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Part B
Technical and legal issue

CLOSE QUARTER SITUATIONS REPORTING BY VTS

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PART B
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Note:

This technical and legal document has been produced as part of academic work. It aims to address a broad audience that is not necessarily expert on safety of navigation, but the lead gradually to a high level of reflection.

This file is part of the 2014 - 2018 program of the IALA VTS Committee where France is shown in particular by the Cerema. It complements a first overview on the reporting of close quarter situations by Ushant VTS exposed at the 18th conference of the IALA end of May 2014.

CLOSE QUARTER SITUATIONS REPORTING BY VTS

Executive summary

In case of a close quarter situation detected by Ushant VTS, in compliance to the “rules of the road”, it is not obvious to demonstrate an infringement, for the rule 16 relative to the “action by the give-way vessel” should be balanced with rule 17 relative to the “action of the stand-on vessel”. Hence a mail is send to the company of the give-way vessel exposing the analysis of the situation by the VTS with documentary evidences including radar screen prints if necessary. A copy is sent to the Flag State Authority and the Class Society delivering the ISM certificate.

For 6 years that the procedure is in force, Ushant VTS has received positive feed-back from companies, Flag States and Class Societies. Internal feed-back is also very positive for operators training and the quality system of the centre. The number of close quarter reporting has become a real indicator of the VTS activity.

The process of reporting could be enlarged to any other near-misses. But close quarter situations are interesting for the application of COLREG 72 to all ships. This is a long-term process, but patient work collects fruit and the analysis of close quarter situations could help a coast State in reviewing its safety of navigation infrastructures or regulations. Reporting close quarter situations and near-misses in general by VTS would fill a “cultural gap” of safety at IMO and rise up the requirement to the equivalent logic implemented already by ICAO. Reporting culture is the previous element to implement towards a Safety culture in the maritime community. But without any explanation and a Just culture in the maritime community the reporting from VTS would create another burden on seafarers and would strengthen a culture of punishment which is already too persistent.

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Acronyms and abbreviations

AB: able-body seaman
ADREP: Accident/incident Data Reporting system of ICAO
AIS: automatic identification system
Airprox: reporting of near collisions and other serious air traffic incidents
ARPA: automatic radar plotting aid
ATC: Air Traffic Control
COLREG 72: Convention on the International Regulations for Preventing Collisions at Sea of 1972
COMSAR: sub-committee on radio communication and search and rescue of the IMO
CPA: closest point of approach
D/F: direction finder
DNC: Digital Nautical Charts
DSC: Digit Selecting Call
EC: European Commission
ECS: Electronic Chart Systems
ECDIS: electronic charts display and information systems
EEZ: exclusive economic zone
ENC: electronic navigational charts
GMDSS: Global Maritime Distress and Safety System
GPS: Global Position System
GISIS: Global Integrated Shipping Information System of the IMO
IALA: International Association of Marine Aids to Navigation and Lighthouse Authorities
ICAO: International Civil Aviation Organization
IMO: International Maritime Organization
Inmarsat: International maritime satellite organization created in 1979, this is a private company since 1999
ISM: International Safety Management
ISO: International Organization of Standardization
ITU: International Telecommunication Union
MEPC: Maritime Environment Pollution Committee of the IMO
MSC: Maritime Safety Committee of the IMO
MSI: Maritime Safety Information
NAV: sub-committee of safety of navigation of the IMO
Navtex: Navigation Telex system
NBDP: Narrow Band Direct Printing
NCSR: sub-committee on Navigation, Communications and Search and Rescue of the IMO
NM: Nautical Mile
PPI: Plan Position Indicator
PAD: Predicted Area of Danger
PSC: Port State Control
QS: Quality System department
RACON: Radar Beacon, an aid to navigation system based on the activation of a clear signal on radar display generated by radar transmission
Radar: radio detection and ranging
Res.: resolution
SARP: standards and recommended practices of ICAO
SART: Search And Rescue Transponder, a system to locate castaways functioning based on a similar system than RACON

SMCP: Standard Marine Communication Phrases

SMM: Safety Management Manual

SOLAS: Safety Of Life at Sea convention

STCW: Standards for Training, Certification, and Watch-keeping convention of IMO

TCPA: time to closest point of approach

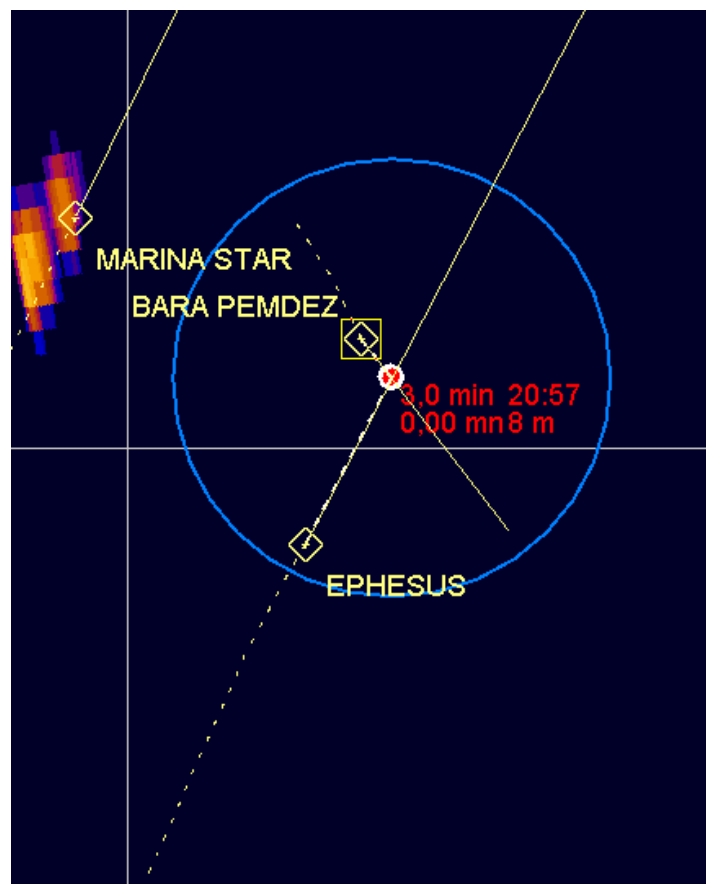
Telex: an international system of telegraphy with printed messages transmitted and received by teleprinters

UNCLOS: United Nations Convention on the Law Of the Seas

VHF: Very High Frequency band for radio communication

VTS: Vessel Traffic Service

WIG: Wing-In-Ground craft, report to COLREG Rule 3 (m)



Crossing situation (source: Ushant Traffic)

Introduction

In the beginning of the 20th century there were still a lot of merchant ships powered by sail. The three-mast barque BELEM which is now part of the French maritime heritage has survived the 1902 eruption of the Mount Pelée volcano in Martinica. The s/v¹BELEM is also the only survivor of a very prolific merchant fleet at the beginning of the 20th century of French merchant sailing vessels which were used to head the Cap Horn. The s/v PAMIR was the latest merchant sailing vessel operating. She was a five-mast barque using trade wind to ply between Europe (Hamburg) and South America (Argentina). She sunk dramatically in the Atlantic on 10th August 1957 and only 6 seafarers were rescued including 2 cadets on a total of 86 cadets on board. Because of this important number of fatalities and because these fatalities involved a large number of cadets in training on board PAMIR, many families were concerned by this shipwreck and there was an wide public emotion not only in Germany but around the world. We may say that the PAMIR shipwreck closed this glorious time of merchant sailing ships.

Captain Johannes Diebitsh, master of s/v PAMIR, used to say to his cadets: *“Always be careful because anything can happen at sea”*. Wise words of a wise man who perished with his ship. We should always remember his words despite the evolution of technology for shipping is performed against the forces of nature: the sea, the winds and the currents.

“Anything can happen at sea” could be the motto of this technical report for the intention is to explain the possible role of Vessel Traffic Services (VTS) in the prevention of collision with an evolving shipping traffic.

* * *

Evolution of the shipping traffic

In the end of the 20th century, there is no more sailing vessel, apart from a few exceptions such as msv² CLUB MED 2³, msv WIND SURF⁴ and others carrying passengers for cruise and one or two experimental cargo ships, and the shipping traffic has considerably change in one century, since the time of the three-masted barque Belem was trading cocoa between Brazil and Europe. Throughout the last century, the shipping industry has seen the total trade volume increasing constantly. Technological advances have also contributed to the increasingly efficient and fast shipping. In tonnage, the bulk of international freight is carried by maritime transportation.

Some figures from UNCTAD⁵ studies (Journal of maritime Transportation and UNCTAD, 2008) are sufficient to place the importance of shipping to world trade.

- in 2007, more than 7 billion tons of goods were transported by maritime,
- this represents approximately 77% of the value and 90% of the volume of international trade ;
- there are approximately 50,000 merchant ships worldwide, carrying all kinds of goods.

¹ s/v : sailing vessel

² msv: motor sailing vessel

³ CLUB MED 2 was built in Le Havre (France) in *Atelier de Construction du Havre* (ACH) and is rigged with 5 mast, 2 electric main propulsion engine, 1 bow thrusters, 1 stern thrusters and 2 Becker type rudders

⁴ WIND SURF is former msv CLUB MED 1, sister ship of CLUB MED 2

⁵ UNCTAD: United Nations Conference on Trade And Development

This fleet is registered in over 150 different flags, and operated by nearly 1.2 million seafarers of all nationalities.

Ships are high-value goods and high-tech: the construction of the largest of them can cost more than U.S. \$ 150 million and the exploitation of merchant ships generates an annual income currently estimated freight rates more U.S. \$ 380 billion, or about 4% of the total value of world trade in goods.

Over the past four decades, the total estimated trade by sea has almost quintupled, from less than 11 billion tonne-km in 1965 to nearly 57 billion ton-km in 2006, representing a growth rate average of 4% per year.

The main factor that led to the increase in trade in manufactured goods is containerization, which now represents 80% of maritime cargo traffic. Forecasts indicate a further development of container traffic in the world. Thus, according to Drewry Shipping Consultants and Global Insight, the rate of growth in world container traffic to reach 6.5% per annum for the period 2005-2020, against 11% for the period 2000-2005. It is important to realize that nowadays a single container ship like MÆRSK Mc-KINNEY MØLLER is measuring 398 m of length and carries 18 270 TEU⁶.

According to the latest EQUASIS statistics on the world merchant fleet in 2012, there was a total number of 79 471 merchant vessels.

Consequences versus causes

A ship is mobile in a hostile environment. The visual part of this environment is the surface of the sea and the coastline. The invisible part is the depth of water available under the keel. The officer of the watch's main task is to avoid collision with others vessels in the vicinity and to avoid stranding within the coast, bearing in mind that the "nearest coast is beneath the keel".

*"Too many collisions and strandings still take place, bringing discredit on all concerned – ship masters, pilots, watch officers, marine superintendents, ship-owners and insurers. Nor is the cost to the community of marine disaster now limited to loss of life and the value of the ships and cargoes. Large-scale pollution of the shoreline and lethal explosion may result from the stranding or collision of vessels laden with noxious or dangerous materials."*⁷

With the expansion of merchant shipping, the consequences of a maritime accident are catastrophic in terms of casualties, ecology, industry and also media, politic and of course insurance. I would list 2 major catastrophes that stroke France. The first one relative to the total lost of m/v⁸ MSC NAPOLI for I experienced this accident as MRCC manager in Corsen. From the beginning of the affair I was liaising between the French Authority, the "Préfet Maritime" in Brest, and the Secretary of States Representative for Maritime Salvage and Intervention (SOSREP) in United Kingdom. In a way this accident is a nice illustration of what can be done nowadays in terms of emergency response to a maritime accident involving a large merchant ship. Nevertheless lessons still need to be learned from experience, and in the

⁶ TEU is the abbreviation for Twenty foot Equivalent Unit, which is a standard container of 2.591 m (8.5 feet) height, 2.438 m (8 feet) breadth and 6.096 m (20 feet) length. The capacity of this standard 20 foot container is of 38.8 cubic meters.

⁷ Foreword by Vice-Admiral Sir Ian McGeoch to Richard A. Cahill's book « Stranding and their causes » (Fairplay publications).

⁸ m/v: motor vessel

MSC NAPOLI salvage response were used at an extreme limit. It shows that one Emergency Towing Vessel (ETV) is not enough to tow a container ship, not only because of the size of the ship, but also because of incident such as a rudder blocked on one side that generates a large resistance to towing.

The second accident is a founder event, only because nothing was the same after the disaster. If there was a Traffic Separation Scheme (TSS) off Ushant in 1978, there was no Vessel Traffic Service (VTS). And the lessons learned from the stranding of VLCC AMOCO CADIZ were drawn and ETV as well as infrastructures for a coastal VTS were established (coastal radio station, direction finder and an important tower to support a radar) in order to avoid a new disaster.

The need to secure the shipping traffic globally

Over the years, it became obvious to secure globally the shipping traffic. This is the Titanic in 1912 which gave birth to the SOLAS Convention. Indeed, the first SOLAS was adopted in 1914, thirteen countries attended, it was organized by the United Kingdom. The purpose of this conference was to put on paper a number of requirements concerning the safety of navigation for merchant vessels, the establishment of waterproof and fire resistant partitions, the fight against the fire on board merchant ships and rescue equipment, as well as rules on the presence of wireless telegraphy equipment in ships carrying more than fifty people. Unfortunately, only five countries have ratified the treaty because of the arrival of the First World War.

At the second conference in 1929, 18 countries were present. This version of the SOLAS includes a section on shipbuilding, improves the fight against the fire and rescue equipment and wireless telegraphy. This version also includes a section on the navigational aids and improves regulations for prevention of collisions.

For the third convention in 1948, only technological improvements were made. The content remains unchanged, but the SOLAS went into much more detail and covers a larger portion of the vessels.

Established in 1948, the Intergovernmental Maritime Consultative Organization (IMCO) is a specialized agency of the United Nations. IMCO's first task was to update SOLAS Convention; the resulting 1960 Convention was subsequently recast and updated in 1974 and it is that Convention that has been subsequently modified and updated to adapt to changes in safety requirements and technology. In 1982, IMCO was renamed the international maritime organization (IMO). And in 1983 the IMO established the World Maritime University (WMU) in Malmö, Sweden.

Throughout its existence IMO has continued to produce new and updated instruments across a wide range of maritime issues covering not only safety of life and marine pollution but also encompassing safe navigation, search and rescue, wreck removal, tonnage measurement, liability and compensation, ship recycling, the training and certification of seafarers, and piracy. More recently SOLAS has been amended to bring an increased focus on maritime security through the International Ship and Port Facility Security (ISPS) Code. The IMO has also increased its focus on air emissions from ships.

But improving maritime safety did not wait IMO. The cooperation between the services responsible for Maritime Signalling of different countries has existed for more than a century, as shown by the Organisation of different international conferences which, in principle generally took place at the universal exhibitions.

On 25 May 1885, the first Inland Navigation Congress was held in Brussels, providing a forum for an international debate on these questions. Coinciding with the Paris Universal Exhibition of 1889, the first International Congress on Maritime Works was held and included colloquia and visits specifically related to maritime signalling. Throughout the congress there was an obvious desire and need to give these meetings continuity and this happened for a series of years until in 1900, the Inland Navigation Congress merged with the Ocean Navigation Congress and the International Navigation Congress was born. In order to organize these kinds of meetings was created PIANC, the Permanent International Association of Navigation Congresses.

However, as these congresses were organised by the commission in which maritime signalling was hardly represented, little space was given over to this speciality. Therefore the AIPCN Congress of 1926 in Cairo organised the first "official meeting" of people responsible of a few maritime buoy services in which the need was revealed for cooperation in this field and an agreement was reached on the measures that should be taken to facilitate this cooperation. This was the origin of the International Conference of Lighthouse Services held in London (1929), and then followed by Paris (1933) and Berlin (1937). Following the interruption caused by the Second World War, this was taken up again in 1950 with the Conference of Maritime Signalling Services held in Paris, although small committees had previously been constituted made up of services interested in discussing specific subjects.

But it was during the conference held in Scheveningen (Holland) in 1955 when it was proposed to officially give body to the cooperation between the Maritime signalling services and to create a Permanent Secretariat based in Paris, whose mission on the one hand would be to commission the performance of the ever larger technical studies with collaboration between the different services and, on the other, to represent these services before the international organisations. This proposal was unanimously approved by all of those attending the conference and it was decided to study the creation of a permanent organisation that would not depend on the national governments. The project with the name of International Association of Lighthouse Authorities (IALA) was sent on 31 July 1956 to all maritime signalling services in the world.

Eleven months later, twenty services had confirmed their interest in joining the Association, which officially came into existence on 1 July 1957 in order to provide a permanent organization to support the goals of the Technical Lighthouse Conferences, and to group the maritime signalling services of all countries to study technical questions of general interest.

When it was created in 1957, the IALA only had 20 National members and it now covers more than 80 countries over the five continents. The General Assembly of IALA meets about every 4 years. The Council of 20 members meets twice a year to oversee the ongoing programs. IALA is based near Paris in Saint-Germain-en-Laye, France. With time, in addition to the National Maritime signalling services, the Association has integrated manufacturers and distributors of navigation aid equipment, research centres and consultancies as members of a different category. The IALA's principal objectives are to:

- Provide its members with a forum to compare their experiences and work, to give them international contacts and to encourage the services in industrialised countries to give help to those developing.
- Encourage its members in their efforts to technologically drive aids to navigation and to try to standardise them throughout the world to the benefit of all navigators, for which collaboration amongst the members is fundamental.
- Facilitate the planning and installation of new beacons and vessel traffic services so that navigators might find signs and information on their routes that might be recognised and interpreted without

ambiguity, and thus to contribute to increasing safety at sea and protecting the marine environment.

As it is not a governmental organization, the only means available to the Association for its recommendations to be applied is that they should be supported by national governments or intergovernmental organisations such as the International Maritime Organisation (IMO), the International Telecommunications Union (ITU) and the International Hydrographic Organisation (IHO).

Its principal work since 1973 has been the implementation of the IALA Maritime Buoyage System. This system replaced some 30 dissimilar buoyage systems in use throughout the world with 2 major systems. This rationalised system was introduced as a result of two accidents in the Dover Straits on 12th January 1971 when the m/v BRANDENBURG hit the wreck of the tanker TEXACO CARIBBEAN off Folkestone and sank although the wreck was accurately buoyed. A short while later, on 27th February 1971, the m/v NIKI also struck the tanker TEXACO CARIBBEAN and sank, despite the wreckage was adequately marked. The combined loss of lives in these two accidents was 51 persons. Today with the enforcement on 1 July 2002 of the new text of chapter V of the SOLAS Agreement, in Rule 13 (Establishment and operation of aids to navigation) gives an explicit reference to the recommendations of the IALA which make them almost compulsory.

An important task commissioned by the OMI to the IALA is its intervention in defining and characterising a world system of radio navigation. In the Association's opinion, a civil system must be developed and managed internationally with user receptors capable of indistinctly using the currently available satellite positioning systems, GPS and GLONASS, and the future European GALILEO system. The works related to the Vessel Traffic Services will continue to be extended in order to achieve standardisation in certain aspects (mainly legal responsibility, staff training and uniformity of procedures) and to try to ensure that ships follow these rules in order to facilitate traffic, above all in risk areas.

Vessel traffic Services

The Association has always worked to improve maritime traffic safety in restricted waters, navigation routes and accesses to ports, collaborating with other international organisations representing the different points of view involved in the problem: Port Authorities, ship masters, stevedores, etc. The results of this joint work have included, for example, the adoption by IMO in 1985 of the Guide for the Vessel Traffic Services⁹ and the relatively recent publication of the World Guide of Vessel Traffic Services drawn up jointly by IALA, IAPH (International Association of Ports and Harbours) and IMPA (International Maritime Pilots' Association).

