Expert Meeting
on Navigational Assistance Service by VTS

Tokyo, JAPAN
29 October - 31 October, 2008

Executive Summary

The expert meeting on navigational assistance service by VTS, sponsored by the Ocean Policy Research Foundation and hosted by the Japan Coast Guard (JCG), was held in Tokyo from 29th to 31st October 2008. Four experts from Singapore, UK and USA participated in the meeting with the Japan Coast Guard officers. The list of the attendees is attached as ANNEX 1.

On the first day of the meeting, the open symposium on VTS was held and the experts made presentations regarding VTS, in particular to the types of service, training of VTS operator, etc. in each country in addition to a presentation of new software for VTS simulator presented by a Japanese VTS engineer. The symposium was chaired by CAPT Shigeo AKIMOTO, Director, Policy Planning and Research Office, Maritime Traffic Department of the JCG and about one hundred and twenty participants enthusiastically listened to the presentations and actively participated in the question and answer session.

On the second day, the participants visited the Tokyo-bay VTS at Kannonsaki, Kanagawa. They observed the traffic situation of Tokyo-bay which is one of the most congested waterways in the world and the operation of the VTS. They also exchanged views and opinions with the accompanied JCG officers and the operators of the VTS.

On the final day, one day meeting was held by the chairperson, Capt. Hisao FUJII, Director, Navigation Guidance Office, Maritime Traffic Department of the JCG. The experts and the JCG officers discussed various matters such as practical use of AIS, duties and authority of VTS operators including legal matters, human resources of VTS operators including training. The meeting has reached the conclusion which is presented at the end of this document..

After the meeting, the experts had a chance to attend the 140th Japanese Lighthouse Memorial Day reception and celebrated the day with the guest of honour, Mr. Kazuyoshi KANEKO, Minister of Land, Infrastructure, Transport and Tourism, and distinguished guests.

CONCLUSION

THE MEETING,

RECALLING IMO Resolution A.857(20) Guidelines for Vessel Traffic Service and IALA Vessel Traffic Service Manual;

HAVING NOTICED the development of the discussion in the IALA VTS Committee especially the draft IALA Woking Paper on Provision of a Navigational Assistance Service by VTS;

HAVING CONSIDERED that a number of marine accidents have occurred in VTS service area;

CONCLUDES

1. *That with the increase in both domestic and international maritime traffic in the busy waterways, the importance of the VTS becomes more significant;*

2. *That therefore the evolution in navigational assistance by VTS, in particular the use of AIS, is of crucial importance and will enhance the safety of navigation.*

The Report of the Expert Meeting on Navigational Assistance Service by VTS

1. Open Symposium

The Open Symposium was held on the first day, 29th October 2008, at the Kaiyo Senpaku Building in Toranomon, Tokyo. The symposium was chaired by CAPT Shigeo AKIMOTO, Director, Policy Planning and Research Office, Maritime Traffic Department of the Japan Coast Guard. In his opening remarks, CAPT AKIMOTO thanked the Ocean Policy Research Foundation for supporting the event and also introduced the speakers to the audience. The speakers from Singapore, UK and the USA took turns to present on the VTS operations in their respective countries, in addition, a representative from Mitsui Bussan Aerospace Co. Ltd, gave a presentation on a new VTS simulator system using the Soar Technology. The event was attended by about 120 participants from Japanese government agencies, shipping companies and marine systems suppliers.

1.1. CAPT Terry HUGHES, UK

He started his presentation by mentioning that the most of the VTS in UK were managed by the local port authorities with three currently being under the supervision of the UK Maritime and Coastguard Agency. Then he described about the types of services provided by VTS that were primarily Information Services (INS) in addition to some Traffic Organization Service (TOS) and a few Navigational Assistance Service (NAS). However, he insisted that even the VTS which provided INS may be asked to provide NAS when vessel requested. Then he explained about the training courses of the VTS Operator (VTSO) in UK that were carried out in accordance with the IALA Recommendation V-103 series. He said that although the trainee who had a mariner's background was preferable, a marine background was not necessary. He also insisted that in addition to the initial school training at an accredited VTS training establishment, the VTSO should be trained and evaluated by continuous OJT (On the Job Training). Finally he showed a case study of a marine accident in VTS area and insisted that although NAS was a sensitive and complex subject, the team work of Master, Pilot and VTSO was important and good communication among them was indispensable for the safety of navigation.

After his presentation, he was asked who was able to provide an instruction to a VTSO trainee and answered that the person who provides the instruction needed to have qualifications appropriate to the VTS training itself. The second question was if the VTS Supervisor should have experience as a pilot and he answered that it was not necessary and depended on the requirements of the particular VTS Authority. However, training and motivation was important.

The copy of the presentation slide is attached as annex 2.

1.2. CDR Brian James TETREAULT, USA

At first he thanked the OPRF and JCG for inviting the USCG to this meeting. Then he mentioned that the services of VTS in the USA were similar to those in the UK and the all VTS were internationally based on the IMO Resolution A857(20) and the IALA Recommendations and Guidelines. He added that the VTS was also nationally authorized by the Ports and Waterways Safety Act (PWSA) and other acts and regulations. He said that 10 of the 12 VTS in the US were managed by the USCG; the VTS in Tampa and Los Angeles were managed through a partnership with local organizations. Then he discussed US VTS training matters. He stated that VTSOs were recruited from the both USCG personnel who were military and civilians who were usually retired Coast Guard or Navy crew or had commercial shipboard experience. He explained that the training course for VTSOs was based on IALA Recommendation V-103 and each VTS had its individual local training in addition. He stated that the USCG was planning to establish a training course for the VTS supervisor and establish a standard for OJT, in alignment with Recommendation V-103. He then explained the COSCO BUSAN incident which occurred in the last year in San Francisco Bay and the following activity. He said that two acts which clarified the authority of the VTSO were proposed by the U.S. Congress but he added that the acts were not specific and the USCG already had the authority to issue guidance or orders to vessels. He stated that after the investigation of the incident, it became clear that the VTSO was reluctant to provide information to the pilot; it was also clear the pilot did not request assistance from the VTS. He stated that VTSOs should be trained to fully understand his or her authority and responsibility to provide information to ensue navigation safety. Finally he mentioned that the USCG was now developing new AIS binary messages that provided environment, weather and hydrographic information and also considering to expand AIS services to nation wide and to provide VTS like services using AIS. But he insisted that the AIS was not same as the VTS.

After the presentation he was asked what was the new AIS binary messages developing by the USCG and answered that the new binary messages were flexible in its length from one to five slots and were multiply broadcasted from many AIS stations.

The copy of the presentation slide is attached as annex 3.

1.3. CAPT Kevin WONG, SINGAPORE

He started his presentation by highlighting the traffic density of the Malacca and Singapore Straits which is one of the busiest straits used for international navigation. To ensure safety in the straits, the TTEG comprising technical experts of Indonesia, Malaysia and Singapore regularly meet to discuss on navigational safety issues and implement measures in consultation with the maritime community and industrial associations. Some of the measures to enhance safety of navigation include the Traffic Separation Scheme, Rules for Navigating in Straits of Malacca and Singapore, and the

mandatory reporting system STRAITREP. He further highlighted the navigational challenges of the Malacca and Singapore Straits which is more than two hundred nautical miles in length and at its narrowest part is only one point five nautical miles wide. He added that the first voluntary ship reporting scheme in the Singapore Strait was established in 1990 and the mandatory reporting system known as STRAITREP was adopted by IMO and established in December 1998. He also described the reporting system in the Straits, which was divided into nine sectors. While the Malaysian VTS is responsible for sectors 1 to 6, Singapore is responsible for the sectors seven, eight and nine. He stated that the VTIS system of Singapore was established in 1990 and subsequently modified in 1999 and 2005, respectively in anticipation of the increase in traffic volume. He added that the VTIS system comprises eleven radars, 22 cameras at 11 sites and seven AIS shore base stations, providing a comprehensive coverage of Singapore port waters and the Singapore Strait. He elaborated that the two VTIS Centres, i.e. POCC1 and POCC2, backup each other with 100% redundancy while managing and monitoring the Singapore port waters and the Singapore Strait simultaneously. He then described the training system of the VTIS operators and supervisors. The operators are graduates of the Diploma in Maritime Transportation and Management programme from the Singapore Maritime Academy, while the supervisors are Master Mariners with Certificate of Competency Class 1. He added that the training for the operators and the supervisors are conducted by the MPA's Integrated Simulation Centre and examinations/certifications are carried out by the MPA's Training and Standards Department, in accordance with the IALA Recommendations V103-1 and V103-2 respectively. He also said that after the successful completion of the training and certification, VTIS operators and supervisors undergo periodic audits to ensure compliance and familiarization of the Standard Operating Procedures (SOP). He finally introduced several initiatives to enhance the safety of navigation in the Malacca and Singapore Straits, such as, the annual training course on Maritime Safety Management conducted by the Japan and Singapore Partnership Program for the Twenty-first century (JSPP21), and, AIS Class-B Demonstration Project.

After the presentation, he was asked if the radar system of the VTIS was also duplicated for backup since there are 2 control centres. In reply he said the 11 radars are located such that any particular operational area/sector would be covered by at least 3 radars and both control centres are highly integrated.

The copy of the presentation slides is attached as Annex 4.

1.4 MR. Satoshi OHNUKI, Mitsui Bussan Aerospace Co., Ltd.

At the beginning of his presentation, Mr. OHNUKI proposed a new VTS simulator system using the Soar Technology Inc. solution which is based on Intelligent Human Behavior Models. He explained that the Soar Technology was invented in the

USA and was now widely used in military training applications such as a flight simulator, a shooting simulation for Iraq deployment soldiers.   He added that using Soar Technology, simulators became more realistic and the trainee was able to experience more practical situations.   He then gave an example of a VTS simulator for the recruits of VTSO using the Soar.   He described that the recruits were able to simulate verbal communication between VTSO and master of vessel or captain of patrol boat and to give them a warning of a divergence from a waterway or information service during a bad visibility.   He also introduced an example of a simulator for OJT that provided a dynamic simulation in a more practical and complicated situation.   He then explained that the Soar Technology used a pattern matching capability which can recommend proposed action to the application such as VTS simulator in around 50m seconds based upon the rules.   A application generally has several 100s or several 1000s rules which is wrote in text format.   This case, rules defines each ship captain's behavior ; skill level, nationality, navigation rules, local rules, friend/bad   etc.   And he proposed best simulated an actual human behavior action to the Simulation application including human error.   He emphasized that the Soar Technology could enhance quality and efficiency of training as well as reducing cost.   Finally he showed a training image of Kurushima straight which was the most difficult straight for navigation in Japan using the Soar Technology solution.

After the presentation he was asked some commercial questions and replied to answer the questions later and individually.

The copy of the presentation slide is attached as annex 5.

2. Technical Tour

On the second day, the JCG organised a visit to the Tokyo Wan Traffic Advisory Service Centre, which included stopovers at Yokohama and the Hamarikyu Japanese Garden, near the Port of Tokyo. The delegation was shown a video on the JCG's VTS services and briefed on the operations of Tokyo Wan Traffic Advisory Service Centre. At operations centre, the experts were impressed with the navigational information services provide via AIS by the VTS, and that Japan was one of the leading countries in this field. The experts were also able to observe the latest AIS equipment and its operation. There was also a lively discussion and exchange of ideas with the JCG officers and operators at the centre.

3. Discussion

On the final day, the full-day discussion at the Kaiyo Senpaku Building was chaired by CAPT Hisao FUJII, Director, Navigation Guidance Office, Maritime Traffic Division, Japan Coast Guard. The four foreign experts and twelve JCG officers participated in this discussion. The discussion was structured in three sessions and each

session preceded with a short presentations on the existing operational procedures of the JCG. The JCG officers present fielded the questions, while the experts responded by sharing on the experiences of their respective countries. A copy of the slides used in the discussion is attached as Annex 6.

3.1 Session   "Duties and Authorities of VTS Operator and Legal Basis"

LCDR ONO explained the present situation of VTS in Japan.   He stated that a traffic control was carried out by taking huge vessel (LOA is 200 meters or over), dangerous goods carrier and tug boat towing long goods as the target and the VTS provided two types of information, general information for broadcasting and individual information including NAS.   Then he asked to each expert what extent of the authority, information, warning, advice ant instruction, was given to the VTSO in each country. In replying the question, CAPT HUGHES emphasized that the information service and the NAS were clearly different and the case of Japanese VTS was the information service.   He added that the NAS was provided for example in a situation such as sudden illness of pilot or lack of necessary equipment and categorized that~~in~~ information should be based on fact and advice based on professional opinion.

The Japanese side asked again what kind of words the VTSO issued as warning, recommendation and instruction.   CDR TETREAULT answered that the information service was provided to ensure each vessel recognized each other and understood each others' intentions; and instructions were issued when there were obvious hazards, such as limited visibility or a vessel was observed violating a navigation rule..   He added that such services were result oriented and specific maneuvering instruction such as bearing, speed were not usually issued.   CAPT HUGHES also answered that an instruction should be given in a diplomatic way and a message marker should be added at the beginning of the sentence.   He gave an example that the VTSO may probably say "instruction - do not enter the area" and should not say "steer port" or "steer starboard" and added that the final decision should always be with the Captain.   CAPT WONG responded that the Singapore VTIS provides traffic organisation service within the port waters; and information and navigational assistance services in the Singapore Strait. When necessary, Singapore VTIS issue warnings to mitigate a developing situation (e.g. grounding, close-quarters situation, etc) with the use of "Standard Marine Communication Phrases" as recommended by IALA VTS manual.   Singapore VTIS does not provide instructions, as it would undermine the responsibility of the shipmaster.

The Japanese side also asked if the authority of the VTSO was based on a domestic law and if so, what kind of the contents.   CDR TETREAULT answered that only instruction had legal basis and the US Coast Guard had the authority.   He added that if a vessel did not obey the instruction the vessel was penalized.   CAPT HUGHES also said that if a vessel broke a domestic law, there was a penalty to the vessel in UK.

CAPT SEGAR said that MPA has provisions in the Act and regulations to control, restrict and management of ships in the port waters. The VTSO are empowered by the Port Master to execute their authority. He added that MPA has six patrol boats on duty 24/7 to enforce navigational safety and environment protection in the port waters, while the patrol craft from the Police Coast Guard are responsible for security and civil cases (i.e. criminal cases).

Finally the Japanese side asked that if there is a case which the VTSO was sued by not providing information or providing improper information. CAPT WONG replied that there are provisions in the Act to protect staff from personal liability in the course of discharging their duties. Internally, if a staff is found responsible for an error, corrective actions are carried out immediately, which includes counseling and re-training (where necessary) for the staff concerned. CDR TETREAULT also answered that the US was the same as Singapore and the VTSO was protected within the scope of the government contract. He said that he knew of no such cases involving VTS but there was at least one recent law case involving conventional AtoN.

3.2 Session "Selection, Competence, Education and Training of VTS Operators"

LCDR NISHI explained the Japanese VTSO training situation that the VTSO was usually selected from the graduate of the JCG School who was already assigned to a front line post such as crew of patrol vessel, staff of the Coast Guard Office after the graduation and the VTSO received OJT before the assignment. He then asked who certified the qualification of the VTSO training in each country and if the periodic renewal of the qualification was required. CAPT HUGHES answered that there were in-class lessons and simulator training in the VTSO training course in the UK and after the satisfactory completion of the training course, the accredited school issued the course certification. He added that this certification was general and the graduate should receive an OJT in a specific VTS before officially assigned to operate as a VTSO. He said that the national competent authority issued a log book for each VTSO after the OJT and the log book needs to be revalidated every five years. CDR TETREAULT also answered that the US Coast Guard had two weeks training course based on V-103 and issued the nationally authorized certification to the trainee of the course. He then said that another certification from each VTS was also required and the national certification expired in five years if the VTSO did not continue to be engage in VTS service. CAPT WONG pointed out his presentation slides on the structured training plan for Singapore VTIS staff, he added that the training for the staff are conducted at the MPA's Integrated Simulation Centre and, examinations/certifications are carried out by the MPA's Training and Standards Department, in accordance with the IALA Recommendations V103-1 and V103-2 respectively. Besides having their logbooks endorsed annually, the VTIS staff undergo periodic internal audits and annual audits by external ISO auditors.

LCDR NISHI also asked if the experts had an opinion or comment regarding the English proficiency of the VTSO since English was one of the big problem for the VTSO training in non-English native country such as Japan. CAPT HUGHES answered that the V-103 had a recommendation regarding English proficiency and each country should decide the English level of the VTSO by itself. It was important to clearly communicate with a clear understanding of the English language.

CDR TSUTSUI then asked their opinion or comment regarding English proficiency of mariners as some mariners did not understand English communication from the VTSO. CAPT HUGHES said that this problem was mainly caused by the mariner's side, not the VTSO side and the IALA VTS Committee had noticed this problem and proposed certain amendments to the STCW. CAPT SEGAR recognizes that there exist a minority group of mariners in the Malacca and Singapore Straits, who are not proficient in the English language. These are mainly the Indonesian and Chinese vessels; hence as a practical approach the VTIS operators provide information in English and followed by Bahasa or Mandarin. In this way, situational awareness for the other vessels in the vicinity is being maintained. CAPT HUGHES added that the VTSO in Northern Europe provided information in English and their native language.

3.3 Session "Practical Use of AIS in Navigational Assistance Service"

LCDR MICHITSUJI introduced the present situation of AIS usage in the JCG which provided various information such as weather, traffic situation by AIS text message and then asked the present situation of AIS and its coverage area in each country. CDR TETREAULT answered that it is impossible to cover the whole coastal line by AIS in the US however the first AIS receive only shore station network was established in 2004 and was expanded into a more extensive one in 2008. He added that there was a plan to add the transmission capability to these AIS shore station network and it would cover approximately eighty percent of the coast. CAPT WONG said that Singapore has full AIS coverage for both the port waters and the Singapore Strait, however, does not leverage on the AIS messaging facilities to promulgate navigational information as these information are available via NAVTEX and voice broadcast. With regards to AIS binary messaging, Singapore is participating in the IMO correspondence group and is monitoring IMO's development of the messaging protocol. He added that there are plans to leverage on the AIS messaging facilities to reduce voice communication over-the-air, e.g. sending/receiving arrival notifications, and possibly STRAITREP. CDR TETREAULT said that when the AIS shore station was established in the VTS area, the US Coast Guard made the AIS carriage of SOLAS ship mandatory and abbreviated the number of the ship reporting however the first reporting was conducted by the oral communication. CAPT HUGHES explained that there was the advantage of the AIS however there was also the false information from the AIS and therefore the VTSO should not rely one hundred percent on the AIS. He

said that there was the AIS shore station network among the UK ports and harbors and it exchanged the AIS information. He added that the IALA established the world wide AIS network and some amateur organizations were publishing AIS data on the internet. CAPT SEGAR enquired if it was legal in the UK for commercial entities to establish AIS base stations ashore. CAPT HUGHES answered yes. CDR TETREAULT explained that the IMO issued a document that the usage of the AIS data was decided by each country if there was a problem. He said that the receiving AIS data was legal in the US but the using AIS data for commercial purpose may be illegal. CAPT WONG said that the Info-comm Development Authority of Singapore issue licenses for shore-based station only after consultation with the relevant Authorities (e.g. MPA) in Singapore. He added that Singapore's position is to prohibit the setting up of commercial AIS base stations on the grounds of security, as it would be difficult to monitor transmissions or the transfers of information. CDR TETREAULT said that the establishment of the AIS was also decided by the Federal Communication Commission in the US and the transmission of AIS messages from the shore station was allowed only to the US Coast Guard. LCDR YOKOYAMA asked what the usage of the world wide AIS network is since it seemed not so effective to use the network for the VTS. CAPT HUGHES answered that it could be useful to certain commercial companies to share the vessel data on the whole route from LONDON to TOKYO for example but it was not so useful in the case of the VTS.

3.4 Conclusion

After the discussion, the participants agreed on the conclusion of the meeting drafted by the JCG, as amended by the experts. The conclusion was incorporated into the Executive Summary of the meeting. At the end of the discussion, CAPT FUJII thanked to the all experts for their active participation and finally declared the closing of the meeting.

Expert Meeting on Navigational Assistance Service by VTS
Attendance

29th Oct.
The Presenter of the Symposium

NAME	Affiliation Post	note
Capt. Terry Hughes	VTS Consultant, Representing IALA	
CDR. Brian James Tetreault	Chief, Vessel Traffic Services Division, United States Coast Guard	
Capt, Kevin Kar Weng Wong	Assistant Director (Vessel Traffic Management), Maritime and Port Authority of Singapore	
Mr. Satoshi Ohnuki	Mitsui Bussan Aerospace Co., Ltd.	
Capt. Shigeo Akimoto	Director, Policy Planning and Research Office, Administration and Planning Division	the chair

31st Oct.
Foreign Experts

NAME	Affiliation Post	note
Capt. Segar MA.	Group Director (Hub Port)/ Director (Port), Maritime and Port Authority of Singapore	
Capt, Kevin Kar Weng Wong	Assistant Director (Vessel Traffic Management), Maritime and Port Authority of Singapore	
Capt. Terry Hughes	VTS Consultant, Representing IALA	
CDR. Brian James Tetreault	Chief, Vessel Traffic Services Division, United States Coast Guard	

JAPAN COAST GUARD

NAME	Affiliation Post	note
Capt. Yoshio Ozeki	Director, Administration and Planning Division	
Capt. Hisao Fujii	Director, Navigation Guidance Office, Navigation Safety Division	the chair
CDR. Yuji Ono	Deputy Director, Administration and Planning Division	
CDR. Naoki Tsutsui	Assistant to the Director, Navigation Safety Division	program director
CDR. Hideki Noguchi	Senior Engineering Officer, Aids to Navigation Engineering Division	
LCDR. Yuji Nishi	Chief, Personnel Section, Administration and Planning Division	
LCDR. Hiroshi Michitsuji	Chief, Aids Notify Section, Administration and Planning Division	
LCDR. Taro Ono	Chief, Planning and Research Section, Navigation Safety Division	
Mr. Hiroyuki Yokoyama	Engineering Officer, VTS System Office, Aids to Navigation Engineering Division	
Mr. Mototsugu Tagawa	2nd Traffic Affairs Section, Navigation Guidance Office, Navigation Safety Division	
Mr. Fujio Endo	International Affairs Section, Administration and Planning Division	
Mr. Singo Ezaki	Port Affairs Section, Navigation Guidance Office, Navigation Safety Division	

VTS in the United Kingdom

presented by

Captain Terry Hughes
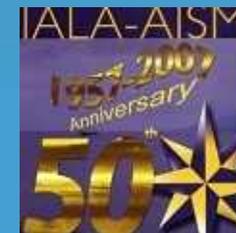
VTS in the United Kingdom

Captain Terry Hughes

Chairman Personnel & Training

IALA VTS Committee

VTS in the United Kingdom

Captain Terry Hughes

UK National VTS Representative
for Trinity House Lighthouse Service
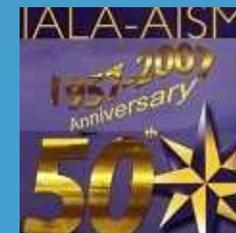
VTS in the UK

