The Implementation of the Moroccan VTS and its Role in the Safety of Navigation in the Strait of Gibraltar

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WORLD MARITIME UNIVERSITY
Malmö, Sweden

THE IMPLEMENTATION OF THE MOROCCAN VTS AND ITS EXPECTED ROLE IN THE SAFETY OF NAVIGATION IN THE STRAIT OF GIBRALTAR

By

BRIOUIG Mohamed
Kingdom of Morocco

A dissertation submitted to the World Maritime University in partial fulfilment of the requirements for the award of the degree of

MASTER OF SCIENCE

in

Port Management

1997

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DECLARATION

I certify that all the material in this dissertation that is not my own work has been identified, and that no material is included for which a degree has previously been conferred on me.

The contents of this dissertation reflect my own personal views, and are not necessarily endorsed by the University.

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To my Parents,

To my late father Chaibi and my mother Khaira,

I want to say thank you for teaching me and guiding me through all my years of childhood.

Your guidance has helped me to choose right from wrong and made me a more confident and secure person.

I have got the best of you, and I want you to know that I could not have had better parents.

I will always love you.
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ABSTRACT

Title of Dissertation: The Implementation of the Moroccan VTS and its expected role in the Safety of Navigation in the Strait of Gibraltar

Degree: MSc

Being one of the most important waterways used for international navigation, the Strait of Gibraltar accommodates yearly an increasing volume of traffic of all kinds which converge en route between the Atlantic and the Mediterranean Sea and the European and African Continents.

To the element of risk posed by such dense and diverse maritime traffic, must be added other factors such as sea and meteorological conditions, that further complicate the navigation and expose the traffic and the area to a high level of hazards.

With a view to avoiding hazardous situations and protecting their environment, Morocco and Spain decided to establish a Vessel Traffic Services (VTS) as means of traffic control, aid to navigation and incident response. From the time the Spanish VTS was established in 1989, it was expected that the Moroccan system would follow up in order to create an efficient safety scheme to the benefit of safety and environment protection within the Strait of Gibraltar. Recently, this VTS centre has been established in Tangier and is expected to be operational in the near future.

The paper is an attempt to examine the situation regarding the safety of navigation in the Strait of Gibraltar and investigates the role which the VTS of Tangier can play as a component of the aforesaid safety scheme. For that, a description of the important features of the system of Tangier is made together with an assessment of its level of conformity with IMO and international standards.

Finally, the study concludes by highlighting the importance of establishing the centre of Tangier which is correctly timed with the achievement of important projects through the Strait such as the Maghreb-Europe gas pipe-line, exporting the Algerian gas to Europe and the expected tunnel link between Europe and Africa.

These constitute real challenges for both VTS systems which lead the author, firstly, to draw conclusions about the necessity of an adequate co-ordination of the two systems. Recommendations were made on the basis of a global view of safety and environment protection within the Strait and the Mediterranean as a whole.
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CHAPTER I

INTRODUCTION

1.1 Historical background to the Strait of Gibraltar:

The Strait of Gibraltar connects the Atlantic Ocean to the Mediterranean Sea. It lies between the southernmost tip of Spain and the northernmost part of Morocco.

The Strait is 36 miles long and narrows to 7.5 miles wide between point Marroque, Spain and Ras Cires, Morocco. Actually under the 12 miles territorial sea for coastal states, the entire Strait falls within the Moroccan and the Spanish territorial waters.

For centuries, the Mediterranean Sea and the Strait of Gibraltar have been vital waterways for the flow of people and goods. The Mediterranean has been for a long time, an area of disparate political, military and religious forces that have strongly influenced the shape of modern civilisation.

The name of Gibraltar, given to the Strait and its famous rock, is of relatively recent origin. It dates to around the fourteenth century and is a Spanish mispronunciation of the Arabic word “Djabal Tarick” the “Mount of Tarik” Tarik Ibn Zayad, the general commander of Muslim forces that landed somewhere near the rock and then entered
the Iberian peninsula at the beginning of the eighth century. However, the history of Gibraltar is much older. The Phoenicians called it Calpe.

According to Scott C. Truver (1980), the word Calpe has a significant meaning in the Phoenician legend which means half of a single mountain that Hercules had split in two as he created the Sea passage from the Atlantic to the Mediterranean. The other half of this mountain remained on the north coast of Africa and is actually called “Djabal Musa”. In fact, it is at the time of Phoenicians, around 573 B.C that both shores of the Strait were, for the first time, held by the same power as north Africa and the Iberian peninsula which were both under the Phoenician control. Carthage, the Phoenician colony in north Africa, concerned about denying its passage to potential enemies, issued a total prohibition against all non-Carthaginian ships passing through the Strait, The Strait was kept closed until the Romans.

Under the Roman Empire, the Strait of Gibraltar played an important role for about 500 years as a means of communication between Iberia and Mauritania (now North Africa) and as a means of passage between the Mediterranean and the Atlantic to Britain. At that time, Carteia (A Phoenician-Carthaginian town located at the inner point of Algeciras Bay) became an important military base in the campaigns against Mediterranean pirates, and the control over the Strait aided Rome in this effort.

The control of the Strait changed hands numerous times following the collapse of the Roman Empire. After the Roman period, the Strait of Gibraltar attained great historical importance as a link between Africa and Iberia, especially during the Moors successful conquest of Iberia. Around 700 A.D, the Muslim general Musa Ibn Nusair finished his four-year campaign in which he conquered the whole actual Maghreb as far as the Atlantic Ocean.
In 710 A.D, Musa prepared an army of 500 cavalry and 7,000 foot soldiers for the conquest of Spain, under the command of Tarik Ibn Zayad. In April 711, the army sailed across the Strait and took control of the whole area at the north-west side of the rock and in the following years, Tarik skilfully managed to take over most of the Spanish territory.

For more than 700 years within the Moorish kingdom, the Strait was a link between two lands united by government, language and religion. During this time, the Strait was more important as a bridge between Africa and Europe than as a link between the Mediterranean and the Atlantic. The Muslims completely controlled traffic in the Strait for most of the whole period of their existence in the Iberic peninsula.

Due to internal political problems, the Moors became powerless to stop the flow of commerce through the Strait and after being expelled from Spain in 1610, the importance of the Strait as a communication medium was transformed completely. The Strait was no longer a bridge between two continents. Instead, it served as a barrier to communication between the south of Europe and north Africa.

The importance of the Strait as a strategic maritime passage was even further reduced due to the discovery of the route of Good-Hope by the Portuguese navigator Vasco de Gama in 1497-1499. This discovery opened a new sea route to India and provided an alternative route for the trade with the Far East, further reducing the seaborne commerce in the Mediterranean.

During the long war of the Spanish succession (1702-1713), a combined Anglo-Dutch fleet attacked and captured Gibraltar for Austria.

In 1711 the British government, sensing a declining popularity for the long war against France, made a proposal of peacetalks for a compromise or agreement.
France, under pressure of the high cost of the war, replied that in return for peace the English would be given security to exercise their trade in Spain, the Indies and the ports of the Mediterranean.

The peace negotiations between France and Britain ended with the signature of the treaty of Utrecht in 13 July 1713 which brought an end to the war of the Spanish succession. In the terms of the peace, Britain recognised Philip of Anjou as King of Spain, Philip recognised Anne as Queen of England and Philip granted to Britain, among other things and more importantly, by Article X of the treaty of Utrecht, the full and entire property of the town and castle of Gibraltar, together with the port and fortifications without any territorial jurisdiction.

The concept of *full and entire propriety* and without *any territorial jurisdiction* formed the main grounds of dispute that has lasted until today and which still influences British and Spanish relationships.

The treaty of Utrecht had the advantage to bring an end to the war of the Spanish succession but it also signalled the beginning of a controversy that was to persist for hundreds of years.