The IALA Vessel Traffic Service (VTS) Committee focuses on all aspects of VTS, including the expanding role of vessel monitoring for maritime safety, environmental protection and security. The committee aims to develop and review VTS related IALA documentation on issues such as the training of personnel, operational procedures, equipment requirements, the impact of AIS on VTS and the role of VTS in security and global traffic monitoring systems. The committee also reviews and updates the IALA VTS Manual, a comprehensive reference document. A new edition of the VTS Manual is published every four years.

Every four years, in conjunction with the General Assembly, the IALA organises an International Conference to which all members are invited to present talks on their latest experiences in the field of aids to

⁹ Guidelines for VTS: IMO Res.A.578 (14) adopted on 20th November 1985, and revoked by IMO Res.A.857 (20) adopted on 27th November 1997.

navigation. The texts of these papers are published in English and French. At the present time, the Association is working on improving and adapting the visual aids to the new technologies available, above all regarding power supply and light source systems. Furthermore, a large part of the activity is expected to be developed in the field of radio electric aids, principally in satellite positioning systems, systems of automatic identification and maritime traffic services, in which the influence will be reflected of developments in electronics, IT and even space technology. The first conclusion of 18th IALA Conference from 25th to 31st May 2014, held in A Coruña, Spain, was: “IALA should consider providing guidance on anomalous behaviour recognition to improve VTS operation and ship monitoring.”

Hence, the future programme of the IALA VTS committee includes the task to produce a guideline on incident/accident reporting and recording, including near-miss situation. There are many types of incidents, accidents and near-misses generated by the maritime traffic. Amongst all these events, close-quarters situations are an interesting focus. All navigators talk about close quarter situations, but nobody had defined it or had talked about what could be tough from close quarter situations. It is often a good occasion to tell a nice sea story around a beer in a bar and learn the “rules of the road” in a lively manner from the mouth of experienced seafarers who have the sincerity to admit they missed something in their daily task of watch keeping.

But nowadays, seafarers are not alone everywhere. In some area, traffic is regulated and monitored by vessel traffic services (VTS). And the anxiety generated by close quarter situations is shared by the VTS operator as well. Sometimes, only the VTS operator is the only one to be aware of the situation, for on board ships nobody cares about what has happen. From the point of view of the VTS operator, a daily task is to watch the regulated area through sensors in order to avoid close quarter situation as much as possible, and obviously to avoid collision.

Near Miss

Accidents are often the accumulation of minor incidents or near-misses. Then, why not take the chance to learn from the experience of near-misses? But what is a near-miss?

Near-miss¹⁰: A sequence of events and/or conditions that could have resulted in loss. This loss was prevented only by a fortuitous break in the chain of events and/or conditions. The potential loss could be human injury, environmental damage, or negative business impact (e.g., repair or replacement costs, scheduling delays, contract violations, loss of reputation). Some general examples of a near-miss help to illustrate this definition:

- .1 Any event that leads to the implementation of an emergency procedure, plan or response and thus prevents a loss. For example, a collision is narrowly avoided; or a crew member double checks a valve and discovers a wrong pressure reading on the supply side.
- .2 Any event where an unexpected condition could lead to an adverse consequence, but which does not occur. For example, a person moves from a location immediately before a crane unexpectedly drops a load of cargo there; or a ship finds itself off-course in normally shallow waters but does not ground because of an unusual high-spring tide.

¹⁰ MSC-MEPC.7/Circ.7, 10th October 2008, guidance on near-miss reporting

.3 Any dangerous, or hazardous situation or condition, that is not discovered until after the danger has passed. For example, a vessel safely departs a port of call and discovers several hours into the voyage that the ship's radio was not tuned to the Harbour Master's radio frequency; or it is discovered that ECDIS display's scale does not match the scale, projection, or orientation of the chart and radar images.

Safety Culture

For a company to realize the fullest potential benefits of near-miss reporting, seafarers and onshore employees need to understand the definition of a near-miss to ensure that all near-misses are reported. The company also needs to be clear about how the person who reports the near-miss and those persons involved will be treated. The company should encourage near-miss reporting and investigation by adopting a "safety culture" approach.

The term "safety culture" came into popular after the 1986 Chernobyl nuclear power plant accident. After this accident the International Atomic Energy Agency (IAEA) issued a report and mentioned the weakness of the organization's safety culture and it has been cited as one of the cause of the accident. After this report, to prevent the occupational accidents, safety culture has been identified among the causes of numerous high-profile accidents in others industries, such as the capsizing of the HERALD OF FREE ENTERPRISE, the disaster of the Space Shuttles CHALLENGER and COLOMBIA or the BP oil platform accident in Mexico Bay, etc.

In general, poor safety culture means that safety is sacrificed, even when people are saying that safety comes first – hence practice differs from theory or policy. Simple examples would be where staff concerns about safety are consistently not addressed; where there appears to be no learning from past events; where safety cases state the system is safe but operational people believe an accident is imminent; or where safety is believed to be someone else's responsibility. Safety Culture "mismatches", where management and employees do not share the same beliefs about safety, or where their behaviours are in opposition, can often be detected in organizations.

A positive safety culture would be one where everyone knew where their role with respect to safety, and believed that everyone in the organization was truly committed to safety, because there was clear safety leadership, activity, and commitment in term of resources. Safety would be discussed frequently at all levels in the organization, and would be the first agenda item in the periodic meetings. There would be a clear safety strategy, and anyone could raise a safety issue with impunity; operational staff could also report events without fear of any recrimination or even of losing face amongst their peers.

Characteristics of positive safety culture are:

- **Reporting culture**, which encourages employees to divulge information about all safety hazards they encounter.
- **Just culture**, which features an atmosphere of responsible behaviour and trust whereby people are encouraged to provide essential safety-related information without fear of retribution. However, a distinction is drawn between acceptable and unacceptable behaviour. Unacceptable behaviour will not necessarily receive a guarantee that a person will not face consequences.
- **Flexible culture**, which adapts effectively to changing demand and allows quicker, smoother reactions to off-nominal events.

- **Learning culture**, which is willing to change based on safety indicators and hazards uncovered through assessments, audits, and incident analysis.
- **Informed culture**, where a safety system integrates data from incidents, accidents and near misses and combines them with information from proactive such as safety audits and climate surveys.

It is important to note that a safety culture is already in place in civil aviation, not only in airline companies, but at the highest level in the international civil aviation organization (ICAO). Parallel procedures in aviation will be presented in order to compare with the maritime world.

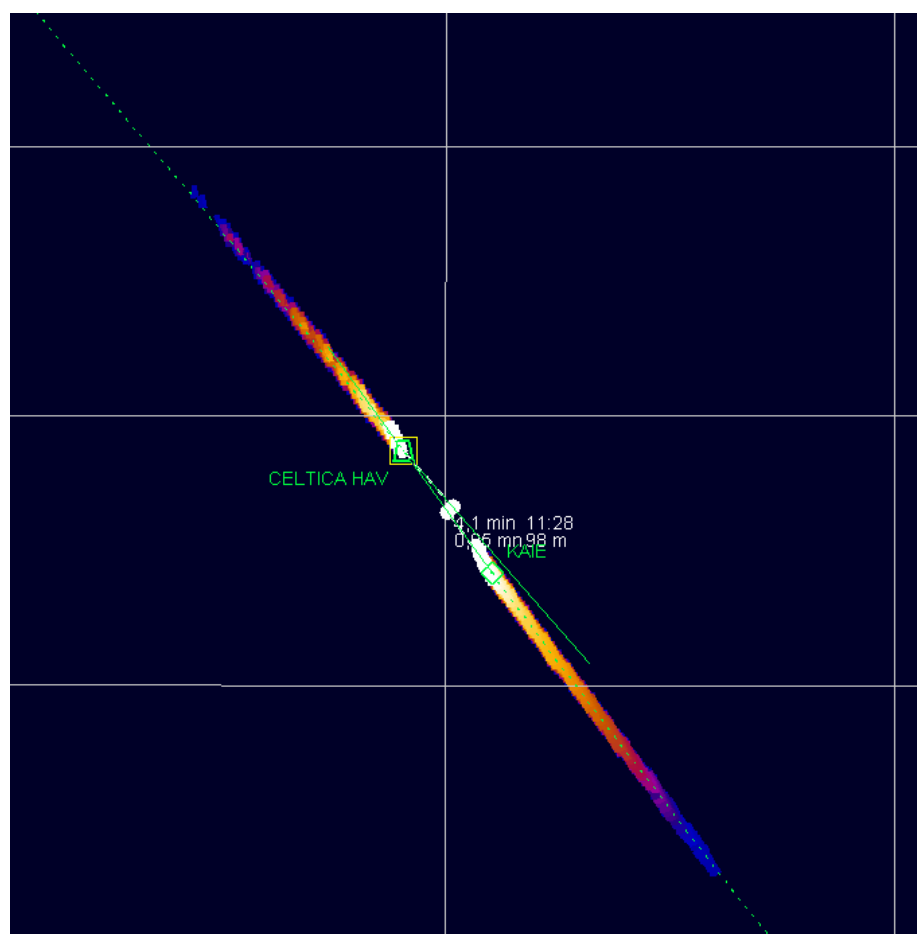
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Main near-miss cases in maritime traffic could be identified in 2 categories: near-stranding cases and near-collision cases. If the first category could be the result of a close quarter situation by diverting the course of one vessel to shallow waters¹¹, or the loss of propulsion or steering gear, this results in general to deviation in navigation. Hence the analysis of near-stranding cases is worth studying separately. Near-collision cases or close quarter situations result in general in the way in which vessels involved are applying the “rules of the road”. Nevertheless, dangers to navigation, such as shallow waters, will interfere in the way applying the “rules of the road”.

Scope and definitions will be first defined with a highlight on international regulatory references. The point of view of the navigator and the VTS operator will be compared in order to understand the analysis that could be made from the latter. In a second part, the Ushant VTS reporting of close quarter situations will be developed as a reference experience. The procedure is now an integral part of quality assurance of all French coastal VTS. In order to develop a safety culture in VTS and for the maritime community, the last part will develop the interest of reporting close quarter situations, compare with the ICAO procedure already in force, how and to whom to report and what use could be made from all these records. In addition, a proposal to the IMO regulation will be presented so that the possibility that a VTS may report a close quarter situation may be enforced.

This document is focusing particularly on close quarter situation for this represents a dedicated near-miss situation in maritime traffic based on the understanding of the “rules of the road” mandatory to all vessels at sea. The objective is to develop a Safety culture, and as explained above, a Safety Culture is characterized first by a Reporting culture. Hence this present memoir is developing the way to go on the first step of a Safety culture in maritime navigation.

¹¹ This special situation is worth to be studied as a close quarter situation.



Head-on situation (source: Ushant Traffic)

I – Definitions and maritime traffic overview

I.1 – definitions

For the development and understanding of the present paper, the following definitions are used and proposed.

An **Accident** or a **marine casualty** means, as defined in MSC.255 (84) known as Casualty Investigation Code: an event, or a sequence of events, that has resulted in any of the following which has occurred directly in connection with the operations of a ship:

- .1 the death of, or serious injury to, a person;
- .2 the loss of a person from a ship;
- .3 the loss, presumed loss or abandonment of a ship;
- .4 material damage to a ship;
- .5 the stranding or disabling of a ship, or the involvement of a ship in a collision;
- .6 material damage to marine infrastructure external to a ship, that could seriously endanger the safety of the ship, another ship or an individual; or
- .7 severe damage to the environment, or the potential for severe damage to the environment, brought about by the damage of a ship or ships.

An **incident** or A **marine incident** means, as defined in MSC.255 (84) known as Casualty Investigation Code: an event, or sequence of events, other than a marine casualty, which has occurred directly in connection with the operations of a ship that endangered, or, if not corrected, would endanger the safety of the ship, its occupants or any other person or the environment.

Near-miss, as defined in MSC-MEPC.7/Circ.7 Guidance on near-miss reporting: a sequence of events and/or conditions that could have resulted in loss. This loss was prevented only by a fortuitous break in the chain of events and/or conditions. The potential loss could be human injury, environmental damage, or negative business impact (e.g., repair or replacement costs, scheduling delays, contract violations, loss of reputation).

Close quarter situation, proposition based on near-miss definition above: a sequence of events and/or conditions between different vessels that could result in a collision between vessels.

In order to clarify all wording, the term “collision” needs at last to be defined as well. The following definition is proposed to clarify the present paper developing close-quarters situation.

Collision: an interaction between two or more vessels at sea. It should be kept in mind that a collision between vessels does not lead necessarily to a direct contact between them. In some situation, the water displaced by a vessel can generate an accident on others vessels in the vicinity, hence this is considered as a collision. In others situations, the contact could be with a ship equipment or tow such as fishing gears, dredging gear, cable line, towing line or tow.

Of course the definition list would be complete by the term “vessel” as defined by COLREG Rule 3 (a): The word **vessel** includes every description of water craft, including non-displacement craft, WIG¹² craft and seaplanes, used or capable of being used as a means of transportation on water.

¹² WIG craft : Wing-In-Ground craft, report to COLREG Rule 3 (m).

In addition, IMO Res. A857 (20), guidelines for vessel traffic services, provides the following useful definitions:

Vessel traffic service (VTS): 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.

VTS authority: the authority with responsibility for the management, operation and co-ordination of the VTS, interaction with participating vessels and the safe and effective provision of the service.

VTS area: the delineated, formally declared service area of the VTS. A VTS area may be subdivided in sub-areas or sectors.

VTS centre: the centre from which the VTS is operated. Each sub-area of the VTS may have its own sub-centre.

VTS operator: an appropriately qualified person performing one or more tasks contributing to the services of the VTS.

VTS sailing plan: a plan which is mutually agreed between a VTS Authority and the master of a vessel concerning the movement of the vessel in a VTS area.

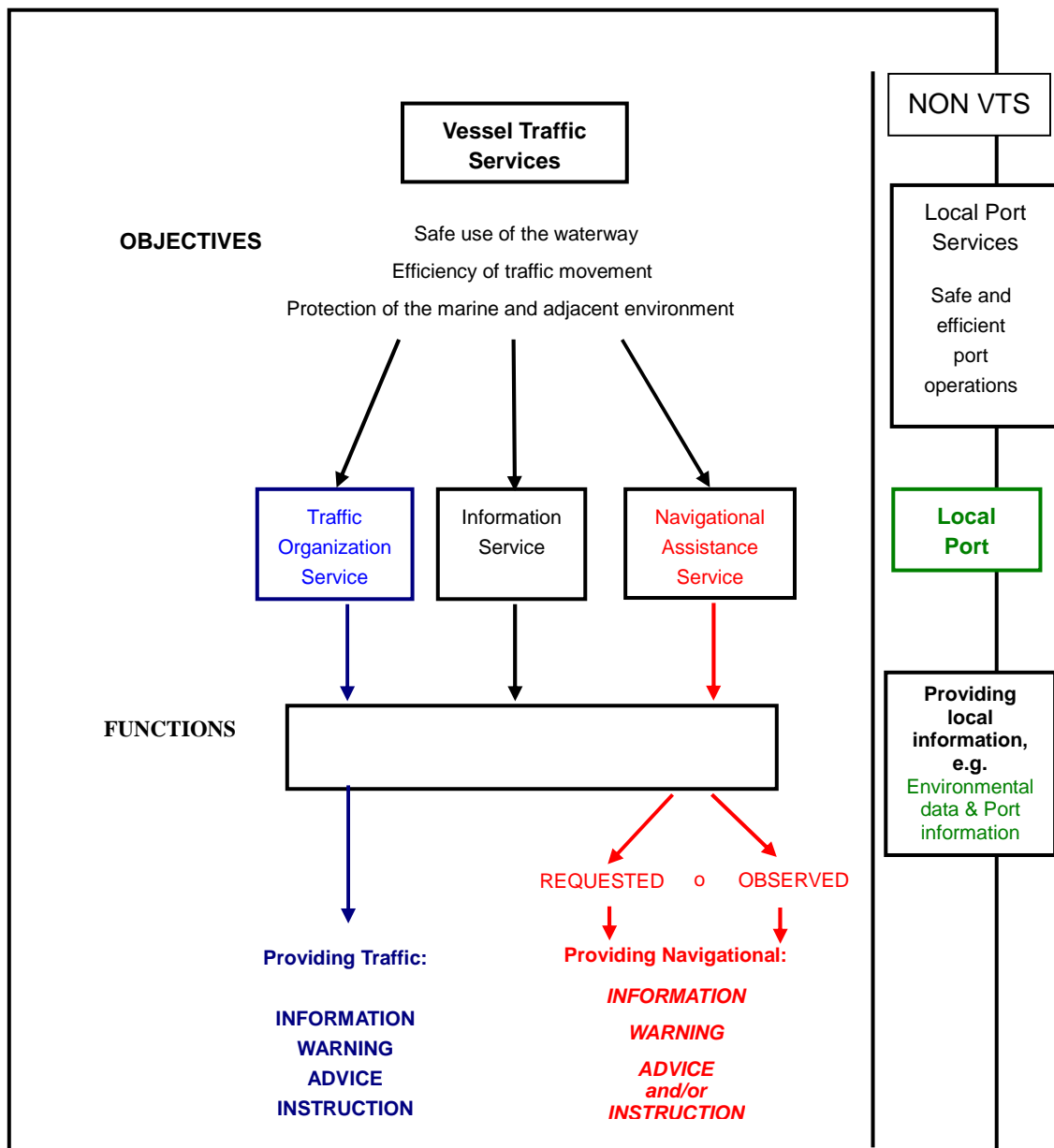
VTS traffic image: the surface picture of vessels and their movements in a VTS area.

VTS services: VTS should comprise at least an information service and may also include others, such as a navigational assistance service or a traffic organization service, or both, defined as follows:

An **information service** is a service to ensure that essential information becomes available in time for on-board navigational decision-making.

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

A **traffic organization 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 services (source: IALA VTS manual)

I.2 – Regulatory references

I.2.1 - COLREG 72

The International Regulations for Preventing Collisions at Sea 1972 (COLREGs) are published by the International Maritime Organization (IMO), and set out, among other things, the "rules of the road" or navigation rules to be followed by ships and other vessels at sea in order to prevent collisions between two or more vessels. COLREGs can also refer to the specific political line that divides inland waterways, which are subject to their own navigation rules, and coastal waterways, which are subject to international navigation rules. The COLREGs are derived from a multilateral treaty called the Convention on the International Regulations for Preventing Collisions at Sea.

A commonly held misconception concerning the rules of marine navigation is that by following specific rules, a vessel can gain certain rights of way over other vessels. No vessel ever has absolute "right of way" over other vessels. Rather, there can be a "give way" (burdened) vessel and a "stand on" (privileged) vessel, or there may be two give way vessels with no stand on vessel. A stand on vessel does not have an absolute right of way over any give way vessel, for if there is a risk of collision, a stand on vessel may still be obliged under Rule 2 to give way so as to avoid it, if doing so will be effective and is practicable. Two power-driven vessels approaching each other head to head are *both* deemed to be "give way" and both are required to alter course so as to avoid colliding with the other. Neither vessel has "right of way".

Last, but not least, the "rules of the road" are mandatory to all vessels at sea: merchant ships, fishing vessels, yachts, warships and any other water craft, including non-displacement craft, Wing-In-Ground craft and seaplanes, used or capable of being used as a means of transportation on water.

I.2.2 - ISM Code

The purpose of the International Safety Management Code (ISM Code) is to provide an international standard for the safe management and operation of ships and for pollution prevention.

Recognizing that no two shipping companies or ship-owners are the same, and that ships operate under a wide range of different conditions, the Code is based on general principles and objectives. The Code is expressed in broad terms so that it can have a widespread application. Clearly, different levels of management, whether shore-based or at sea, will require varying levels of knowledge and awareness of the items outlined. The cornerstone of good safety management is commitment from the top. In matters of safety and pollution prevention it is the commitment, competence, attitudes and motivation of individuals at all levels that determines the end result.

MSC-MEPC.7/Circ.7 Guidance on near-miss reporting has been included into the ISM Code 2010 Edition. The Maritime Safety Committee of IMO (MSC) encourages reporting near-misses as a way to promote a no-blame culture. The MSC further noted that the guidance was required:

- 1- to encourage near-misses reporting so that remedial measures can be taken to avoid recurrences; and
- 2- on the implementation of near-misses reporting in accordance with the requirements of section 9 of the ISM Code with respect to reporting of hazardous situations.