There are 85 Ports

and

26 designated VTS centres

VTS in the UK

**Channel Navigation Information Service
operated by Dover Coastguard**

VTS in the UK

Nab VTS - operated by Southampton VTS

Southampton VTS Authority Limits

Key to VTS Authority and VHF Channels

- Southampton VTS (NAB AREA) VHF Ch. 12
- Southampton VTS (QHM Dockyard Port of Portsmouth Area) VHF Ch.12
- Southampton VTS (Southampton Harbour Area) VHF Ch. 12
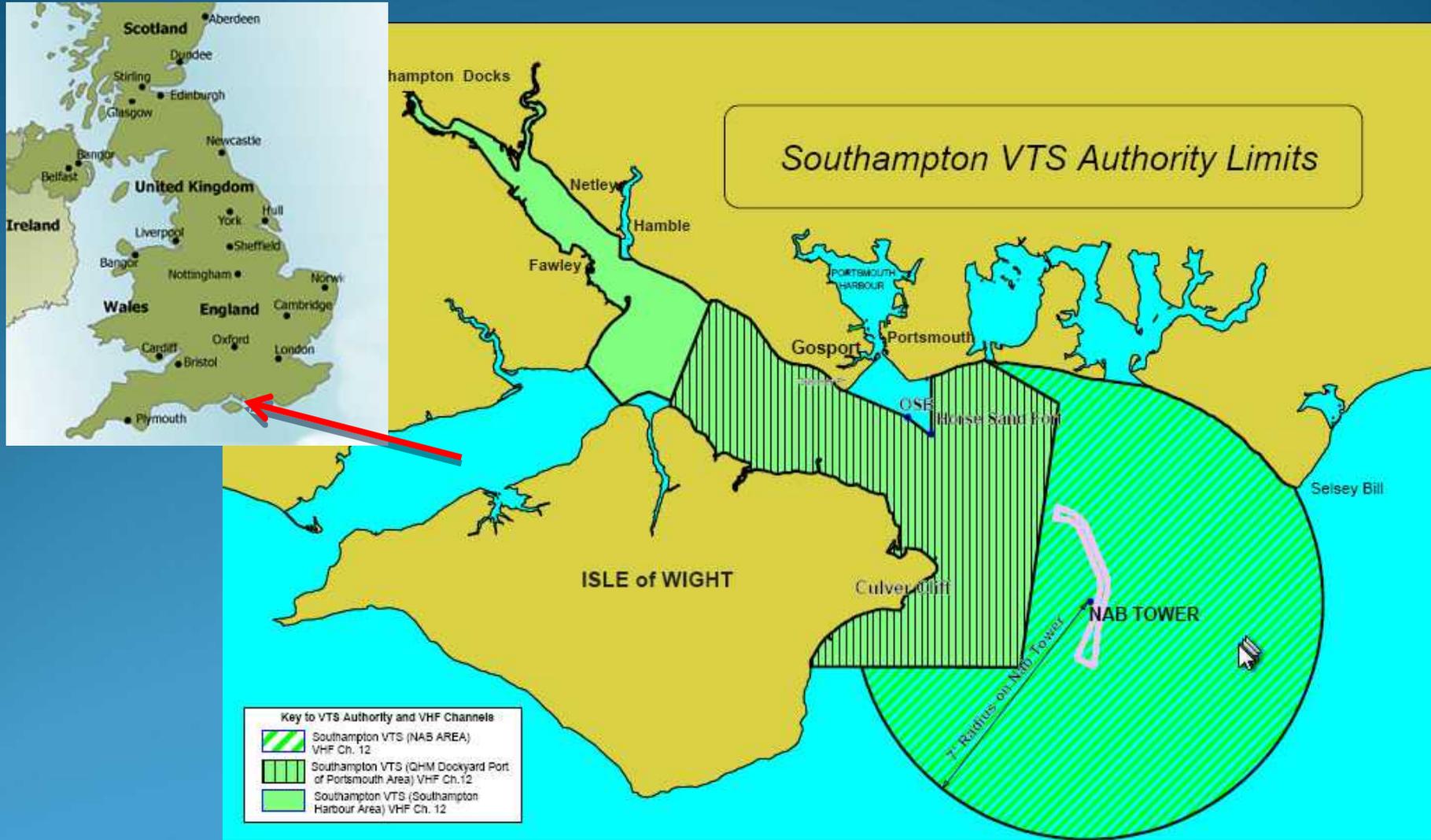
VTS in the UK

Severn VTS - operated by Bristol VTS
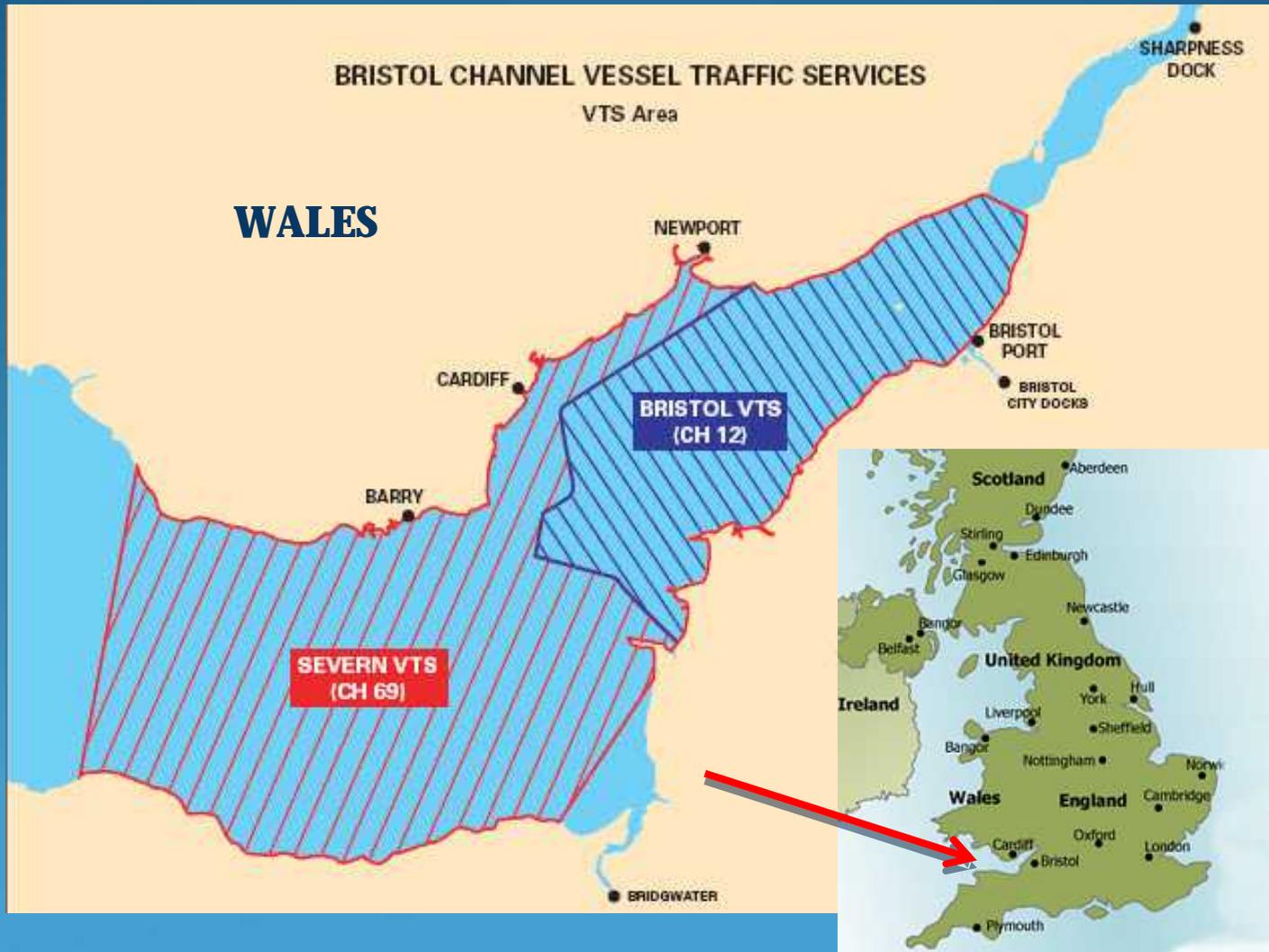
VTS in the UK

HARWICH

Sunk VTS
to be operated by
Dover CG

LONDON
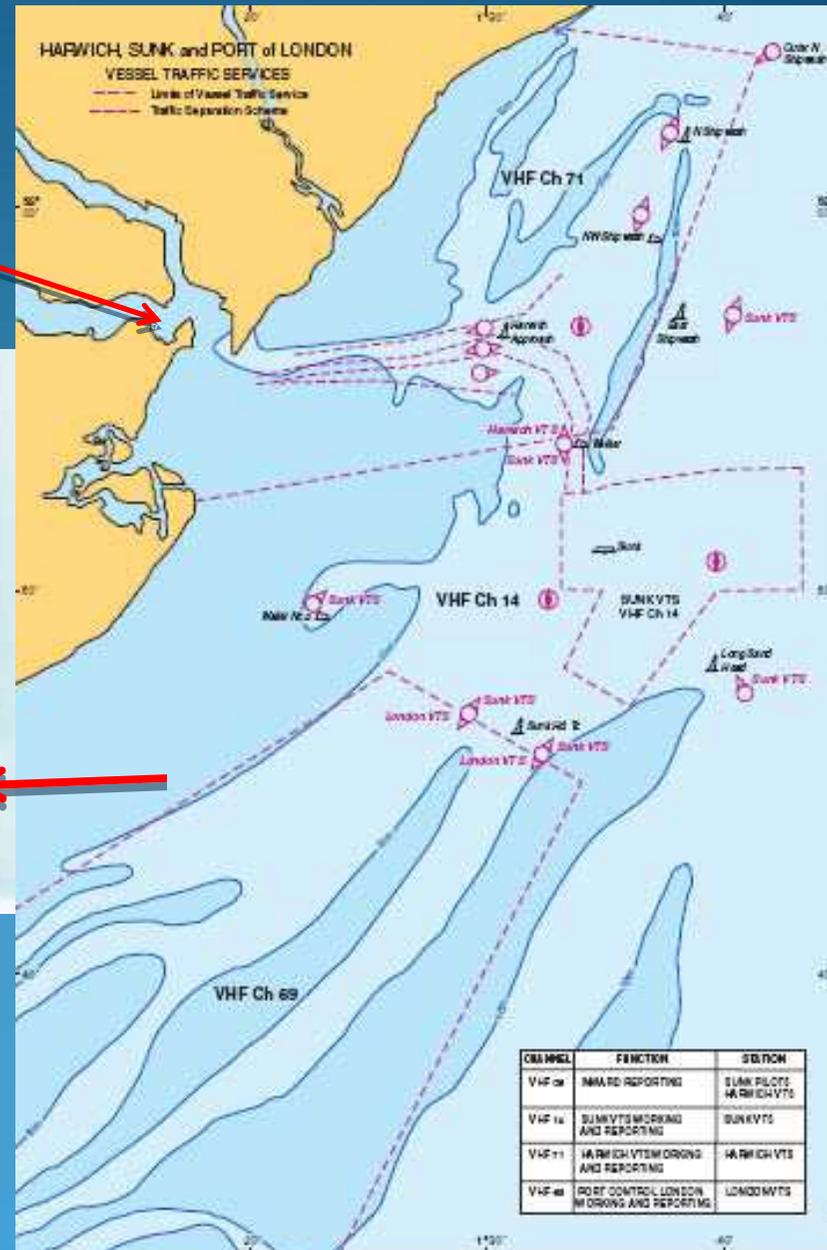
VTS in the UK

RECRUITMENT & TRAINING

VTS Authority recruits from:
Maritime and/or non-Maritime background

VTSOs are trained at:
Accredited VTS training organisations
to IALA V-103 standard

This is followed by
specific On the Job Training (OJT)
at their VTS Centre

VTS in the UK

TRAINING
in addition to classroom

VTS Simulator

VERY important for VTSO assessment

Exercises should ideally be in a generic/neutral area

They should cover all aspects of VTSO duties

Assessments should be continuous

VTS in the UK

VTS CENTRE STAFFING

Number of personnel depends on Port size

VTS Manager

VTS Supervisor
V103-2

VTSO	VTSO
V103-1	V103-1
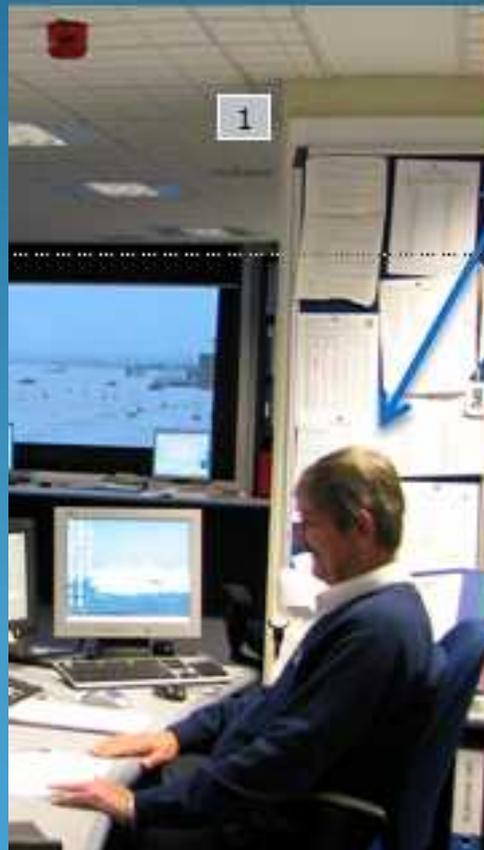
The VTSO

VTS in the UK

TYPES OF SERVICE PROVIDED

Information Service

… is a service to ensure that essential information

becomes available in time for on-board decision making

… it is based on observed facts, situations etc

VTS in the UK

VTSO DUTIES
for Information Service

PROVIDE

Traffic information

Navigational information

Hydrological / Weather information

MONITOR

Traffic

Vessels in Transit - at Berths - in Anchorages

VTS in the UK

TYPES OF SERVICE PROVIDED

Traffic Organisation Service

... 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 VTS area

VTS in the UK

VTSO DUTIES
for Traffic Organisation Service

In addition to Information Service

Scheduling movements

Establishing routes

Monitoring routes / passage plans

Monitoring speed limits

VTS in the UK

TYPES OF SERVICE PROVIDED

Navigational Assistance Service

"... is a service to **assist** on-board navigational decision-making and to **monitor** its effects"

VTS in the UK

TYPES OF SERVICE PROVIDED

Navigational Assistance Service

navigational information is information using VTS sensors and the traffic image (**FACTUAL**)

navigational advice is where a professional opinion is included

The Team

Master

VTSO

Pilot

CASE STUDY

**TSS
in a
VTS area**
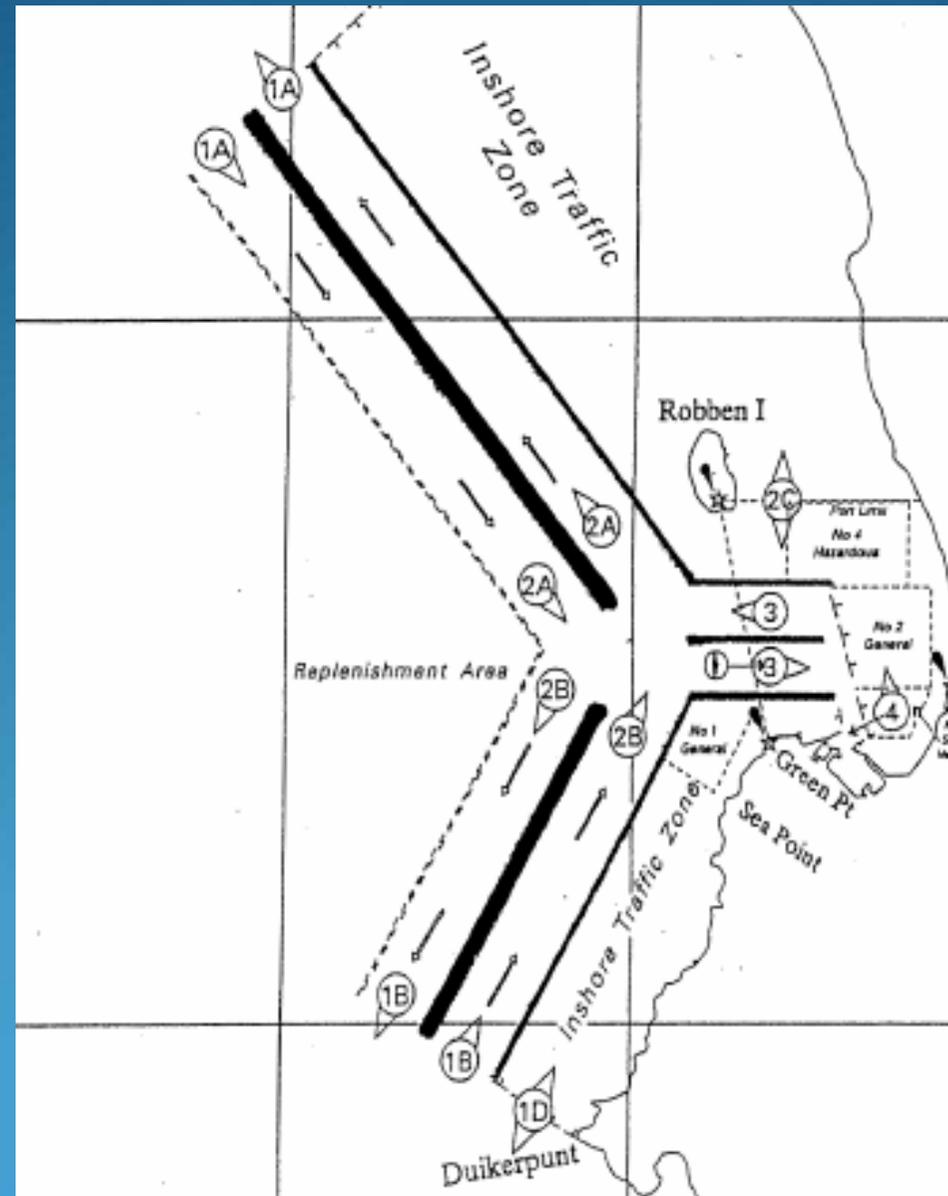
CASE STUDY

arriving vessel
berth not ready

departing vessel

informed about
arriving vessel
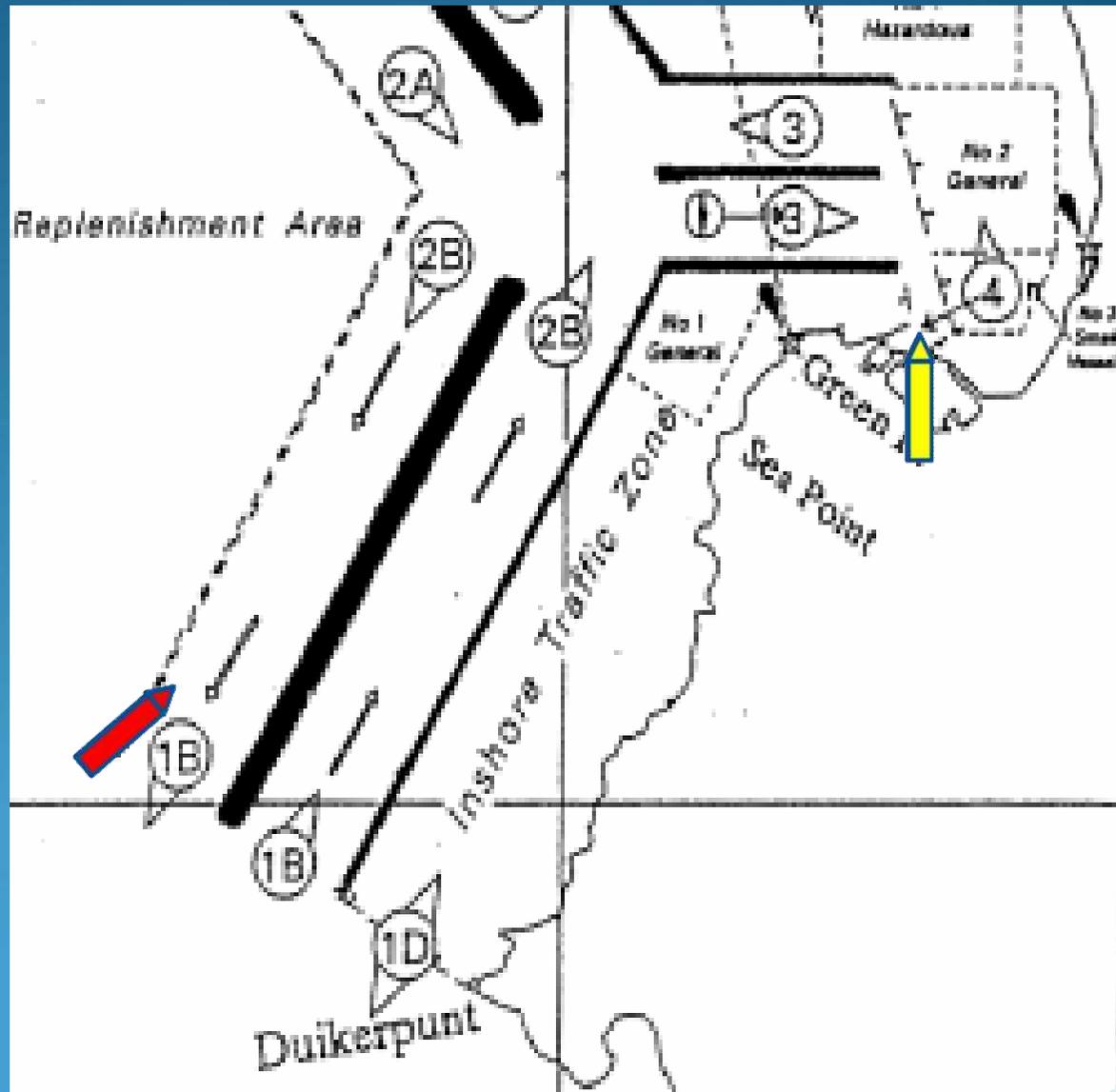
CASE STUDY