### 1.2 The Strait of Gibraltar: An important international waterway:

The Strait of Gibraltar throughout most of history was the only passage out of the Mediterranean Sea. Since the sixth century B.C, when Carthage extended its hegemony over the Iberian peninsula, the Strait had been regarded as an important military asset, and control over the Strait has offered dominance over distant areas.

The world economic and military powers have always considered the strategic interests of the Strait and have been struggling in an attempt to take control over the Strait’s waters.
The military importance of the Strait of Gibraltar has been confirmed during recent times, for instance, during the Napoleonic wars as well as World Wars I and II. This military position of the Strait was in fact partly driven by its strategic commercial importance. In this respect, the Mediterranean Sea and the Strait of Gibraltar have been vital maritime routes for the flow of commerce. They have given back their strategic position after the opening of the Suez Canal in 1869 as a vital link between Europe and regions located south and east of Suez.

After the second world war, the discovery of large reserves of crude oil under the sole of the Middle East has made the Strait one of the most important routes for oil tankers carrying energy resources to Europe and North America. Moreover, the Strait has been the principal waterpassage for the North African oil and liquified natural gas (LNG) to Europe and North America. In 1995, an important pipeline link, called the Maghreb-Europe pipeline, was accomplished. Following its passage through Algeria and Morocco, the M-E gaze pipe cross the Strait of Gibraltar carrying important quantities of Algerian gaze to Europe.

A steady increase of traffic volume through the Strait has been recorded, including the important traffic of dangerous goods vessels such as oil, gas and chemical tankers without considering an unestimated volume of war ships and submarines which are of permanent presence in the Mediterranean.

This importance of the Strait for the worlds’ economy together with the variety of risks (mainly accidents and pollution risks) that are presented to the environment and the economies of the bordering states has, for a long time, brought discussions on the legal status of the Strait as Morocco and Spain extended their territorial Seas to the 12 miles limit under the United Nations Convention on the Law of the Sea (UNCLOS) 1982.
1.3 Legal regime of the Strait of Gibraltar under the UNCLOS 1982.

1.3.1 The principle of freedom of navigation:

Freedom of navigation through and overfly above international Straits has been recognised as indispensable for the freedom of navigation and overfly the high seas of the world.

The Strait of Gibraltar is one of the world’s international Straits that have been identified as vital for international trade and communication among people of the world. The concept of freedom of the high seas is one of the oldest respected international law principles throughout history. However, several military and naval powers have tried to jeopardize this principle in an attempt to control, by means of power and enacted regulations, larger parts of the world’s trade.

The Greeks and Romans were one of the earliest maritime powers to adopt legislation for the regulation of the world’s shipping movements. Many examples of this can be found concerning the middle and recent ages, when Spain, Portugal and Britain controlled, for a long time, world shipping.

Nevertheless, despite these attempts to control the seas, the freedom of navigation has remained for centuries a widely accepted principle which has served the general interests of the international community.

Serving as an element of customary international law, the principle of freedom of the high seas was codified in the 1958 Geneva Convention on the High Seas in which the freedom of navigation, fishing and overflight were explicitly defined as established principles of international law.
1.3.2 International Straits:

The question of what precisely constitutes an international Strait under international law has been a central to the controversy over rights of innocent passage. Geographically, a Strait may be defined as:

'A narrow contraction of the Sea between two territories, being of a certain limited width and connecting two Seas otherwise separated at least in that place by the territories in question'

Scott C. Truver, (1980)

However, not all straits that satisfy this definition are considered as international Straits to which a special regime of passage applies. According to the previous source, a narrow maritime passage is an international Strait only if it is first geographically a Strait and secondly serves as a means of communication between two Sea areas, where navigation is common to all nations.

While the geographical condition can be easily determined, it seems rather complex to define the functional or utility aspect of an international Strait. Nevertheless, the need of international commerce and free movement of people and goods depends upon the freedom of high seas. Therefore, the right of passage should be recognised only in Straits used for international navigation.

This principle was endorsed by the final act of the third United Nations Conference on the Law of the Sea and its resulting convention, UNCLOS 1982.

However, if the UN Convention on the Law of the Sea has recognised the right of transit through Straits used for international navigation, this right to transit is subject to innocent passage. In fact, it is generally accepted that within the territorial sea, the sovereignty of a coastal state is subject to only one qualification: the right of innocent passage by foreign vessels.
For Straits used for international navigation, Article 38 of the UNCLOS 82 stipulates that ‘all ships and aircraft enjoy the right of transit passage, which shall not be impeded...’. The same Convention states the duties and behaviours of ships during transit. Article 39 lists requirements for ships and aircraft to comply with during their passage through such Straits.

These requirements can be summarised as follows:

- A ship shall proceed without delay and refrain from any threat or use of force against the sovereignty, territorial integrity or independence of states bordering the Strait. For that, it should also refrain from any activities other than those connected with its continuous and expeditious transit unless rendered necessary by force majeure.

- A ship should comply with generally accepted international regulations, procedures and practices for safety at sea including the COLREGs and also those for the prevention, reduction and control of pollution from ships.

-Finally, aircraft in transit shall observe the rules of the air established by the International Civil Aviation Organisation (ICAO) and at all times monitor the radio frequency assigned by the competent designed air traffic control authority or the appropriate international distress radio frequency.

1.3.3 The legal regime of the Strait of Gibraltar:

Although having a unique history, the Strait of Gibraltar’s current legal regime under UNCLOS 82 seems to be identical to that of other international straits used for international navigation. It should be noted that the right of transit and innocent passage through such Straits was one of the most important issues which caused most disagreements among participants to the third United Nations Conference on the Law of the Sea. The origins of these disputes were in fact a conflict of interests among maritime and naval powers.
In all sessions of the United Nations Conference on the Law of the Sea, the claims of the bordering states (Morocco and Spain) were different from that of the world economical powers. On the one hand, the first claimed a special transit regime based on the fact that the Strait’s waters are part of the territorial seas of Spain and Morocco. On the other, the maritime powers argued that the Strait is a vital waterway for international trade of all nations of the world and that no single state should have the right of controlling the passage of foreign ships and claim the freedom of navigation.

The UNCLOS 1982 confirmed the right of freedom of navigation but restricted it to innocent and inoffensive passage. If this principle is also applicable to navigation through the Strait of Gibraltar, it is, however, important to notice that the Convention clearly stipulates that the right of innocent passage does not affect the legal status of the waters forming such a Strait. In a sense these waters are part of the territorial seas of bordering states. Therefore, the Strait of Gibraltar should be understood as a strait for international use rather than an international strait from the property point of view. In this case, the right of bordering states in the Strait’s waters remains.
CHAPTER II
THE CURRENT SITUATION REGARDING SAFETY OF NAVIGATION IN THE STRAIT OF GIBRALTAR

2.1 Background information about the region:

The Mediterranean Sea is a semi-closed basin with only one natural opening to the Atlantic Ocean through the Strait of Gibraltar. It is almost an independent Sea which presents its own particularities regarding its geological and hydrographical features. Within this huge Mediterranean basin, the Strait of Gibraltar plays an important role from various points of view:

- It is the only natural connection of the Mediterranean Sea with the Atlantic Ocean.
- It is the narrowest and most important link between Africa and Europe.
- It is an important maritime route for the world’s merchant fleet.

The geographic configuration of the Strait can be defined as follows:

It is a wide sea passage linking the Atlantic Ocean and the Mediterranean Sea, between Europe and Africa, about 50 km in length, 40 and 20 km in width respectively at the western and eastern entrances. The minimum width of 14 km is at the Tarifa Canyon. Water depth varies from 700 to 1000 m at the western and eastern entrances respectively.

The oceanographic and meteorological features of the Strait present some complexity due to the interaction of several parameters which define, most of the time, the conditions of navigation in the region.
The region is marked by a Mediterranean climate, rainy in the winter and dry in summer. According to OPEFORM, (1991), the average rainfall per year in the Strait is around 900mm, 9/10 of which occurs during the period of October-April. The temperatures of the region are moderate and lie between 10 and 20 degrees Celsius during the winter and 20 to 25 degrees Celsius during the summer. It can exceptionally reach 40 degrees in the case of dry easterly winds blowing from the desert.

