	<p>Contingency plans should be exercised.</p>

3.2 Decision Support	
<p>Decision Support helps to assess situations, to plan and to provide timely and necessary information for taking decisions.</p> <p>For example, CPA/TCPA is a commonly used tool in a VTS, delivering TOS, and helps in maintaining traffic separation.</p> <p>Note that decision support in VTS is under continuous development, resulting in tools that will support an increasing number of aspects of the operation, planning and management of VTS.</p> <p>IALA Guideline No. 1110 gives further guidance on the use of decision support tools for VTS personnel when considering decisions on evolving or emergency situations in a harmonised way.</p>	
<ul style="list-style-type: none"> • Take appropriate actions in emergency situations and other special circumstances defined for the VTS area. Where appropriate, co-ordinate communications for such situations and/or circumstances; and • Maintain a log of all incidents/accidents and all other relevant events occurring within the area of responsibility. 	
<p>In an emergency or incident situation, the media will probably try to contact the VTS centre directly and use every means at their disposal in order to obtain information. However, VTS personnel should not express opinions, or speculate on outcomes of incidents, but direct the media to the person appointed to liaise with the media according to the procedures</p>	

ANNEX A	
Emergency Item OF VTS OPERATIONAL PROCEDURES	
Check Item your SOP for Emergency	OK or No
Internal Procedures	
External Procedures	
Routine Procedures	
Non-Routine Procedures	
Gathering and Recording of information	
Operational staff	
Equipment operation, maintenance, calibration and updating	
Interaction with allied services	
Public Relations	
Security	
Training	
Watch handover	
Vessel handover	
Maintenance of marine publications	
Pre-Arrival Information	
Vessels Entering VTS Area	
Vessels Transiting VTS Area	
Vessels at Anchor	
Vessels at Berth	
Vessels Departing the VTS Area	
Transition between Adjacent VTS Areas	
Environmental conditions	
Waterway conditions	
Emergency Procedures	
System Failure	
Internal emergencies, for example fire and flood	
Forced evacuation of VTS centre	
Personnel medical emergencies	
Security incidents.	
Collision, Capsize, Sinking, Grounding, Fire	
On Vessel, Man Overboard	
Pollution	
Places of Refuge	
Medical Emergency	
Vessel Not Under Command (NUC)	
Security incident	
Protest Action	
Natural Disaster	

ANNEX B
EMERGENCY RESPONSE PROCEDURE – From OPERATIONAL PORT OF HEDLAND
1. MARINE INCIDENTS
1.1 General Guidance for Marine Operational Emergencies
<p>For all marine operational emergencies the duty VTSO upon receiving the report will gain the necessary information (who, what, when, where, why, how and actions), from the vessel or stakeholder reporting the incident. The duty VTSO will contact the Harbour Master or delegate and provide the necessary brief. The duty VTSO will take action in accordance with the direction of the Harbour Master and the relevant aide memoir.</p> <p>A careful assessment of the impact the incident has on shipping will be made by the Incident Controller. The Incident Controller will assess the impact and where the safety of personnel is at risk the operation will be restricted or suspended shipping movements until it is safe to recommence. The impact will be carefully managed with a view to safely facilitate all operations.</p>

1.2 Channel Integrity
<p>The integrity of the channel is paramount to the continued operation of the port and the surrounding economy. The Harbour Master or delegate, Duty Pilot, Marine Pilots and VTSO's are to be mindful of the risk each incident presents to the channel and the continued operation on the port. This risk is to be carefully managed, with the ultimate aim being for the channel to remain clear, or where this is not possible minimising the extent and duration of the obstruction or blockage.</p> <p>Where there is doubt as to the continued safe operation of a vessel including the vessels propulsion, main engine, power generation or steering gear the Marine Pilot or Master shall not committee to the channel.</p>