Section 6 of the ISM Code on resources and personnel indicates that the company should ensure that each ship is manned with qualified, certificated and medically fit seafarers in accordance with national and international requirements.

I.2.3 - STCW

The Standards for Training, Certification, and Watch-keeping, or STCW, is a convention of the IMO. These regulations first came into existence in 1978. Major revisions to the convention occurred in 1984, 1995, and 2010. The goal of the STCW training is to give seafarers from all nations a standard set of skills useful to crew members working aboard large vessels outside of the boundaries of their country. In particular, Chapter II of STCW is dealing with master and deck department.

I.2.4 - SOLAS V R12

Vessel traffic services (VTS), as indicated in SOLAS V R12, contribute to safety of life at sea, safety and efficiency of navigation and protection of the marine environment, adjacent shore areas, work sites and offshore installations from possible adverse effects of maritime traffic. Contracting governments planning and implementing VTS shall wherever possible follow the IMO Res. A857 (20) Guidelines for Vessel Traffic services. The resolution is divided in two annexes: one on guidelines and criteria for VTS; and another on guidelines on recruitment, qualification and training of VTS operators.

In addition to IMO guidelines for VTS, IALA has developed recommendation V-103 on standards for training for VTS personnel, recommendation V-128 on operational and technical performance requirements for VTS equipments and many others guidelines for VTS operations and model courses for VTS operators.

I.3 – Navigator point of view

The task of the officer in charge of the navigational watch is complex. The course of the ship must be secured in order to avoid grounding and collision with other vessels. On modern merchant ship, the fire alarm, fire and watertight door controls are reported on the bridge. In addition, engine room controls and alarms are reported on the bridge on modern merchant ship, which increase the workload and stress of the officer of the watch. In clear visibility during daylight, the officer is alone on the bridge. There are few ships where the officer is seconded all times by an AB¹³ or an additional officer or cadet. During the night and in case of poor visibility there should be an extra AB for watch keeping.

To complete the picture, the ship is moving on the surface of the sea. When the weather is nice, the surface is like a mirror, but heavy weather generates waves, sometimes of 6 to 12 metres, which generate a real physical burden to the officer of the watch. It is in such situation that we realize a ship moves in three dimensions: rolling from one side to another, pitching from aft to forward and heaving up and down. Then come rain and fog, and in such heavy and bad weather the sensors you need to help you are also hampered: there are sea and rain clutters on the radar and others sensors and systems are also sensible to the environment.



A merchant ship bridge arrangement (French cruise ship Boreal)

¹³

AB : able-body seaman

I.3.1 - COLREG

COLREG rule 5 on look-out stipulates that *“every vessel shall at all times maintain a proper look-out by sight and hearing as well as by all available means appropriate in the prevailing circumstances and conditions so as to make a full appraisal of the situation and on the risk of collision”*. That is to say a seafarer is supposed to be medically fit in order to use properly his eyes and ears. But what other means are given available to the seafarer?

I.3.2 - Charts

Marine charts are necessary to report a position and avoid grounding. Corrections should be updated in order to have correct information of the area. The correction of the marine charts could be the task of one of the officer in charge of the navigational watch.

With the discussion on e-Navigation at IMO since 2005, one of the first actions is the mandatory introduction of electronic charts display and information systems (ECDIS) in 2018. But ECDIS are already installed on many merchant ships.

An ECDIS is a computer-based navigation information system that complies with IMO regulations and can be used as an alternative to paper nautical charts. IMO refers to similar systems not meeting the regulations as Electronic Chart Systems (ECS). An ECDIS system displays the information from electronic navigational charts (ENC) or Digital Nautical Charts (DNC) and integrates position information from position, heading and speed through water reference systems and optionally other navigational sensors. Other sensors which could interface with an ECDIS are radar, Sailing Directions, echo sounder, Navtex and automatic identification system (AIS).

I.3.3 - RADAR

Radar (radio detection and ranging) is clearly the premium equipment to help the navigator. Radar is also the only aid to navigation listed in COLREG, in rule 6 (safe speed), rule 7 (risk of collision) and of course rule 19 relative to Conduct of vessels in restricted visibility. Radar has been developed since the 1930's and started to be introduced on merchant shipping in the 1950's. Mostly based on magnetron technology, new generation of radar is now based on solid state technology. Nevertheless this latter type of radar does not detect RACON¹⁴ and might not detect SART¹⁵ as well, but it consumes less energy and gives a better picture detection.

Marine radar with automatic radar plotting aid (ARPA) capability can create tracks using radar contacts. The system can calculate the tracked object's course, speed and closest point of approach (CPA), thereby knowing if there is a danger of collision with the other ship or landmass. Development of ARPA started after the accident when the Italian passenger liner ANDREA DORIA collided with the passenger liner STOCKHOLM in dense fog and sank off the east coast of the United States on 25th July 1956. ARPA radars started to emerge in the 1960s and, with the development of microelectronics. The first commercially available ARPA was delivered to the cargo liner TAIMYR in 1969 and was manufactured by Nordcontrol, now a part of Kongsberg Maritime. ARPA-enabled radars are now available even for small yachts.

¹⁴ RACON: Radar Beacon, an aid to navigation system based on the activation of a clear signal on radar display generated by radar transmission.

¹⁵ SART: Search And Rescue Transponder, a system to locate castaways functioning based on a similar system than RACON.

The availability of low cost microprocessors and the development of advanced computer technology during the 1970s and 1980s have made it possible to apply computer techniques to improve commercial marine Radar systems. Radar manufactures used this technology to create the Automatic Radar Plotting Aids. ARPA's are computer assisted radar data processing systems which generate predictive vectors and other ship movement information.

The International Maritime Organization (IMO) has set out certain standards amending the International Convention for the Safety of Life at Sea requirements regarding the carrying of suitable automated radar plotting aids. The primary function of ARPA's can be summarized in the statement found under the IMO Performance Standards¹⁶. It states a requirement of ARPA's: "to improve the standard of collision avoidance at sea: Reduce the workload of observers by enabling them to automatically obtain information so that they can perform as well with multiple targets as they can by manually plotting a single target". As we can see from this statement the principal advantages of ARPA are a reduction in the workload of bridge personnel and fuller and quicker information on selected targets.

A typical ARPA gives a presentation of the current situation and uses computer technology to predict future situations. An ARPA assesses the risk of collision, and enables the operator to see proposed manoeuvres by his/her own ship.

While many different models of ARPA's are available on the market, the following functions are usually provided:

1. True or relative motion radar display.
2. Automatic acquisition of targets plus manual acquisition.
3. Digital read-out of acquired targets which provides course, speed, range, bearing, closest point of approach (CPA), and time to CPA (TCPA).
4. The ability to display collision assessment information directly on the Plan Position Indicator (PPI), using vectors (true or relative) or a graphical Predicted Area of Danger (PAD) display.
5. The ability to perform trial manoeuvres, including course changes, speed changes, and combined course/speed changes.
6. Automatic ground stabilization for navigation purposes. ARPA processes radar information much more rapidly than conventional radar but is still subject to the same limitations. ARPA data is only as accurate as the data that comes from inputs such as the gyro and speed log.

Officer in charge of navigational watch is required to have an ARPA certificate in accordance to the minimum standard requirements of STCW in table A-II/1¹⁷. The ARPA course is based on training in radar observation and plotting and in operational use of ARPA in section B-I/12¹⁸ of STCW and on the IMO Model course 1.07¹⁹.

But radar provides a dual functionality to the navigator. It helps to avoid collision, and it is also a means to navigate by fixing a position with an electronic bearing and distance line. In coastal navigation the accuracy of a radar fix is between 10 to 100 m which is good enough with the help of cross-checking information to navigate in safety.

¹⁶ IMO Res.A.823(19) performance standards for ARPA amended by Res.MSC.192(79) adoption of the revised performance standards for RADAR equipment

¹⁷ STCW A-II/1 use of RADAR and ARPA to maintain safety of navigation

¹⁸ STCW B-I/12 guidance regarding use of simulators

¹⁹ IMO model course 1.07 RADAR Navigation Operation Level, 1999 Edition (Ref. TA107E)

I.3.4 - Sailing Directions

Sailing Directions as marine charts need to be updated. These are the first source of information in the preparation of a voyage in unknown areas for the crew. Detailed information about service onshore can be found in sailing directions, such as VTS procedures: reporting point, reporting details, VHF working channels, etc.

I.3.5 - Navtex

This is a system of broadcasting maritime safety information (MSI) by the way of telex over radio on medium frequency. Information provided by Navtex is updating the Sailing Directions and marine charts and complete the awareness of the navigators on the potential dangers to navigation in the vicinity. The range of coverage of Navtex system is approximately 200 miles.

I.3.6 - SafetyNet

The safetyNet system is supported by Inmarsat satellites and supplements the Navtex coverage on the high sea for maritime safety information (MSI).

I.3.7 - NBDP

Narrow Band Direct Printing (NBDP) is based on telex over radio and affords coverage of the Polar Regions not covered by Inmarsat and Navtex for maritime safety information.

NAVTEX, SafetyNet and NBDP information are Telex messages that need to be reported manually by the navigator on a chart or log book. For instance a gunnery exercise squared area is indicated by the geographical coordinates of each corner point. Then the navigator should report on a chart the data in order to visualise the gunnery exercise area to be avoided.

I.3.8 - Echo sounder

Ships are moving not only on the surface of the sea, but in a three dimensional space because of the draft of the ship. Echo sounder indicates the height of water available under the keel. This is also a source to cross check the fixing of a position if necessary.

I.3.9 - Automatic identification systems (AIS)

The Automatic Identification System (AIS) is an automatic tracking system used on ships for identifying and locating vessels by electronically exchanging data with other nearby ships. AIS information supplements marine radar, which continues to be the primary method of collision avoidance for water transport.

Information provided by AIS equipment, such as unique identification, position, course and speed, can be displayed on a screen or an ECDIS. AIS is intended to assist a vessel's watch-standing officers. AIS integrates a standardized VHF transceiver with a positioning system such as GPS receiver, with other electronic navigation sensors, such as a gyrocompass or rate of turn indicator.

The IMO's International Convention for the Safety of Life at Sea (SOLAS) requires AIS to be fitted aboard international voyaging ships with gross tonnage (GT) of 300 or more, and all passenger ships regardless of size.

Due to the limitations of VHF radio communications, and because not all vessels are equipped with AIS, the system is meant to be used primarily as a means of lookout and to determine the risk of collision rather than as an automatic collision avoidance system, in accordance with the International Regulation for Preventing Collision at Sea.

When a ship is navigating at sea, information about the movement and identity of other ships in the vicinity is critical for navigators to make decisions to avoid collision with other ships and dangers (shoal or rocks). Visual observation (e.g., unaided, binoculars, and night vision), audio exchanges (e.g., whistle, horns, and VHF radio), and radar or Automatic Radar Plotting Aid (ARPA) are historically used for this purpose. These preventive mechanisms, however, sometimes fail due to time delays, radar limitations, miscalculations, and display malfunctions and can result in a collision.

While requirements of AIS are to display only very basic text information, the data obtained can be integrated with a graphical electronic chart or a radar display, providing consolidated navigational information on a single display.



Example of a bridge navigation display

I.3.10 - Magnetic Compass

The magnetic compass is still in force on merchant ship, much as a back-up system than daily equipment for the navigation. Hence even as a back-up system, the magnetic compass need to be checked and maintained in good working condition in case of use.

I.3.11 - Gyrocompass

Gyrocompass is sensitive equipment on a modern ship to keep the course to steer. Gyrocompass bearing information is given to the automatic pilot and the radar in order to stabilize the display North up or course up (true or relative motion). Majority of merchant ship gyrocompass are of mechanical type. This is sensitive equipment and is often obviously positioned in a bad location on the bridge, i.e. often very high above the sea level. Hence this device is more subject to acceleration in such a position. There are others types of gyrocompass using new technology without any mechanical piece in motion. These are inertial system based on infra red technology and the latest generation on fibre optic technology. These

technologies are in place on navy ship, including submarine for a self-contained navigation based on inertial navigation, but it appears slowly on merchant ship.

I.3.12 - Automatic pilot

It is unthinkable nowadays not to have an automatic pilot on modern merchant ship. Meanwhile this important equipment is a slave to gyrocompass or magnetic compass. This is a good reason enough to check periodically the error of the gyrocompass and magnetic compass. At the eve of “e-Navigation” this basic navigation issue still relies on the navigator proficiency by checking a well known bearing line from marks ashore or by plotting a celestial body like the sun or a star²⁰ when sailing on the high sea.

I.3.13 - Helmsman

If it seems easy to steer the course of a merchant ship with an automatic pilot, it is a totally different story to do it manually. A ship cannot be steered like a car is driven or an aircraft is piloted. When steering the helm of a merchant ship it is not possible to concentrate on another task. This is the purpose of the helmsman while the ship is in manoeuvring, narrow passage or heavy traffic. The helmsman is under the order of the officer of the watch or the master who have a better conning position. That is the reason why ships are handled by the voice of shipmate or master. Moreover, depending from the cargo laden in the holds, the ship will react differently. Voice acknowledgment, cargo situation of the ship, transmission of engine manoeuvring generates inertia in the feed back of the master manoeuvring order that should be taken into account differently from one ship to another.

²⁰ It is obvious to check this basic requirement by asking the gyrocompass error book during a port state control. It is surprising to notice so few crew still have the proficiency to maintain basic navigation standards.

I.4 – VTS Operator point of view

I.4.1 - Sensors available to the VTS Operator

VTS operators have in general 3 main sensors: Radar, AIS and Direction Finder (D/F). A radar VTS is a radar of a primary type like the ship borne radar, but working on different frequency. The frequency, power and height of the aerial afford a better coverage area than a ship borne radar. The ARPA system of an important VTS is also more efficient than the one of a ship and affords the tracking of more than a hundred targets. VTS radar tracking system is now combined with AIS information.

The use of AIS in VTS operations assists in the development and maintenance of a traffic image. VTS operators should take into account the fact that AIS, on its own, cannot be relied upon to provide a complete picture of the actual traffic image in a VTS area due to ship based and shore based equipment limitations.

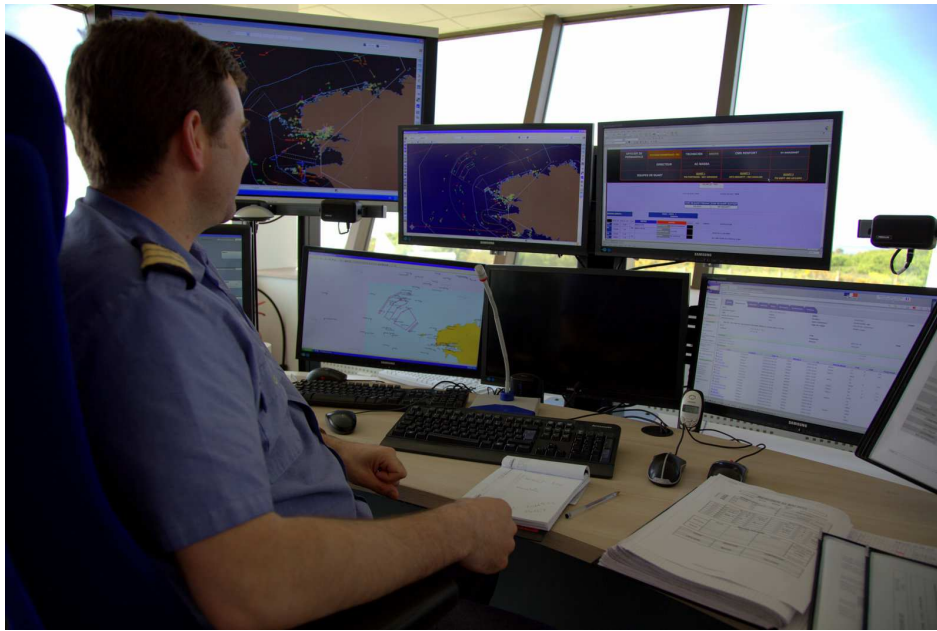
In developing a traffic image and maintaining situational awareness, the limitations of AIS, when used without the input from other sensor devices, should be taken into consideration. However, whilst AIS data should normally be integrated with data from other sources, in some cases - such as monitoring of coastal and inland waterways - AIS may be the only source of positional data available. The degree of accuracy required may vary depending on the service for which the AIS data is being provided. When assessing the degree of reliance that can be placed on the information displayed, it is important to take into consideration the level of validation that can be obtained from other sensors.

In many circumstances AIS, as an additional sensor device in a VTS, may provide redundancy of some data. Information from different sources should be analysed to ensure, as far as practicable, that the data used in the traffic image is the most accurate available. Where redundant sources of information of a particular vessel are available - such as position, speed and destination - means to select the preferred source of data should be provided²¹.

D/F is an old basic radio locating system still very useful in VTS. The bearing of a VHF call is reported on the radar screen or the VTS display integrating radar, AIS and D/F information on an electronic marine chart. D/F information is particularly important in heavy traffic area such as the Channel or any other part in the world where the traffic is heavy. Istanbul Strait, Singapore, Dover-Calais Strait ... in such areas ships are often concentrated in a small parcel of the VTS area and can not be quickly identified by radar and AIS. All data are gathered in a small area of the VTS display. In this case the VHF call of a ship is automatically indicated by the D/F bearing on the VTS display. Istanbul VTS is using two D/F at both ends on Black Sea and Marmara Sea. The accuracy of the bearing (+/- 0.5°) can afford the location of a ship with only 2 D/F bearings in short notice and without any ambiguity.

²¹

See further 1.5 interaction between ship and VTS and annex 1 radar versus AIS information.



Ushant Traffic VTS operator working desk

I.4.2 - VTS display²²

The VTS display should take into account the operational requirements at the VTS Centre concerned. Human-machine interface aspects should optimise the performance of VTS, thus ensuring that the traffic image is enhanced by the acquisition of accurate information. This will enable full evaluation of traffic situations and facilitate decision-making. All tactical information relating to the traffic image should be presented on one suitable set of displays covering the area, sub-area or sector as appropriate.

There are a number of issues that may need to be taken into account when considering the presentation of information in a VTS. These include Data Filtering and Track Labelling, Correlation, and the presentation of sensor information.

Data Filtering and Track Labelling

VTS Centres should consider carefully the number and arrangement of displays for the presentation of the VTS traffic image and how much information on individual tracks is presented. Whilst it may be valuable to have detailed information on-screen, equally it may tend to clutter the screen. Technical solutions that include pop-up displays or other means of displaying the details of individual tracks may need to be introduced. When developing such technical solutions, consideration should be given to the density of traffic, the VTS area, sub-area or sector concerned and the amount of detail needed to be displayed directly on the screen or available through pop-up menus/data fields.

The section on charting above identifies options that involve filtering data that may result in a presentation that differs from the S-52²³ and S-101²⁴ onboard standards. Careful consideration should be given to the

²² Report to IALA Recommendation V-125 on the use and presentation of symbology at a VTS Centre.

²³ IHO standard.

²⁴ IHO standard.

suppression of data to ensure that this does not impact on safety and the interpretation of potential navigational dangers of which the VTS Operator should be aware.

For general safety purposes the VTS Authority may authorise transmission of track data to users. Any track data selected for transmission should be clearly identified on the display.