2.1.1 Winds:

Probably, the most significant characteristic of the Strait concerns the wind regime resulting from singular atmospheric dynamics. Wind variability is characterized by strong and persistent winds. They are of two kinds:

- Easterly winds called “Levanter”, formerly greatly feared by mariners. The average velocity of these winds is around 35 km/h and their maximum recorded speed is about 150km/h.
- Westerly winds known as “Poniente”.

However, those winds blowing from the south-west remain the most dangerous, known as the “Vendavales”. They are especially dangerous in the region of Algeciras Bay, where they can do serious damage to ships and the port infrastructures.

Generally, the Strait of Gibraltar is home to several Atlantic disturbances which cross the Strait towards the Mediterranean.

2.1.2 Fog and Visibility:

Sea going vessels passing through the Strait experience major difficulties in case of concentrated fog leading to low visibility.
According to F.Bonzon (1989), the officially declared figure of four and twelve days fog per year respectively in Gibraltar and Tangier is considered to be inaccurate by the users of the Strait. A number of ship masters confirm that the fog occurs more frequently in the region causing low visibility. This situation, associated with dense maritime traffic, creates dangerous navigational conditions.

As the situation appears to be very complicated concerning the records of fog in the region, the VTS of Tarifa (Spain) distinguishes eight different zones in the region according to their visibility level:

- TRAFALGAR.
- ESPARTEL.
- WESTERN TARIFA.
- TANGIER.
- EASTERN TARIFA.
- CIRES.
- EUROPA POINT.
- CEUTA.

Ship masters using the Strait's passage frequently have experienced major difficulties in operating their ships, especially between Algeciras and Ceuta in the event of fog, where sometimes the visibility is below 10 meters. In this case, they are obliged to use more sophisticated radar with high definition, plus their usual ARPA radars. Furthermore what renders the situation more complicated and dangerous is the existence of fishing vessels operating in the separation scheme area.

The table below illustrates the frequency of low visibility expressed in number of days per year.
Table 2.1: Average monthly period of low visibility (days).

<table>
<thead>
<tr>
<th></th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
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<td>4</td>
<td>4</td>
<td>2</td>
<td>0.5</td>
<td>1</td>
<td>1</td>
<td>0.6</td>
</tr>
</tbody>
</table>

Source: SNED, 1991

2.1.3 Bathymetry:

The seafloor of the Strait is particularly irregular everywhere, especially between the line linking the peak of Camarinal (Spain) and the Malabata peak (Morocco). At nearly five miles west of this line is the Spartel Bank and at one mile east there is a big rocky geological formation. This big rock, covered by 82 meters of seawater, is located in the vicinity of the separation scheme zone. These two bottom heights produce strong water movements known as internal waves that appear on the sea surface and can be detected by radar.

The Strait's seabed is made of sand and gravel mosaic. The existence of strong currents prevent deposits from reaching the bottom. (figure 2.1)
Figure 2.1: Water density in the Strait of Gibraltar.

Figure 2.2 Gibraltar Strait's Bathymetry.

Source: Bonzon, (1989)
2.1.4 Currents:

*Generalities:*

The Mediterranean Sea does not receive a sufficient quantity of water from the rain or rivers source in order to compensate for the quantity lost by evaporation. The sea receives a huge input from the Atlantic Ocean which leads to the formation of density currents. Added to this surface current, there is another flowing at the bottom in the opposite direction, from the Mediterranean Sea to the Atlantic Ocean.

Generally, it is necessary to distinguish between the following types of current in the region:

- Currents of density.
- Currents of drift (driven by winds). (Figure 2.3)
- Tidal currents (driven by the tide).

In fact, ships passing through the Strait experience a current resulting from the connection of these three current types.
Figure 2.3 Speed of currents of drift (Noeuds)

Source: Bonzon, (1989)
**Eddy Currents:**

Eddies usually occur around particular areas such as continental edges or offshore peaks. They present serious danger, especially for small vessels.

Bonzon, (1989) reports that a number of ships have experienced difficulties in following their planned paths as they were forced, under eddy effect, to deviate far from the navigational route by more than 20 degrees. (Figure 2.4)

**The Tide:**

In Gibraltar Strait, the tide is semi-diurnal. The high and low tides are almost of equal height:

- The high tide takes about 6 hours 35 minutes.
- The low one lasts 5 hours 30 minutes.

**Table 2.2 The level of Tide within the Strait.**

<table>
<thead>
<tr>
<th>Place</th>
<th>High tide (Spring)</th>
<th>High tide (Neap)</th>
<th>Low tide (Spring)</th>
<th>Low tide (Neap)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tarifa</td>
<td>1.4</td>
<td>1.0</td>
<td>0.5</td>
<td>0.2</td>
</tr>
<tr>
<td>Gibraltar</td>
<td>1.0</td>
<td>0.7</td>
<td>0.3</td>
<td>0.1</td>
</tr>
<tr>
<td>Tangier</td>
<td>2.4</td>
<td>1.9</td>
<td>1.0</td>
<td>0.6</td>
</tr>
<tr>
<td>Ceuta</td>
<td>1.0</td>
<td>0.8</td>
<td>0.4</td>
<td>0.2</td>
</tr>
</tbody>
</table>

Source: Bonzon, (1989)
**Tidal Currents:**

Figure 2.5 shows the configuration and speed of tidal currents within the Strait area, for each hour of the day, comparative to the normal condition of the Mediterranean. These currents reach their maximum speed near coastal zones.

However, it should be noticed that all types of current discussed above are acting together and in fact, the current received by ships while passing the Strait is actually the sum of these three kinds of currents: current of density, current of drift and tidal current. They represent a real danger for sea going ships when acting in the same direction. Their force and the sea conditions explain why vessels find some difficulties to follow their planned route.
Figure 2.4 The eddy phenomenon within the Strait

Source: Bonzon, (1989)
Figure 2.5 Speed of Tidal Currents (m/sec).

Source: Bonzon, (1989)
2.1.5 Internal waves:

F. Bonzon (1989) reported that the waves occur usually in groups or packets, generally following the period of semi-diurnal tide. Indications are that the waves are generated at, or near, the bathymetric sill located at 5.45 degrees west, slightly west of the narrowest section of the Strait. (figure 2.6)

Furthermore, waves appear on top as north-south lines of roughness or tide rips.

The phenomenon, as well as some steering problems, have been reported by ships masters when encountering the edges of these disturbances.

Figure 2.6 Internal waves

Source: Bonzon, (1989)

Disturbances driven by the connection of the Atlantic flow of water and the bathymetric sill of the region of Tarifa.
2.2 Maritime Traffic in Gibraltar Strait.

2.2.1 Traffic Separation Scheme (TSS).

As discussed earlier in this chapter, the Strait of Gibraltar is one of the most heavily used waterway in the world: traffic density, concentration of fishing and leisure boats and meteorological and sea conditions constitute more elements of risk to the traffic.

For organizing the traffic flow within the Strait, a Traffic Separation Scheme (TSS) was established by IMO in 1967 and agreed upon by the parties concerned: Morocco, Spain and the UK.

_TSS description:_

In Bonzon, (1989), the Traffic Separation Scheme (TSS) of the Strait of Gibraltar is described as follows:

a) A separation zone of 0.5 mile width is made, with the axis link the following locations:

(1) 35° 59', 09N -5º 25', 60 W.
(2) 35° 56', 21N -5º 36', 40 W.
(3) 35°56', 29N -5º 44', 90 W.