1.3 Port Emergency
<p>In the context of operational emergencies a port emergency is defined as an event that poses significant risk to the safe or continued operation of the port by effecting the;</p> <ul style="list-style-type: none"> • Safety of personnel within the port area • Shipping channel, • Port assets, or • Port infrastructure. <p>Note: A port emergency shall be declared if a steering gear failure or main engine slowdown or main engine failure is encountered by a vessel in the inner harbour or channel.</p> <p>A port emergency can be declared by the following;</p> <ul style="list-style-type: none"> • A Marine Pilot, piloting a ship • The Harbour Master or delegate <p>A port emergency requires the co-ordination and careful allocation of port resources such as marine pilots, tugs, helicopters, pilot launches and lines boats. The Harbour Master or delegate will assess the situation, allocate resources as required and monitor the effectiveness of the response.</p> <p>For all marine incidents where the complexity of the incident warrants a second pilot will be transferred to the vessel to assist with communication and on scene management of the incident.</p> <p>Where tugs are used to assist a vessel including alongside and in the anchorage a pilot will be transferred to the vessel to ensure the safe control of the tugs.</p>

1.4 Inner Harbour
<p>Where the passage of the vessel in the channel poses a risk to the integrity of the channel she shall be returned to the berth until the defect or deficiency is rectified. The Harbour Master shall determine the most prudent course of action, in consultation with Duty Pilot and the Marine Pilot on the vessel.</p>

1.5 Outer Harbour

Once a vessel has passed the Point, she is committed to the channel and cannot return to the inner harbour. Every effort should be made to continue the transit with tug assistance utilising a safe channel escape area if the vessels UKC will not allow it to clear the channel to open water before the tide falls. When considering the use of the channel escape areas the height of tide at the next low water, the charted depth of the escape area and the vessels draught needs careful consideration.

Where a tidally restricted vessel is in difficulty within the channel the duty VTSO's shall continuously monitor the risk of grounding within the channel using the DUKC system. Where the vessel cannot clear the channel within the tidal window, the Harbour Master will make an assessment of which channel escapement is most suitable.

If a vessel is in difficulty a careful assessment of the impact on subsequent movements shall be made. Based on the DUKC output and consideration of the vessel in difficulties progress and speed made good, subsequent vessels sailing may be delayed.

1.6 Movement and Control of Shipping

During a port emergency the Harbour Master shall assess the situation and determine if there is a requirement to suspend shipping. Where Shipping is suspended, no vessel shall be moved within the VTS Area (including the anchorage) without the express permission of the Harbour Master. This will be coordinated by the duty VTSO through the normal traffic clearance process.

1.7 Port Emergency VHF Working Channel

The Duty VTSO shall allocate a Port Emergency frequency to be used as a working channel for the emergency (normally the vessels pilotage channel). This shall be a VHF channel that is not currently in use and free from interference. Only those stakeholders directly involved in the emergency response shall monitor or use the frequency.

All normal port reporting shall be made on the port working channel VHF Channel XX (or 12).

NOTE: All port users are to be aware that during a port emergency the SCT will be focusing on the emergency. Routine communication will be prioritised. Stakeholders may be asked to wait or to contact the VTS at a later stage. As soon as practicable after the formal declaration of a port emergency, the duty VTSO shall make a securite broadcast to all stations on VHF Ch12 advising of a port emergency in the following format

“SECURITE, SECURITE, SECURITE. ALL STATIONS, ALL STATIONS ALL STATIONS THIS IS XXX VTS (x3). A PORT EMERGENCY HAS BEEN DECLARED INVOLVING [vessel name]. ALL PORT USERS NOT INVOLVED IN THE INCIDENTSHALL REMAIN WELL CLEAR. ONLY ESSENTIAL CALLS ARE TO BE MADE ON CHANNEL XX UNTIL FURTHER NOTICE”

1.8 Ship Stability

Where there is concern that a vessel's stability cannot be maintained within safe limits, it shall be immediately reported to the Harbour Master. The Harbour Master and the Master shall assess the situation and take all necessary steps to ensure the safety of the vessel.

1.9 Dangerous Goods

Where dangerous goods (DG) are present on board the Master and crew shall make an assessment of the potential for the DG to be affected by the emergency and advise the VTS accordingly. The Harbour Master will assess the situation and determine if DFES assistance is required.

If a ship is discharging Ammonium Nitrate and there is a fire that poses a risk to the cargo, consideration shall be given to stop cargo operations, closing all hatches and where applicable the vessel readied for sea.