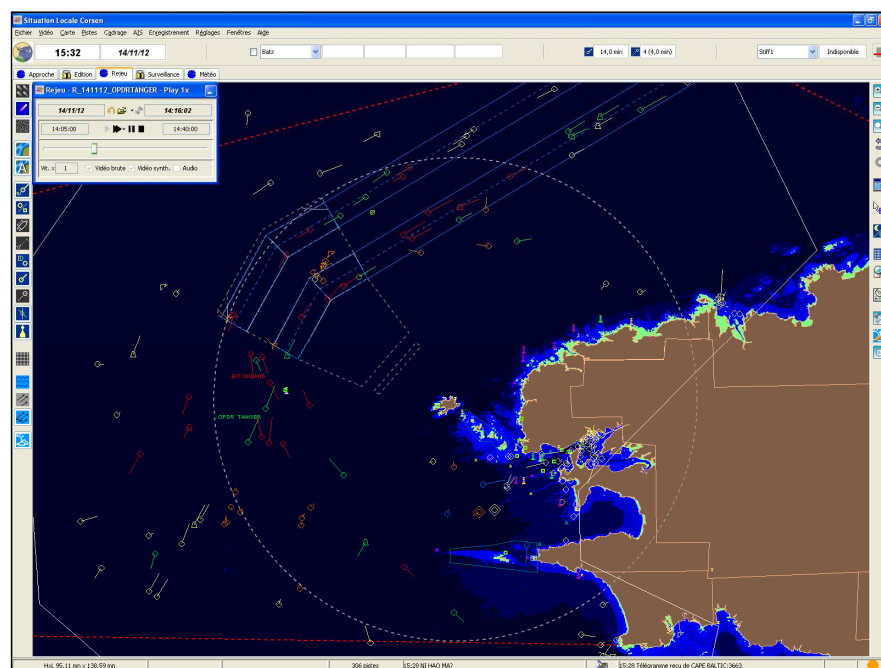
Track Fusion and Correlation

Correlation between sensor information needs to be considered. Systems may be capable of automating the correlation process and it may be appropriate to indicate on, or adjacent to, the display the source(s) of information being presented. Signals may be lost and consideration should be given to the presentation of the elapsed time since the loss occurred and any automatic change between sensors.

Where a VTS has the ability to integrate data from one or more other sources of information for tracking a vessel, means should be provided to enable the track sources to be correlated or de-correlated as necessary.

In addition, AIS specifies the provision of short safety related messages, despite this provision not being included in the standard GMDSS²⁵ radio-communication, and it is important that a method is identified to draw the attention of the VTS operator to the receipt of such a message. However, use of AIS short safety-related messages is generally discouraged for alerting.

In addition, it is recommended that the terminology used for alerts (alarm, warning and caution) reflects the maritime standards contained in MSC.302 (87) Adoption of Performance Standards for Bridge Alert Management unless particular local circumstances require otherwise.



Ushant traffic VTS area display

²⁵

GMDSS : global maritime distress safety system.

I.4.3 - Decision support tools

According to IMO Resolution A.857 (20), Vessel Traffic Service is implemented 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.

Decision support tools have been used in VTS centres to enhance situation awareness by assisting VTS operator. These tools can assist VTS operator to support decision making activities at an operational level.

Decision support tools may be identified in the VTS operational procedures such as: CPA/TCPA, collision alarms, grounding alarms, anchor watch, dangerous areas.

Decision support tools may differ depending on the needs and functions of the VTS. In order to assist VTS Personnel fulfilling their tasks of surveillance in a specific context, some decision support tools may require user input such as the vessel(s) concerned or the area supervised. In other cases, some tools are working permanently in a self-contained way and should warn the VTS personnel automatically.

The operational procedures of the VTS should clarify the use of decision support tools according to local environment of the VTS area.

It should be noticed that IALA has developed technical requirements for decision support tools in Recommendation V-128. But guidelines on the use of decision support tools are still under development by the VTS committee of IALA.

I.5 – Interaction between ship & VTS

I.5.1 - Radio communication

GMDSS communication and systems are used by VTS. A VHF coastal radio station in compliance to GMDSS and ITU Radio Regulations is an important infrastructure of the VTS.

A radio call is often the first contact between ship and VTS. Despite new technology providing text messages that can help ships to report relevant and basic information, voice communications are still important.

In general, voice communication is essential to the human's mind balance in any activity and cannot be handed over totally to text messages. This critical situation has been pointed out in civil aviation where communication system project only based on text messages shows the affection of pilot's mood in long-term travel without any external voice communication. This should be emphasized for seafarers working months on ships. Moreover, with experience, the VTS operator may detect by the voice of the navigator if he or she is self-confident or may hide any information.

A dedicated VHF channel should keep watch in a VTS area. In the case of no answer from a ship, the VTS operator may call her on channel 16²⁶ or use a dedicated digit selecting call (DSC). This DSC activates an alarm on the bridge that needs to be acknowledged by the officer of the watch. The latter should shift to

²⁶

Refer to Resolution MSC.131(75) maintenance of a continuous listening watch on VHF channel 16

the designated working channel indicated by the DSC in order to speak with the VTS operator. In seldom occasion, when DSC is unsuccessful, there is still the possibility to send a telex message on Inmarsat C or to call the ship on her satellite telephone system if rigged. These are extreme situation when VHF is obviously not properly watched on the bridge.

I.5.2 - SMCP

Communication is useless if people do not understand each other. Hence English is used for all external communication to the ship and in particular with VTS. Taking into account the large number of nationalities of seafarers, English language is not the native language of the majority of seafarers, but English is more a “working language” as requested in the internal communication of a ship in the ISM Code. IMO has adopted Standard Marine Communication Phrases (SMCP) in order to help seamless communication between ships and between ship and shore.

I.5.3 - Radar and AIS plotting

The main problem of a VTS operator is to obtain a picture of the VTS area as accurate as possible. Each sensor, as a measurement system, is inflicted by errors. VTS radar is then bound to error that can be corrected and integrated. The further is the target from the radar the less is the accuracy of the radar distance measurement. But this error is steady and depends only on the radar. A radar plot is not a clear display and depending on the radar settings, the radar plot can be more or less accurate (see annex 1).

On the contrary AIS display is clear and conspicuous. But this attractive display could drive to error if the position of the ship is not cross-checked. The AIS information depends on different parameters. The geographical position is set with the help of a GPS attached to the AIS transceiver. An error on the setting of the height of the GPS aerial could drive to an error of the length of the ship ... that is to say around 300 m for large vessels. In order to be properly positioned in a general referential, in other words, to be at the right position for the VTS operator point of view and others ships point of view, the AIS transceiver should be correctly set within the ship relative position : from the stern and beam of the ship. Without this precaution, the information transmitted by the AIS could give a picture of the ship that is not at the correct position. In consequence, the radar plot of the ship is not overlapping the AIS mark on the VTS operator display (see annex 1). And there are as much possibilities of errors that there are parameters and ships. It is then wise not to trust only AIS when preventing collision.

II – Prevention of collision and action taken following a close quarter situation by Ushant VTS

II.1 – Ushant VTS and the origin of the procedure in place at Ushant Traffic

In compliance to IMO Res. A857 (20), point 2.3.3, Ushant Traffic VTS centre (in French: *Ouessant Trafic*) is dedicated to monitor the traffic in order to avoid dangerous situation. The area of Ushant VTS is a circle of 40 NM radius centre on the island of Ushant, including a TSS beyond territorial waters and fairways along the coastline and different islands and rocks within territorial waters (see annex 2). The tower on the Island of Ushant supporting the VTS radar is the centre of the circle VTS area. The VTS centre is on the continent at the Corsen Point where the CROSS Corsen²⁷ is located.



Stiff VTS radar tower (1979) & Stiff Lighthouse (1699) on the foreground on Ushant island (Brittany – France)



CROSS Corsen (1982) at Corsen Point (Brittany - France)

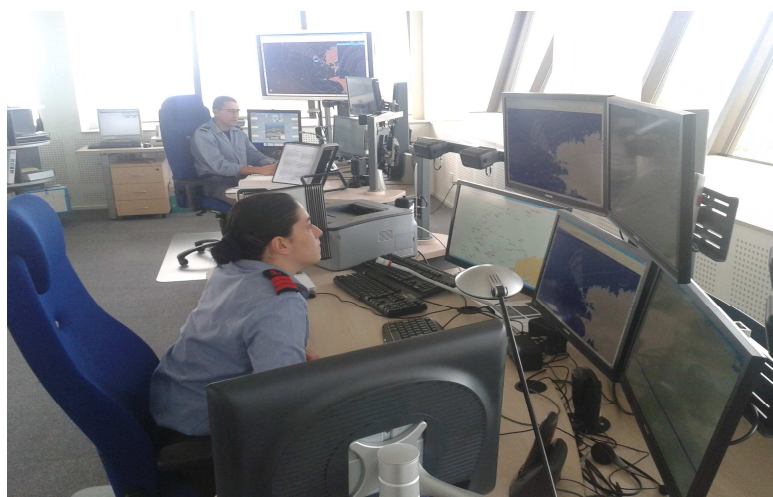
²⁷

CROSS Corsen is a coastal VTS and a MRCC as well.

Operators at Ushant Traffic must be aware of the limits of the different sensors they are using. The radar information is refreshed every 12 s and AIS information can be altered because AIS transceivers are not always properly fitted and set on ships²⁸. There are still direction finders (D/F) with a 0.5° precision to help operator to locate a ship-borne transceiver on VHF: one is located on the island of Ushant at “Créac’h” lighthouse, and the other at “Pointe du Raz”. Hence it is recommended to operators at Ushant Traffic to exercise a critical mind when gauging the information provided by radar, AIS or D/F.

In compliance to COLREG 72, rule 10, attention must be exercised at both ends of the TSS for the density of traffic and cross situations generate a lot of close quarter situations as well as turning point. The weather conditions have to be taken into consideration, in particular the visibility. As a matter of experience in Ushant Traffic, it rises up to a compromise that a call on VHF can be effective to the give-way vessel at last 10 minutes before CPA.

When a close quarter situation is detected, the operator tries to contact at first the give-way vessel on VHF 13 or 16 or with the help of a DSC at last. In compliance to IMO Res. A857 (20), the VTS centre has no manoeuvring order to summon to the ship. The task of the VTS is but to ensure that the watch-keeper on board ships have the information to decide the proper manoeuvring in order to avoid a close-quarters situation. A close quarter decision tree in annex 3 has been developed as an indication to VTS operator.



Ushant Traffic operation room

On 4th September 2006 at noon, the author of the present paper just appointed as director of CROSS Corsen for 3 days that a VTS operator called him for a critical manoeuvring of a cargo ship. The ship under Belgium flag made a full 360° turn in foggy situation. This manoeuvring was generated because a naval ship in charge of coastal security surveillance went towards the cargo ship on a collision course in order to identify it. Being in restricted visibility the officer of the watch on the cargo ship did not understand the manoeuvring of the ship heading toward him. The warship went so close without any warning that the only alternative to the cargo was to make a full turn.

As a matter of fact, it is not fair to perform a collision course in poor visibility and moreover at noon when everybody is having lunch.

²⁸

Report to annex 1

The master's point of view of the naval ship in this situation was to check the identity of the cargo ship for security intelligence without any concern to the rules of the road. But the concern of the shipmate on the cargo ship was to keep clear of any vessel, in particular of non-identified vessel in poor visibility.

This story is interesting to keep in mind that the focus of ship's master is very different from the type of one ship to another: whether merchant ship, warship, fishing vessel or yacht. This event led to the start of developing accurate VTS procedure to implement a "safety culture" in Ushant traffic VTS.

During the following winter 2006-2007, a second opportunity was given to develop another procedure at Ushant VTS for the double way lane (see annex 2).

When the weather conditions are good, Ushant TSS²⁹ is a fine turning point where you can see all ships of any sizes following each other and keeping pace to each other like ducks on a quiet lake. But in heavy weather, when ships could meet 12 meter waves, this is another story. This situation affects particularly small coasters which need two days to transit in the TSS South West bound line (the most westbound line at sea – see annex 2) in heavy weather, while in good weather only 12 hours are necessary. Despite the local regulation authorising to a very few ships the double way lane, it rises up to an evidence to authorise small coaster in heavy weather to use this lane and shorten their transit to 24 hours. This measure gave the extra advantage to reduce the stress and fatigue of the crew of these small merchant ships with a very short manning.

These two events generate a critical approach to the local regulation and a spirit of self-conscious "pro-active safety culture" within the VTS operators.

The first event led to the "close-quarters situation reporting" procedure explained in the present document and the second led to the modification of the regulation on the double way lane as approved by the 58th sub-committee of navigation in July 2012 at IMO.

II.2 Precision on action taken on areas beyond territorial waters

Concerning the fact Ushant VTS area beyond territorial waters is located in exclusive economic zone (EEZ). Despite the freedom of navigation in force in this area³⁰, UNCLOS gives rights to the coastal State to adopt laws and regulations in order to prevent pollution and also, if necessary, to implement traffic circulation schemes. This right, contrary to the one implemented on the territorial waters, is nevertheless limited by approval of IMO³¹.

Moreover, UNCLOS requires obligation of reporting to coastal State when the ship is considered to have committed an infringement to the environment protection regulation. The reporting concerns amongst other things, the ship identity, port of registry and any other relevant information required to establish whether a violation has occurred³².

It should be recalled that Ushant Traffic VTS has been established after the stranding of VLCC AMOCO CADIZ on 16th March 1978. And when coastal State considers a particular area of the EEZ requires special

²⁹ TSS : Traffic Separation Scheme

³⁰ UNCLOS art.58.1

³¹ UNCLOS art.211.1

³² UNCLOS art.220.3

obligatory measures to prevent pollution by ships, it can adopt law and regulations in order to ensure the marine environment protection. This process may be consistent with international law when the areas covered by these measures are recognized as special by the IMO through technical argumentation provided by the coastal State and the measures taken are consistent with measurements made applicable by IMO in this type of area.

Advancing the cause of protection of the marine environment, coastal States may therefore establish various provisions to ensure the safety of navigation in the EEZ although this area is placed under the freedom of navigation.

In consequence, the sea area off the island of Ushant is the most representative in the application of UNCLOS opportunities for surveillance of navigation in territorial waters and EEZ example. France, as a coastal State, has established a Traffic Separation Scheme associated with a system of mandatory reporting. This area is also under the supervision of a vessel traffic service.

II.3 – Action taken in case of infringement to COLREG 72

In case of infringement to COLREG 72 in the VTS, a report to the Flag State is established with all documentary evidences: radar screen prints and VHF records if necessary. The report is forwarded to the Flag State through central office and foreign affairs ministry. A related message can be allocated to the ship in THETIS the data base of Paris Memorandum of Understanding on Port State Control (PSC) and requirement to such notification is mandatory under EC directive 2009/016 on PSC³³.

French merchant vessels which would be taken in infraction would be prosecuted under the French regulation. Concerning fishing vessels or yachts the report of contravention to COLREG is transmitted directly to the administrative office of the port of registry for administrative prosecution. A report of contravention model at Ushant Traffic VTS is presented in annex 4.

Concerning naval ships, if any, this report is a nice way to indicate a non conformity in the “safe” management of the navy ship.

But a repressive action has very limited impact for different reasons. On one hand, the United Nations Convention on the Law of the Seas (UNCLOS) limits the action of the coastal State on the High Sea, that is to say beyond territorial waters. This is up to the discrepancy of the Flag State to take sanction on the base of evidences provided by the coastal State. The procedure has to go through the diplomatic channel which is not the quickest to attract the attention of the navigator charged by the contravention.

On the other hand, a blaming and repressive behaviour does not help to go ahead and try to understand why the infraction occurred. This is in no way a positive action to create a “safety culture”.

³³ Amended on 12th August 2013 by EC directive 2013/83

II.4 – Action taken in case of a close quarter situation

II.4.1 – Close quarter situation

In case of a close quarter situation detected in the VTS area, in compliance to COLREG 72, it is not obvious to demonstrate an infringement to the rules of the road for the rule 16 relative to the “action by the give-way vessel” should be balanced with rule 17 relative to the “action of the stand-on vessel”; hence the following action are carried out:

- 1) The masters of the ships involved in the close quarter situation are invited to make a sea-report to their Flag State Authority;
- 2) A “dangerous situation notice” (report to annex 5) is established with an analysis of the situation;
- 3) A mail is sent to the company of the give-way vessel with documentary evidences including the dangerous situation notice and radar screen prints if necessary. A copy is sent to the Flag State Authority, the Class Society delivering the ISM certificate and to the company of the stand-on vessel in case of the latter makes any complain to Ushant Traffic following the manoeuvring of the other vessel.

As MSC-MEPC.7/Circ. 7 guidance on near-miss reporting has been included in the ISM Code since 1st January 2010, the idea of the above action taken is:

- 1) To make watch keepers of merchant ships, fishing vessels and any other type of ship aware to navigate with caution in a VTS;
- 2) To make companies of merchant ships aware on the management of the competency of their personnel in charge of watch-keeping;
- 3) To inform Flag State authorities and Class Society acting on behalf of them of the situation in order to exercise attention in a future audit of the company and the ship on the resources and personnel point of the ISM, in particular for personnel in charge of watch-keeping on the bridge.

II.4.2 – Collection of evidences

There are different evidences a VTS operator can collect from the VTS recording system.

A print picture of the VTS system display is the first evidence of a traffic event. This picture can be consolidated with the past track following positions of ships. The layout obtained gives a clear vision of the ships manoeuvring.

Radio VHF recordings are also interesting evidences for the mate on duty or the master confirms the situation was not fully taken into account.

II.4.3 – Reporting

There are many barriers related to the reporting of near-misses. In many cases, close quarter situations are only known by the VTS but not the vessels involved in the close quarter situations. The main reason is the VTS monitors in general a wider area than a single vessel can do. Moreover Vessels involved in close quarter situations are not necessarily flying the flag of the coastal State where the VTS is located, thus there is no direct interest for the VTS to inform the companies and navigators. Moreover, in compliance to the

United Nations Convention on the Law Of the Sea, there is no reason in the convention to take action by the Coastal State.

The letter of reporting should then be positive and not blaming. This is the most difficult part of the exercise, for the reporting may not be understood. The idea is to encourage a direct share of information to promote feature of a “just culture” in an atmosphere in which the behaviour of all the actors of the shipping traffic is that of co-operation.

Then it is important also to keep pace to a minimum format of correspondence in order to report to all stakeholders. The following format is used by Ushant Traffic VTS.

Direct receiver of the reporting: The Company of the give-way vessel:

Considering close quarter situation reporting as a key issue to monitor the personnel in charge of watch-keeping and to enhance bridge management, the reporting is first dedicated to the Company of the give-way vessel that was supposed to be the first to manoeuvre. This reporting will feed the ISM system of the company. And the first corrective action should be provided by the company.

At the very least, there is a psychological impact to the company on the reception of the reporting: someone exterior to the company is watching the behaviour of its ships... and Ushant Traffic VTS is expecting a better behaviour from ships that has been the focus of attention.

The address of the company could be asked directly to the ship involved and cross-checked on Lloyd's list data base, any Port State Control information system or EQUASIS³⁴.

Receiver in copy of the reporting:

1) Flag State of the give-way vessel

First of all, it is important to copy to the Flag State, for the reporting as explained above is first dedicated to the company. The VTS is not writing to the Flag State but just inform in copy about the reporting. The Flag State is of course the Maritime Authority whose address could be found in the IMO data base and not the diplomatic embassy. This procedure is fully in line with the detention notification in Port State Control (PSC) procedures consisting to inform directly the Maritime Flag State Authority and not the diplomatic embassy. By the way, this is purely accepted procedure, and it is always better to inform the diplomatic embassy of the detention of a ship for sometimes there is no contact of the Maritime Authority on the IMO data base or the contact has not be updated. By the way, the diplomatic way is a better way to take time for PSC offices.

2) Class society of the give-way vessel delivering the ISM certification on behalf of the flag State

Maritime Authorities often delegate to Class Societies the certification of ships including the ISM certification. Class Society are acting as external auditor in the ISM Code and the information of reporting of near-misses, such as close-quarters situations, are evidences to check if corrective actions have been taken by the audited companies.

Of course, some Maritime Authorities still directly exercise the ISM certification, and they are interested for the same reasons to receive the reporting.

³⁴ Public web-site promoting quality shipping : www.equasis.org

3) Company of the stand-on vessel in the case the master of the stand-on vessel has expressed a complain to the VTS

For the same psychological reason the VTS is writing to the company of the give-way vessel, it is important to copy the reporting to the company of the stand-on vessel ... particularly if the master of the stand-on vessel has expressed a complaint to the VTS. On the contrary, it is difficult to copy the reporting, for the company of the stand-on vessel would not understand the meaning of the reporting. But if the master of the stand-on vessel was fully aware of the close quarter situation, it would be a confirmation that some action has been taken by the VTS to inform about the case.