B) For Westbound traffic, a navigational corridor is established within a lane linking the following locations:

(4) 36° 01', 29N -5º25, 60 W
(5) 35° 58', 49N -5º36', 40 W
(6) 35° 58', 49N -5 44', 90 W
c) For Eastbound traffic, a separation zone is established between the separation zone and a line linking the following locations:

(7) 35°52', 59N- 5° 44', 90W
(8) 35°53', 89N- 5° 36', 40W
(9) 35°56', 89N- 5° 44', 60W

The main traffic routes are located 90 and 72 degrees south of the separation zone at 252 and 270 degrees north of this zone. The areas located outside the limits of the separation zones and the coasts are classified as coastal navigational zones and considered to be an area for short sea shipping and fishing activities. Therefore, the Strait includes the following zones:

- **The Spanish coastal navigational zone:**

  This is an area of high traffic density where operate short sea vessels, an increasing number of fishing vessels, yachts, coast guard patrol boats and Navy patrols. The area presents a very high risk of accidents.

- **The northern navigational waterway:**

  This represents the main northern corridor dedicated for the westbound traffic calling the Atlantic. The access to these lane is made easier thanks to the Gibraltar rock and its lighthouse well identified by mariners.

- **The separation zone:**

  This is located between the northern and southern navigational waterways and frequently used by an increasing number of fishing vessels.

- **The southern navigational waterway:**

  This is a corridor similar to the northern waterway, dedicated for eastbound traffic passing from the Atlantic to the Mediterranean. Its access is facilitated by the use of
another traffic separation scheme located in the vicinity of Cape Saint-Vincent in Portugal which is well seen due to its lighthouse.

A second TSS, known as TSS of Banco de Hoyo has been established between the cap of Saint -Vincent and the Strait of Gibraltar in order to facilitate the movement of ships before their entry or exit to the Gibraltar Strait.

Therefor, after passing through the TSSs of Saint-Vincent and Banco de Hoyo, the eastbound traffic make its access to the southern corridor, easily identified thanks to the Cap of Spartel and its lighthouse with good echo-radar emission(15 Miles).

- The Moroccan coastal navigational zone:

This is an area of similar traffic density compared to the Spanish one. The most important risk area in this zone is located north-west of Tangier-Bay where eddy currents become stronger.
Figure 2.7 Traffic Separation Scheme of the Strait of Gibraltar
2.2.2 Description of the Western and Eastern Strait’s approaches:

- At the western exit of the Strait, ships have to follow one of the two main routes made available under the TSS of Saint-Vincent. Vessels leaving the Strait have to head towards:
  - The TSS of Saint-Vincent for the north sea route, or
  - The TSS of Banco de Hoyo for the Atlantic-west route.
- For vessels coming from northern Europe, after passing the TSS of Saint-Vincent, they have to use the TSS of Banco de Hoyo in order to make their entry to the southern navigational corridor of Gibraltar Strait (North of Morocco).
- For the Eastern approach of Gibraltar Strait, vessels leaving the Strait towards the Mediterranean make their passage beside the Cape of Bengut (Algeria) and cross in their way ships leaving the ports of Nador and Melilia (Morocco) and Ouahran (Algeria).

Ships calling the Strait from the Mediterranean pass close to the Cape of Gate (Spain) without crossing other vessels going in the opposite direction and enter directly the northern navigational corridor of the TSS.

2.2.3 Mandatory ship reporting system:

One of the latest developments concerning the safety scheme in the Strait of Gibraltar is the approval by IMO of a mandatory ship reporting system. The system was proposed by Spain and addressed to the IMO Sub-Committee on safety of navigation in its 42 session in April 16, 1996.

The Spanish proposal, endorsed by Morocco, was adopted by the IMO-Maritime Safety Committee at its 67 session in 1997 and entered into force by June 6, 1997.
According to the IMO-MSC 67/22 resolution (Annex 2), the reporting system covers the area between longitudes 5° 58’w and 5° 15’w. This area includes the Traffic Separation Scheme (TSS) and inshore traffic zones.

The ship report should be addressed to Tarifa VTS and to the VTS of Tangier as well when it starts operation in the future.

The text of this resolution stipulates that:

'The ship report short title “GIBREP” shall be made to the ship reporting centre located at Tarifa, when the Tangier VTS is in operation in Morocco, ships sailing in the area of coverage shall notify Tangier Traffic, in accordance with the terms which will be established in the future. A double report should be amended'

IMO-MSC 67/22, (1997)

The report should be provided in the standard format given in the appendix to IMO resolution A.648 (16) and the content of ship report to the VTS centre should include the following information:

**Information considered essential:**
- Name of the ship, call sign, IMO identification number;
- Position;
- Last and next port of call;
- Hazardous cargo, class and quantity, if applicable and;
- Breakdown, damage and/ or deficiencies affecting ship or cargo or anything disturbing the normal navigation according to the provisions of SOLAS and MARPOL conventions.

**Information considered necessary:** Course and speed of the ship.
It is important to notice that the current mandatory ship reporting system was devised in conformity with the guidelines and criteria adopted by the Maritime Safety Committee of the International Maritime Organisation at its 64 session and in accordance with regulation 8 of chapter V of the SOLAS convention, as the instruments which can contribute towards improving the safety and efficiency of navigation and the protection of the marine environment.

The system is expected to play an important role in the enforcement of the collision regulations in particular and the international maritime law in general within the Strait of Gibraltar.

2.2.4 Traffic flow analysis:

The Strait of Gibraltar is considered to be one of the most heavily used waterways in the world and the volume of the traffic, together with the width of the passage, make it one of the most dense international maritime passages. Each year, an average recorded traffic of 70,000 vessels of all kinds are seeking passage through the 7.5 miles wide waterway. An estimated average number of ships passing per hour, Per day and per year for 1989 is given in the table below:

Table 2.3 Average traffic.

<table>
<thead>
<tr>
<th>Type of Traffic</th>
<th>Ships/Hour</th>
<th>Ships/Day</th>
<th>Ships/Year</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>-Direct</td>
<td>6.64</td>
<td>159.4</td>
<td>58.169</td>
<td>79.02</td>
</tr>
<tr>
<td>-Crossing</td>
<td>1.76</td>
<td>42.3</td>
<td>15.440</td>
<td>20.98</td>
</tr>
<tr>
<td>Total</td>
<td>8.40</td>
<td>201.7</td>
<td>73.609</td>
<td>100</td>
</tr>
</tbody>
</table>

Source: SNED (1991)
### Table 2.4 Total Traffic using Gibraltar Strait.

<table>
<thead>
<tr>
<th>Year</th>
<th>Transit Traffic</th>
<th>Crossing Traffic</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1981</td>
<td>48.000</td>
<td>5.300</td>
<td>53.300</td>
</tr>
<tr>
<td>1982</td>
<td>57.000</td>
<td>6.270</td>
<td>63.270</td>
</tr>
<tr>
<td>1985</td>
<td>53.000</td>
<td>6.400</td>
<td>59.400</td>
</tr>
<tr>
<td>1986</td>
<td>60.000</td>
<td>-</td>
<td>60.000</td>
</tr>
<tr>
<td>1989</td>
<td>48.000</td>
<td>15.228</td>
<td>73.222</td>
</tr>
<tr>
<td>1990</td>
<td>58.721</td>
<td>11.152</td>
<td>69.873</td>
</tr>
<tr>
<td>1994</td>
<td>22.631</td>
<td>18.091</td>
<td>40.722</td>
</tr>
<tr>
<td>1995</td>
<td>26.262</td>
<td>15.942</td>
<td>42.204</td>
</tr>
<tr>
<td>1996</td>
<td>28.048</td>
<td>26.058</td>
<td>54.106</td>
</tr>
</tbody>
</table>

**Sources:**


Data 1990-96: Tarifa VTS Reports

**NB:**
- Both data are estimations based on short period surveys.
- Data from Tarifa VTS does not include fishing vessels, pleasure boats and warships.