arriving vessel

departing vessel
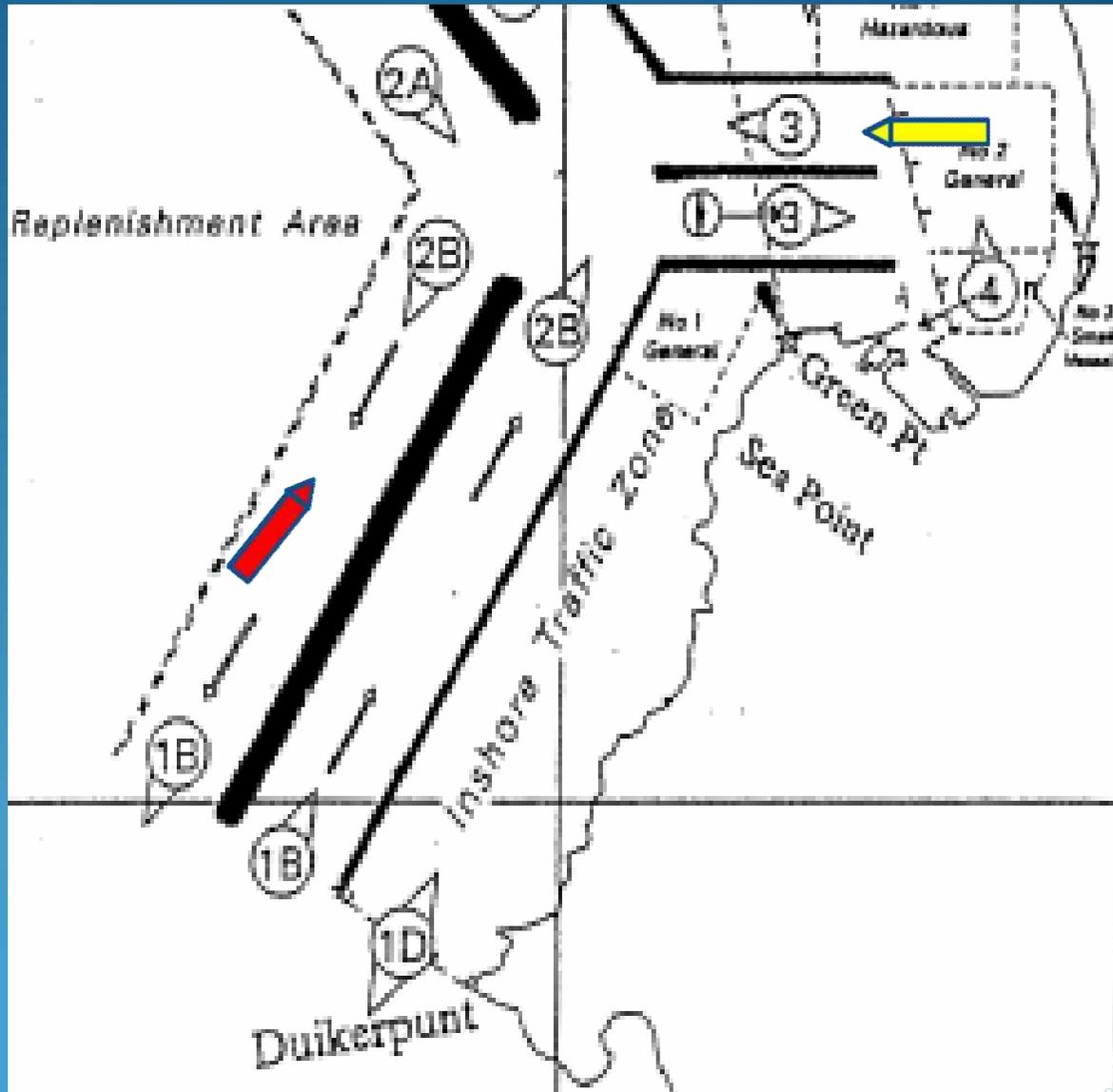
CASE STUDY

arriving vessel
not informed about
departing vessel

not informed about TSS

departing vessel
at RP 3

no update about
arriving vessel
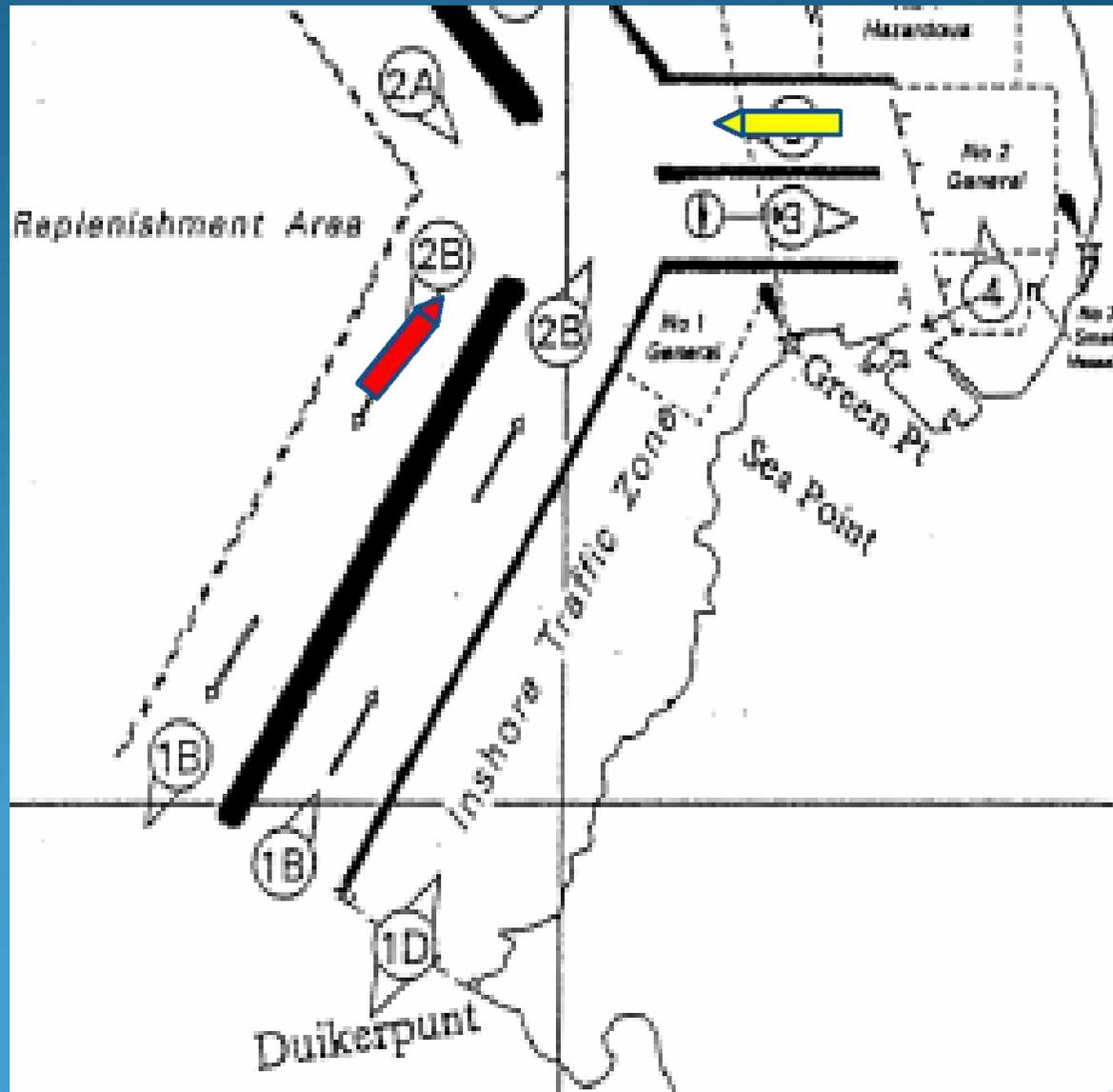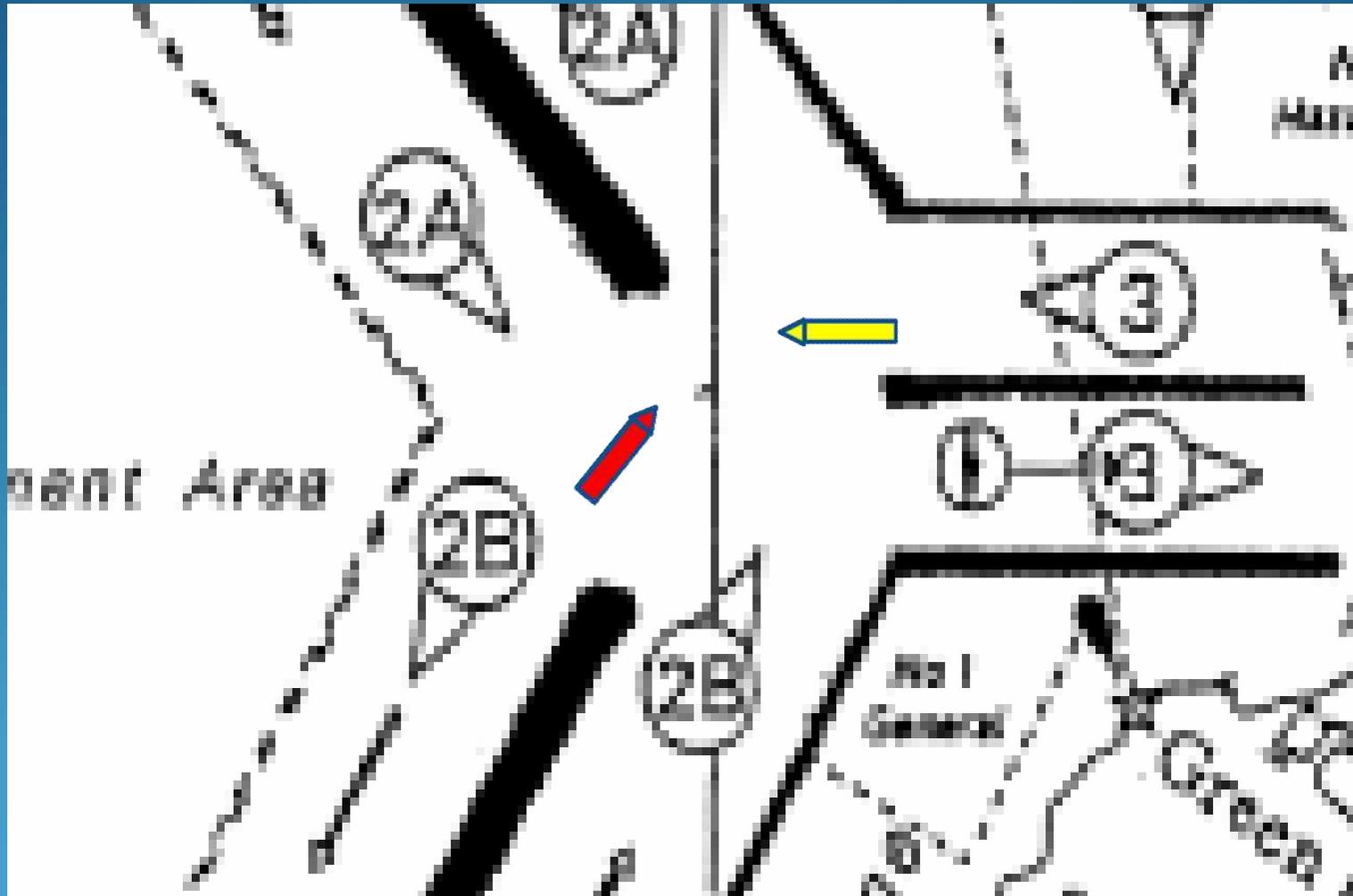
CASE STUDY

CASE STUDY
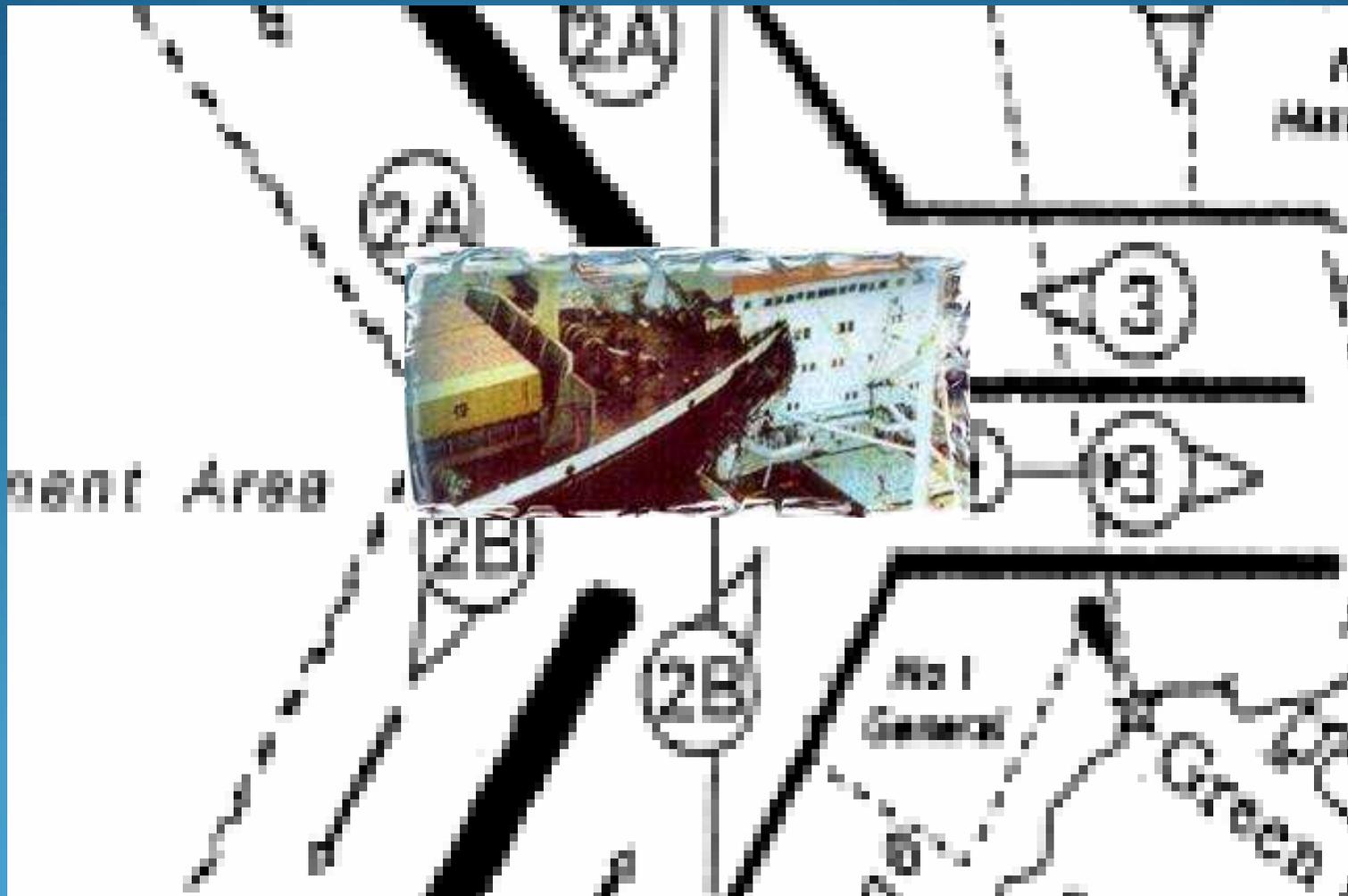
CASE STUDY

SUMMARY OF RESULTS:

The Port Authority stated in various publications that it would assist traffic in the VTS area

It was advertised that the Port Authority, *"will provide the vessel with more accurate information of other vessels positions and the density of traffic converging on the same positions"*

VTSO did not carry out duties and ignored Standard Operating Procedures

CASE STUDY

SUMMARY OF RESULTS:

Who was responsible for accident ...

The VTSO or Management ?

CASE STUDY

SUMMARY OF RESULTS:

Ships admitted liability for collision

P&I Clubs not 'happy' that collision occurred in VTS area

Court Case - settled out of Court (against Port)

Improper or Lack of Communications Annex2

Ensure that ...
VHF terminology complies with SMCP

Use Message Markers ...
Information
Warning
Advice (based on Recommendation)
Instruction – designated person

Improper or Lack of Communications

Ensure that ...
VHF terminology complies with SMCP

Use Message Markers ...
Information
Warning
Advice (based on Recommendation)
Instruction – designated person

VTS in the UK

presented by

Captain Terry Hughes

www.maritime-vts.co.uk

Thank You!

VTS in the UK

presented by

Captain Terry Hughes

www.maritime-vts.co.uk

Arigato Gozaimas!

# Vessel Traffic Services in the United States:
Status, Current Issues and Future Developments

Ocean Policy Research Foundation
VTS Workshop
29-31 October 2008

Commander Brian Tetreault
Chief, Vessel Traffic Services
Office of Shore Forces (CG-7413)
U.S. Coast Guard
Washington, DC
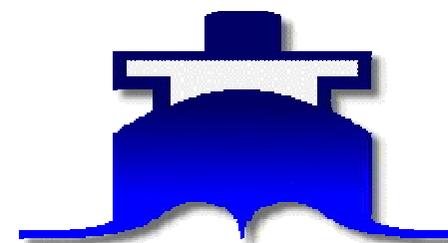
Providing navigation safety information
for America's waterways

Homeland Security

Presentation Outline

- USCG VTS Overview
    - International Guidance and National Authority

- Operational Procedures
    - Development and Implementation of VTS standard procedures

        ・Existing procedures

        ・Alignment with IMO and IALA guidelines and recommendations

        ・Legal matters
    - Locations

- VTS Personnel and Training

- Recent developments
    - Incidents
    - Investigations and potential legislation
    - Changes to VTS operations

Homeland Security

# U. S. Coast Guard Vessel Traffic Services Overview

The mission of the VTS Program is to maximize the safe and efficient use of waterways by preventing marine accidents and their associated environmental damage.

- International Guidance
    - IMO Resolution A.857(20)
    - IALA Recommendations and Guidelines
- U. S. National Authority
    - Ports and Waterways Safety Act (PWSA) (1972)
        - Authorized establishment and operation of VTSs
    - Ports and Tankers Safety Act (1978)
        - Amended PWSA to clarify VTS authority
    - Oil Pollution Act of 1990 (OPA 90)
        - Made VTS participation mandatory
- VTS Regulations
    - Implement authority, mandate requirements for participation, equipment carriage, establish operating requirements, etc.
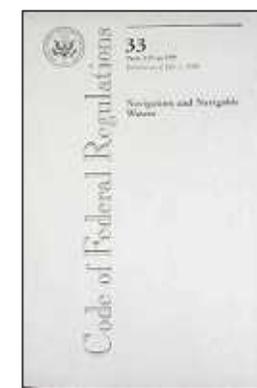
VTS Operational Procedures

- Existing measures (passive)
    - Regulations, Rules of the Road, TSS

- VTS procedures
    - National Standard Operating Procedures (NSOP)
    - Local Procedures
        - Developed in cooperation with local users
        - Determined by local situation and risk
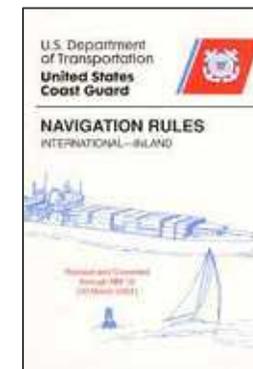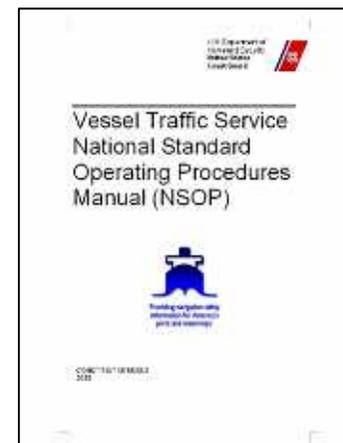
- VTS Exercise of Authority
    - "Continuum of Control"
- Monitor
    - Surveillance capability
- Inform
    - Communications
- Advise/Recommend
    - Knowledge, procedures
- Direct
    - Authority

Employment in VTS Operations

Monitor   Inform   Recommend   Direct

Level of Control

Homeland Security
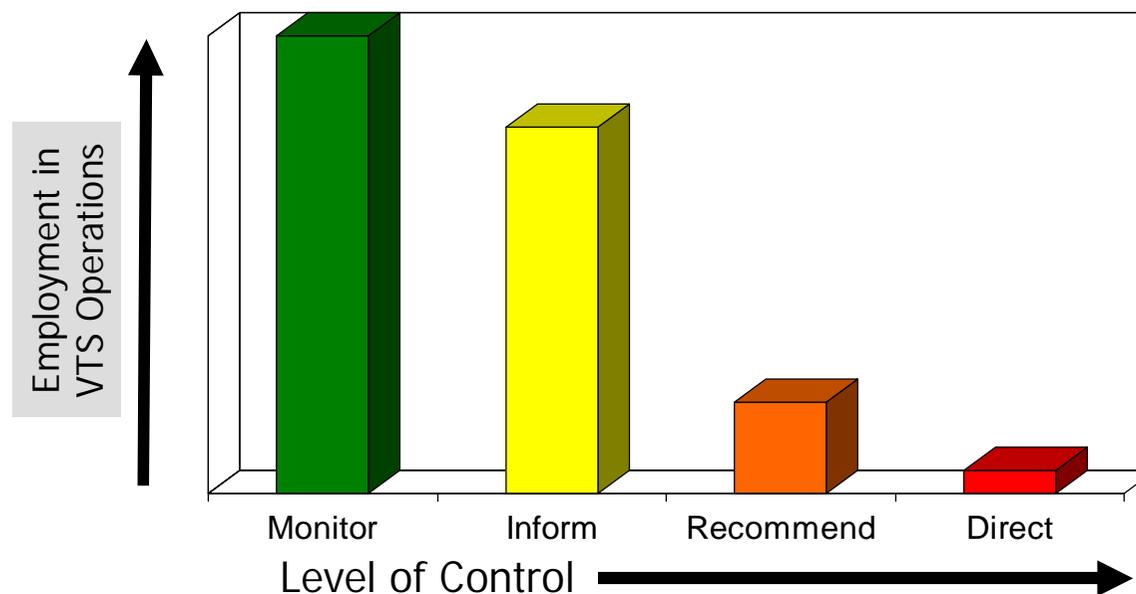
VTS Locations

★ USCG operated

☆ USCG-local Partnership

Prince William Sound
(Valdez)

Puget Sound
(Seattle)

St. Mary's River
(Sault Ste Marie)

New York

San Francisco

Louisville

Los Angeles-Long Beach

Berwick Bay
(Morgan City)

Port Arthur

Lower Mississippi River
(New Orleans)

Houston-Galveston

Tampa
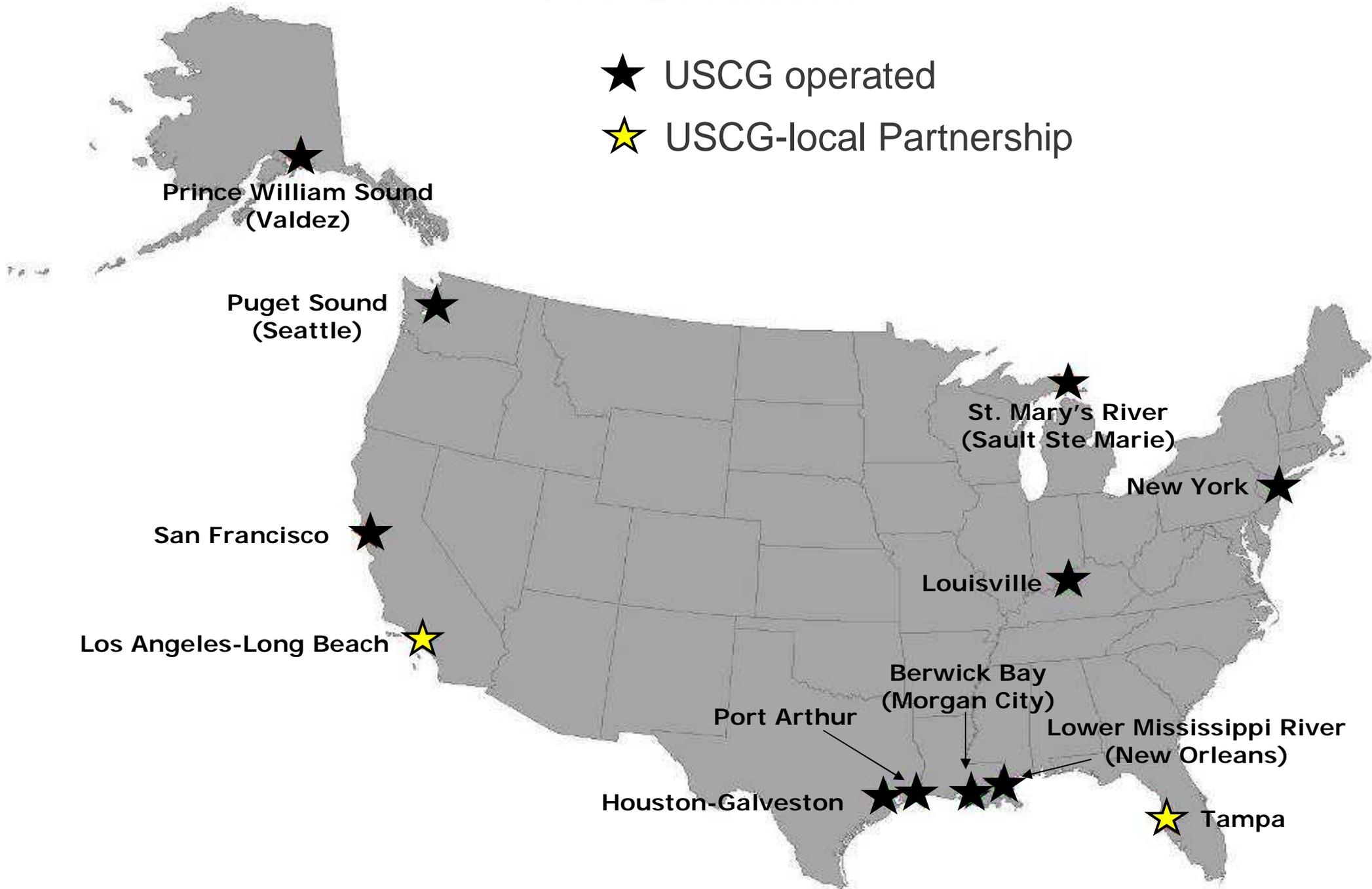
VTS Personnel and Training

- Personnel:
  - Military and Civilian
  - Shipboard experience
  - Most VTS employees are retired military or commercial mariners
- Training
  - Alignment with IALA V103
  - National Certification
    - 2 week course at maritime training facility - MITAGS
      - Basic VTS Concepts
      - VTS authority and regulations
      - Simulation
  - Local Training at "home" VTS
    - 4-6 months
    - Builds on certification course
    - Local geography, regulations, procedures
- Refresher Training and Recertification
  - Local – developing national Standards
- In development:
  - Supervisor training
  - Local "On the Job Training (OJT)" standards
  - "Grandfather" certification