Special care to fishing vessels and yachts:

The reporting of French fishing vessels or yachts is sent to the Maritime Offices of the port of registry. For foreign fishing vessels or yachts the report is sent to the Flag State Maritime Authority. The main reason is fishing vessels and yachts are not implementing ISM and the report might not be understood properly. The VTS expects that the Maritime Authority will use the reporting to recall the “rules of the road” to the navigators concerned.

On some special occasion the VTS write directly to the fisherman or yacht man. These are occasions to initiate sensitization meetings for fishermen unions or yacht men involved in sailing races.

A case study is reported in annex 6. The names of vessels have been changed into fake ones discreetly to the companies involved. This case study presents an overtaking situation, the reporting to the Flag State and the interesting answer of this Authority.

II.5 – Feed back

From 2008 to September 2013, that is to say 68 months, 120 close-quarters situations have been reported. Ushant Traffic has received positive feed-back from companies, Flag States and Class Societies until now for almost 6 years this procedure is in force. Internal feed-back is also very positive for operators training and the quality system of the centre.

The procedure was first warmly welcomed by the external auditor of the VTS centre. The feed-back from companies, flag-State Authorities or Class-Societies to the reporting is now a clear indicator of the VTS process. The reporting of close quarter situation is now an integral part of quality assurance of all French coastal VTS.

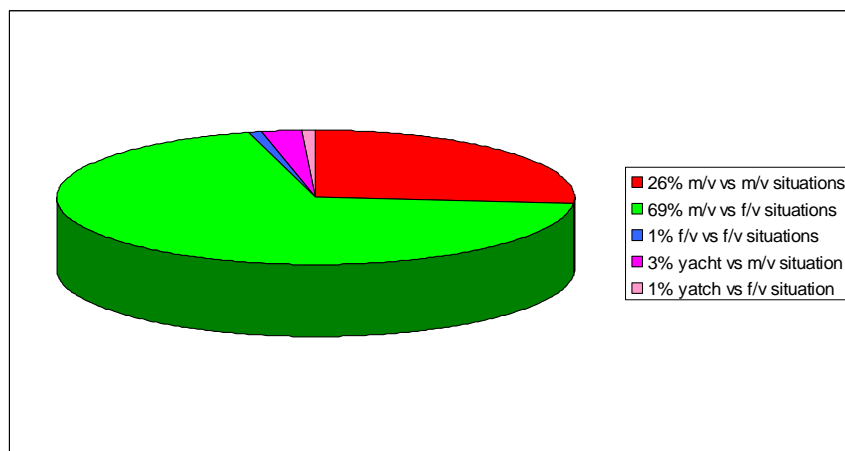
Without any consultation, it appears that Dover VTS has implemented the same procedure of close-quarters reporting.

In reference to the close-quarters decision tree of Ushant Traffic VTS (annex 3), all reporting cases of close-quarters situations meet the following 2 conditions:

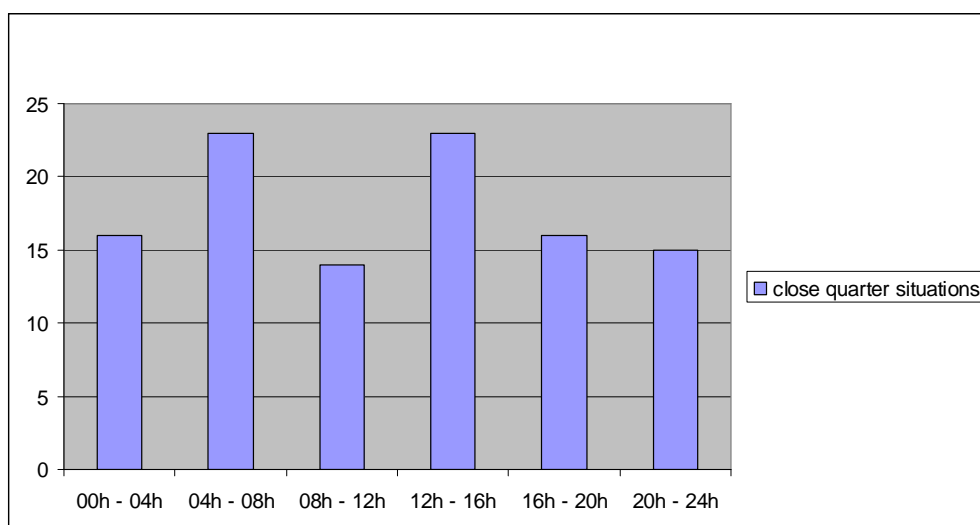
- 1) a CPA less than 0.5 NM, and
- 2) a time to CPA within next 10 minutes.

The distribution of close quarter situation in Ushant Traffic VTS area during the above mentioned period between the different types of ship is:

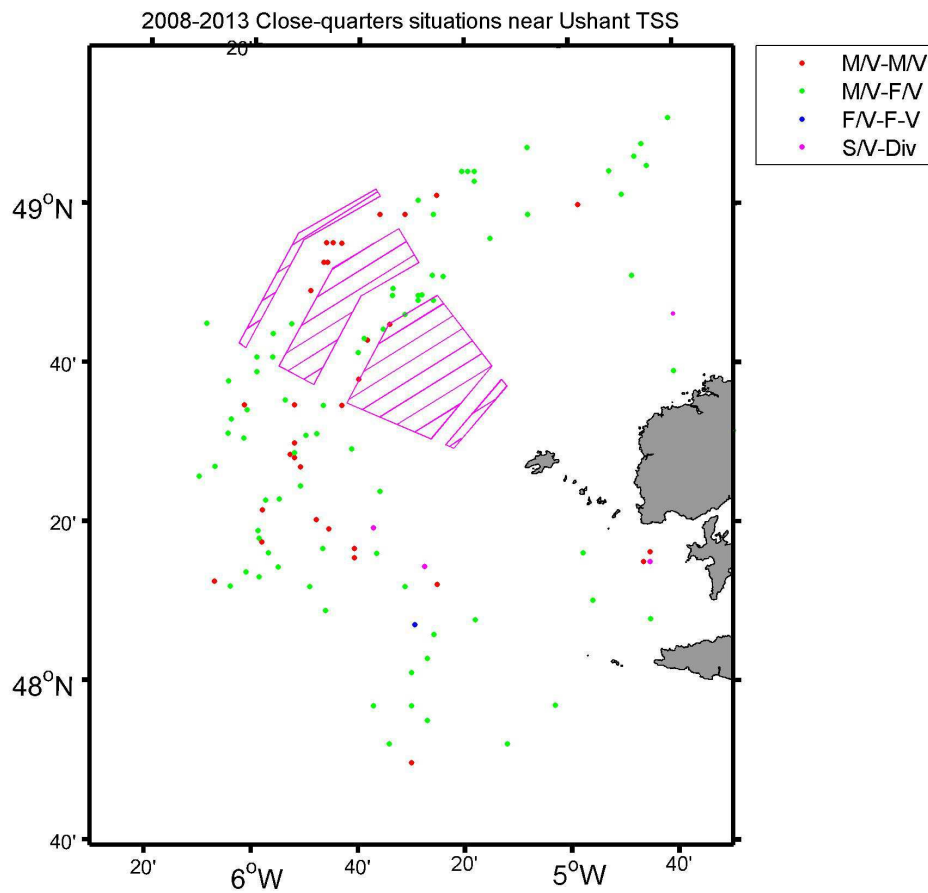
- | | |
|---|------|
| 1) merchant ship versus merchant ship (m/v vs m/v) : | 26 % |
| 2) merchant ship versus fishing vessel (m/v vs f/v): | 69% |
| 3) fishing vessel versus fishing vessel (f/v vs f/v): | 1% |
| 4) yacht versus merchant ship (yacht vs m/v): | 3% |
| 5) yacht versus fishing vessel (yacht vs f/v): | 1% |



The distribution of close quarter situations during the day is shown on the graphic below. There is no clear trend in the day with an average rate of 17 close-quarters situations occurring during each quarters of the day.

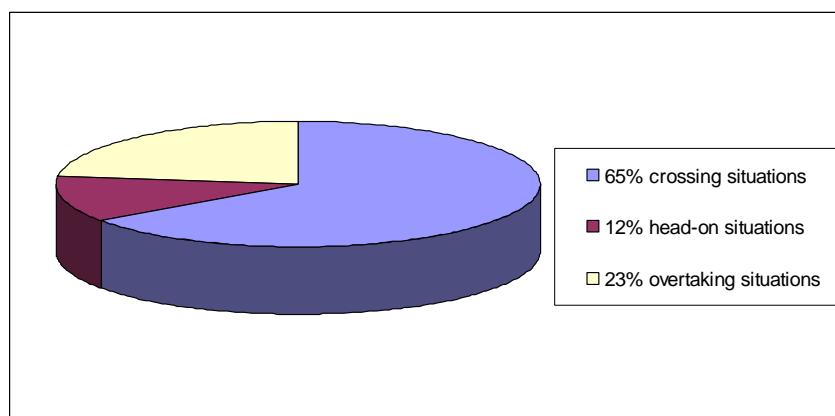


The following chart indicates the geographic distribution of the close quarter situations within the VTS area:

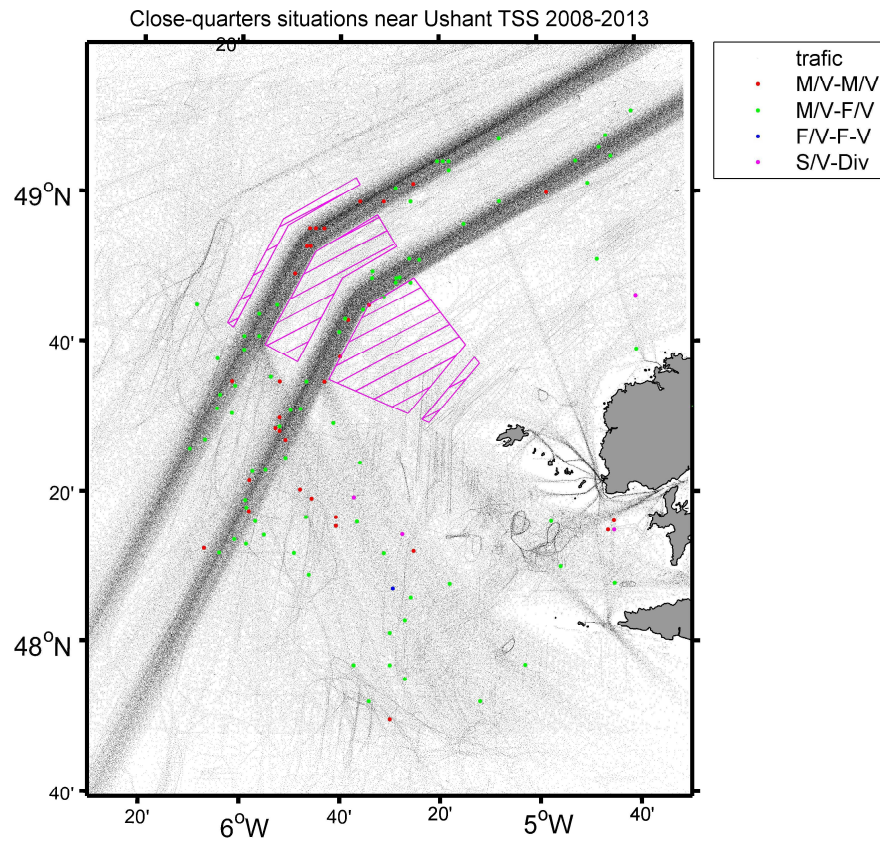


Nota: pink points (S/V-Div) indicates the close quarter situations of yachts with merchant ships or fishing vessels.

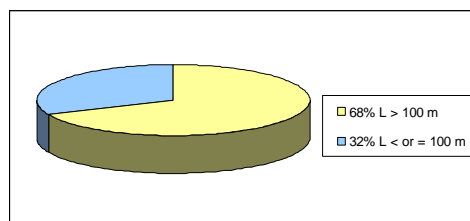
Type of close quarter situations recorded from 2008 to September 2013:



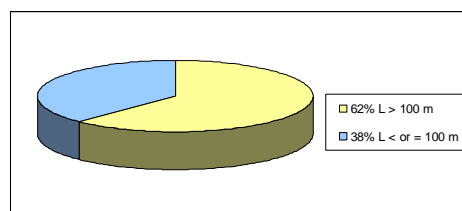
The following chart indicates the geographic distribution of the close-quarter situations within the VTS area, during the period from 2008 to September 2013. In the foreground the record of 2012 traffic based on AIS detection (source Cérema/DTecEMF/DT/PTI: information processing centre) as a reference to the general traffic in the VTS area.



Length of merchant ships in close quarter situation with another merchant ship:



Length of merchant ships in close quarter situation with a fishing vessel:



In most of the cases rule 5 of COLREG 72 is not properly implemented with a lack of look out, including a lack of listening watch on the dedicated channel of the VTS as well as channel 16 or 70 (DSC). A majority of vessels involved in close quarter situation then do not determine if a risk of collision exist in due time in compliance to rule 7 of COLREG 72.

It is conspicuous that these two basic rules of COLREG, n° 5 & 7, are still relevant nowadays despite the modern navigation systems.

Another clear issue that came out the analysis of the close quarter situations from 2008 to 2013 at Ushant VTS area is no reduction of speed was used to avoid a collision, but only alteration of course. The analysis of the past tracks of ships during one year shows ships' courses are recorded in the navigation system with GPS turning points. Speed and commercial pressure to arrive on schedule at destination drive captains to take shortcuts and manoeuvre at the last minute.

III – Reporting enforcement

III.1 – The interest to analyse near-misses

Generally speaking, the interest to report and analyse near-miss is multiple. In the industrial world, the complexity of the procedures mixed with the dangerous products in use generates numerous hazards. The nuclear power stations industry, for instance, is an obvious area where there is little room to give to hazard due to the consequence to the environment and the living species.

The quality ISO standard 9001, was supposed to bring a spirit of quality in all activities. The ISM Code is fully inspired from ISO 9001, simply because the standard is adapted for any kind of product whether manufactured (like car, aircraft or ship construction) or a service (like insurance, safety or security). Meanwhile there are diversions of the use of quality certification for pure commercial purpose at all cost, the goal of quality is often forgotten.

But the quality ISO standard gives tools to monitor rationally a product. It implies measurements, analyses and improvement in order to enhance the product.

In the International Safety Management Code (ISM Code) there are clear issues on the quality procedures of the Safety Management in a shipping company:

“The safety management system should include procedures ensuring that non-conformities, accident and hazardous situations are reported to the company, investigated and analysed with the objective of improving safety and pollution prevention.”³⁵

“The company should carry out internal safety audits on board and ashore at intervals not exceeding twelve months to verify whether safety and pollution-prevention activities comply with the safety management system. In exceptional circumstances, this interval may be exceeded by not more than three months.”³⁶

Another good reason to report and analyse near-misses is purely statistical. If we are expecting only the occurrence of accidents, there are definitely few materials to make general conclusion to enhance a system. On the contrary, if we collect the reporting of near-misses, there is much more material to help for conclusion in order to enhance any system. This is the case in the nuclear industry where obviously there are few accidents, for when they occur everyone knows it in the newspapers. And when we know that accident is the accumulation of minor incidents, it is then better to concentrate on the analyses of the different potential causes of accident.

There are also psychological reasons to concentrate on near-miss than on accident. On the contrary of accident, there is no injury nor fatal injury or damage in a near-miss. Consequently, there is no legal investigation to determine the responsibility of the event.

Legal investigators know that the testimony of witnesses of an accident will depend on the responsibility they have in the event. A very human behaviour is to minimize the responsibility in the light of justice. Then it is very difficult to determine the truth through all these testimonies.

³⁵ Point 9 of the ISM Code: reports and analysis of non-conformities, accidents and hazardous occurrences.

³⁶ Point 12 of the ISM Code: company verification, review and evaluation.

On the contrary, in case of near-miss there is no legal burden on the witnesses and they should be more talkative. The biggest difficulty in the case of a near-miss is to make people aware that they have to report, for they generally minimize the importance of the event just because nothing happened, or sometimes they do not realize what has happened.

In conclusion, the collection of reports and analysis of non-conformities, accidents and hazardous events developed by the ISM Code is a good tool to report near-misses. As a matter of fact, MSC-MEPC.7/Circ.7 relative to guidance on near-miss reporting has been included to the ISM Code in 2010. But the ISM Code is a relatively new idea in the maritime world. The origin of the code goes back to the late 1980s, when there was mounting concern about poor management standards in shipping. Investigations into accidents revealed major errors on the part of management, and in 1987 the IMO Assembly adopted resolution A.596 (15), which called upon the Maritime Safety Committee to develop guidelines concerning shipboard and shore-based management to ensure the safe operation of ro-ro passenger ferries³⁷. The ISM Code entry into force on 1 July 1998, with the 1994 amendments to the SOLAS 74, which introduced a new chapter IX into the convention, the International Safety Management Code.

But ISM as well as near-miss reporting are purely internal procedures of shipping companies and do not involve any others stakeholders of the maritime community. There should be a way in order to share a “safe-culture” not only within the shipping companies but within all stakeholders in maritime safety. And VTS are in a good position to witness near-misses and report them, for sometimes crews do not realize they face a near-miss.

III.2 – the ICAO near-miss procedure

There are as many differences as there are similarities between aviation and the maritime world. In terms of safety, the aviation has developed a bigger cultural background and a safety culture since the beginning of its history. On the contrary, fatality is still in force in the mind of many seafarers and the public when a marine accident occurred. As mentioned earlier, IMO has adopted the ISM Code in merchant shipping after major disasters less than 20 years ago. Concerning fishing, the spirit is still the same as that of 4 000 years ago: a hand for the ship, a hand for the fish and nothing for the fisherman!

The international Convention of Civil Aviation of Chicago, adopted on 7th December 1944, entered into force on 4th April 1947. Fifty years before the adoption of the ISM Code by IMO, the international convention of civil aviation established fundamental principles which still drive the aviation safety: accident investigation (article 26) and standards and recommended practices (SARP – article 37).

There are 18 annexes to the Civil Aviation convention, annex 13 is dealing in detail of aircraft accident and incident investigation.

On 12 December 1972, the Air Navigation Commission adopted amendments to annex 13 in order to notify and exchange information on incidents.

But one important document of ICAO covering near miss situations is the safety management manual (SMM). Chapter 7 of the SMM is dealing with hazard and incident reporting and chapter 17 is about air traffic services.

³⁷ Capsizing of ferry HERALD OF FREE ENTREPRISE in 1987 and fire on ferry SCANDINAVIAN STAR in 1994.

ICAO has developed basic principle for effective incident reporting systems. As mentioned in the ICAO SMM, people are understandably reluctant to report their mistakes to the organization that employs them or to the government department that regulates them. Too often following an occurrence, investigators learn that many people were aware of the unsafe conditions before the event. For whatever reasons, however, they did not report the perceived hazards, perhaps because of:

- a) embarrassment in front of their peers;
- b) self-incrimination, especially if they were responsible for creating the unsafe condition;
- c) retaliation from their employer for having spoken out; or
- d) sanction (such as enforcement action) by the regulatory authority³⁸.

Then, ICAO requires that States establish a mandatory incident reporting system to facilitate the collection of information on actual or potential safety deficiencies. In addition, States are encouraged to establish a voluntary reporting system and adjust their laws, regulations and policies so that the voluntary programme:

- a) facilitates the collection of information that may not be captured by a mandatory incident reporting system;
- b) is non-punitive; and
- c) affords protection to the source of the information³⁹.

Concerning hazard and incident reporting, ICAO has developed a mandatory international Accident/incident Data Reporting (ADREP) system. And as indicated in the ICAO SMM the rule to report an incident is basic: *“if in doubt – report it”*. When ADREP reports are received from States, the information is checked and electronically stored, constituting a databank of worldwide occurrences. Amongst the types of serious incidents of interest to ICAO there are near collisions and other serious air traffic incidents, the reporting of these incidents are named *“Airprox”*.