1.10 Fire on the Vessel Underway

Where a vessel is under way and suffers a fire the pilot or master is to advise Port Hedland VTS. The Harbour Master in conjunction with the Pilot or master will assess the situation. Considerations will include;

- The severity of the fire and the location on-board
- The ability of the ship's crew to respond effectively to the fire
- The location of the vessel and its ability to reach safe water
- Assets required to assist and their availability

Firefighting support vessels will be sent to assist the vessel as above. The Harbour Master and duty pilot will assess the situation and determine the most suitable option including;

- Continue the passage to open water
- Anchor
- Berth

1.11 Fire on a Vessel in the Anchorage

Where a vessel suffers a fire in the anchorage the vessel shall remain at anchor unless approved to weigh anchor and get underway by the Harbour Master. Firefighting support vessels will be used to assist the vessel with the firefighting response

1.12 Vessel Grounding

Where a vessel grounds a careful assessment of the damage condition of the vessel will be made. The Harbour Master and Duty Pilot will assess the height of tide at the time of grounding and subsequent tides to determine if the vessel is likely to be refloated. Where there is sufficient tidal height and the condition of the vessel allows, the vessel will be refloated as soon as possible and shifted to an anchorage until an assessment of the vessels damage condition can be made.

Where the vessel cannot be refloated or the damage condition is such that the vessel cannot be safely refloated and moved to open water the Harbour Master will assess the situation and determine what services are required. This may include tugs to hold the vessel in place and work boats to transfer personnel and equipment to the vessel.

If a vessel grounds in the berth pocket the vessels steering gear and propellers condition will be carefully assessed. If safe to do so the vessel will be shifted to the anchorage so an assessment of the vessels condition can be made.

1.13 Vessel Collision

Where a collision occurs between two vessels tug assistance will be provided if required. Both vessels will, if safe to do so, be allocated an anchorage whilst the damage condition is assessed.

For serious collision a careful assessment of the damage condition of both vessels will be required.

Where vessels are locked together a salvage plan will be required.

1.14 Disabled Vessel in the Channel

Where a vessel is disabled in the channel, such as for a main engine failure or blackout, the VTS will mobilize additional tugs to assist the vessel. The Harbour Master and the Duty Pilot will assess the options for the vessel and determine the best course of action based on Under Keel Clearance, the speed of advance and the conditions. In general the vessel will be taken to open water where possible; if this is not possible the vessel will be towed to the furthest channel escape area possible.

Careful assessment of the subsequent tides will be undertaken to determine the time the vessel can safely remain in the channel escape.

1.15 Vessel/Vessels in Channel Hindered by Vessel Ahead

Where a vessel in the channel is disabled or the speed of advance hinders subsequent ships in the channel, the Harbour Master and the Duty Pilot will assess the situation and determine the safest course of action.

Where appropriate, additional towage will be provided to assist the vessel or vessels which are hindered, by the vessel ahead. So that the vessels or vessels, can be safely controlled and maintained in the channel.

Detailed surveys of the areas adjacent to the channel have been conducted and are available on the Pilots Portable Pilot Unit (PPU) and in the VTS. Depending on the location of the vessels, the respective draughts, the charted depth, environmental conditions and the height of tide the Harbour Master, Duty Pilot and the Marine Pilot on the vessel will assess the feasibility of the disabled or slow vessel departing the channel to allow the convoy to pass or conversely the convoy to pass the disabled vessel. This will be assessed on a case by case basis and be dependent on the environmental conditions and UKC.

1.16 Pilot Injured or Incapacitated

Where the pilot is injured or incapacitated a second pilot will be immediately transferred to the vessel. In the interim the duty VTSS shall provide assistance to the masters and tugs relating to course over the ground and speed made good. Where the passage cannot be safely continued the tugs are to arrest the momentum of the ship and hold it in the centre of the channel with the assistance from the VTSS until another pilot can be transferred to the vessel.

1.17 Mooring line/ Cavorted failure

Mooring lines parting is a significant risk in the Port. There is potential for significant interaction between ships berthed and large bulk carriers entering or departing the inner harbour. All mooring failures shall be reported to the VTS. To ensure the vessel remains securely moored, a Pilot will be transferred to the vessel and tug assistance provided until the line/s can be rerun or the vessel taken to the anchorage. Where necessary a lines boat will be used.

1.18 Day or Cyclone Mooring Failure

Where a vessel breaks free of its mooring, the duty VTSS will alert all shipping to the incident and attempt to establish contact with the vessel. Where communications with the vessel cannot be established, the Duty VTSS will use vessels of opportunity to tow or push the vessel to safety out of the channel. The vessel will be towed to a safe location until the owner or operator can take control of the vessel.