Homeland Security

COSCO BUSAN Incident
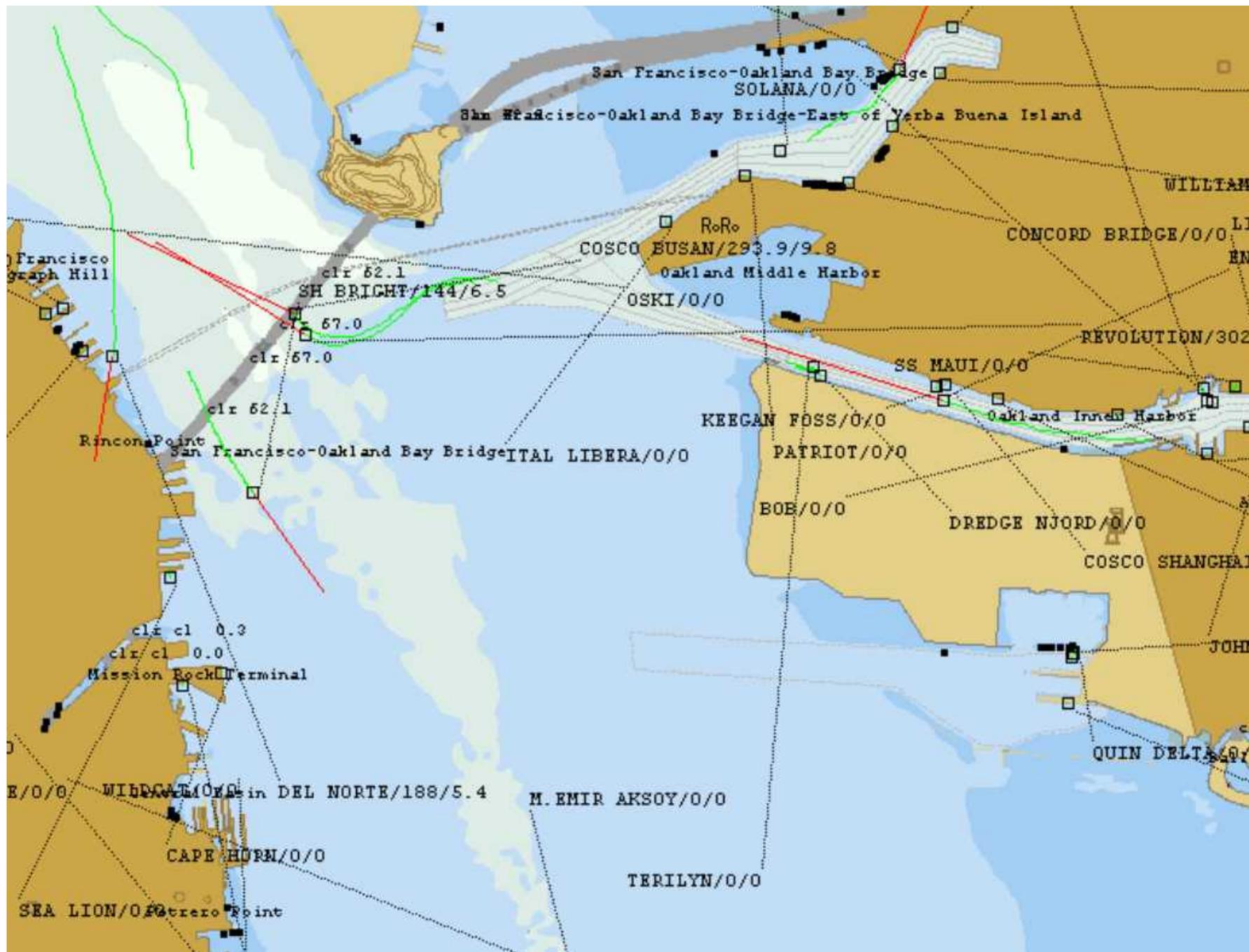
08:24:54

All looks OK

All times approximate and unofficial

Homeland
Security
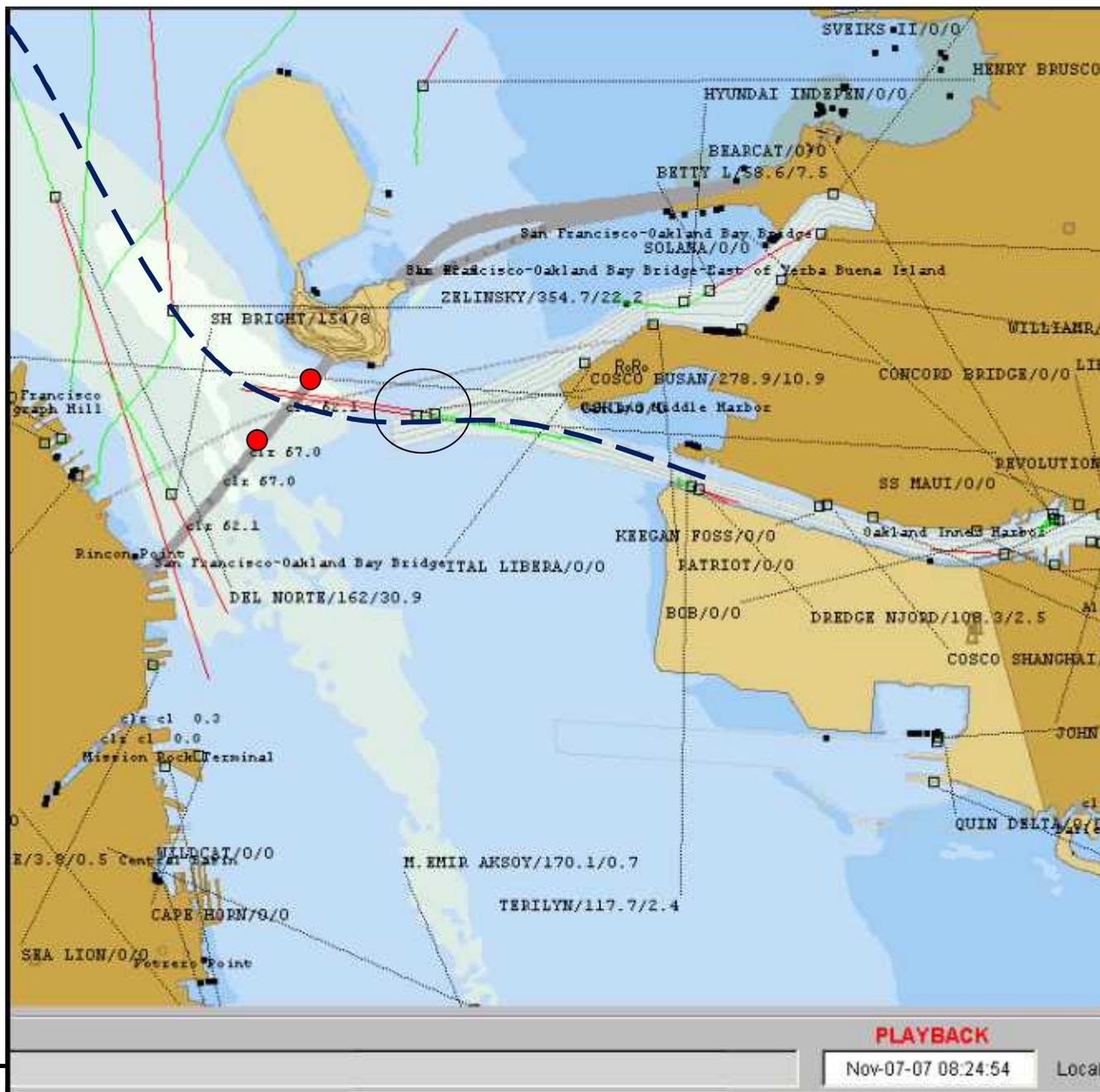
08:26:24

VTS calls; asks if pilot still intends to use D-E span
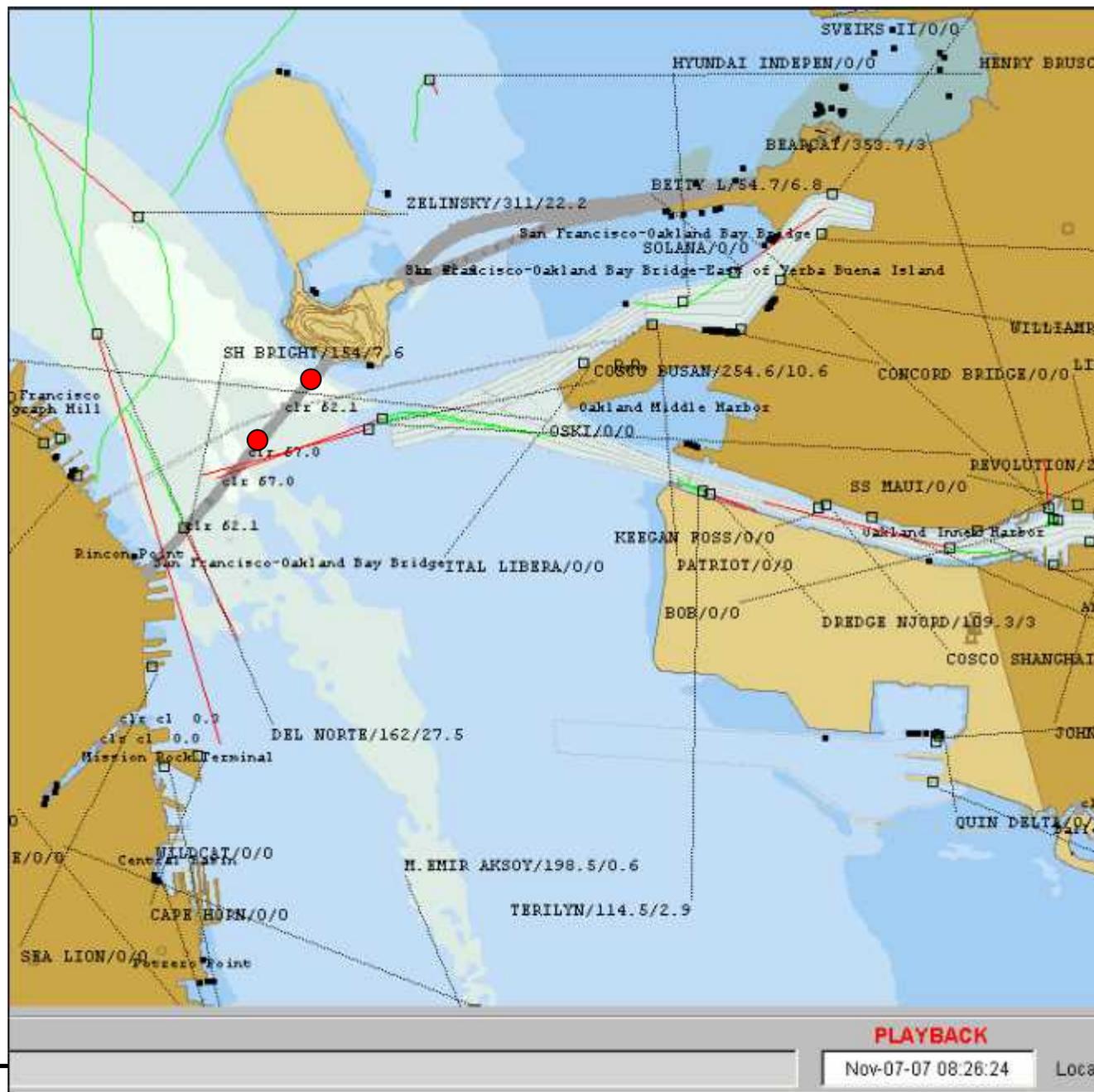
All times approximate and unofficial

Homeland Security

08:27:50

VTS calls again;
informs pilot VTS
AIS shows
COSCO BUSAN
on 235 heading
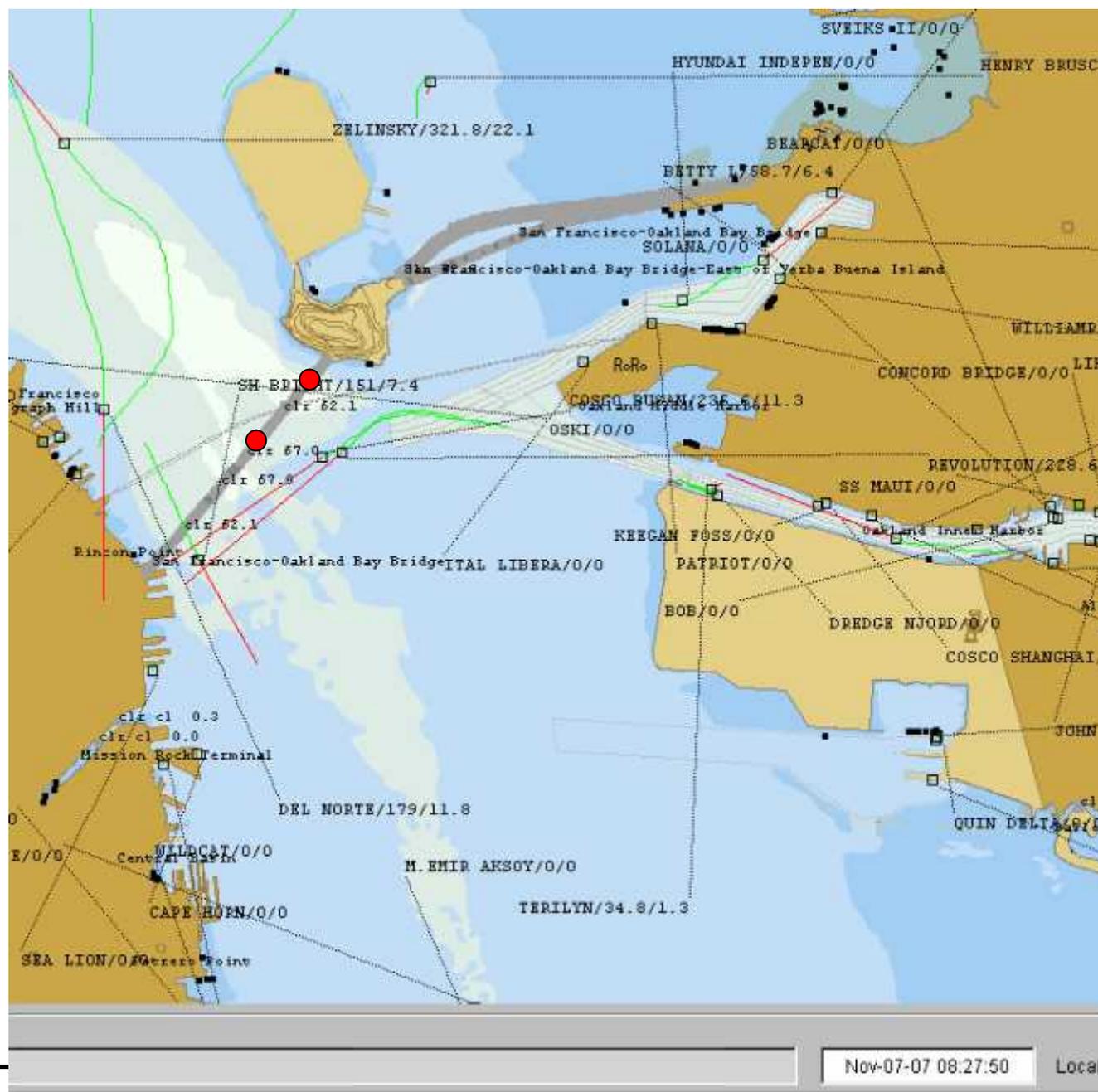
All times approximate and unofficial

Homeland
Security

08:30:05

COSCO BUSAN
has struck bridge
fendering system
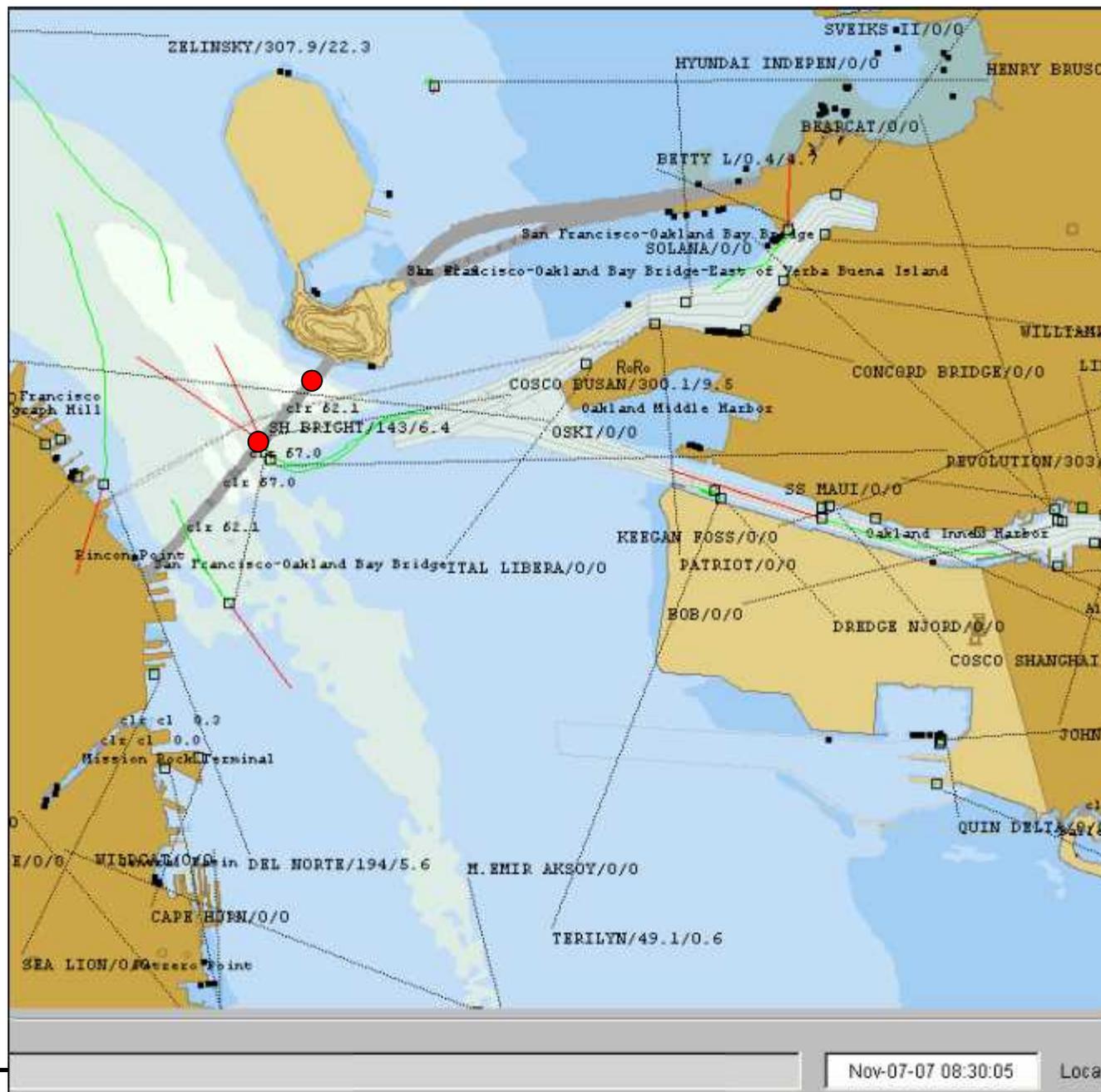
All times approximate and unofficial

Homeland
Security

COSCO BUSAN Incident

- Investigations
  - National Transportation Safety Board (NTSB)
  - Department of Homeland Security Inspector General
  - USCG Internal reviews and investigations

- Legislative action

- Changes to VTS procedures
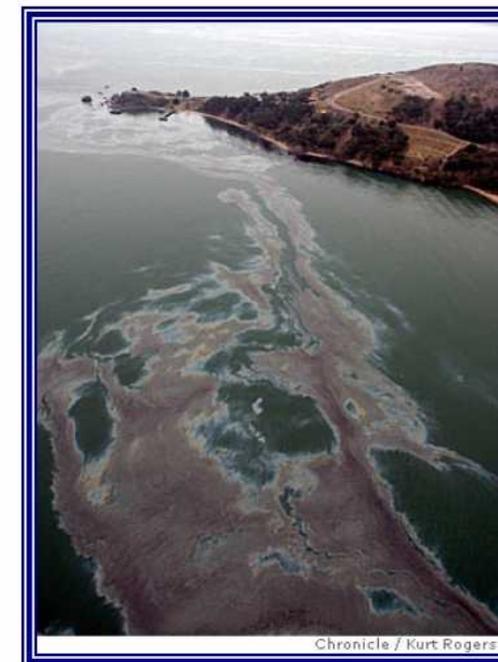
Chronicle / Kurt Rogers

Source: San Francisco Chronicle

Chronicle / Michael Macor

Source: San Francisco Chronicle   M/V COSCO BUSAN at Anchor

Homeland Security

Legislative action

```
21  SEC. 3. MARITIME EMERGENCY PREVENTION.

22      (a) IN GENERAL.—Section 4 of the Ports and Water-
23  ways Safety Act of 1972 (33 U.S.C. 1223) is amended
24  by striking "operate or" in subsection (b)(1) and inserting
25  "operate, including direction to change the vessel's head-
26  ing and speed, or".

    •S 2699 RS
```

```
1  "§ 99. Emergency command authority

2      "(a) IN GENERAL.—Using the Vessel Traffic Service
3  (VTS) maintained under the Ports and Waterways Safety
4  Act of 1972 (Public Law 107–340, 33 U.S.C. 1221 et
5  seq.), the Secretary may command the person directing
6  the movements of a vessel to modify the speed or direction
7  of a vessel in the event of an emergency or hazardous con-
8  ditions as determined by the local Coast Guard VTS direc-
9  tor.

10      "(b) LIMITATION ON CIVIL ACTIONS.—

11      "(1) IN GENERAL.—Notwithstanding any other
12  provision of law, a civil action for damages may not
```

Changes to PWSA VTS Authority
- More specific: direct "speed of direction"

Additional limitation of liability

Current language:

```
(b) Special powers
    The Secretary may order any vessel, in a port or place subject to the jurisdiction of the United States
or in the navigable waters of the United States, to operate or anchor in a manner he directs if--
        (1) he has reasonable cause to believe such vessel does not comply with any regulation issued under
this chapter or any other applicable law or treaty;
        (2) he determines that such vessel does not satisfy the conditions for port entry set forth in
section 1228 of this title; or
        (3) by reason of weather, visibility, sea conditions, port congestion, other hazardous
circumstances, or the condition of such vessel, he is satisfied that such directive is justified in the
interest of safety.
```

Legislative action

1 SEC. 3. LAPTOP NAVIGATION REQUIREMENT FOR FEDER-

2   ALLY LICENSED PILOTS.

3   The Commandant of the Coast Guard shall require

4 that, beginning not later than 90 days after the date of

5 the enactment of this Act, any pilot licensed under subtitle

6 II of title 46, United States Code, who directs the move-

7 ment of a vessel in circumstances in which the applicable

8 State or local pilotage authority determines that utiliza-

9 tion of a laptop computer equipped with a navigation sys-

10 tem aboard is practicable and necessary, the pilot shall

11 carry and utilize a laptop computer so equipped for navi-

12 gation purposes.