The total traffic in Gibraltar Strait includes two different kinds of traffic:
- The Transit traffic.
- The Crossing traffic.
The transit traffic (Atlantic-Mediterranean and vice-versa) includes the following routes:

- Tangier----Algesiras(or Gibraltar)-----Tangier.
- Atlantic-----Algesiras(or Gibraltar)-----Atlantic.
- Ceuta -----Atlantic-------------------Ceuta.

The Crossing traffic:(North of Morocco, South of Spain and vise-versa).
The following are the most important crossing lines between Morocco and Spain:

- Gibraltar----Elmediq-----Gibraltar.
- Algesiras----Ceuta------Algesiras.
- Tarifa-------Tangier----Tarifa.

2.2.4.1 Traffic of Transit:

Table 2.4 shows the evolution of the traffic flow between 1981 and 1996.

During this period, an average traffic of 64,000 recorded vessel have made their passage through the Strait annually, which represents an average daily traffic of 128 ship.

According to the VTS of Tarifa, these figures do not include the military traffic, the fishing fleets of both Spain and Morocco and the pleasure boats. In fact, it is not easy to have an accurate figure about the volume of this traffic, especially regarding the military fleet which includes different kinds of warships and submarines belonging to different military powers.

The second reason is that the ship reporting system was voluntary during that period which does not help enough to record every entry and exit of vessels to the Strait. According to the VTS of Tarifa, 65% only of the total passages was reported in 1996, the Strait’s volume of traffic representing 40% of the traffic passing through the Dover Strait.
Traffic Composition:

Having already discussed the volume of traffic, it is important to analyze its composition according to the type and size of vessels involved. As far as transit traffic is concerned, the table 2.5 below gives a breakdown of the westbound traffic, bearing in mind that eastbound and westbound traffic components are almost of equal size.
Table 2.5 Composition of westbound traffic in Gibraltar Strait.

<table>
<thead>
<tr>
<th>Ship Type</th>
<th>Size Classes in GRT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>100 to 499</td>
</tr>
<tr>
<td>Tankers (oil/Bulk/ore)</td>
<td>--</td>
</tr>
<tr>
<td>Tankers (chemical)</td>
<td>8</td>
</tr>
<tr>
<td>Tankers (water, wine, replenishment)</td>
<td>0</td>
</tr>
<tr>
<td>Tankers (oil)</td>
<td>9</td>
</tr>
<tr>
<td>LNG tankers</td>
<td>0</td>
</tr>
<tr>
<td>LPG tankers</td>
<td>0</td>
</tr>
<tr>
<td>Gas tankers remaining.</td>
<td>0</td>
</tr>
<tr>
<td>Bulkers</td>
<td>0</td>
</tr>
<tr>
<td>Unitised (excluding passenger ferries)</td>
<td>10</td>
</tr>
<tr>
<td>General (dry cargo)</td>
<td>1,070</td>
</tr>
<tr>
<td>Passenger ships</td>
<td>0</td>
</tr>
<tr>
<td>Ferries</td>
<td>1</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>116</td>
</tr>
<tr>
<td>Fishing vessels</td>
<td>*</td>
</tr>
<tr>
<td>Tug/supply vessels</td>
<td>*</td>
</tr>
<tr>
<td>Hydrofoil, hovercraft</td>
<td>*</td>
</tr>
<tr>
<td>Total</td>
<td>1,214</td>
</tr>
</tbody>
</table>

Source: OPEFORM, (1991)
From the above table, at least 20% of the total westbound traffic represent a vessels carrying dangerous goods. By dangerous goods it is meant any cargo which, in case of accident, can create a problem of pollution. Therefore, the following ship types from the previous source are considered fully or partly dangerous goods carriers:

- All oil, gaze and chemical tankers are carrying dangerous products.
- All container vessels carrying different proportions of dangerous goods.
- 40% of general cargo ships carrying dangerous products.

As a result, a large proportion of ships passing through the Strait carry dangerous cargo, either eastbound or westbound traffic. However, the westbound traffic is used to carrying more quantities of dangerous cargoes due to the flow of crude oil, oil products and gaze from the Middle East and North Africa to Europe and North America.

As far as oil traffic is concerned, the project CEDRE(1993) concluded in its final report that the Strait of Gibraltar is considered to be the second largest waterway in the world in handling oil tanker traffic.

Table 2.6  The Traffic of oil Tankers through Gibraltar Strait in 1992.

<table>
<thead>
<tr>
<th>type of handling</th>
<th>Number of Trips</th>
<th>Capacity Tons</th>
<th>Quantity carried tons</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>West - East</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>disch.in</td>
<td>472</td>
<td>58 911 584</td>
<td>54 675 670</td>
</tr>
<tr>
<td>Medit.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transit in</td>
<td>3</td>
<td>466 879</td>
<td>443 535</td>
</tr>
<tr>
<td>Medit.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>East - West</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>disch.in.</td>
<td>705</td>
<td>71 511 192</td>
<td>63 314 057</td>
</tr>
<tr>
<td>Medit.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Load.in</td>
<td></td>
<td>18 064 642</td>
<td>16 976 695</td>
</tr>
<tr>
<td>Medit.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>1286</td>
<td>151 954 297</td>
<td>135 409 957</td>
</tr>
</tbody>
</table>

Source: CEDRE (1993)
From the above, it is clear that the risk of pollution within the Mediterranean Sea, particularly in the Strait’s area is very high due to the following reasons:

- The traffic density within the Strait’s passage is considered to be one of the highest among other Straits of the world.

- The existence of high traffic of dangerous cargoes, especially crude oil and oil products, due to the location of the Strait as a main route between the main oil producers (Middle East) and the main consumers (Europe and North America).

2.2.4.2 The Crossing Traffic:

The Crossing Traffic represents about 20% of the total traffic, and includes mainly ferries and RO-RO vessels making daily trips between the North of Morocco and the South of Spain according to the following lines.

- Tangier- Tarifa - Tangier.
- Tangier- Sete(France)- Tangier.
- Ceuta- Algeciras - Ceuta.
- Gibraltar - El-Mediq-Gibraltar.

According to SNED (1994), the main Crossing Traffic flows between Gibraltar Bay and Ceuta (74%).
Figure 2.8 The Crossing Traffic lines, North-South of Gibraltar Strait.

Source: Bonzon, (1989)
The crossing traffic is marked by its seasonal characteristic, therefore, the number of ferries and passengers almost double during the summer time, especially the period of July-August. The VTS of Tarifa reported that in 1989 more than 3 million passengers crossed the Strait between Algeciras and the north of Morocco.

The seasonality of the traffic is also observed in the case of the fishing and pleasure fleet which become more active during summer time. Therefore, during that period, the Strait becomes busier bringing the level of risk to a high level. The situation is that the traffic flow becomes more complex due to the existence in the Strait's passage of all type of vessels seeking various directions using different speed levels.

2.2.5 Risk Assessment and risk areas:

From the traffic analysis given so far, three elements of risk can be identified:
1-The weather conditions present a danger, especially during the time of fog and low visibility.
2-The diversity of the traffic and its activities within the straits passage.
3-The degree of compliance with the navigation rules and the use of the Traffic Separation Scheme (TSS).

Concerning the first element, it is mentioned earlier that the regime of winds, waves, fog and currents creates increasing difficulties for vessels. All together, they can cause dangerous situation for ships in connection with steering and manoeuvrability. Number of vessels have experienced deviations due to the force of waves and currents.
The problem of reduced visibility is also important and creates risk situations for mariners, especially between Algeciras and Ceuta where the visibility is sometimes below 10 metres. The frequency of recorded fog reaches more than 26 days a year.
For this reason, most of the ferries crossing the Strait are equipped with high definition radar and lights capable of improving the visibility to an acceptable level.

The regime of currents also presents some particularities due to the flow of massive amounts of seawater eastward, from the Atlantic to the Mediterranean. As already mentioned earlier, the Mediterranean Sea receives huge inputs of water from the Atlantic which lead to the creation of currents of density. Together with other types of currents in the area (currents of drift and tidal currents), currents of density make strong disturbances within the Strait which render navigation more difficult.