Lessons learnt from incidents are shared with the all aviation community: companies, constructors, national Authorities and media as well when relevant. This transparency culture of safety is nowadays important considering the large number of air passengers. The civil aviation needs to develop confidence with the public by using obvious incident cases that shows safety is secured.

ICAO is focusing in particular on near collisions requiring an avoidance manoeuvre to avoid a collision or an unsafe situation or when an avoidance action would have been appropriate. This is similar to the idea of close quarter situation reporting by VTS.

In order to understand how the reporting of near-miss in civil aviation works, I visited air traffic control (ATC) centre located in Loperhet close to Brest. This ATC is in charge of the European western approaches and monitors 15 radars and 17 radio stations. There is a dedicated quality system department (QS) where air traffic controllers are despatched regularly during some months in order to make the safety management system work. The base of investigation is the event notification sheets filled by the air traffic controllers. This sheet is similar to the *“dangerous situation notice”* presented in annex 5.

2 500 event notification sheets are generated in average per year in the ATC. The QS analyses the different events with the help of the video recording of the air traffic. Based on national and local rules, the QS writes directly to the company of the aircraft involved in an incident. It occurred sometimes the Air Force is

³⁸ ICAO Safety Management Manual
³⁹ ICAO Safety Management Manual

involved in an “Airprox”. The latter, contrary to the Navy with VTS, is used to this feed back from civil aviation and has also developed a safety management system. Near-miss reporting is finally in the safety culture of aviation, whether civil or military.

Some “Airprox”, because of their nature are selected to a national office for closer analysis and feed the international Accident/incident Data Reporting (ADREP) system.

It is interesting to notice that overtaking situation concerned 30% of Airprox and are not obvious to be detected. In comparison, overtaking situation at sea is considered the most dangerous situation that can involve more than two vessels⁴⁰. But there is yet no data from VTS to evaluate the occurrence of overtaking situations.



Loperhet ATC close to Brest (Brittany – France)

III.3 – IMO enforcement propositions

There are different possible actions to enforce the reporting of VTS:

III.3.1 - Modification of IMO Res. A.857 (20) guidelines for VTS:

During the work program 2010-2014, the VTS committee of IALA reviewed the resolution. The present guidelines for VTS have a reporting requirement only on information of an alleged violation of a VTS regulation. IALA VTS committee proposed to add “report of a near-miss” as well. This little change could make a difference in a “just culture” promotion. IALA is an international association, Member States of IALA and IMO should submit in coordination an unplanned output to the Maritime Safety Committee (MSC) at IMO in order to amend the guidelines for VTS. The proposal, if accepted, will be discussed at the new sub-committee on Navigation, Communications and Search

⁴⁰

The collision of m/v TRICOLERE on 14th December 2002 involved 3 vessels.

and Rescue (NCSR). In the wake of the re-organization of IMO work, NCSR has merged former COMSAR and NAV sub-committee, but in the same time span of 5 open days.

There is a nice opportunity for IMO to benefit from the work carried out during 4 years by IALA in order to amend the resolution A.857 (20) on VTS.

III.3.2 - Proposition of guidance to close-quarters situation reporting:

In the following of amendment to Res A.857 (20) on guidelines for VTS proposing to add “report of a near-miss” by VTS, it is proposed to develop “guidance on close quarter situation reporting” in line with MSC-MEPC.7/Circ.7 Guidance on near-miss reporting. A proposition of unplanned output to MSC is presented in annex 7.

III.3.3- Proposition of an international maritime accident/incident data reporting:

When “report of a near-miss” by VTS would be accepted, the collection of close quarter situations would be interesting to analyse. For this purpose, data reporting could be locally, nationally and also internationally as it is practised by ICAO. There is already an European data base for marine accident, it is proposed an international Maritime Accident/Incident Data REPorting (MAIDREP). The GISIS system of IMO could be the support web site to collect accidents, incidents and near-misses.

III.3.4. – Amendment to the ISM Code or creation of an IMO Safety Management Manual:

The idea is to involve others stakeholders in safety management than companies: Flag States, Port States, Coast States and why not shipyards. This may be a long term goal, but the idea beneath the reporting of near-misses by an IMO Member State is to share information in order to enhance safety at sea. This may be carried out by an amendment to the ISM Code or this may be the real need for an IMO Safety Management Manual (SMM) as it is the case for ICAO.

These propositions are purely procedural and administrative: amendment to Res.A.857 (20), guidance to close quarter situation reporting, MAIDREP or SMM. Most of these propositions have been prepared and discussed at IALA where Members States could bring the work to IMO. Then the result of the proposition will depend on the willingness of Member States to report. But if the VTS could report directly, it is always better to feed the system from the source of information. And VTS are motivated to report for it is an interesting indicator of activity of a VTS centre. The number of close quarter situations could be balanced with the number of collisions in the VTS area. This is an interesting indicator for policy decision-maker and the media.

Conclusion

The ultimate objective of close quarter situation reporting and investigating is to identify areas of concern and implement appropriate corrective actions to avoid collision at sea, at least in VTS area. To do so requires that reports are to be generated, shared, read and acted upon. VTS should be encouraged to inform companies and Flag State to consider close quarter-situation reporting as a way to enhance safety of navigation in general.

It may take years for safety trends to be discerned, and so reporting must be archived and revisited on a timely basis. Near-miss reports should be considered along with actual collision or incident reports to determine trends. These should be consistent in the identification and nomenclature of causal factors across close quarter situation and collision reports.

Archives on close quarter situations can provide detailed knowledge of the services provided by a VTS centre and be part of practical training and experience in the tasks.

The following actions, based on recording of close quarter situation reports, could be done:

- 1) Improvement of the ISM system of companies on manning and resources, in particular for the officers in charge of the watch;
- 2) Clue for Flag State and Class Society delivering ISM certification for auditing;
- 3) Return of experience for VTS and training for VTS operators;
- 4) Material for the Training of merchant marine cadets & officers;
- 5) Setting decision support tools for VTS.

Detection of close quarter situations is in the heart of VTS missions. VTS are windows of coastal States open to the international maritime traffic, in particular coastal VTS beyond territorial waters. Collection and analysis of close quarter situations are interesting and a clear indicator of the VTS activity. Reporting close quarter situations promote a “Safety culture” amongst all stake-holders of the maritime community and not only companies as it is in the present situation with the ISM code.

But a Reporting culture is not enough to implement a Safety culture. Hell is paved with good intentions hence a Just culture should accompany a Reporting culture. Without any explanation, and a Just culture in the maritime community the reporting from VTS would create another burden on seafarers and give way to a culture of punishment which is too easy to implement.

The collection of voluntary reporting of close quarter situations on an international data-base would greatly enhance data on accidents and incidents and help decision makers for data would be more important to make a better picture of the traffic situation. The process of reporting could be enlarged to any other near-misses. But close quarter situations are interesting for the application of COLREG 72 to all ships.

Reporting close quarter situations and near-misses in general by VTS would fill a “cultural gap” of safety at IMO and rises up the requirement to the equivalent logic implemented already by ICAO. This way VTS might be the first national operational centres to participate in a basic global maritime safety management system. This is a long-term process, but patient work collects fruit and the analysis of close quarter situations could help a coast State in reviewing its safety of navigation infrastructures or regulations.

References

Bibliography :

- "Collisions and their causes", Richard A. Cahill (Fairplay publications)
- "Finding solutions before accidents happen", Cem Gazioglu, Istanbul University & Hasan Terzi, Istanbul VTS Centre, Turkey (présentation à la conférence AISM 2014)
- "Implementing an effective safety culture – basic advice for shipping companies and seafarers", International Chamber of Shipping
- "Just culture Policy", Eurocontrol, Septembre 2012
- "La technologie ne suffit pas pour prévenir les accidents" ; article published in Digital Ship, november 2012 and copy in NAVIGATION the magazine of Institut Français de Navigation (IFN) n°241, mai 2013.
- "Stranding and their causes", Richard A. Cahill (Fairplay publications)
- "Veille: peut-on faire confiance à l'électronique" ; article of Olivier Chapuis published in Voiles & Voiliers n°503, january 2013 and copy in NAVIGATION the magazine of Institut Français de Navigation (IFN) n°241, may 2013.

International Conventions:

- UNCLOS
- COLREG 72
- SOLAS 74
- STCW
- International Civil Aviation Convention, 1944 – ICAC
- ICAC annex 11 – Air Traffic Services
- ICAC annex 13 – Aircraft accident and incident investigation

Texts of references:

- ICAO Safety Management Manual
- ISO 9001 / 2008 on Quality Management Systems
- IMO Res. A.823 (19) performance standards for ARPA
- IMO Res. A.857 (20) guidelines for Vessel Traffic Service
- IMO Res.MSC.191(79) performance standards for the presentation of navigation-related information on shipborne navigational displays
- Res. MSC.131(75) maintenance of a continuous listening watch on VHF channel 16
- Res. MSC.192 (79) adoption of the revised performance standards for RADAR equipment
- Res. MSC.255 (84) Casualty Investigation Code
- Res. MSC.302 (87) Adoption of performance Standards for Bridge Alert Management
- MSC-MEPC.7/Circ.7 Guidance on near-miss reporting
- IALA recommendation V-103 on standards for training for VTS personnel
- IALA recommendation V-119 on the implementation of VTS (December 2009)
- IALA recommendation V-125 on the use and presentation of symbology at a VTS centre (June 2012)
- IALA recommendation V-127 on operational procedures for VTS (June 2011)
- IALA recommendation V-128 on operational and technical performance requirements for VTS equipments (June 2011)
- IALA guidelines n°1055 on preparing for a Voluntary IMO Audit on VTS delivery (December 2006)
- IALA guidelines n°1056 on the establishment of VTS Radar Services (June 2007)
- IALA VTS manual
- IALA guidelines n°1089 on provision of VTS
- EC Directive 2006/16 on Port State Control
- EC Directive 2013/83 amending EC Directive 2006/16

Web sites:

EUROCONTROL : www.eurocontrol.int

OMI: www.imo.org

AISM: www.iala-aism.org

AIPCN: www.aipcn.fr & www.pianc-aipcn.be

Annexes

Annex 1: Radar versus AIS

Annex 2: Ushant Traffic VTS area

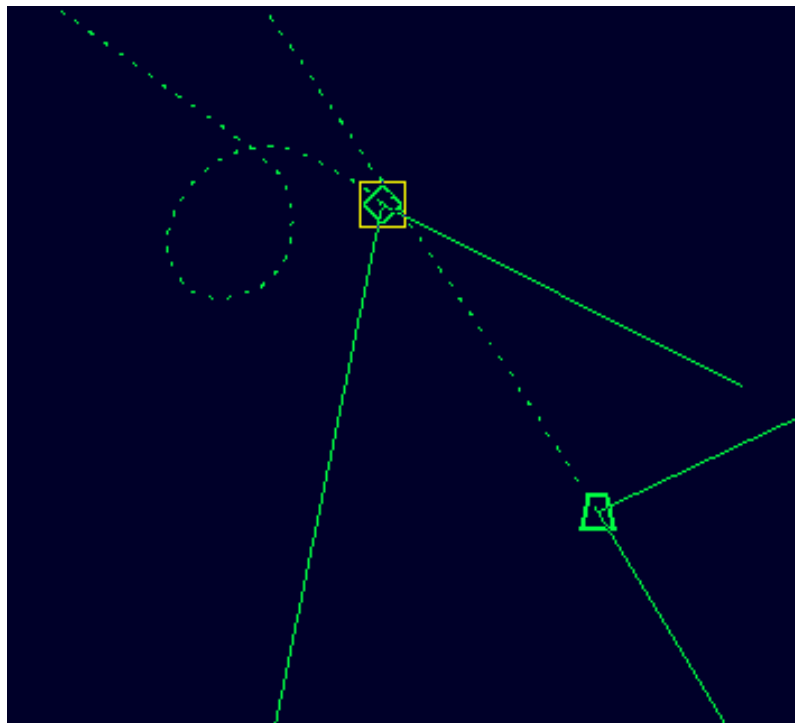
Annex 3: Close quarter situation VTS decision tree

Annex 4: Report of contravention at Ushant Traffic VTS

Annex 5: Dangerous situation notice

Annex 6: case study

Annex 7: Draft unplanned output to MSC - “Guidance on close quarter situation reporting by VTS”



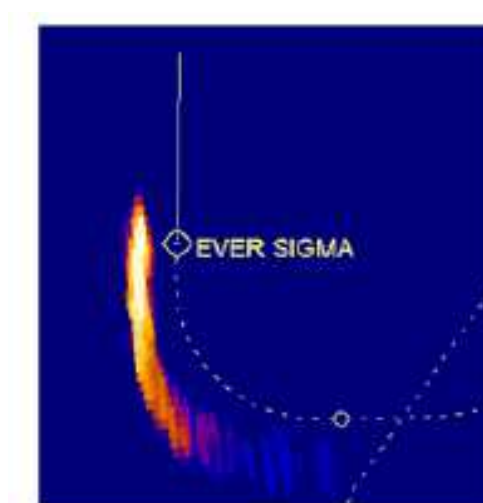
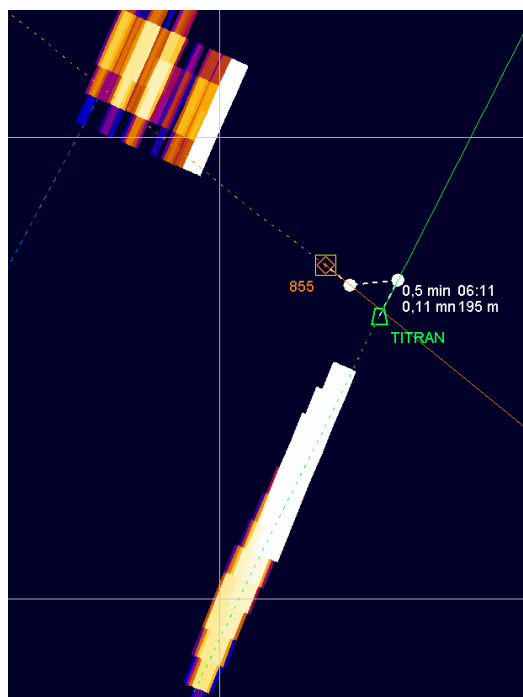
Collision avoided with a full-turn in an overtaking situation (Ushant Traffic)

Annex 1 Radar versus AIS

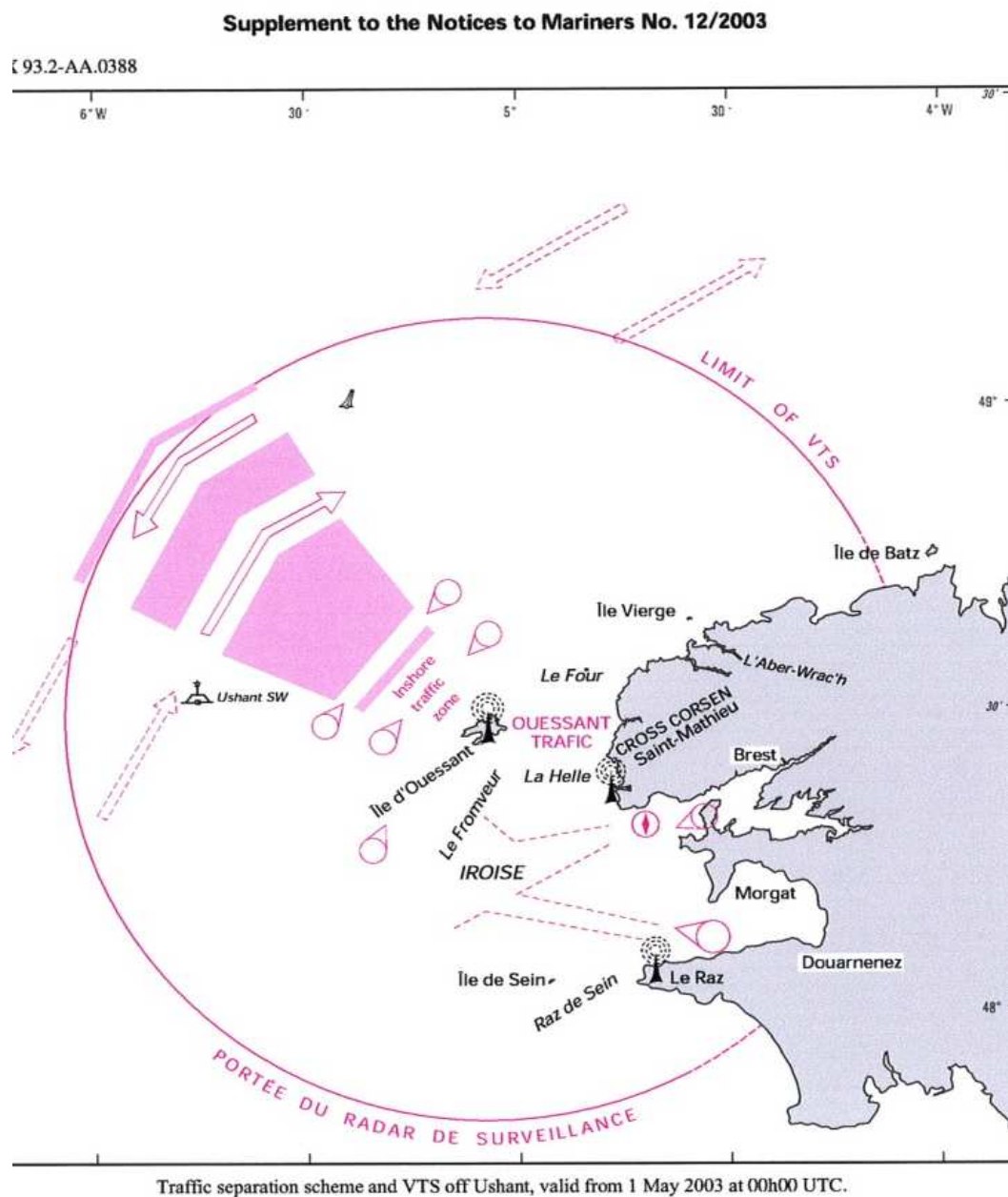
	RADAR	AIS
DETECTION	Radar is an active system: its detection is complete ... in theory and if only it is well settled and well understood	AIS is a passive system reception: it detects the AIS transmitters ... provided they are lit
VERY GOOD DETECTION	All big ships and any ship fitted with a radar transponder	all vessels with AIS is on
GOOD DETECTION	All ships fitted with a radar reflector but at distances lower than their size or reflection are reduced	Only vessels equipped with AIS lit
CANNOT DETECT	Radar cannot always detect all small crafts lower on the water line, or bigger wooden ship with a deficient radar deflector	All ships without AIS (absent or off) ... even bigger than a sailing boat!
OBSTACLES	no detection of a small echo being masked by a large echo	possible detection behind an obstacle (e.g. island) and distinguish two very similar targets
INSTANTANEITY	A detection little slower and especially a shift of several minutes to extrapolate the trajectory and the crossing point to the closest point of approach (CPA)	almost immediate detection of a change in direction (2 to 12 seconds depending on the decreasing speed)
DISPLAY INTERPRETATION	difficult, even if the broadband support and signal processing easier to read if the image is not overloaded, in which case a monochrome radar is easier	easy provided you do not overload the screen layers of unnecessary data
COVERAGE	Coastal and offshore	Coastal and offshore
MAXIMUM COVERAGE	2 to 20 miles depending of the antenna height, shape, nature and reflexion of targets, and propagation conditions; superiority of pulse radar to see far	About 25 miles (VHF range) regardless of the size (if AIS turned of course)
OPTIMUM ACCURACY	Less than 8 m (0,9%) and 1° in theory but distance and bearing more random in practice; broadband radar more accurate than pulse radar for small targets close	5 to 10 m (maximum non-differential GPS accuracy)
TARGET COURSE AND SPEED	Relative vectors (independent of the screen in relative motion) but ARPA can be set in real vector for correlating with AIS	Course over ground and speed over ground (GPS source)
TARGET DATA	no information other than the echo and its trajectory on the screen, along with useful navigation parameters with APRA	multiple information bringing nothing in terms of collision avoidance but may create a perverse effect of distraction
FIXED TARGETS	detection of land surface and markup (amplified in the case of a Racon or RAMARK beacon) as metal buoys if there is not heavy sea	detection of single markup with an AIS transmitter that the markup is real or virtual
COLLISION ALARM	yes, after definition of guard zone, but often triggered by clutter, or saturation due to transponders in heavy traffic	yes, but the risk of saturation with very high traffic even if the system reduces the scope in this case
CONSUMPTION	Average (3A at 12V for a small radar in operation, can be put on stand-by between two watchtowers)	low if computer (or tracer) and VHF lit anyway, very small if dedicated screen (40mA for receiver only)

Source: article of Olivier Chapuis in *Voiles & Voiliers* n°503 January 2013, article published in *NAVIGATION* of Institut Français de Navigation (IFN).