13 SEC. 4. AUTHORIZATION OF APPROPRIATIONS.

14   There is authorized to be appropriated $20,000,000

15 for the upgrading of Coast Guard equipment and tech-

16 nology for the Vessel Traffic Service.

Proposes equipment requirements for pilots
- Not specific
- Carriage for persons vs. vessels
- State vs. Federal authority

More money for VTS!
- Unfortunately, not likely...

Homeland Security

Changes to VTS Procedures following COSCO BUSAN incident

- Accelerated development of VTS National SOP

- Development of standards for better coordination and information sharing between VTS and other authorities (SAR, pollution response)

- Development of national standards for providing Navigational Assistance
  - Aligned with draft IALA NAS guidelines
  - National guidance on procedures and communications

- Increased training of operators to use more assertive communication
  - Emphasize existing VTS authority
  - Address liability concerns

- Specific VTS San Francisco changes:
  - Developing re-certification program for veteran operators
  - Additional VTSO when fog limits visibility to <1NM
  - Transit restrictions during reduced visibility
    - Developed in cooperation with local mariners, authorities

Homeland Security

Additional US VTS developments

- AIS Binary Broadcast
  - Research Project
  - Evaluated existing IMO binaries
  - Developing and testing new binary applications
    - Environmental – in testing
    - Zone – in limited testing
    - Waterways Management – under development

- Coordination with Nationwide AIS project
  - Equipment coordination
  - AIS outside of VTS Areas
  - Expanded Services

- VTS-like services outside of VTS Areas

Summary

- USCG VTS Overview
  - International Guidance and National Authority

- Operational Procedures
  - Development and Implementation of VTS standard procedures
  - VTS Locations

- VTS Personnel and Training

- Recent developments
  - COSCO BUSAN Incident
  - Investigations and potential legislation
  - Changes to VTS operations

Thank you for your attention!

Vision for expanded use of AIS in VTS

- Improved VTS efficiency

  - Reduce voice communications

  - Possibility of "silent" traffic advisories

  - Automatic encounter lists

- Improved VTS services

  - Better, more information to mariner

  - In usable format

  - Less intrusive

- Support to other agencies

  - NOAA

  - Army Corps of Engineers

  - Others

- Future use of and coordination with AIS outside of VTS

Communicate VTS navigation safety information
Meteorological information

U.S. Coast Guard AIS Binary efforts

USCG created an R&D project with three goals:

1. Establish a working group
   - External involvement (mariners, equipment manufacturers, etc.). Ensure alignment with standards, coordination with international efforts

2. Perform a Requirements Study
   - Determine user needs; help with technology development

3. Develop and implement a test bed
   - Test concepts, ideas, draft standards prior to wide implementation
   - Coordinate demonstration projects

- Tampa Test Bed
  - Transmit PORTS data
  - Local user community – pilots, tug companies, others
  - Began September 2008

- Stellwagen Bank demonstration project
  - Broadcast of endangered Right Whale locations
  - Test of zone message

Homeland
Security

SAFE NAVIGATION IN THE SINGAPORE STRAITS

By
CAPT KEVIN WONG
ASSISTANT DIRECTOR (VESSEL TRAFFIC MANAGEMENT)

M P A
SINGAPORE

Total GT for Vessel Arrivals (1994 to 2007)

Total GT in Million Tons

678.56 710.58 768.52 808.30 857.66 877.13 910.19 960.09 971.67 986.39 1042.45 1151.79 1314.98 1459.22
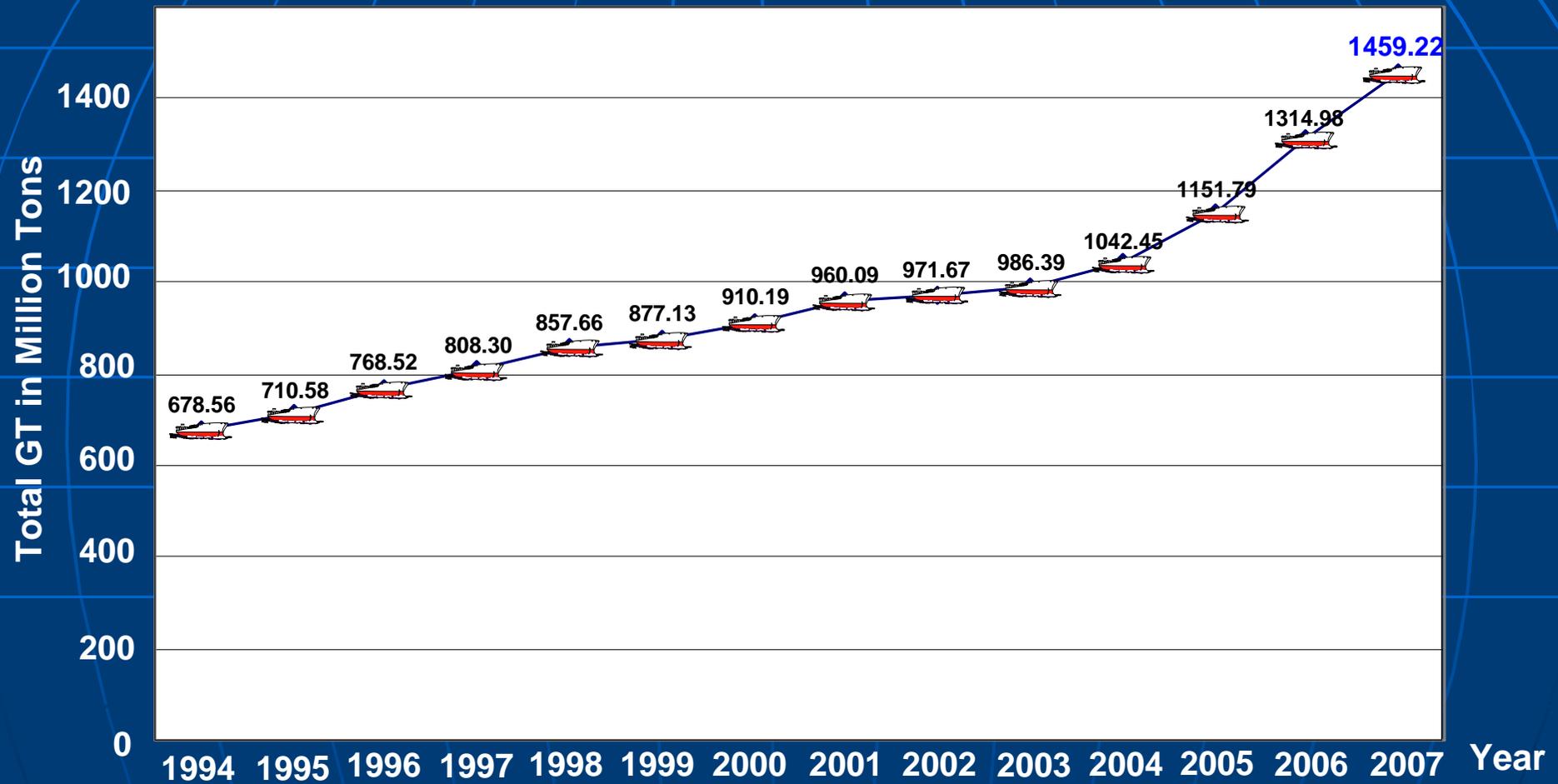
Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
GT (MT)	678.56	710.58	768.52	808.30	857.66	877.13	910.19	960.09	971.67	986.39	1042.45	1151.8	1314.98	1459.22
ARRIVAL	101.11	104.01	117.72	130.33	140.92	141.52	145.38	146.27	142.75	135.39	133.185	130.32	128.92	128.57

Promoting safety of life at sea and protection of the marine environment

At the regional level…

- Tripartite Technical Expert Group (TTEG)

  - ✓ Indonesia, Malaysia and Singapore

  - ✓ Straits Malacca and Singapore

  - ✓ Establishment of TSS, DWR and Rule for Vessels Navigating through the Straits

The 1970s
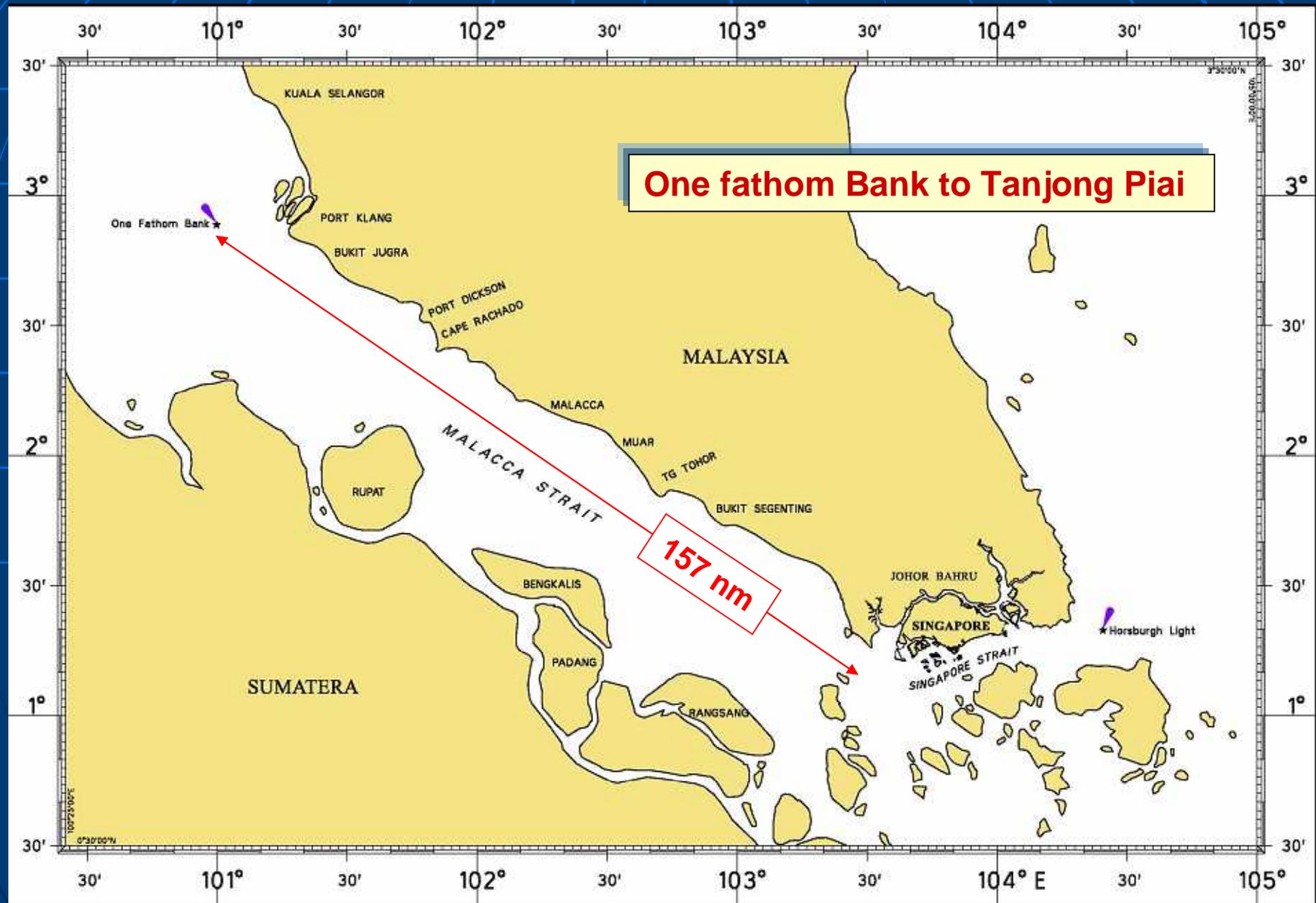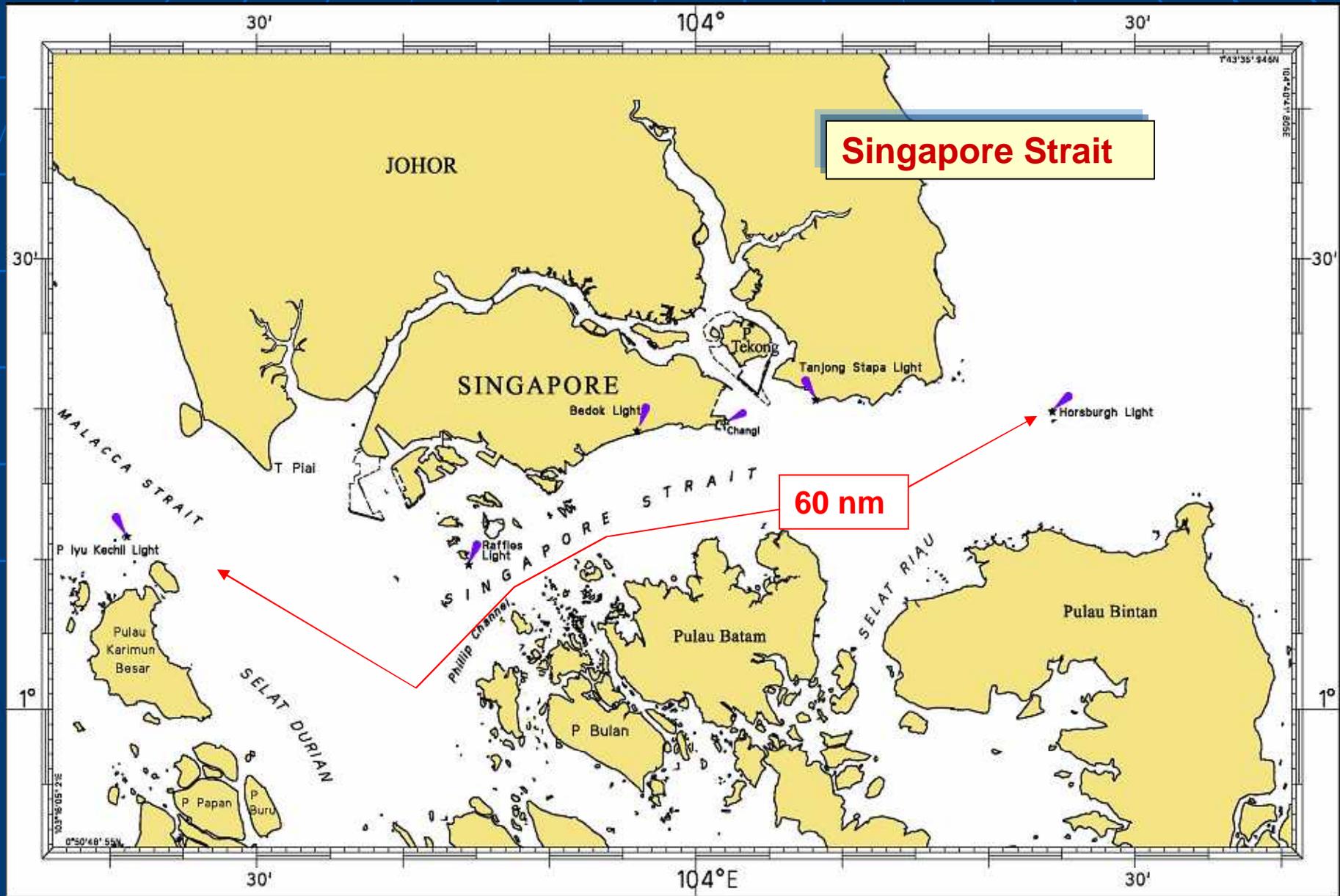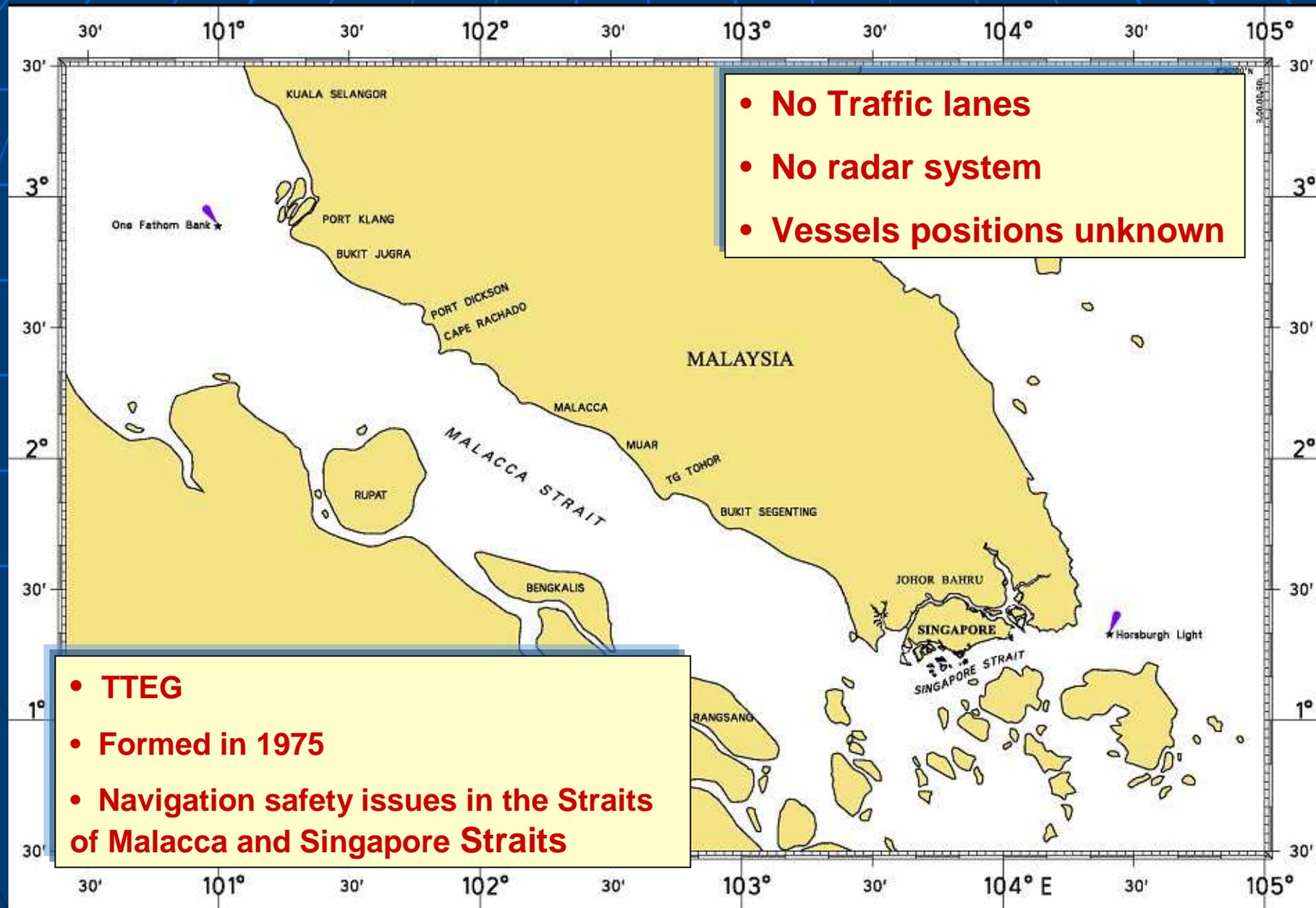
Singapore Strait

60 nm

St. John's Island and Batu Berhenti Area

1.5 nm wide!

Annex 4

The 1980s – Routing System

May 1981 (IMO resolution)

• **Traffic Separation Schemes (TSS)**

• **Deep Water Route for Deep Draft Vessels**

• **Rules for Vessels Navigating in the Straits**

• **Reporting procedures for Deep Draft Vessels**
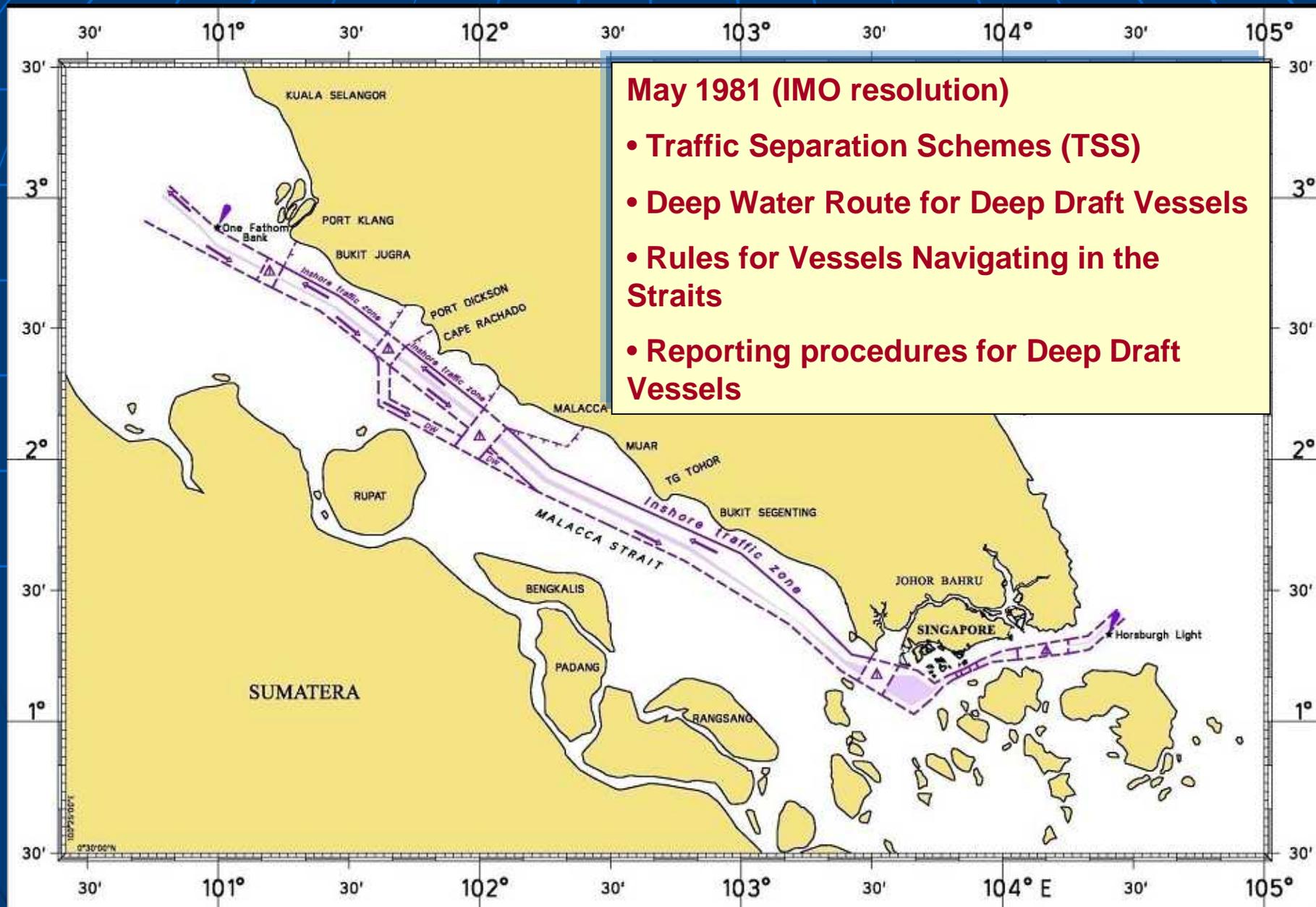
1990s - Proactive Traffic Management