Another element comes to further complicate the situation of navigation in the waterway, is the existence of different kinds of vessels within the passage: sea going merchant ships, ferries, fishing boats, leisure boats, navy vessels, coast guard and police patrols. The problem is increased when fishing and leisure boats are operating in the navigational lanes, which in case of high traffic density and bad weather conditions, create a risk of collision.

Another element of risk is the presence in the area of different kind of dangerous good carriers (tankers, container chips) which expose the area to a high risk of pollution.

Furthermore, the Mediterranean Sea is a semi-closed basin which cannot afford high scale pollution, bearing in mind the sensitivity of the area as home for several kinds of living resources, migratory currents of birds and aquatic fauna.

The third major element that participate in increasing the level of risk is the degree of compliance with the safety and collision avoidance rules. In this respect, rule 10 of the International Regulations for Preventing Collisions at Sea,

This rule states the following:

'A Vessel using a Traffic Separation Scheme shall:
i) Proceed in the appropriate traffic lane in the general direction of traffic flow for that lane;
ii) so far as practicable keep clear of a traffic separation line or separation zone;
iii) normally join or leave a traffic lane at the termination of the lane, but when joining or leaving from either side shall do so at as small an angle to the general direction of traffic flow as practicable.
- A vessel shall so far as practicable avoid crossing traffic lanes, but if obliged to do so shall cross on a heading as nearly as practicable at right angles to the general direction of traffic flow'

According to the VTS of Tarifa, the average contravention recorded during 30 days in 1988 in Gibraltar TSS and inshore traffic zones are presented in the following table:
Table 2.7 Average contravention in The TSS and inshore traffic zones.

<table>
<thead>
<tr>
<th>Area and course</th>
<th>Number of Transits</th>
<th>Percentage(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>-East lane, course East</td>
<td>2221</td>
<td>43.50</td>
</tr>
<tr>
<td>.Contravention East lane</td>
<td>50</td>
<td>0.98</td>
</tr>
<tr>
<td>.North, course East</td>
<td>119</td>
<td>2.33</td>
</tr>
<tr>
<td>.South, course East</td>
<td>24</td>
<td>0.47</td>
</tr>
<tr>
<td>-West, course West</td>
<td>2121</td>
<td>41.54</td>
</tr>
<tr>
<td>.Contravention, West lane</td>
<td>50</td>
<td>0.98</td>
</tr>
<tr>
<td>.North, course West</td>
<td>135</td>
<td>2.64</td>
</tr>
<tr>
<td>.South, course West</td>
<td>61</td>
<td>1.20</td>
</tr>
<tr>
<td>TSS correct crossing</td>
<td>255</td>
<td>4.99</td>
</tr>
<tr>
<td>TSS incorrect crossing</td>
<td>70</td>
<td>1.37</td>
</tr>
<tr>
<td><strong>Total crossing</strong></td>
<td><strong>5106</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

Source: SNED (1991)

Therefore, as can be seen from the above table, 3.33% of the total traffic in 1988 contravened rule 10 of COLREG; 70% of contraventions occurred in the TSS area and were made by the crossing traffic. The remaining 30% happened in the East and West lanes with equal percentages. From the above analysis of the risk factors discussed so far, it is clear that the combination of all elements result in a high level of risk for the safety of navigation in the Gibraltar Strait.

**Risk areas:**

The study of the hydrographic characteristics and sea conditions within the Strait area reveals the following risk areas to be considered:

- The Eastern and Western entrances of the Strait: These constitute an eminent danger for short sea vessels, fishing and pleasure boats. This is due to the
combination of currents following the flow of ocean water into the Mediterranean.

- The North and South coasts: These are considered high risk areas due to the formation of eddy currents along the coasts and continental edges. Vessels in these areas have experienced difficulties in following their planned courses and were forced to deviate towards the coastline.

2.3 Maritime Casualties in Gibraltar Strait.

Different type of accidents have occurred in the Strait passage, in this respects we should distinguish between the following:

- Grounding.
- Fire, explosion.
- Collision.

During the period 1988-1996, 36 major events of all kinds were recorded within the Strait which represents a yearly average of 4 accidents.

**Table 2.8 The number of accidents occurred during 1988-1996**

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of causalities</th>
</tr>
</thead>
<tbody>
<tr>
<td>1988</td>
<td>6</td>
</tr>
<tr>
<td>1989</td>
<td>5</td>
</tr>
<tr>
<td>1990</td>
<td>3</td>
</tr>
<tr>
<td>1991</td>
<td>3</td>
</tr>
<tr>
<td>1992</td>
<td>1</td>
</tr>
<tr>
<td>1993</td>
<td>5</td>
</tr>
<tr>
<td>1994</td>
<td>4</td>
</tr>
<tr>
<td>1995</td>
<td>5</td>
</tr>
<tr>
<td>1996</td>
<td>4</td>
</tr>
<tr>
<td>Total</td>
<td>36</td>
</tr>
</tbody>
</table>