The mooring owner is required to submit a report to the Harbour Master outlining the failure, the root cause and a plan to prevent reoccurrence. The Harbour Master may require an inspection and Naval Architect to certify the mooring is safe prior to use.

1.19 Vessel Dragging Anchor

All vessels are responsible for monitoring their position and safety whilst at anchor. Where the vessel observes the anchor is not holding, the Master is to assess the weather conditions and the draughts of the vessel. Where safe the vessel is to pay out more cable or request permission to get underway to re anchor. This is to be reported to the VTS immediately and the vessel shall keep the VTS apprised of its actions and intentions.

If the vessel is immobilized (note this requires approval) or requires assistance to anchor a pilot and tugs will be allocated to assist the vessel.

1.20 Man Over Board (MOB)

In the event of a MOB where the vessel cannot recover the man or the man fell from a wharf or structure the VTS will direct suitable vessels in the vicinity to recover the man. Where there are no suitable vessels the Pilot boat or recovery capable vessel will be used to recover the man.

Search and rescue will be conducted as described below.

1.21 Medical Evacuation and Sick or Injured Seafarer Transfer from a Ship

Where a casualty is conscious and can sit upright without assistance the pilot transfer helicopter may be used. An ambulance Officer shall accompany the sick or injured seafarer. The vessel is to ensure that any wounds are cleaned and dressed and a vomit bag is provided for the casualty.

The vessels Agent is responsible for arranging the attendance of the ambulance Officer and where the transfer cannot be incorporated into the scheduled pilot transfers the cost will be invoiced to the agent.

1.22 Small Vessel Incidents

Where there is a small vessel incident such as collision, grounding or a small vessel becomes disabled, the VTS will request the assistance of nearby vessels to assist the vessel. The vessel will be towed to a safe place.

Any casualties will be dealt with as above and search and rescue will be as below.

1.23 Search and Rescue

For search and rescue incidents, the BASARNAS (National S & R Agency) will be notified for MCC (Marine Command Center) will be notified for relevant waters. The VTS will request the assistance of small vessels in the area to help find the man. Where the situation is more complex assets will be allocated to the search.

1.24 Vessel Underway Collision with Ship Loader

For all piloted shipping movements, all personnel are required to be clear of the ship loader boom. Where there is a collision between a vessel underway and a ship loader (such as during maintenance) the VTS will utilize small craft in the vicinity to check for people in the water.

If required additional towage will be provided to assist with the control of the vessel that collided with the ship loader. A careful assessment of the damage condition will be made and a plan for the vessel will be developed by the Harbour Master and where appropriate the Duty Marine Pilot.

1.25 VTS Evacuation

The Securite Broadcast will be as follows;

“SECURITE, SECURITE, SECURITE. ALL STATIONS ALL STATIONS, ALL STATIONS THIS IS XXX VTS (x3). THE VTS IS BEING EVACUATED. VTS SERVICE IS TEMPORARILY SUSPENDED UNTIL FURTHER NOTICE.”

Once the VTSO's are in a safe location they will recommence providing VTS at a reduced level of service. The reduced level of service will be communicated to all Port Users and Stakeholders.

ANNEX C	
Check List for Emergency (What you need to know)	
No	Health and Safety
1	Hazards and risks of the workplace affecting people and the environment.
2	How to make and apply decisions based on the assessment of risk.
3	How to apply practices that maximise the health, safety and good of yourself and others in the workplace.

Organisational	
No	Applicable legislation. (Law and Regulations)
4	Standard Operating Procedures.
5	Record and storage systems and their use.
6	Sources and availability of information.
7	Job description/specification.

Personal and Interpersonal	
8	How to communicate clearly and effectively with the range of people involved.
9	Lines and methods of communication/reporting in the workplace.

Technical	
10	Mandatory – Principles, controls and operations of VHF, telephone, facsimile.
11	Mandatory – Principles, controls and operations of mobile VHF, telephone, computers.
12	Optional – Principles, controls and operations of marine radar, marine radar + tracking system, VTS radar + tracking system, CCTV.
13	Optional – Principles, controls and operations of manual tracking systems.