VTIS Singapore

- **Established Oct 1990**
- **Voluntary ship reporting system in the Singapore Strait**
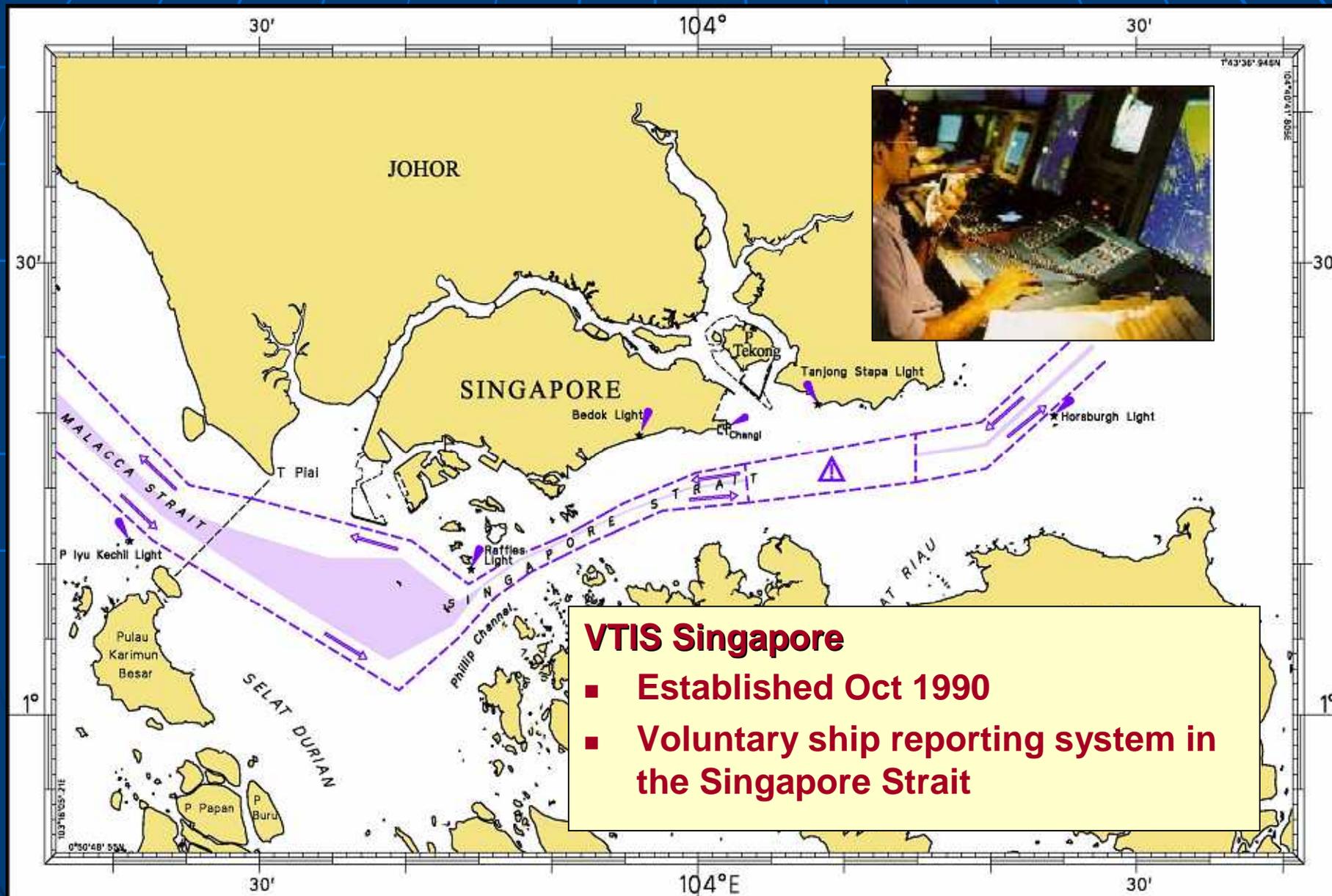
Mandatory Ship Reporting System - STRAITREP

- Jointly implemented by the 3 littoral States

- Adopted by IMO on 19 May 1998

- Resolution MSC.73(69)

- In force 0000hrs UTC on 01 Dec 1998

- Strait of Malacca and Singapore

Mandatory Ship Reporting System - STRAITREP

Objectives

- Enhance safety of navigation
- Protect the marine environment
- Facilitate movements of vessels; and
- Support SAR and Oil Pollution response

Applicable to …

All vessel >300GT or >50m LOA

Vessels carrying hazardous goods

Passenger Vessels

Towing or Pushing, combined GT > 300 or >50m LOA

STRAITREP Operational Areas

STRAITREP

- **Name of ship**
- **Call sign**
- **IMO number**
- **Position**
- **Hazardous cargo**
- **Deficiencies (if any)**
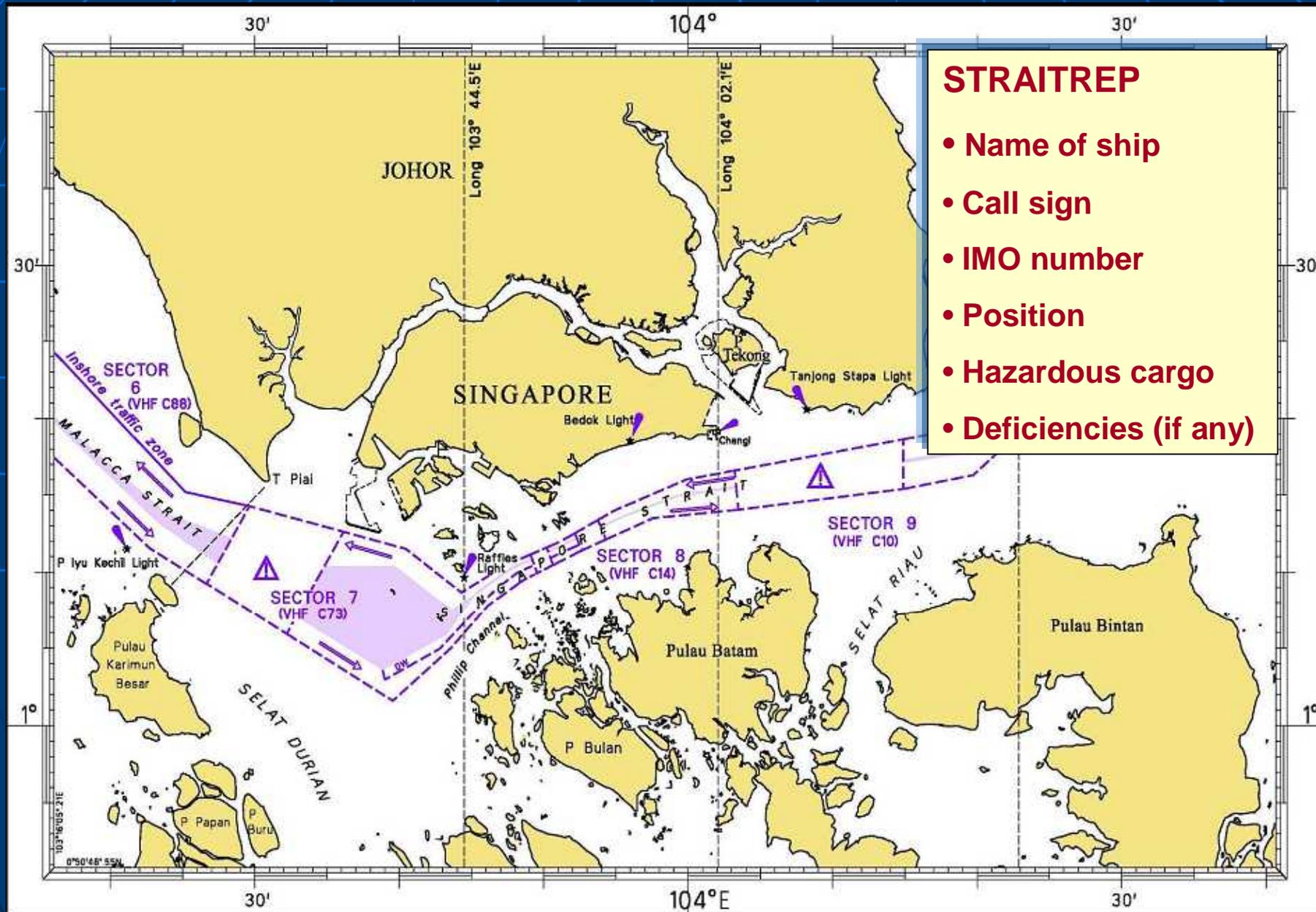
VESSEL TRAFFIC INFORMATION SYSTEM (VTIS)

- Use of radars and communication systems known as Vessel Traffic Information System (VTIS) to monitor shipping traffic in the port waters and Singapore Strait

- The VTIS was introduced in 1990 and upgraded in 1999

FUNCTIONS OF VTIS

✓ Receive movement reports from vessels

✓ Track and monitor vessels' movements with radars

✓ Check that vessels are observing traffic rules

✓ Provide traffic information and navigational assistance

✓ Broadcast navigational warnings

VTIS Today

- 11 Radars

- 5000 Tracks

- Multi-Sensor Tracking Module

- Synchronised Logging and Replay of Radar Tracks, Voice and Data

- Use of Electronic Navigation Chart (ENC)

- Multi-Display Windows
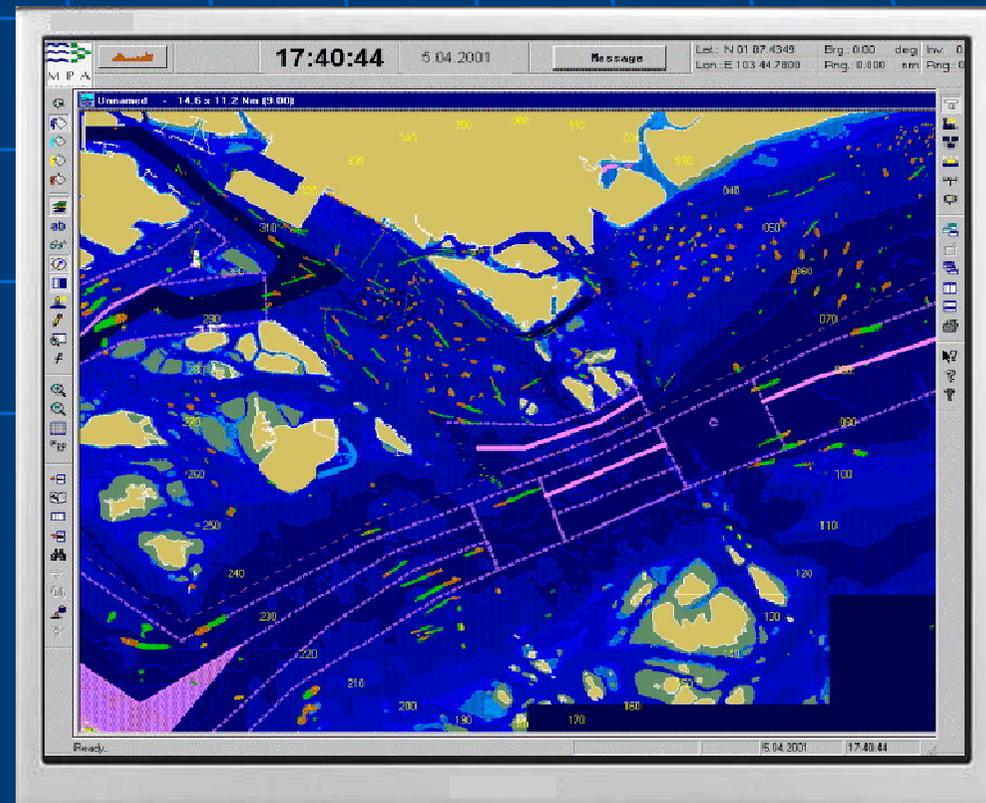
OVERVIEW OF VTIS SUB-SYSTEMS

CCTV Cameras

Radar Stations

CCTV Surveillance System

Vessel Traffic Information System

AIS Transponders

Marine Communication System

Port Traffic Management System

POCC1

POCC2

POCC 1

POCC 2
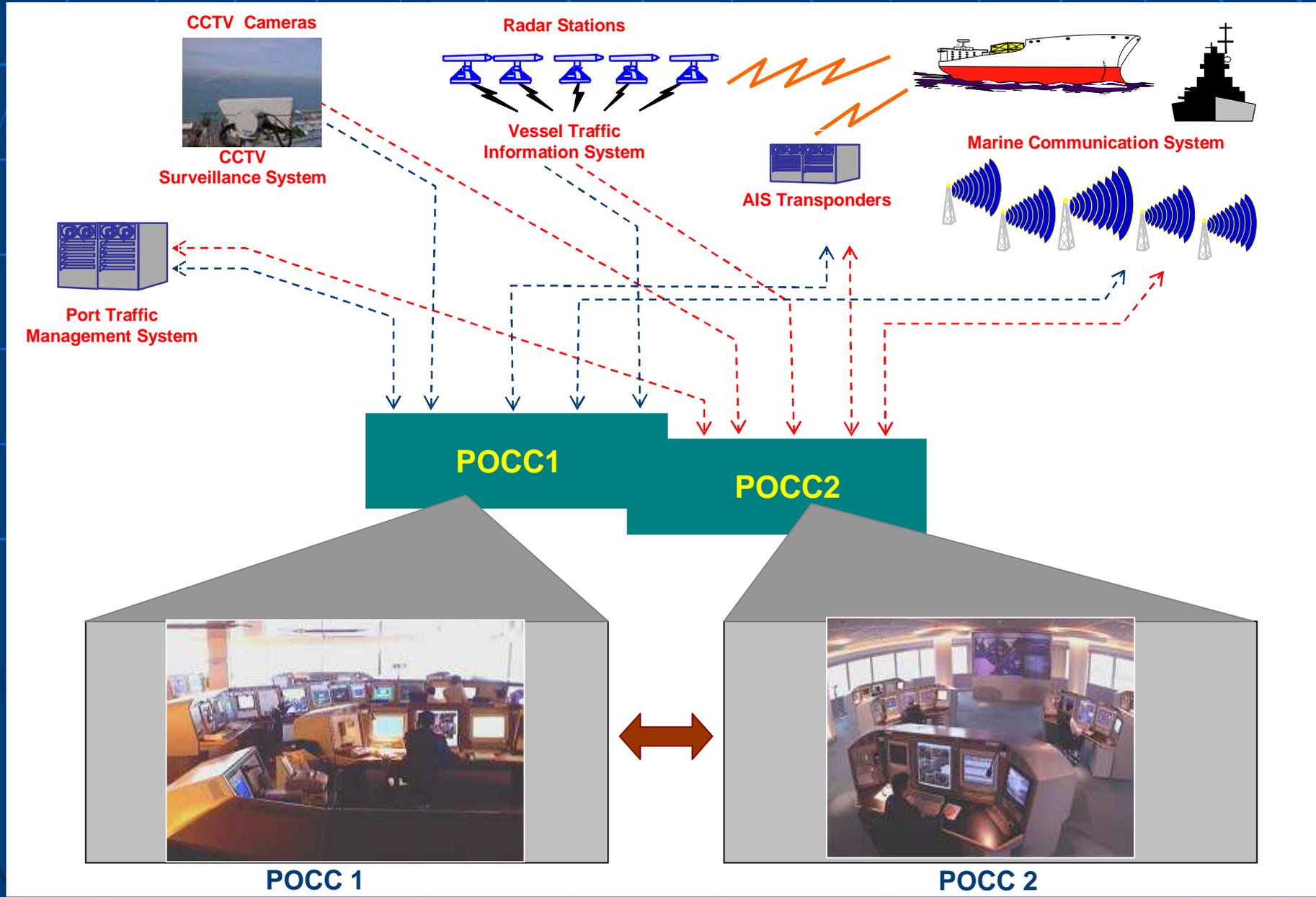
PORT TRAFFIC MANAGEMENT SYSTEM

- Vessels Database

- Record of vessel particulars and movements reported by ship masters

- Alert operators on vessels that required special attention

- Vessel records are linked to VTIS tracks

CCTV SYSTEM

- **11 Sites**

- **2 cameras at each site**

- **One camera for day use**

- **One camera for night use**

- **All video are recorded**

RADAR SYSTEM

- 11 Radars

- 5000 Tracks

- Multi-Sensor Tracking Module

- Synchronised Logging and Replay of Radar Tracks, Voice and Data

- Use of Electronic Navigation Chart (ENC)

- Multi-Display Windows

AIS TRANSPONDER SYSTEM

- All ships of 300 gross tonnage and upwards engaged on international voyages and passenger ships irrespective of size shall be fitted with an automatic identification system

- AIS enables automatic identification of vessels and provision of navigational information to enhance navigation safety

- Seven AIS base stations established to cover port waters and Singapore Strait

- AIS Integrated to VTIS

OPERATOR'S CONSOLE

Radio & Telephone Communication
PC
Radar Screen
PTMS
CCTV
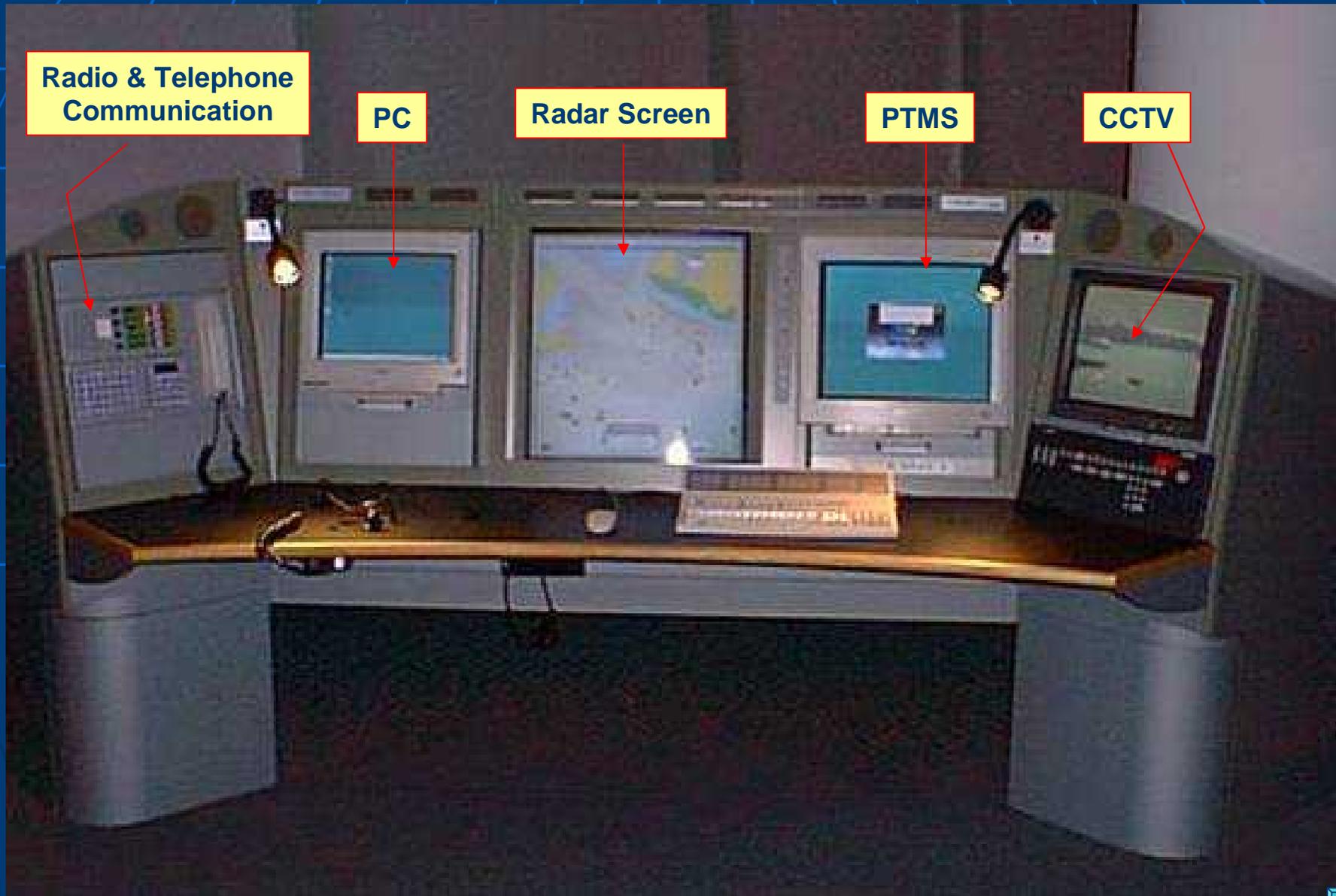
PORT OPERATIONS CONTROL CENTRES

POCC1

POCC2

POCC1 and POCC2 Serve as Full Back-up to Each Other

Recruitment

OPERATORS

- **Entry qualifications**
  - Diploma in Maritime Transportation and Management, or
  - Certificate of Competency (Deck) Class 2/3

- **Selection**
  - Aptitude Test/Interview
  - Voice Test
  - Medical Examination

SUPERVISORS

- **Entry qualifications**
  - Certificate of Competency Class 1 (Master Mariner)
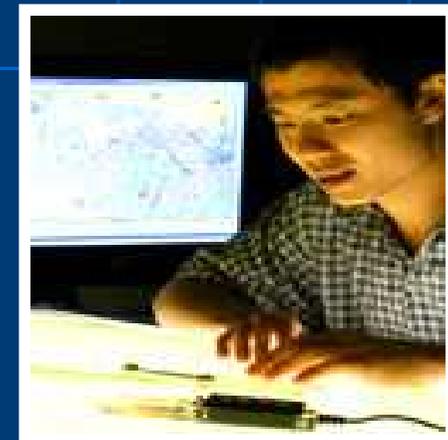
Job Designations

Grade	Diploma In Maritime Transportation Management	Merchant Navy Officers COC Class 3 or 2	Merchant Navy Officers COC Class 1 (Master Mariners)
Division 1			Assistant Director (HOD)
			Controller
		Senior Marine Officer	Senior Marine Officer
	Marine Officer	Marine Officer	Marine Officer
Division 2	Marine Officer	Marine Officer	Entry
	Senior Asst Port Operation Officer	Senior Asst Port Operation Officer	
	Asst Port Operation Officer	Entry	
	Entry		

Entry Level Training

MPA's Integrated Simulation Centre

- Located at the Singapore Maritime Academy

- IALA Model Course V-103/1

- IALA Model Course V-103/2

- VTS Simulator Training

IALA Model Course V-103/1

✓ Language Training
✓ Vessel Traffic Management
✓ Equipment
✓ Nautical Studies
✓ VHF Radio
✓ Personal Attributes
✓ Emergency
✓ Simulator Training

Entry Level Training

Supervisor (Master Mariner)	Operator (Diploma holder or COC Class 2 &3 Deck)
Classroom Training	Classroom Training
VTS Supervisor Advancement Training Programme (IALA V-103/2)	VTS Operator Training Programme (IALA V-103/1)
On-the-Job Training (OJT)	On-the-Job Training (OJT)
	Pilotage Attachments (Day & Night)
	Shipboard Attachments

Updating/Refresher Training

- **Conducted periodically according to the requirements of the Competent and/or VTS Authority.**

- **Ensure that level of competence is maintained appropriate to the service types provided by the VTS centre.**

For example....

Training for new equipment,

Updating on new operating procedures,

Quarterly Near-Miss presentation

Service enhancement training

Corporate training

Periodic Auditing of VTS Operators

Objectives

- ✓ To ensure that the operator are complying and up-to-date with the Standard Operations Procedure (SOP).

- ✓ To collect feedback from VTIS operator and review the SOP when it's necessary.

- ✓ Empowerment for the VTIS Supervisors

OTHER INITIATIVES TO ENHANCE SAFETY OF NAVIGATION IN THE STRAITS

Automatic Identification System (AIS) Base Stations.

• First country in the region

• Integrated to VTIS

• Reduced voice communication

• Traffic monitoring

OTHER INITIATIVES

Presenting Case studies at forums

• to share experience

• to sharpen understanding

Lectures/workshops targeting ship officers

• Simulation-based courses

• "Malacca and Singapore Straits Passage Planning"

• "Effective Navigational Watch keeping in the Port of Singapore"

OTHER INITIATIVES

Japan-Singapore Partnership Programme for the 21stCentury (JSPP21)

Training Course on Maritime Safety Management

- A series of marine aids to navigation courses

- Scope of the course :   - VTS, AIS, ECDIS, HARTS
  - Maritime traffic trends
  - Navigation safety measures in the SOMS
  - Aids to navigation equipment and operation.