Example of dissociation of radar and AIS position on a VTS display

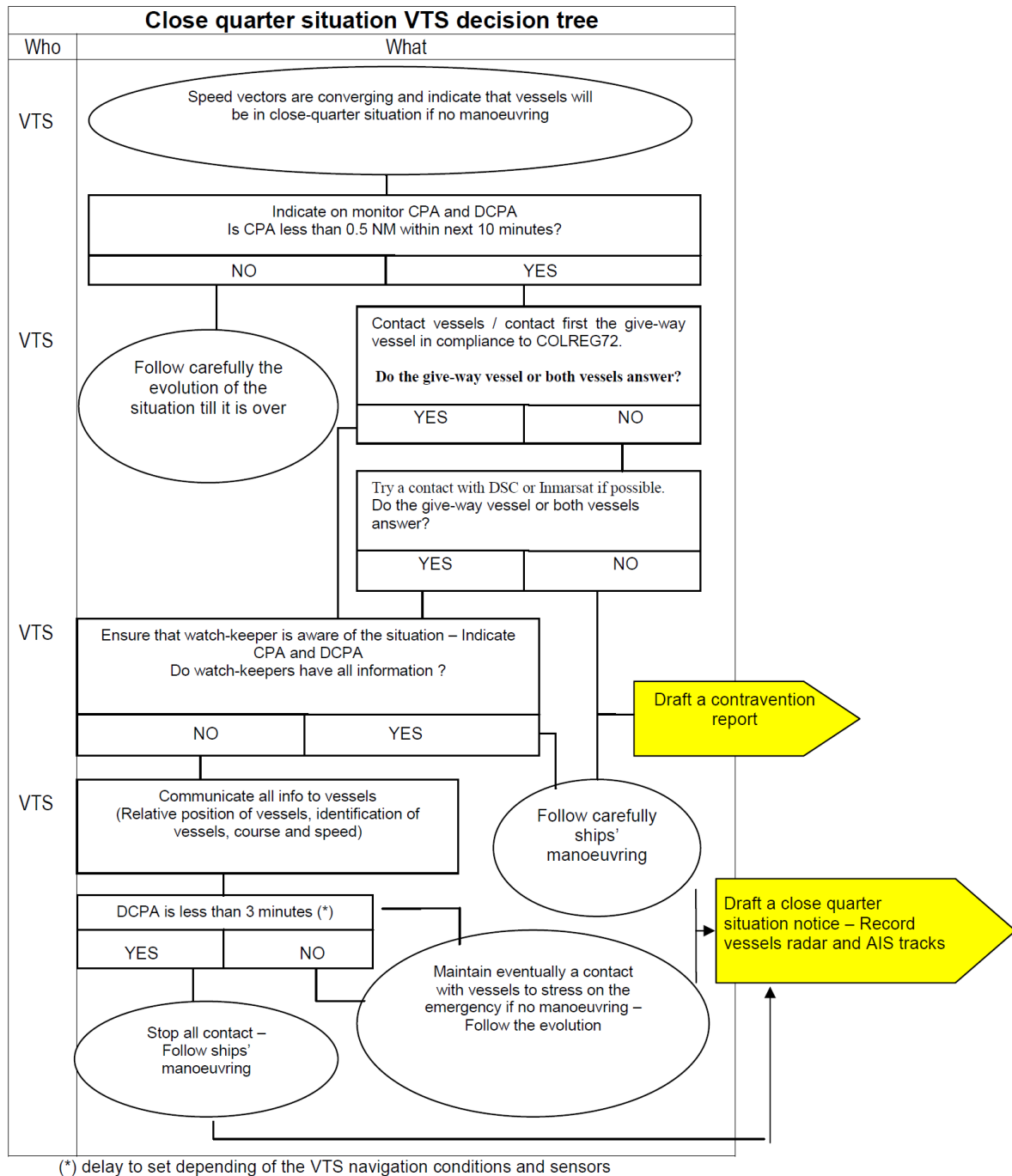


Annex 2 Ushant Traffic VTS area



Annex 3

Close quarter situation decision tree



Annex 4: Report of contravention at Ushant Traffic

REPORT OF A CONTRAVENTION OF THE INTERNATIONAL REGULATIONS FOR PREVENTING COLLISIONS AT SEA, 1972 ☐
 CONSTAT D'INFRACTION AU REGLEMENT INTERNATIONAL DE 1972 POUR PREVENIR LES ABORDAGES EN MER

REPORT OF A CONTRAVENTION OF MANDATORY SHIP REPORTING SYSTEM «OUESSREP» ☐
 CONSTAT D'INFRACTION AU COMPTE RENDU OBLIGATOIRE « OUESSREP »

REPORT OF A CONTRAVENTION OF NATIONAL NAVIGATION REGULATION ☐
 CONSTAT D'INFRACTION A UNE REGLE NATIONALE DE CIRCULATION

<u>CONTRAVENING VESSEL / NAVIRE CONTREVENANT</u>			
THE VESSEL/ LE NAVIRE:		PORT OF REGISTRY / PORT D'IMMATRICULATION:	
FLAG / PAVILLON:		CALL SIGN / INDICATIF:	
TYPE:		<input type="checkbox"/> LLOYD'S REGISTER <input type="checkbox"/> NATIONALE	
REFERENCE NUMBER / NUMERO DE REFERENCE:			
ON THE / LE:		BETWEEN / ENTRE: AND / ET GMT	
CONTRAVENED / A COMMIS UNE INFRACTION :			
<input type="checkbox"/> THE INTERNATIONAL REGULATIONS / A LA REGLEMENTATION INTERNATIONALE <input type="checkbox"/> THE NATIONAL REGULATIONS / A LA REGLEMENTATION NATIONALE			
AS SPECIFIED AFTER / COMME INDIQUE CI APRES :			

<u>LOCATION / LOCALISATION</u>			
<input type="checkbox"/> INTERNATIONAL WATERS EAUX INTERNATIONALES		<input type="checkbox"/> TERRITORIAL WATERS OF FRANCE EAUX TERRITORIALES FRANCAISES	
<input type="checkbox"/> USHANT TRAFFIC SEPARATION SCHEME DISPOSITIF DE SEPARATION DE TRAFIC DE OUESSANT		<input type="checkbox"/> OUTSIDE SCHEME HORS DISPOSITIF	
<input type="checkbox"/> LANE VOIE	<input type="checkbox"/> ASSOCIATED INSHORE ZONE ZONE COTIERE ADJACENTE	<input type="checkbox"/> FAIRWAY OF : CHENAL OU PASSAGE :	<input type="checkbox"/> LE FOUR <input type="checkbox"/> LA HELLE <input type="checkbox"/> LE FROMVEUR <input type="checkbox"/> RAZ DE SEIN
<input type="checkbox"/> SEPARATION ZONE ZONE DE SEPARATION	<input type="checkbox"/> OTHER LOCATION AUTRE LOCALISATION		

<u>PLOTTING AND IDENTIFICATION / POINTAGE ET IDENTIFICATION</u>			
THE CONTRAVENING VESSEL HAS BEEN PLOTTED BY: LE NAVIRE CONTREVENANT A ETE POINTE PAR :		METHOD : Track number / Numéro de piste :	
AS SHOWN ON ATTACHED CHART AND IDENTIFIED BY : COMME INDIQUE SUR LE CARTE JOINTE ET IDENTIFIE PAR:			
ON THE / LE (Date):	AT / A :	GMT	IN POSITION A LA POSITION
			Lat : Long :

<u>WEATHER CONDITIONS / CONDITIONS METEOROLOGIQUES</u>		
WIND / VENT (Direction) :	FORCE (Beaufort) :	STATE / ETAT DE LA MER (Douglas) :
VISIBILITY / VISIBILITE :		

<u>CONTRAVENED REGULATIONS / REGLES ENFREINTES</u>			
<input type="checkbox"/> RULE 10 COLREG 72/ REGLE 10 <div style="display: flex; justify-content: space-between;"> <div> <input type="checkbox"/> § b i <input type="checkbox"/> § b ii <input type="checkbox"/> § b iii joining / entrée <input type="checkbox"/> § b iii leaving / sortie </div> <div> <input type="checkbox"/> § c <input type="checkbox"/> § d <input type="checkbox"/> § e <input type="checkbox"/> § f </div> <div> <input type="checkbox"/> § g <input type="checkbox"/> § h <input type="checkbox"/> § i <input type="checkbox"/> § j </div> </div>		<input type="checkbox"/> REGLES NATIONALES FRANCAISES <input type="checkbox"/> CIRCULATION <input type="checkbox"/> MOUILLAGE <input type="checkbox"/> AVARIE <input type="checkbox"/> APPROCHE DES NAVIRES A RISQUES <input type="checkbox"/> SIGNALLEMENT <input type="checkbox"/> ASSISTANCE <input type="checkbox"/> AUTRE	
<input type="checkbox"/> OTHERS RULES COLREG 72 / AUTRES REGLES: <input type="checkbox"/> 1974 SOLAS CONVENTION – Chapter V – Regulation 11 mandatory ship reporting system IMO resolution MSC 52(66) amended by resolution MSC 127(75) adopted on 20may 2002 mandatory ship reporting off Ushant “OUESSREP”		Référence: <input type="checkbox"/> Arrêté PREMAR ATLANT 2003/11 <input type="checkbox"/> Arrêté préfectoral commun Brest 2004/2 <input type="checkbox"/> Arrêté PREMAR ATLANT 2004/10	

<u>REMARKS / OBSERVATIONS</u>			
COMING FROM / PROVENANCE:		BOUND FOR / DESTINATION:	
LENGTH / LONGUEUR:		CARGO / CARGAISON:	
NOTIFICATION			
INFRINGEMENT / INFRACTION		<input type="checkbox"/> NOTIFIED / NOTIFIEE <input type="checkbox"/> NOT NOTIFIED / NON NOTIFIEE	
AND / ET		<input type="checkbox"/> CONCEDED / RECONNUE <input type="checkbox"/> NOT CONCEDED / NON RECONNUE	
BY THE MASTER OF THE CONTRAVENING VESSEL / PAR LE CAPITAINE DU NAVIRE CONTREVENANT			

Continued over leaf / Suite au verso

<u>REMARKS / OBSERVATIONS:</u>	
NAME OF THE MASTER / NOM DU CAPITAINE:	
PASSPORT NUMBER / NUMERO DU PASSEPORT:	
<u>REPORT ESTABLISHED BY / CONSTAT ETABLI PAR:</u>	
AUTHORITY / AUTORITE:	
COMMANDING OFFICER / COMMANDANT:	
DATE:	
SIGNATURE:	
<p style="text-align: center;"><i>République Française</i> <i>Ministère de l'écologie, de l'énergie, du développement durable</i> <i>et de la mer en charge des technologies vertes et des négociations sur le climat</i></p>	
<u>TRANSMISSION</u>	
<u>PIECES JOINTES :</u>	<input type="checkbox"/> 1 constat <input type="checkbox"/> 1 trajectographie <input type="checkbox"/> 1 listage trajectoire <input type="checkbox"/> 1 carte (extrait) <input type="checkbox"/> <input type="checkbox"/>
<u>DESTINATAIRES</u>	<input type="checkbox"/> ADMINISTRATION DE LA MER / DAM / SM1 <input type="checkbox"/> SERVICES DES AFFAIRES MARITIMES <input type="checkbox"/> CROSS <input type="checkbox"/>
<u>COPIE</u>	CROSS CORSEN (CHEF DU SERVICE NAVIGATION)

Annex 5: Dangerous situation notice

Dangerous situation notice

1- Nature of the situation

Date / time :

dangerous situation <input type="checkbox"/>	close quarter situation <input type="checkbox"/>	collision <input type="checkbox"/>
--	--	------------------------------------

2- Vessels involved

Ship's name	IMO n° or Registration n°	FLAG	Type of ship	LoA (m)	Position (longitude & latitude)	Speed (kt)	Course

3- Description of the event

CPA : TCPA : Position relative to a mark ashore : Visibility <u>Evolution of vessels</u>	Most critical situation :
--	----------------------------------

4- Analyse

--

5-Conclusion

--

6-Enclosed documents

radar & AIS monitor print ☐ vessels' data ☐ other : ☐

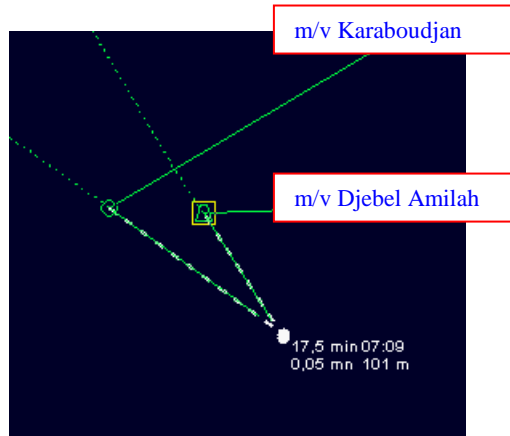
Conclusion on the action of the VTS :

Does the vessel(s) change course following VTS information?

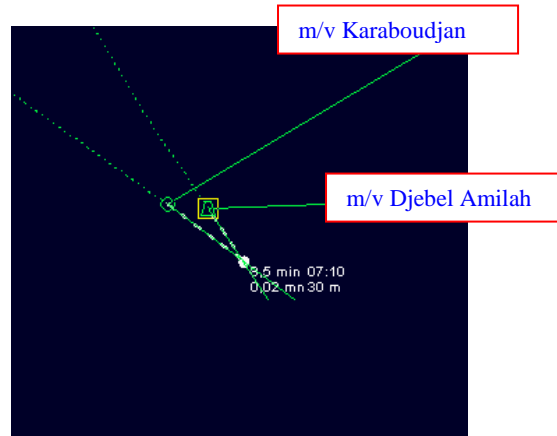
Yes ☐ No ☐ Vessel does not answer ☐

Annex 6 Case study

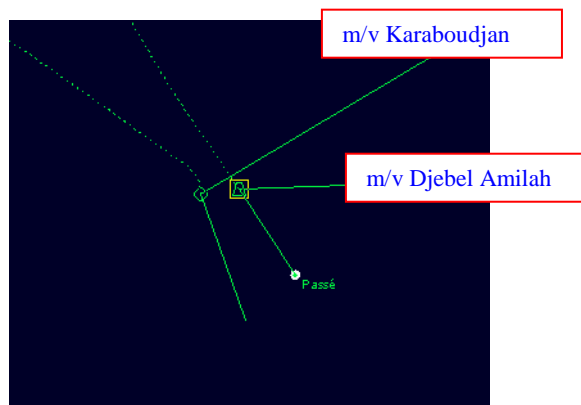
A- Close quarter situation records



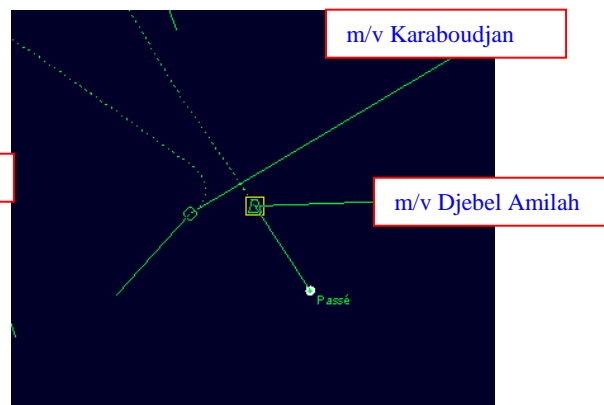
30/10/2010 – 06h52 UTC



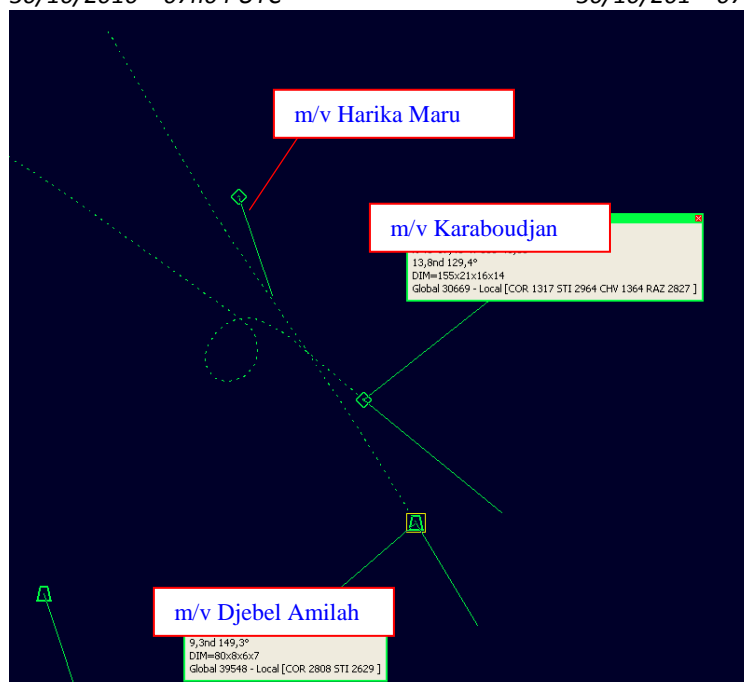
30/10/2010 – 07h00 UTC



30/10/2010 – 07h04 UTC



30/10/2010 – 07h07 UTC



30/10/2010 – 07h30 UTC

B- Dangerous situation notice**1- Nature of the situation****Date / time :** 30/10/2010 – 07h00 UTCdangerous situation ☐close quarter situation ☒collision ☐**2- Vessels involved**

Ship's name	IMO n° or Registration n°	FLAG	Type of ship	LoA (m)	Position (latitude & longitude)	Speed (kt)	Course
Karaboudjan	XXXXXXX	Bahamas	BBU	176	48°19'14" N 005°45'41" W	14	126°
Djebel Amilah	XXXXXXYY	Antigua & Barbuda	GGC	88	48°18'53" N 005°43'18" W	9.6	147°

3- Description of the event**Most critical situation:**

CPA : 0
 TCPA : 8 mn
 Position relative to a mark ashore : 250°/ Stiff Tower/ 28.96NM
 Visibility: 15 km

Evolution of vessels: emergency full turn manoeuvring by m/v Karaboudjan to avoid collision

4- Analyse

m/v Karaboudjan is overtaking. After a VHF contact with m/v Djebel Amilah, m/v Karaboudjan started an emergency full turn manoeuvring to avoid collision on starboard. This manoeuvring took place 4 NM from another ship, m/v Harika Maru, on the same course of the two others vessels. CPA was nil during the emergency full turn manoeuvring. TCPA between m/v Karaboudjan & m/v Harika Maru: 15 mn.

5-Conclusion

m/v Karaboudjan has made an emergency full turn manoeuvring to avoid collision without informing the VTS and generating a risk of collision with another vessel in the vicinity by creating a dangerous surprise.

6-Enclosed documentsradar & AIS monitor print ☒vessels' data ☒other : ☐**Conclusion on the action of the VTS :**

Does the vessel(s) change course following VTS information?