Source: Tarifa VTS
<table>
<thead>
<tr>
<th>Date</th>
<th>Events</th>
</tr>
</thead>
<tbody>
<tr>
<td>01/03/1988</td>
<td>Collision between “Polar” and “Sealand Leader”. Only material damage</td>
</tr>
<tr>
<td>03/04/1988</td>
<td>The General cargo ship “pouyc” took fire. No assistance was required.</td>
</tr>
<tr>
<td>12/05/1988</td>
<td>The yacht “MOANA 3” run aground at punta paloma. Crew members rescued.</td>
</tr>
<tr>
<td>22/06/1988</td>
<td>The yacht “TRAMA”, with 2 persons on board, sunk. Crew members rescued by another vessel.</td>
</tr>
<tr>
<td>03/09/1988</td>
<td>The trawler “MOLLORI” collided with the yacht “CINDERELLA”. Material damage only.</td>
</tr>
<tr>
<td>29/12/1988</td>
<td>The yacht “JENNY BABY” run aground near los lances in Tarifa, 3 crew members rescued.</td>
</tr>
<tr>
<td>25/01/1989</td>
<td>Collision between the container ship “LIAO HE/ BOBD” carrying D.G. and a general cargo vessel. 2.5 Miles south of Tarifa. Bad weather conditions, Visibility less than 100 meters. Material damage.</td>
</tr>
<tr>
<td>17/06/1989</td>
<td>The yacht “Jack of Gloucester” run aground and sunk after hitting a rock. 2 people missed, 1 rescued.</td>
</tr>
<tr>
<td>27/09/1989</td>
<td>The yacht “Aurora” run aground at Punta Alcazar (Morocco), 5 crew rescued.</td>
</tr>
<tr>
<td>Date</td>
<td>Event Description</td>
</tr>
<tr>
<td>------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>04/01/1990</td>
<td>The cargo ship “Ulalar VII Efyz” run aground at Punta Almina, no damage.</td>
</tr>
<tr>
<td>16/06/1990</td>
<td>Collision between the cargo ship “Losing/YTHE,4” and a Spanish fishing boat, north of Cabo Espartel. Serious material damage.</td>
</tr>
<tr>
<td>06/08/1990</td>
<td>Collision between the tanker “Sea Spirit” carrying 55000 tones of crude oil and the LPG “Hesperus”. 12000 tones of oil spilled in the Strait, serious pollution damage.</td>
</tr>
<tr>
<td>31/01/1991</td>
<td>Grounding of the chemical Tanker “Alphine Lady” at Punta Bermeja (Ceuta), 17 crew rescued, no pollution.</td>
</tr>
<tr>
<td>18/04/1991</td>
<td>The fishing boat “Tiago Acuna” run aground in the vicinity of Rio Guadalmes. 14 crew member were rescued.</td>
</tr>
<tr>
<td>04/08/1991</td>
<td>Collision between two cargo ships: “Astro coach” and “Lane”, the former took fire, the later sank, 1 crew missing crew.</td>
</tr>
<tr>
<td>04/08/1992</td>
<td>The British yacht “Salama” grounded near the coasts of Tarifa and towed by a fishing vessel.</td>
</tr>
<tr>
<td>10/2/1993</td>
<td>Fire took place on board the oil tanker “Sunrise II”, anchored at Algeciras bay. Material damage.</td>
</tr>
<tr>
<td>20/4/1993</td>
<td>The fishing boat “Divino Corazon” sank in Los Cabezos bay. 13 crew members rescued.</td>
</tr>
<tr>
<td>03/05/1993</td>
<td>Collision between</td>
</tr>
<tr>
<td>17/10/1993</td>
<td>Collision between the fishing boat “Tolin” and unknown cargo ship. Material damage.</td>
</tr>
<tr>
<td>31/12/1993</td>
<td>The fishing boat “MI Rosalia” with seven (7) crew run aground following a failure in automatic pilotage. Loss of 1 crew.</td>
</tr>
<tr>
<td>16/3/1994</td>
<td>A fishing vessel called “Antonio y Agueda” sank in the vicinity of Punta Cires. The five(5) crew members were rescued.</td>
</tr>
</tbody>
</table>
| 11/06/1994 | Collision between the ferry “Bahia de Ceuta” and the cargo ship “Aleko Konstantinov” south of Punta Europa. Visibility less than...
<table>
<thead>
<tr>
<th>Date</th>
<th>Event Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>13/06/1994</td>
<td>Collision between the general cargo ship “Acrux” and the bulk carrier “Leon” south of Punta Europa. Reduced visibility. Material damage.</td>
</tr>
<tr>
<td>21/12/1994</td>
<td>Fire on board the ferry “Kelibia” with 141 passengers on board. Location: Near the Port of Tangier. Fire extinguished. Material damage.</td>
</tr>
<tr>
<td>13/02/1995</td>
<td>Fire on board the cargo ship ‘God is Love” West of the strait. Fire controlled, Ship towed and crew rescued.</td>
</tr>
<tr>
<td>08/05/1995</td>
<td>Fire took place on board the Hydrofoil “Marrajo” at Algeciras bay. Fire controlled and ship assisted by the Spanish SAR services.</td>
</tr>
<tr>
<td>20/11/1995</td>
<td>Fire took place the vessel “Racha One” due to electrical cause. Vessel anchored in Algeciras bay. Material damage.</td>
</tr>
<tr>
<td>15/02/1996</td>
<td>Grounding of cargo vessel “Pan” in Sotogrande beach, due to bad weather conditions; Wind velocity: 50 km/h. Crew injured, Material damage.</td>
</tr>
<tr>
<td>07/07/1996</td>
<td>The yacht “Belfegor II” sank near cap Trafalgar in difficult sea and weather conditions, Crew members rescued.</td>
</tr>
<tr>
<td>18/09/1996</td>
<td>Fire on board the fishing boat “nuevo Manuel lobico”. Crew left the vessel and rescued by another fishing vessel.</td>
</tr>
<tr>
<td>18/11/1996</td>
<td>Collision between the ferry “Alboughaz” and the fishing vessel “Vella Blanca” in the southern navigational lane of the TSS. Good visibility and good weather conditions. The fishing boat sank, no loss of life. Material damage to the ferry.</td>
</tr>
</tbody>
</table>
From the above record of accidents and events in the Strait it should be noticed that the most important accidents of Khark V and Sea Spirit, occurred in the Atlantic at the western entrance of the Strait. Therefore, the Mediterranean Sea has been relatively saved from high pollution damage. Although these accident occurred outside the Strait, it is worth to consider the lessons learned so far from them in the followings:

On December 18, 1989 while leaving Gibraltar Strait on her way to Rotterdam, the Iranian supertanker Khark V, carrying 284,000 tonnes of crude oil, exploded and caught fire. Consequently, a big breach in the hull was opened and 90,000 tonnes of oil was spilled.

Among the immediate effects of oil pollution on the marine environment, studies carried out after the clean up operations showed relatively large contamination of fish and other marine species of the area. Moreover, the fishing and tourism industries and related activities in Morocco were shut down for several months and a substantial losses during 1990. Through these disastrous effects, all parties concerned become more aware about the risks and damages associated with such disasters.

The second example concerns the collision occurred between the OBO ‘Sea Spirit’ carrying 56,000 tonnes of fuel oil and the LPG carrier ‘Hesperus’ loaded with 35,000 tonnes of gas. The collision occurred within the Strait area, causing a spillage of 12,000 tonnes of fuel and serious pollution damage to the environment.

These two examples are considered to be the most significant casualties for the period 1988-1996. Fortunately, the number of big disasters within the Strait seems to be relatively reduced, but the above recorders tell about the level of risk.
facing the navigation of the Strait and the environment in the area. It attests indeed about the need for close control, assistance and management of the traffic flow in the Gibraltar waterway. Therefore, the decision of the Moroccan authorities to establish a VTS system in Tangier can be considered as the right way to achieve an enhanced level of safety and environment protection. It is also an important tool added to the safety scheme already existing in the region.

Recommendations:

From the analysis of the level of risks and the casualties patterns in the Strait area, the following measures should be taken into cosideration to enhance the traffic control and the level of safety:

1- As far as the VTS of Tangier is going to be operational in 1988, all arangements have to be made in order to ensure its accuracy for smouth and safe handling of the traffic. Furthermore, the standard of safety cannot be enhanced without close cooperation and exchange of information between the VTSs of Tangier and Tarifa.In this respect, Experience of the Spanish VTS has shown the urgent need for a VTS system on the other border of the Strait.

2-Attention should be given to the crossing traffic and the fishing vessels operting in the vicinity of the traffic separation scheme. In this respect, efforts should be done by the two systems in order to have close control on the traffic of ferries which are making daily trips between the two borders of the Strait. To achieve a successful controle over this traffic, it is recommended:

- To have dedicated working stations within the two systems for the tracking and management of the crossing traffic, especially ferries.
• The problem is that the fishing vessels are permanently operating within the 0.5 miles wide TSS separation lane which, in fact, constitutes a real threat to the traffic, measures should be taken either to close the area for fishing activities and to allow it only in the coastal navigational zones or to have strict control over the movement of fishing boats.

This control should ensure that all traffic regulations are complied with and all safety and communication equipments are good for use according to the safety regulation. In this respect, the station dedicated to the crossing traffic can also be given the responsibility to deal with the control of fishing boats.

Further, it is proposed that co-ordinated control patrol units, using all necessary means of surveillance (patrol boats, helicopters etc) should be permanently operational in the TSS area in both sides of the Strait, in order to deal with contraventions of the collision regulations.

Ships contravening these rules should be reported to their respective governments. However, for an effective enforcement of the collision regulations in the TSS area, it is recommended to increase the fines applicable against ships contravening the aforesaid rules.

• Data information link should be established between the two VTSSs, it will also be a question of harmonising the two systems. Such problems should be resolved for a smooth and accurate exchange of information.
CHAPTER III
IMO RESOLUTIONS ON VTS.

3.1 IMO Guidelines for VTS, Resolution A.578(14)-IMO.

The current resolution details the operational procedures and planning for Vessel Traffic Services, without addressing liability or responsibility to be considered by the authority establishing a VTS. These guidelines do not create new rights to enact legislation which would impose requirements on shipping.

VTS Authorities are urged to ensure that VTS within territorial seas are operated according to their national law and do not prejudice the right of innocent passage through such waters and to enable vessels outside territorial seas to use the service provided on a voluntary basis.

No provision of these guidelines shall be construed as prejudicing obligations or rights of vessels established in other international instruments. VTS Authorities or those planning VTS are recommended to follow these guidelines, as appropriate to their needs, in the interests of international harmonization and improving maritime safety.