GOING FORWARD

Acquire new state-of-the-art VTIS system

- Comprehensive Traffic Situation Picture
- Advance Decision Support Capabilities
- Advance Traffic Analysis Tools
- Synchronized CCTV tracking
- Advance Track Dissemination Capabilities
- Enhanced Visualization Engine
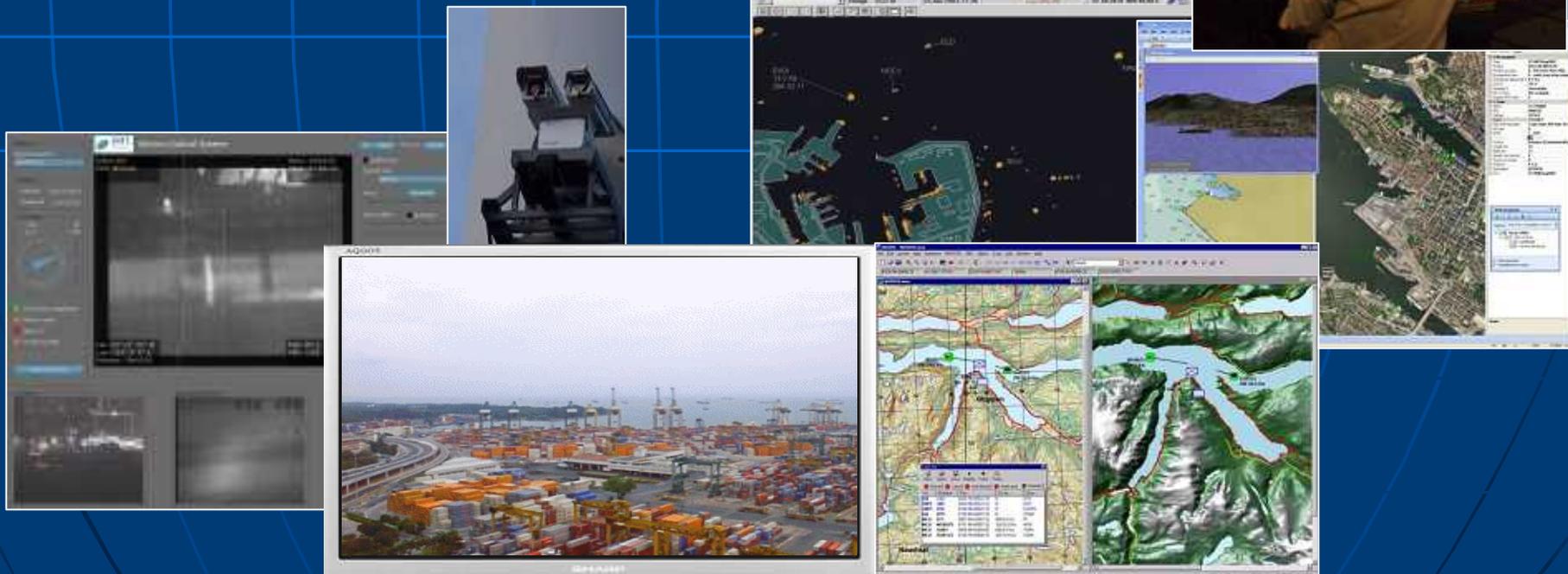
GOING FORWARD

Proposed TSS crossing signal trials

- 3 all-round green lights in a vertical line

- TTEG and SSA support

- Trials involving Containerships, Bulk Carriers and Tankers

GOING FORWARD

AIS Class B Project

- Co-operative Mechanism by the littoral States

- Singapore leading in the Demonstration Project

- AIS – B transponders on small ships

- Assess performance in high traffic density
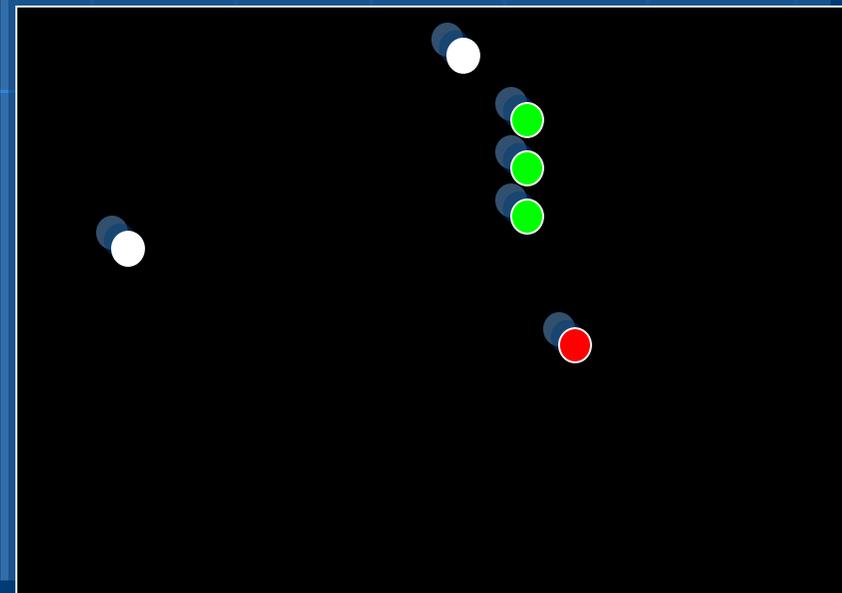
CONCLUSION

Enhancing Safety of Navigation in the Straits

- MPA and our counterparts have established measures

- Ship owners, Managers and Ship Masters have a part to play

- Instill safety culture and good practices onboard

EVERYONE OF US HAVE A PART TO PLAY!

THANK YOU

Intelligent Captain on each ships piloted by Soar Intelligent Human Behavior Models for the VTS Training System

29th of Oct 2008

Mitsui Bussan Aerospace Co., Ltd.

We propose the Intelligent HBM (Human Behavior Models) solution from **Soar Technology** to the **VTS (Vessel Traffic Services) Simulator System** which supports Training of Ships Control Technique including Mission Training, experiences of proactive stress and reviewing the accident cases and so on

A VTS Simulator might provide **:**
   1. Operator level training
   2. Supervisor level training

For these trainings;
The Soar is one of **Cognitive Models** and provides each captain's thought based upon the rules that is build in advance and also can be modified at site. It is NOT programming logic.
It looks like actual captain there, thinking and handling a ship.
It provides a **dynamic simulator.**

Mitsui Bussan Aerospace Co., Ltd.

Controller

Controller

For example : Characteristics and movements of each ships that would be defined on scenarios OR controlled by software logic

Soar Entity

Soar Entity

Realistic & humanlike decision & movement

Soar Entity

Soar Entity

From Isewan Traffic Advisory Service Center home pege

From Isewan Traffic Advisory Service Cent home pege

Soar Entity

Soar Entity

Soar Entity

Soar Entity

Program

Prog

Rules

Mitsui Bussan Aerospace Co., Ltd.

Example Simulation reflecting captain's thought

Voice communication between Seaway Patrolling Ships

Scenarios

Captain maneuvers the ship on the route of a scenario.He considers the environmental conditions as actual human does.
Soar returns what he shall think as for the next action to the simulator application based upon the environmental conditions.
He also responds to operator when operator talks to him by voice.

If he thinks the environmental condition looks OK, then goes through on the route of scenario.
If finished the actions which was needed to avoid accidents, then he goes back to the original route.

Captains can communicate with each other by voice

Option

Soar Speak

Mitsui Bussan Aerospace Co., Ltd.

Soar

Rule **Unique rule of the Strait**

AIS

Guidance of correcting the route
And guidance for avoiding danger
situation on bad weather

Soar

Accidents

**Needs of training with
VTS simulators**

<Expected effect>
Enhance level of Control
Case study
Case assessments
studying past operations
Publicity tool ....

Non-AIS
Ships

Possibilities of Collision
& Crush accidents at
heavy traffic area etc

Soar

Mitsui Bussan Aerospace Co., Ltd.

1. Operator level training with Soar technology solution

Familiarizing control method and mission

XXXXXX

Contact timing
Terminological uniformity
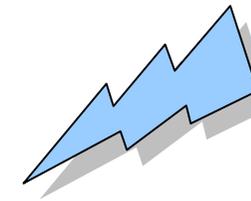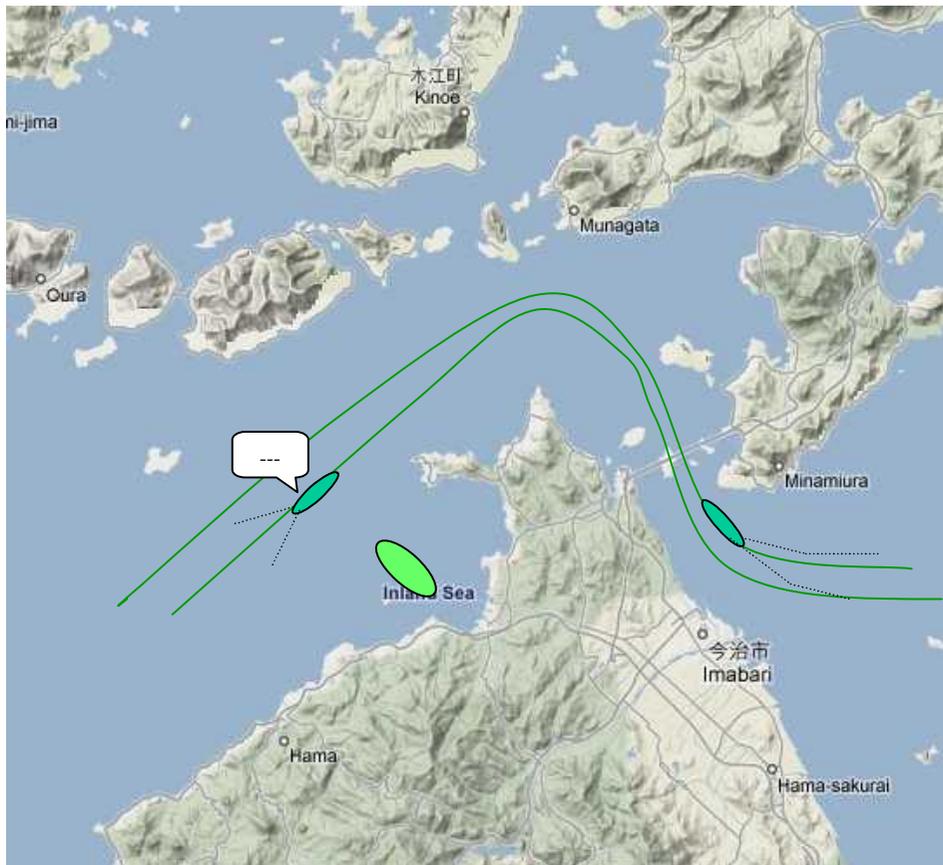
Radio Communication between Captains and also Seaway Patrolling Ships

Guidance of ship course correction

Guidance of avoidance of danger on bad visibility

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Supervisor level training with Soar technology solution

At training of complicated situation

Predictable human errors
Control of overloaded ships (assessment of the situation)
Intentional ship maneuvering (Speed, short-cut)
No communication (wordless, No radio)
Atmospheric & Hydrographic conditions
and more

**Ruling
each Captain skills etc.**

Providing not a pattern type simulation, but a dynamic simulation !
Providing each Captains thought & reaction to the Simulator application, and provide realistic complicated situation ;
an actual human pilots on the boats

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Example　System overview

Sea area
Data
etc

Scenarios

VTS Simulator
Application

I/F routine

Soar

PC　Windows,Linux

Log
data

Rules
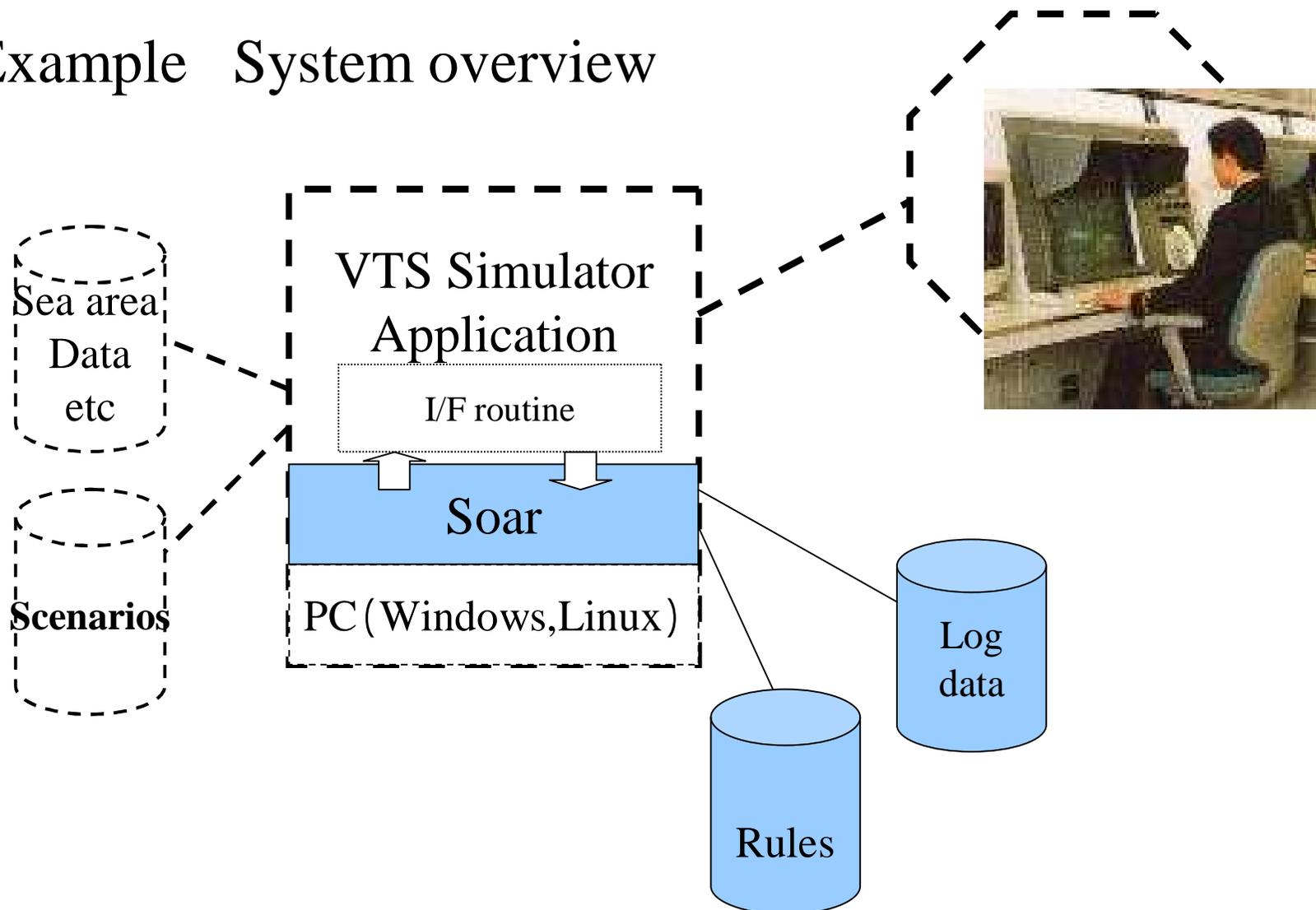
Proposing solution　　On same PC or through HLA etc

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& Soar Technology Mitsui Bussan Aerospace Co., Ltd.

Soar is one of cognitive architectures, developed by John Laird, Allen Newell, and Paul Rosenbloom at Carnegie Mellon University.

Headquartered in Ann Arbor,MI, Soar Technology is a spin-off of the University of Michigan Artificial Intelligence Laboratory.

Soar Technology's been enhancing more capability/function and tools such as AAR(After Action Review) tools & debuggers ……..

April 2008,Dr.Mike van Lent joined Soar Technology who was involving development of the *Full Spectrum Warrior* and other serious games at ICT (Institute for Creative Technologies) of University of Southern California.

XXXX-Soar

 TacAir-Soar : Fixed Wing Pilots model
 HELO-Soar   : Rotary Wing Pilots model
 SOF-Soar   : Special Operations Forces model
 UAV-Soar   : UAV

Soar Technology solution :

 Aware: Maintain sophisticated situation interpretation
 Smart: Make intelligent decisions
 Fast: Operate effectively, in real time, in a highly dynamic environment
 Social: Communicate with humans as naturally as possible
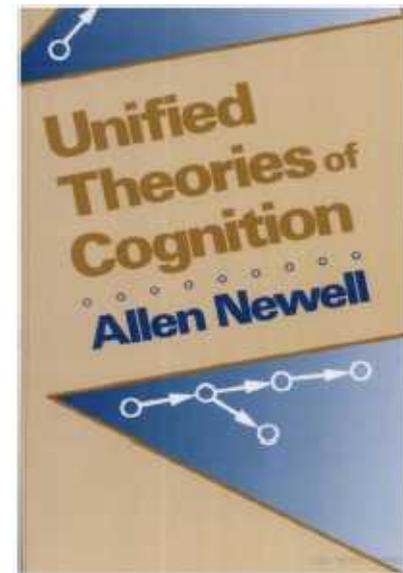
Mitsui Bussan Aerospace Co., Ltd.

Doing pattern matching, triggered several 100s/1000s patterns per second, to pick up next action
based upon rules which would similar like actual human does.

It's not like a programmed logic/scenario,but kind of dynamic scenarios where a human error
would be supported. It supports low maintenance cost.

The rule is in text format which is stored in the Long-term Memory which is consist of approx
8000 rules for the TacAIR-Soar system.

ICF (Intelligent Control Framework

ISAT (Interactive Storytelling Architecture for
    Training)

JFETS (Intelligent Forces for Joint Fires and
    Effects Training System)

CIANC3 (Cooperarive Interface Agents for
Networked Command,Control and Communications)

RAID (Real-time Adversarial Intelligence and
    Decision-making)

SAGIS (SOF Air-Ground Interface Simulator)

VISTA (Visualization Toolkit for Agents)

BINAH (Battlespace Information and Notification
    through Adaptive Heuristics)

Auto Wingman (An Intelligent,Automated Wingman
    for Mission Simulations)

TacAir-Soar (Intelligent,Autonomous Agents for
    the Tactical Air Control Domain)

SoarSpeak (Voice Recognition & Speech generation)

MOUTBots   (Intelligent OPFOR for virtual MOUT Training)

BFTT (Battle Force Tactical Training System)

ModSAF   (Modular Semi-Automated Forces)

JSAF   (Joint Semi-Automated Forces)

OneSAF OTB (One Semi-Automated Force)
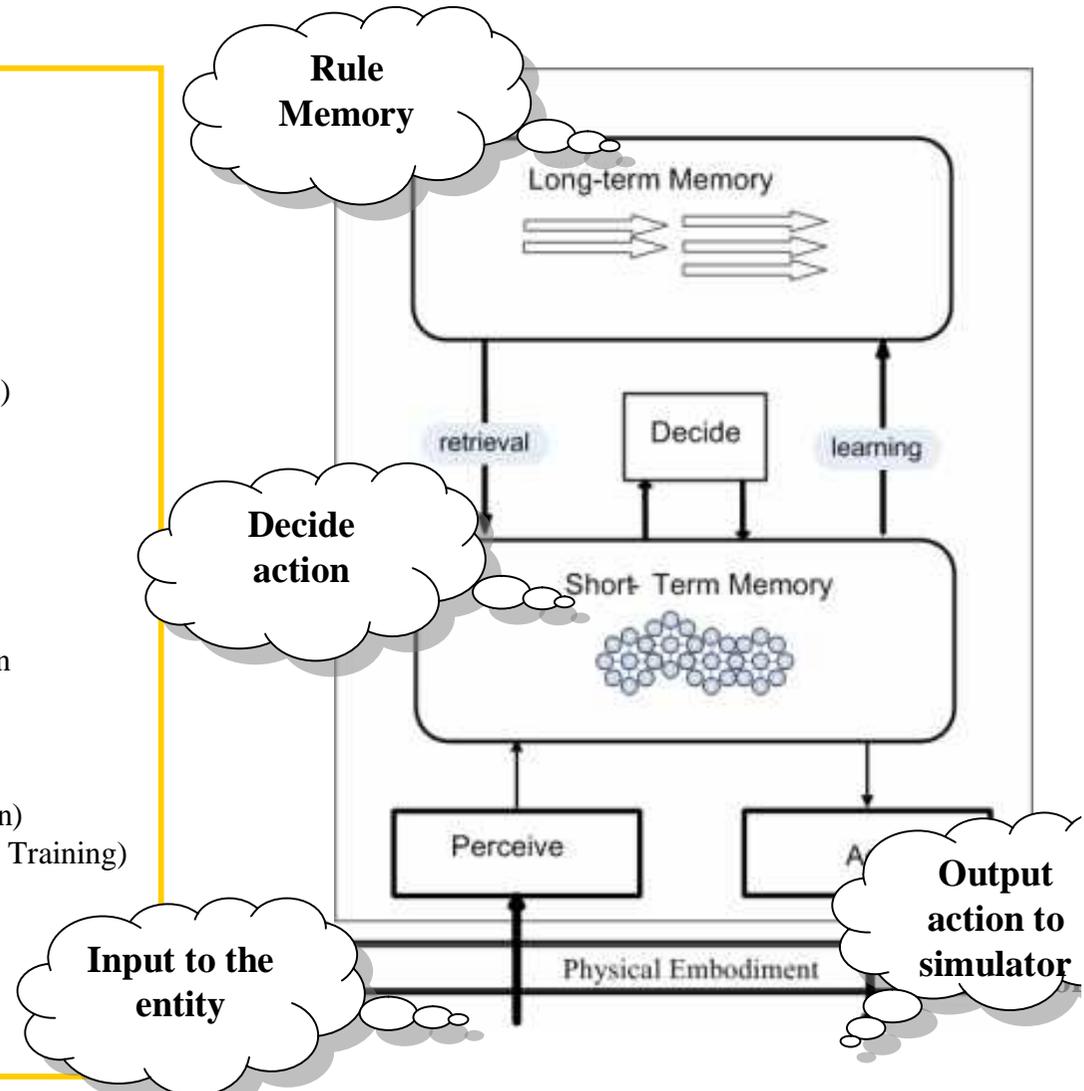
Soar outputs next action of the entity to the Application based upon inputs from Application.
This case, the Application is the VTS simulator.
The Soar Technology solution can enhance quality and better efficiency of the training for the virtual environments, that means having like actual captains pilots on ships at training situation.