Yes ☐No ☒Vessel does not answer ☐

C- Reporting



MINISTÈRE DE L'ÉCOLOGIE, DE L'ÉNERGIE,
DU DÉVELOPPEMENT DURABLE ET DE LA MER
en charge des Technologies vertes et des Négociations sur le climat

Direction Interrégionale de la Mer
Nord Atlantique-Manche Ouest

Centre Régional Opérationnel
de Surveillance et de Sauvetage de Corsen

Plouarzel, le 18 février 2011

Ushant vessel traffic service

to

Zappata Shipping Cie
Po Box 123 - São Tomé
São Tomé e Príncipe

Nos réf. : 030-CSC-2011
Affaire suivie par : Saouzanet Didier
didier.saouzanet@developpement-durable.gouv.fr
Tél. : 02 98 89 31 31 – Fax : 02 98 89 65 75
Courriel : corsen@mccfr.eu

Subject : Close quarter situation between m/v Karaboudjan (Bahamas-IMOXXXXXX) and m/v Djebel Amilah (Antigua & Barbuda-IMOXXXXXX)

Enclosed : 1) MSC-MEPC.7/Circ.7 Guidance on near-miss reporting 10th October 2008
2) copies of RADAR & AIS monitoring system of Ushant Traffic

On 30th October 2010, at 07h00 UTC, m/v Karadoudjan was underway, bound to La Pallice, in position 48°20,27'N – 005°47,8'W was heading 126°, her speed was 14 knots. On the same time, m/v Djebel Amilah in position 48°20,15'N – 005°45,9'W was heading 147° and her speed was 9,6 knots. M/v Karadoudjan was overtaking m/v Djebel Amilah on her starboard quarter. Due to the angle between the two vessels, m/v Karadoudjan and m/v Djebel Amilah had both to be considered in overtaking situation. Ushant VTS established that the CPA was very short but TCPA, about 15 minutes was long enough for m/v Karadoudjan to alter her course to avoid a close quarter situation. At 07h02 UTC, position 48° 18,8'N – 005°44,9'W, m/v Karadoudjan altered substantially her course to make a u-turn in order to avoid a collision. When establishing this situation, « Ushant Traffic » contacted m/v Karadoudjan on VHF channel 13 & 16. M/v Karadoudjan confirmed she was forced to alter her course to avoid a collision, and confirmed a contact on VHF with m/v Djebel Amilah just before the close quarter situation.

This event induce me to inform you that m/v Karadoudjan did not comply with several rules of COLREG convention :

- A sharp look-out shall be maintained at all times, especially when approaching and navigating near or inside a traffic separation scheme (rule 5 and rule 10 f),
- She did not determine efficiently the risk of collision (rule 7),
- She should have altered her course because she was overtaking m/v Djebel Amilah and the CPA between both vessels was very short. If m/v Karadoudjan had doubts about the fact she was the overtaking vessel, she should assume that she was the overtaking vessel and acted accordingly (rule 13 c).

I advise you to remind the crew that close quarter situation may be avoided in dense traffic area such TSS by navigating with particular caution (rule 10 f) and by monitoring permanently the VHF channel 16 and 13 while passing through Ushant VTS area as indicated in ship's routing.

Yours faithfully.

AC2AM Jean-Charles CORNILLOU

Directeur CROSS Corsen

Tél. : 33 (0) 2 98 89 61 55 – fax : 33 (0) 2 98 89 18 37
Route de Corsen B.P. 02
29810 PLOUARZEL

Présent
pour
l'avenir

www.developpement-durable.gouv.fr

Copie à : chrono – Bahamas Maritime Authority – NKK (ISM) – classeur situations dangereuses

D- Answer of Flag State Authority

----- Message original -----

Date: - Thu Feb 24 16:47:34 2011

From: SAOUZANET Didier (Chef du service circulation et pollution) - DIRM NAMO/DOSM/CROSS

Corsen <didier.saouzanet@developpement-durable.gouv.fr>

Organization: DIRM NAMO/DOSM/CROSS Corsen

To: Casualty <Casualty@bahamasmaritime.com>

Subject: Re: Karaboudjan IMO: XXXXXX VTS Ushant - 30th Oct 2010

Good Afternoon,

Thank you very much for your answer and your cooperation sir.

Regards,

O1 Saouzanet Didier

VTs Officer

MRCC Corsen

corsen@mrccfr.eu

ouessant.trafic@developpement-durable.gouv.fr

Phone: +33 2 98 89 31 31

fax: +33 2 98 89 65 75

Date: Thu, 24 Feb 2011 16:38:54 +0100

From : Casualty@bahamasmaritime.com

>

> Good Afternoon

>

> Your attached notification regarding the captioned vessel has been duly
> received and acknowledged.

> We have requested the managers to advise all ships of their obligation
> with regard to Close Quarter Situations.

>

> Regards

> Chris Dowty

> Technical and Compliance Officer

>

> Casualty and Incidents

> Maritime Affairs

> The Bahamas Maritime Authority

> 120 Old Broad Street

> London EC2N 1AR

> United Kingdom

>

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Annex 7

Draft unplanned output to MSC “Guidance on close quarter situation reporting by VTS”

MARITIME SAFETY COMMITTEE
Xth session
Agenda item

MSC X/
date
Original: English

WORK PROGRAMME

New unplanned output to provide guidance on close quarter situation reporting by VTS

Submitted by ...

SUMMARY

<i>Executive summary:</i>	This document presents a proposal of guidance on close quarter situations reporting by VTS in order to feed near-miss report files of companies and promote a “safety culture” and a “no-blame culture” within all stakeholders of the maritime community.
<i>Strategic direction:</i>	12
<i>High-level action:</i>	12.1.2, 12.3.1 & 12.4.1
<i>Planned output:</i>	12.1.2.1, 12.3.1.1, 12.3.1.3 & 12.4.1.1
<i>Action to be taken:</i>	Paragraph 13
<i>Related documents:</i>	IMO Res. A 857(20) guidance for VTS; SOLAS IX – ISM Code; MSC-MEPC.7/Circ. 7 guidance on near-miss reporting; MSC/Circ.1015 repoting near-misses; IALA recommendation V-103 on standards for training and certification of VTS personnel

Introduction

1. This document proposes an unplanned output relative to guidance on close quarter situations reporting by Vessel Traffic Services (VTS) in order to feed near-miss report files of companies and promote a “safety culture” and a “no-blame culture” within all stakeholders of the maritime community.
2. The proposal conforms to the Guidelines on the organization and method of work of the Maritime Safety Committee and their subsidiary bodies (MSC-MEPC.1/Circ.4/Rev.2).

IMO's objectives

3. The propose work item will promote a “safety culture” amongst all stakeholders and consequently contributes to Strategic Direction 12, in further enhancing the quality of shipping by : 12.2 encouraging proper management of ships; 12.3 promoting and enhancing the availability of, and access to, information – including casualty information – relating to ship safety, security and the environment (i.e. transparency); 12.4 ensuring that all stakeholders understand and accept their responsibilities regarding safe, secure and environmentally sound shipping by developing a “chain of responsibility concept” among them. It also contributes to High-level Actions 12.2.1, 12.3.1 and 12.4.1: use risk-based tools that take account of cost and the human element in the development of operational standards; promote and undertake collection and dissemination of high quality, relevant and timely information to support analyses and decisions, taking into account related issues of finance and governance and raise awareness of the “chain of responsibility concept” among all stakeholders through organizations that have consultative status.

Compelling need

4. Close quarter situation reporting by VTS should be considered as a declination from MSC-MEPC.7/Circ. 7 guidance on near-miss reporting in order to promote a “just culture” features and atmosphere of responsible behaviour and trust for navigator and shipping company, as well as VTS personnel. The analysis compilation of close quarter reporting can also be used as training material for VTS.

Analysis of the issue

5. As MSC-MEPC.7/Circ. 7 guidance on near-miss reporting has been included as an annex to the ISM Code, any reporting on close quarter situation reported from VTS should be brought to the attention of the Flag States in order to help them to monitor the certification of ISM of the ships flying their flag, in particular on point 6 of the ISM Code relative to resources and personnel. This point should cover the qualification and training of personnel in charge of watch-keeping.

6. There are many barriers related to the reporting of near-misses. In many cases, close quarter situations are only known by the VTS but not the vessels involved in the close quarter situations. The main reason is the VTS monitors in general a wider area than a single vessel can do. Moreover Vessels involved in close-quarters situations are not necessarily flying the flag of the coastal State where the VTS is located, thus there is no direct interest for the VTS to inform the companies and navigators.

Analysis of implications

7. This issue can be dealt with simply, with no cost impact whatsoever to the shipping industry, and with minimal to the Member States. No changes to requirements or regulation affecting the shipping industry are necessary or warranted.

Benefits

8. The issue will benefit not only to all shipping company safety management systems, but to the all maritime community and in particular the VTS personnel. There will be an increase of data for FSA available to IMO with the collection of reporting on close-quarters situations.

Industry Standards

9. There is no need of industry standard to implement the issue.

Output

10. This is a voluntary process to be monitored by VTS. The issue will bring out the position and importance of VTS in the safety of navigation. It will be a continuous process from VTS in order to collect reports on close quarter situations.

Human element

11. The proposal will help to monitor the ISM Certification, in particular on point 6 of the ISM Code relative to resources and personnel. This point should cover the qualification and training of personnel in charge of watch-keeping. It is consistent with the objectives of the Organization and is based on human element guidance and principles in resolution A.947(23). The completed human factors checklist from MSC-MEPC.7/Circ.1 is set out in annex 1.

Priority/urgency

12. It is recommended that the new item be added to the agenda of the NCSR Sub-Committee with sufficient priority to complete in one session.

Action requested of the Committee

13. The Committee is invited to add the agenda of the NCSR Sub-committee, a new item on “close quarter situation reporting by VTS” with a view to discuss and amend the proposed draft guidance in annex 3.

ANNEX 1

CHECKLIST FOR CONSIDERING HUMAN ELEMENT ISSUES BY IMO BODIES

Instructions: If the answer to any of the questions below is : (A) YES , the preparing body should provide supporting details and/or recommendation for further work. (B) NO , the preparing body should make proper justification as to why human element issues were not considered, (C) NA (Not Applicable), the preparing body should make proper justification as to why human element issues were not considered applicable.	
Subject Being Assessed: (e.g. Resolution, Instrument, Circular being considered) <div style="text-align: center;">Close quarter situation reporting by VTS</div>	
Responsible Body: (e.g. Committee, Sub-committee, Working Group, Correspondence Group, Member State) Sub-Committee on Navigation, Communication and Search & Rescue (NCSR)	
1. Was the human element considered during development or amendment process related to this subject?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
2. Has input from seafarers or their proxies been solicited?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
3. Are the solutions proposed for the subject in agreement with existing instruments? (Identify instruments considered in comments section)	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
4. Have human element solutions been made as an alternative and/or in conjunction with the technical solutions?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> NA
5. Has human element guidance on the application and/or implementation of the proposed solution been provided for the following:	
. Administrations?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
. Ship owners/managers?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
. Seafarers?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
. Surveyors?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
6. At some point, before final adoption, has the solution been reviewed or considered by a relevant IMO body with relevant human element expertise?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
7. Does the solution address safeguards to avoid single person errors?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
8. Does the solution address safeguards to avoid organizational errors?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
9. If the proposal is to be directed at seafarers, is the information in a form that can be presented to and is easily understood by the seafarer?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> NA
10. Have human element experts been consulted in development of the solution?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
11. HUMAN ELEMENT: Has the proposal been assessed against each of the factors below?	
<input type="checkbox"/> CREWING. The number of qualified personnel required and available to safely operate, maintain, support, and provide training for system.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> NA
<input type="checkbox"/> PERSONNEL. The necessary knowledge, skills, abilities, and experience levels that are needed to properly perform job tasks.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> NA
<input type="checkbox"/> TRAINING. The process and tools by which personnel acquire or improve the necessary knowledge, skills, and abilities to achieve desired job/task performance.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> NA
<input type="checkbox"/> OCCUPATIONAL, HEALTH AND SAFETY. The management systems, programmes, procedures, policies, training, documentation, equipment, etc to properly manage risks.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> NA
<input type="checkbox"/> WORKING ENVIRONMENT. Conditions that are necessary to sustain the safety, health, and comfort of those on working on board, such as noise, vibration, lighting, climate, and other factors that affect crew endurance, fatigue, alertness and morale.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> NA
<input type="checkbox"/> HUMAN SURVIVABILITY. System features that reduce the risk of illness, injury, or death in a catastrophic event such as fire, explosion, spill, collision, flooding, or intentional attack. The assessment should consider desired human performance in emergency situations for detection, response, evacuation, survival and rescue and the interface with emergency procedures, systems, facilities and equipment.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> NA
<input type="checkbox"/> HUMAN FACTORS ENGINEERING. Human-system interface to be consistent with the physical, cognitive, and sensory abilities of the user population.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> NA
Comments: (1) Justification if answers are NO or Not Applicable. (2) Recommendations for additional human element assessment needed. (3) Key risk management strategies employed. (4) Other comments. (5) Supporting documentation. The proposal is addressing the ISM Code by VTS in reporting near-misses to companies. There is no implementation by the companies, crews or flag State Administrations for the proposal is focusing a voluntary reporting by VTS.	

ANNEX 2

CHECKLIST FOR IDENTIFYING ADMINISTRATIVE REQUIREMENTS AND BURDENS

<p>The Checklist for Identifying Administrative Requirements and Burdens should be used when preparing the analysis of implications required of submissions of proposals for inclusion of unplanned outputs. For the purpose of this analysis, the terms “administrative requirements” and “burdens” are defined as in resolution A.1043(27), i.e. Administrative requirements are defined as an obligation arising from future IMO mandatory instruments to provide or retain information or data, and administrative burdens are defined as those administrative requirements that are or have become unnecessary, disproportionate or even obsolete.</p> <p>Instructions: (A) If the answer to any of the questions below is YES, the Member State proposing an unplanned output should provide supporting details on whether the burden are likely to involve start-up and/or ongoing cost. The Member State should also make a brief description of the requirement and, if possible, provide recommendations for further work (e.g. would it be possible to combine the activity with an existing requirement?). (B) If the proposal for the unplanned output does not contain such an activity, answer NR (Not Required).</p>		
1. Notification and reporting? Reporting certain events before or after the event has taken place, e.g. notification of voyage, statistical reporting for IMO Members, etc.	NR <input type="checkbox"/>	Yes <input type="checkbox"/> Start-up <input checked="" type="checkbox"/> Ongoing
Description (if the answer is yes): Close quarter situation reporting is performed by VTS on a voluntary basis.		
2. Record keeping? Keeping statutory documents up to date, e.g. records of accidents, records of cargo, records of inspections, records of education, etc.	NR <input type="checkbox"/>	Yes <input type="checkbox"/> Start-up <input checked="" type="checkbox"/> Ongoing
Description (if the answer is yes): Records are kept by VTS.		
3. Publication and documentation? Producing documents for third parties, e.g. warning signs, registration displays, publication of results of testing, etc.	NR <input type="checkbox"/>	Yes <input type="checkbox"/> Start-up <input checked="" type="checkbox"/> Ongoing
Description (if the answer is yes): Publication & documentation, publication of results of testing are made on a voluntary basis by VTS Authorities.		
4. Permits or application? Applying for and maintaining permission to operate, e.g. certificates, classification society costs, etc.	NR <input checked="" type="checkbox"/>	Yes <input type="checkbox"/> Start-up <input type="checkbox"/> Ongoing
Description (if the answer is yes): 		
5. Other identified burdens?	NR <input checked="" type="checkbox"/>	Yes <input type="checkbox"/> Start-up <input type="checkbox"/> Ongoing
Description (if the answer is yes): The proposal has to be implemented by VTS on a voluntary basis in order to collect data on close quarter situations.		

ANNEX 3

Draft Guidance on close quarter situation reporting by VTS

1. Introduction

1.1. Close quarter situation reporting by VTS should be considered as a declination from MSC-MEPC.7/Circ. 7 guidance on near-miss reporting in order to promote a “just culture” features and atmosphere of responsible behaviour and trust for navigator and shipping company, as well as VTS personnel. The analysis compilation of close quarter reporting can also be used as training material for VTS.

1.2. As MSC-MEPC.7/Circ. 7 guidance on near-miss reporting has been included as an annex to the ISM Code, any reporting on close quarter situation reported from VTS should be brought to the attention of the company of the ship involved in a close quarter situation. Flag States should be informed as well in order to help them to monitor the certification of ISM of the ships flying their flag, in particular on point 6 of the ISM Code relative to resources and personnel. This point should cover the qualification and training of personnel in charge of watch-keeping.

1.3 When Class Society acts on behalf of a Flag State for the ISM certification, the close quarter situation should be reported to the Class Society as well.

2. Defining close quarter situation

2.1. Close quarter situation: a sequence of events and/or conditions between different vessels that could result in a collision between vessels. It should be kept in mind that a collision between vessels does not lead necessarily to a direct contact between them. In some situation, the water displaced by a vessel can generate an accident on others vessels in the vicinity, hence this is considered as a collision.

3. Overcoming barriers to report close quarter situations

3.1. There are many barriers related to the reporting of near-misses. In many cases, close quarter situations are only known by the VTS but not the vessels involved in the close quarter situations. The main reason is the VTS monitors in general a wider area than a single vessel can do. Moreover Vessels involved in close-quarters situations are not necessarily flying the flag of the coastal State where the VTS is located, thus there is no direct interest for the VTS to inform the companies and navigators.

3.2. These barriers can be overcome by:

1. Encouraging the direct share of information of VTS to company, Flag State and the Class Society acting on behalf of the Flag State.

2. Considering close quarter situation reporting as a key issue to monitor the personnel in charge of watch-keeping and to enhance bridge management as well as the training of merchant marine cadet officer.

3. Close-quarters situation reporting could also help to train VTS personnel and could be shared between VTS as return of experience for action taken by VTS.

4. Close quarter situation investigation process

4.1. The following amount of minimum information should be gathered about near-miss:

1. Identification of all vessels involved in the close quarter situation. There could be more than two vessels involved and different types of ship.

2. Summary of the chronology of the event: what happened, where, when and in what sequence?

3. What is the like-hood of a recurrence of the chain of events and/or conditions that led to the near-miss?

4. Copies of radar and AIS tracks would be useful to indicate the kinematics of the vessels involved in the close quarter situation.

5. Information on the action taken by VTS to inform ships involved.

4.2. Analyse the close-quarters situation with the help of the near-miss investigation process as indicated in MSC-MEPC.7/Circ. 7 guidance on near-miss reporting.

4.3. Report to the company of the give-way vessel involved in the close quarter situation, with a copy to:

1. The company of the stand-on vessel if the VTS has received any complaint from this one following the close quarter situation. Name and address of the company can be found in PSC data bases, EQUASIS or LMIU data base.

2. The Flag State for information in order to exercise attention in a future audit of the company and the ship on the resource and personnel point of the ISM, in particular for personnel in charge of watch-keeping on the bridge. Contact address or responsible national authorities can be found in MSC-MEPC.6/Circ.6.

3. The Class Society when acting on behalf of the Flag State for the ISM certification of the company. Name and address of the class society can be found in PSC data bases, EQUASIS or LMIU data base. It is recommended to cross-check the information with the different data bases to ascertain the class society in charge of ISM certification on behalf of the Flag State. For instance, some ship can have an ISM certification delivered by one class society and all the other certification delivered by another class society.

5. Completing the investigation

5.1. The ultimate objective of close-quarters situation reporting and investigating is to identify areas of concern and implement appropriate corrective actions to avoid collision at sea, at least in VTS area. To do so requires that reports are to be generated, shared, read and acted upon. VTS should be encouraged to inform companies and Flag State to consider close quarter situation reporting as a way to enhance safety of navigation in general.

5.2. It may take years for safety trends to be discerned, and so reporting must be archived and revisited on a timely basis. Near-miss reports should be considered along with actual collision or incident reports to determine trends. These should be consistent in the identification and nomenclature of causal factors across close-quarters situation and collision reports.

5.3. Archives on close-quarters situations can provide detailed knowledge of the services provided by a VTS centre and be part of practical training and experience in the tasks.