- Action based upon rules
- Can get learning
- Rule can have the navigation rules
- Text base rule and easy to maintain
-Soar Technology solution is introduced to many US
  military programs
- Might have human errors
- Not a random action

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Rules

海上衝突予防法による一般的航法
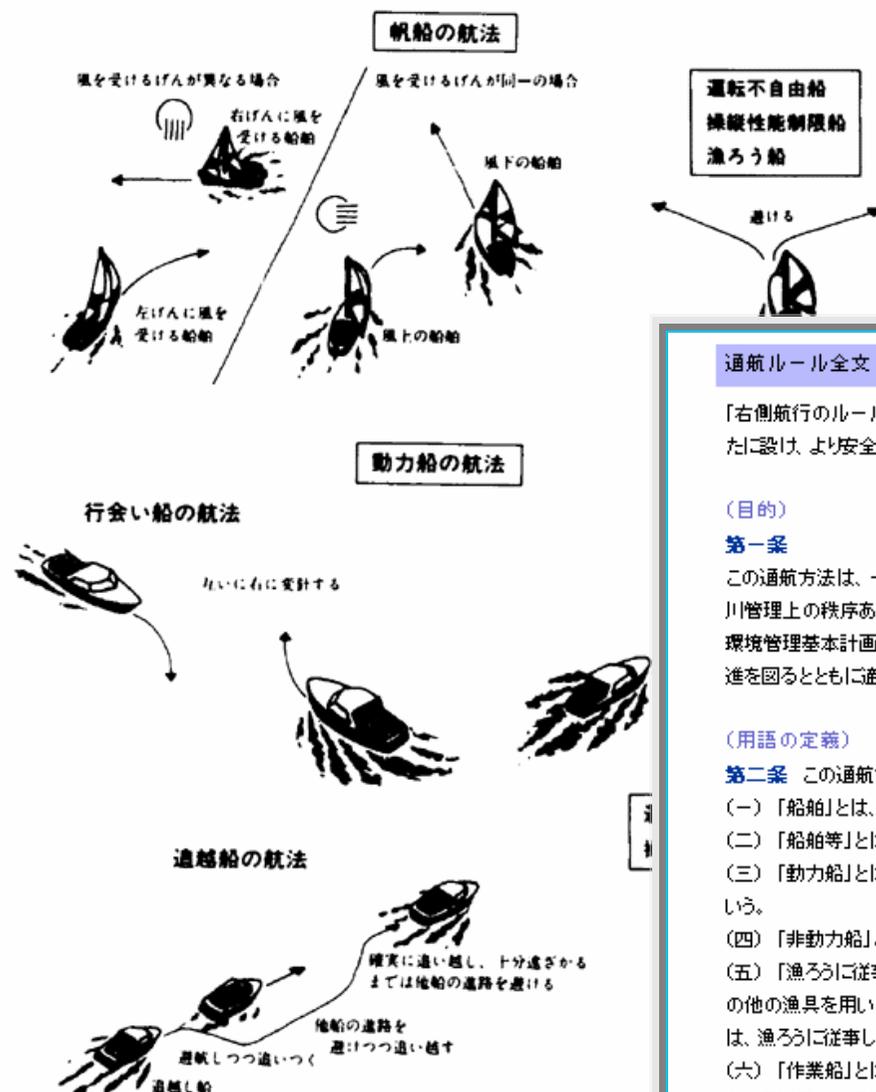
通航ルール全文

「右側航行のルール」や「衝突をさけるための動作ルール」など海上交通で定められたルール以外にも、以下のような河川特有のルールを新たに設け、より安全で秩序ある水面利用を図っていきます。

（目的）
第一条
この通航方法は、一級河川信濃川水系信濃川及び一級河川阿賀野川水系阿賀野川の指定区間外の区域において、船舶等の通航に伴う河川管理上の秩序ある河川使用の調整、河川環境の保全等を図るため、信濃川河川整備計画・阿賀野川河川整備計画及び信濃川水系河川環境管理基本計画・阿賀野川水系河川環境管理基本計画との整合を図りつつ、船舶等が守るべき通航方法を指定し、もって河川舟運の促進を図るとともに適正な河川管理を推進することを目的とする。

（用語の定義）
第二条　この通航方法において、用語の定義は次のとおりとする。
（一）「船舶」とは、通航の用に供する船舟類（ボードセーリングを含む。）をいう。
（二）「船舶等」とは、船舶及びいかだをいう。
（三）「動力船」とは、機関を用いて推進する船舶（機関のほか帆を用いて推進する船舶であって帆のみを用いて推進しているものを除く。）をいう。
（四）「非動力船」とは、動力船以外の船舶をいう。
（五）「漁ろうに従事している船舶」とは、漁業権の行使に係わる漁業活動をおこなっている船舶であり、船舶の操縦性を制限する網、なわその他の漁具を用いて漁ろうしている船舶をいう。なお、魚ろうに従事している船舶であっても、漁具等を用いないで移動のために通航する場合は、漁ろうに従事している船舶の限りではない。
（六）「作業船」とは、次に掲げる操縦性能を制限する作業に従事しているため他の船舶等の進路を避けることができない船舶をいう。
（1）河川工事、通航標識等の敷設、保守又は引揚げに係わる作業
（2）しゅんせつ、測量その他の水中作業
（3）水面清掃、架橋工事等の水面上の作業
（七）「運転不自由船」とは、船舶の操縦性能を制限する故障その他の異常な事態が生じているため他の船舶
ない船舶をいう。
（八）「特殊用務船」とは、河川管理者の業務に使用する船舶
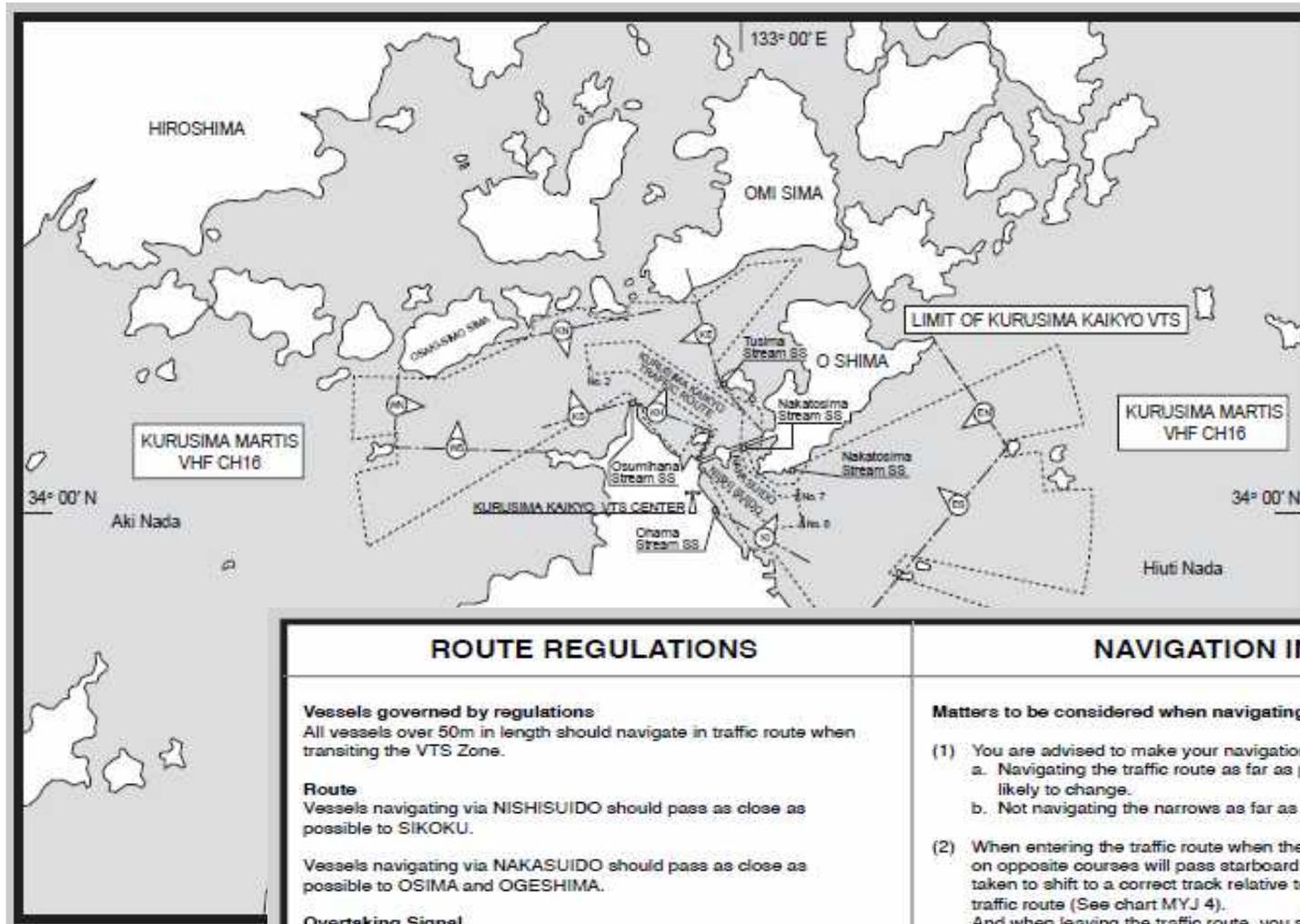
Unique rules of each Strait

ROUTE REGULATIONS

Vessels governed by regulations
All vessels over 50m in length should navigate in traffic route when transiting the VTS Zone.

Route
Vessels navigating via NISHISUIDO should pass as close as possible to SIKOKU.

Vessels navigating via NAKASUIDO should pass as close as possible to OSIMA and OGESHIMA.

Overtaking Signal
A vessel in a traffic route should give the following signals:
One prolonged blast followed by one short
blast (▬ ·)
when overtaking on the starboard side of another, or
One pronged blast followed by two short
blasts (▬ · ·)
when overtaking on the port side of another.

Restrictions on Entry
Entry may be restricted in low visibility or in a dangerous situation, e.g. when an accident has occurred in or near the traffic route.

Vessels may be delayed when time separation from a preceding vessel is not sufficient.

NAVIGATION INSTRUCTIONS

Matters to be considered when navigating in the **KURUSIMA KAIKYO**

(1) You are advised to make your navigation plan in view of the following:
    a. Navigating the traffic route as far as practicable when the tidal stream is not likely to change.
    b. Not navigating the narrows as far as practicable when the stream is strong.

(2) When entering the traffic route when the S-going tidal stream is strong, vessels on opposite courses will pass starboard side to starboard; early action should be taken to shift to a correct track relative to the direction of stream approach to the traffic route (See chart MYJ 4).
And when leaving the traffic route, you should try to navigate carefully with full understanding of your surroundings.

(3) You should not overtake in the narrows.

(4) If the tidal stream changes when you have entered the traffic route, the following actions must be taken:
    a. Shift into a correct track relative to the direction of stream as soon as practicable in view of the surroundings.
    b. Don't alter your course as far as practicable in the sea area close to UMASIMA.

Example of training images
using the Soar/ATE HBMs

Good case

These are not from actual simulation system
,but a concept.

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Ship2 (Poseidon)

Ship1

Inland Sea

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Controller (Person)	Poseidon, this is Kurushima Martis
	You are running into danger
	Strong drift ahead of you
	Risk of collision imminent
	Slow down
	Wait for fishing boat to pass ahead of you
Ship2 (Poseidon)	Roger I am slowing down
Ship1	Do not overtake

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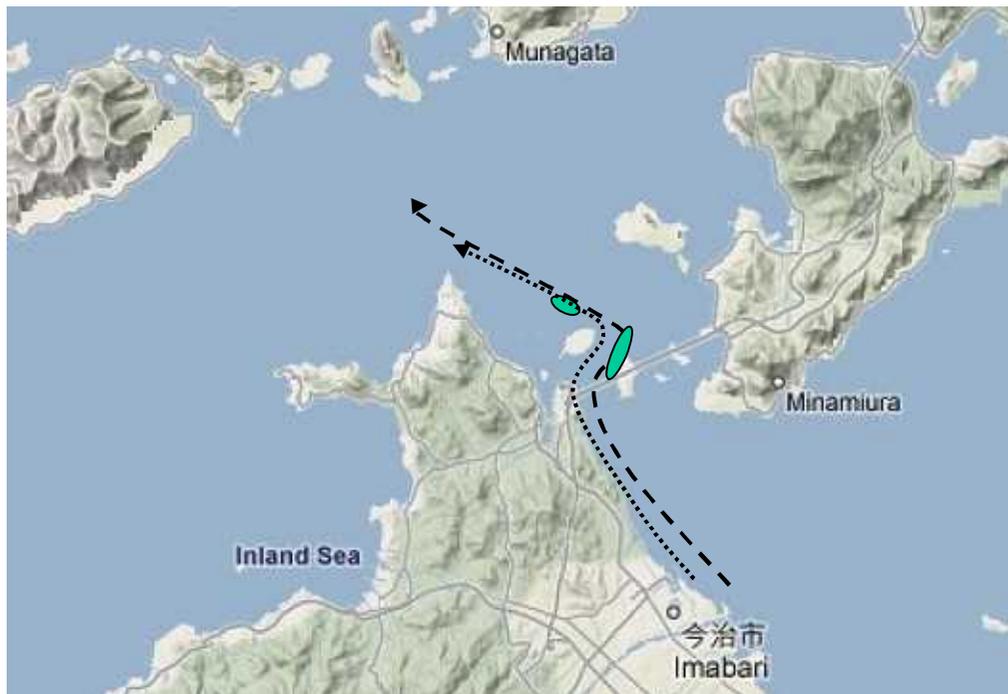
Controller

Ship1

Ship2
(Poseidon)

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Bad case

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Ship2 (Poseidon)

Ship1

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Controller   Poseidon, this is Kurushima Martis

                                    You are running into danger
                                    Strong drift ahead of you
                                    Risk of collision imminent

Ship2   Roger   I am increasing speed
(Poseidon)

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Ship1   I need help
                  I am sinking ……

Ship2   I am on fire
                  I require fire-fighting assistance ……

Controller

Mitsui Bussan Aerospace Co., Ltd.

Contact

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Propulsion & Ordnance Systems Div.
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Email: ohnuki@mb-aero.co.jp

http://aerospace.mitsui.co.jp/products/ms/index.html

Soar Technology

Expert Meeting on Navigational Assistance Service by VTS

Main topics

Session　　Basic matters of VTS

　　Outline of VTS in each country
　　　　Location, service area, reason of establishment, organization structure, human structure, management authority, stuff number, operational fund, etc.

　　Services provided by VTS
　　　　Type of service, intended vessels, languages, etc.

　　Obligation of VTS and vessels
　　　　Obligation of VTS to vessels, obligation of vessels to VTS, legal basis of obligations, etc.

　　Efficient implementation of services
　　　　Position of equipments, position of operators, role of each operator, etc.

　　Issues and efforts regarding service of VTS in each country

Session　　Practical use of AIS in Navigational Assistance Service

　　Outline of AIS shore station in each country
　　　　Location, cover area, services provided, etc

　　Practical use of AIS in navigational assistance service
　　　　Recognition of risk of marine accident, observation of risk of collision, etc.

Session   Duties and authorities of VTS operator and legal basis

  Execution of authority of VTS operator in each country
    Intended issues, level of execution of authority, content of instruction, relation to
    "Result-Oriented", etc.

  Legal basis regarding authority of VTS operators
    Domestic law, level of authority which requires legal basis, penalty, relation of
    penalty to captain's responsibility, etc.

  Responsibility of VTS operators
    Case, legal measures taken, etc.

  Effect of COSCO BUSAN case

  Authority of VTS operators in future

Session   Selection, competence, education and training of VTS operators

  Appointment of VTS operators
    Form of appointment, qualification, securing resources, etc.

  Education and training of VTS operators
    Duration, course, method, recognition of certificate, simulator, etc.

  Promotion of VTS operator
    Model of promotion, career incentives, salary, etc.

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Expert Meeting

on

Navigational Assistance Service

by VTS

October 31, 2008

Tokyo Japan

Meeting Program

Opening

Session   "Basic matters of VTS"

Session   "Practical use of AIS in Navigational
              Assistance Service"

Lunch

Session   "Duties and authorities of VTS operator
              and legal basis"

Session   "Selection, competence, education and
              training of VTS operators"

Closing

Session

Basic matters of VTS

Basic matters of VTS

- **<u>Outline of VTS in each country</u>**

  Location, service area, reason of establishment, organization structure, human structure, management authority, stuff number, operational fund, etc.

- **<u>Services provided by VTS</u>**

  Type of service, intended vessels, languages, etc.

- **<u>Obligation of VTS and vessels</u>**

  Obligation of VTS to vessels, obligation of vessels to VTS, legal basis of obligations, etc.

- **<u>Efficient implementation of services</u>**

  Position of equipments, position of operators, role of each operator, etc.

- **<u>Issues and efforts regarding service of VTS in each country</u>**

1993

1987

1977

1989

1994

1998

2003

Organizational Structure of Japan Coast Guard

Commandant
- **Vice Commandant**
- **Vice Commandant for Operations**
  - **Administration Department**
  - **Equipment & Technology Dep.**
  - *Guard and Rescue Department*
  - **Hydrographic & Oceanographic Dep.**
  - **Marine Traffic Department**
  - **Regional Coast Guard Headquarters(11)**
    - **Coast Guard Office (67)**
    - **Coast Guard Station (63)**
    - **Traffic Advisory Service Center (7)**
    - **National Strike Team Station (1)**
    - **Special Rescue Station (1)**
    - **Others**

Tokyo-Wan Traffic Advisory Service Center ("Tokyo MARTIS")
Traffic Control and Provision Information Necessary for Safety Navigation

Screen of Graphic Display

Monitoring vessel traffic on Graphic Display (graphic emerge processed by radar emerge) and making advice

AIS Display

Transmitting weather condition ,situation of marine construction works and so on to all vessels operating AIS, and also warning message such as prevention of going aground and dragging to an addressed vessel.

Provision of General Information
Maritime Traffic Information
Schedule of Huge Vessels Weather condition

Traffic Control Planning
Reception of Traffic Route and Change Instruction or Advice to the Vessel

Provision of Special Information and Traffic Control
Position of the vessel and Around Situation of other vessels under requested Int. VHF

Transmitting and Receiving Text Message / AIS
Weather condition,etc.
Warning Message such as prevention of dragging

*200m or More in Length and Dangerous Cargo Vessel Shall Report to Tokyo MARTIS in Advance.

TOKYO

CHIBA

TOKYO Light beacon **BN Line**
35°—34´N

CHIBA Light beacon

KAWASAKI

Tokyo Oki Lighted
Buoy (RACON)

TW Line 225°

ICHIHARA

KEIYO
SEA BERTH

YOKOHAMA

KAWASAKI Passage

KE Line
35°—29´N

OHGISHIMA
SEA BERTH

ANEGASAKI

TOKYO WAN
Aqua-Line

SODEGAURA

HE Line
35°—26´N

KISARAZU
Offing beacon

NEGISHI

No.3

No.2 C (Racon)

KW Line 210°

KISARAZU Passage No.5

KISARAZU

UN Line
35°—22´N

No.1 B

A

NAKANOSE Traffic Route

KIMITSU

YOKOSUKA N E
Break Water Light house

Mid No.6 buoy
(Racon)

No.2 Fort
(Racon)

UW Line 152°

Mid No.5 buoy

FUTTSU

YOKOSUKA

TOKYO MARTIS ★

KANNONNSAKI
Light house

URAGA SUIDO

Mid No.2 buoy

Please call TOKYO MARTIS on Ch:16 as soon as you arrive at the initial reporting Line. But vessel operating AIS can omit this call.

Mid No.1 buoy
(Racon)

US Line
35°—10´N

Vessels	reporting Line
All northbound vessels.	US Line
For vessels leave TOKYO,FUNABASHI and CHIBA Passages.	BN Line
For vessels leave KAWASAKI and OHGISHIMA East Passages.	KE Line
For vessels leave YOKOHAMA, TSURUMI and OHGISHIMA Passages.	HE Line
For vessels leave NEGISHI and HONMOKU Passages.	UN Line
For vessels leave ICHIHARA, ANEGASAKI and SODEGAURA Passages.	TW Line
For vessels leave KISARAZU, KIMITSU and FUTTSU Passages.	KW Line
For vessels leave YOKOSUKA.	UW Line

URAGA SUIDO & NAKANOSE Traffic
Route any vessel shall not navigate
at a speed exceeding 12 knots

JAPAN COAST GUARD
TOKYO MARTIS

Session
Practical use of AIS
in
Navigational Assistance Service

Annex6

Introduction of AIS

1st Regional Coast Guard Headquarters
Commenced operations in July,2008

9th Regional Coast Guard Headquarters
Commenced operations in July,2008

8th Regional Coast Guard Headquarters
Commenced operations in July,2008

○ Commenced area at the end of 2007
○ Commenced area in 2008
○ Estimated area to commence operations in 2009

2nd Regional Coast Guard Headquarters
Commenced operations in July,2008

NAGOYA-KO
Traffic Advisory Service Center
Commenced operations in July,2006

TOKYO-WAN
Traffic Advisory Service Center
Commenced operations in July,2004

ISE-WAN
Traffic Advisory Service Center
Commenced operations in July,2005

OOSAKA-WAN
Traffic Advisory Service Center
Commenced operations in Dec.,2007

BISAN-SETO
Traffic Advisory Service Center
Commenced operations in July,2005

KURUSHIMA-KAIKYOU
Traffic Advisory Service Center
Commenced operations in Mar.,2007

KANMON-KAIKYOU
Traffic Advisory Service Center
Commenced operations in July,2005

10th Regional Coast Guard Headquarters
Plan to commence operations in 2009

11th Regional Coast Guard Headquarters
Plan to commence operations in 2009

The images of the AIS operation

Radar + AIS operating consol
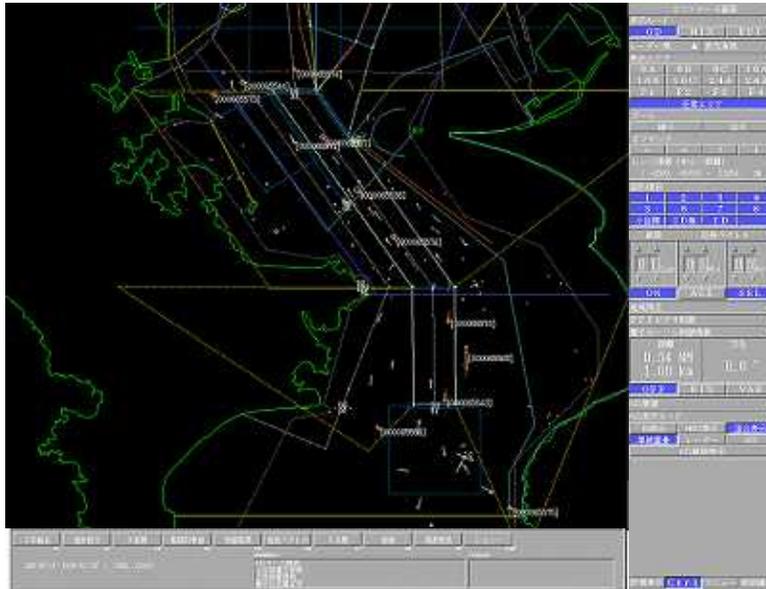
AIS operating console

The weather information

Practical use of AIS in Navigational Assistance Service

- **<u>Outline of AIS shore station in each country</u>**

    Location, cover area, services provided, etc

- **<u>Practical use of AIS in navigational assistance service</u>**

    Recognition of risk of marine accident, observation of risk of collision, etc.

Session
Duties and authorities
of
VTS operator and legal basis

Role of VTS center in Japan

Tokyo Bay VTS Center

Established in 1977

Traffic Control

huge vessels (L..O.A 200m   )

dangerous goods carriers

tug boats towing long goods

Radar & AIS watching

Information service

general information

individual/special information

Management of patrol crafts

Information Service

General Information
Radio broadcast, Internet, AIS etc.

Weather & tide condition

Marine accident

Restriction in waterways

Present traffic situation

Concentration of fishing boats

Schedule of huge vessels on traffic routes

Individual/Special Information
VHF etc.

Vessel position

Movement of vessels around

Warning on collision

Warning of going around

Warning of dragging

Duties and authorities
of VTS operator and legal basis

- **<u>Execution of authority of VTS operator in each country</u>**

    Intended issues, level of execution of authority, content of instruction, relation to "Result-Oriented", etc.

- **<u>Legal basis regarding authority of VTS operators</u>**

    Domestic law, level of authority which requires legal basis, penalty, relation of penalty to captain s responsibility, etc.

- **<u>Responsibility of VTS operators</u>**

    Case, legal measures taken, etc.

- **<u>Effect of COSCO BUSAN case</u>**

- **<u>Authority of VTS operators in future</u>**

Session

Selection, competence, education and training of VTS operators

Outline of Appointment and promotion of VTS operators , JCG

Coast Guard School

The school has four courses.
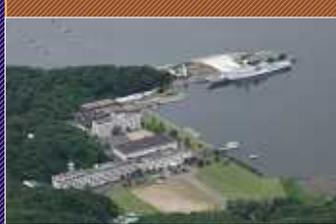

Navigation System Course

Information System Course

Coastal Sciences Course

Aviation Course

Assign to the front

Re-assign

Selected

VTS Center

JCG

Selection, competence, education and training of VTS operators

- **<u>Appointment of VTS operators</u>**

   Form of appointment, qualification, securing resources, etc.

- **<u>Education and training of VTS operators</u>**

   Duration, course, method, recognition of certificate, simulator, etc.

- **<u>Promotion of VTS operator</u>**

   Model of promotion, career incentives, salary, etc.

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