These guidelines describe the possible functions of VTS and provide guidance for designing and operating VTS when the necessity of establishing such system is decided. They also aim at international harmonization and address the procedures
used by VTS taking into account current practice. They are based on relevant recommendations and resolutions adopted by IMO.

The following chapters and sections from the guidelines provide an overview:

3.1.1 Objectives and procedures:

In this chapter definitions of some concepts related to VTS establishment and operation are given. The chapter provides also a general description of a VTS system and related operational features. It contains the following sections:

Section 1: Vessel Traffic Services.
Section 2: VTS authority.
Section 3: Elements of a VTS.
Section 4: Functions of a VTS.
Section 5: Procedures.
Section 6: Personnel.
Section 7: VTS publication for users.

3.1.2 Planning a VTS:

The second chapter states the criteria and procedures to be followed by a competent authority in order to assist it in planning and implementing a VTS. Such criteria and procedures are related to the following points:

1-General considerations about the level of VTS to be installed, taking into account the real need of the traffic. In this respect, the kind of VTS to be established should match the demand of the
traffic in the region in order to assist the effective implementation of a VTS and promote confidence in the procedures to be followed.

2-The operation of a VTS should be carried out according to national and international regulations.

3-The practical criteria to be considered.

4-The VTS area of coverage.

5-Identification of a VTS centre.

6-Clear definition of the reporting points.

3.2 VTS Regime and Liability:

Once a competent authority decides the necessity to establish a VTS within a port or waterway, first of all it has to define the legal considerations regarding the operation of VTS and the exercise of its authority and consequently its liability within its area of coverage.

As we have already seen in the IMO VTS guidelines, the definition of the VTS liability and operational related matters is the responsibility of a competent authority which has to ensure that the VTS, within its territorial sea, is operated in conformity with its national law and does not prejudice the right of innocent passage through such waters. Therefore, the legal issues of a VTS operation is a matter of national legislation within the limit of territorial seas.

The IALA Vessel Traffic Services manual (1993) addresses three legal issues in relation to the implementation of a VTS:

a-The authority of central government or a maritime authority to impose control over vessels by means of VTS regulations.
b-The relationship between VTS personnel and ship masters or pilots operating in the VTS area of coverage.  
c-The determination of liability in case of accidents involving vessel(s) using the VTS facilities.  

3.2.1- Authority: 

A statutory authority invested with the necessary power to improve safety of navigation and the protection of the environment is the foundation of a VTS. This power is generally embodied by regulations enacted by a central government and delegated to the maritime arm of that government or any entity rendered responsible for the operation of a VTS.  

National law and regulations are created to establish a means of control over ships so as to provide the benefit of improved safety and the protection of the environment. They authorize operation of a VTS and may enforce compliance with VTS rules. Domestic law may also require vessels to be equipped and use specific navigation, communication and other safety equipment. Under these rules and regulations, VTS is authorized to perform more control over maritime traffic, especially in hazardous areas and restricted waterways under unsafe circumstances, in reduced visibility, adverse weather or vessel congestion. However, to what extent can this authority be exercised?  

In the IALA VTS manual (chapter2), the degree of exercise of VTS authority in controlling vessel traffic should be clearly established in the national law and may include the authority to:  
• Specify times of entry movement or departure,  
• Establish vessel size, speed and draft limitations and vessel operating conditions,
• Restrict operations to vessels having particular operating characteristics and capabilities, and
• instruct vessels to act when justified in the interest of safety.

In the mean time, statutory instruments regulating the VTS authority should take into consideration the fact that shipping is inherently an international activity and the right of innocent passage and free navigation is a matter of worldwide priority. Therefore, domestic law is required to supplement or parallel the international legal instruments adopted under the auspices of IMO dealing with maritime safety and environment protection matters.

A division of the sea into international waters, territorial waters, contiguous zone, archipelagic waters, exclusive economic zone and the high seas delineates limits to which a coastal state may exercise its authority.

Regarding VTS authority, a state holds the right to control its internal waters and vessels under its jurisdiction. Within its territorial sea, a coastal state may exercise its full authority subject to the right of innocent passage. Beyond this limit, a state’s VTS authority is substantially reduced.

According to the legal regime of straits used for international navigation, a VTS authority cannot restrict or impede the innocent passage of a vessel. In this case, a state should endeavour to enter into agreements with neighbouring countries to agree on standards of conduct for vessels using the strait’s waters. Provisions made by these agreements should be contained in an international convention agreed upon under the auspices of the International Maritime Organization.
3.2.2 Relationship between VTS and vessels.

A strict definition of the extent and nature of the relationship between VTS operators, ship masters and pilots is necessary and plays a key role in the safety of maritime traffic.

VTS legislation has to provide regulatory elements for the aforesaid relationship. If VTS is generally accepted as an informative authority, there are times when it needs to be more directive in communicating with a vessel, in order to perform its role of ensuring safer navigation and improved environment protection. Such directive instructions are generally related to the specification of a vessel's location at a specific time. Receiving this information, the ship master or pilot is entitled to take the necessary actions to comply. However, the degree of compliance with VTS instructions depends on whether it is a mandatory or voluntary participation for vessels. Generally, in port area, mandatory participation of vessels is required. Therefore, ship masters have to comply with the VTS instructions.

With voluntary participation, the users determine much of the accuracy and timeliness of the information provided.

According to the IALA VTS manual, the VTS authority is exercised through information, advice and instruction addressed to vessels. These three functions are in turn affected by the accuracy and timeliness of information received from ships regarding their location, speed, cargo etc. Moreover, VTS operators, in spite of possessing sufficient specialized knowledge of their area of competence, are not on board the vessel and cannot substitute for ship master or pilot.

Therefore, although mandatory participation is applicable, 'a VTS should function primarily as an informative service. In the exercise of its authority, a VTS can be viewed as three tiered relative to the level of authority it will exercise vis:'

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information, advice and instruction'. (IALA VTS manual, 1993)

However, the ship master should also be able to rely with confidence on the expertise
and skills of the VTS personnel.

According to the previous source, all participants in the VTS must fully understand
their role and the extent of their responsibilities. Once a VTS instruction is issued,
the mariner must decide whether or not to comply for the best interest of the safety of
his vessel and other ships in the vicinity. He retains full responsibility and need not
comply with VTS instructions if he considers that it will threaten the safety of the
vessel.

3.2.3 Liability:

Taking into consideration the fact that the VTS authority has recruited highly
qualified personnel to operate a VTS, the question arises whether or not such
operators bear responsibility for their instructions in case of accident.

According to the IALA VTS manual, this question is of constant controversy. It is
rendered more complicated by the legal relationships between masters, pilots,
shipowners and VTS, but it remains an area where the issues are decided upon case
by case.

In the event of a VTS operator giving instructions to a vessel which runs aground
following the operator’s instruction, many maritime laws of liability may apply,
depending on some circumstances, for instance, whether or not VTS participation
was mandatory or voluntary, taking into account the ship master’s ability and
freedom to surpass VTS instructions where he considered them inappropriate or
where they could result in an accident.
3.3 Development and harmonization of VTS in the world:

It is considered that the concept of Vessel Traffic Services was introduced at the time of World War II. The Liverpool system, 1948, was acknowledged to have begun an evolution of the present Vessel Traffic Services.

The introduction of the VTS facility in the global maritime framework came as a response to increased maritime traffic density and probability of accidents, especially in harbour areas, restricted and confined waterways.

According to El-sayed (1996), the number of VTS centres in the world have increased over the last twenty years to reach about 500.

From the first VTS till today's ones, tremendous progress has been achieved in the field of navigation and communication. The output of this has been the advent of new technology based on electronics and satellite communication with a high level of accuracy and reliability.

Furthermore, the establishment of VTS facilities all over the world has been made according to the needs expressed by each area, therefore the level and type of VTS have been different from one place to another.

El-sayed, (1996) in the previous reference, identified three main VTS categories:

- Vessel Traffic Surveillance.
- Vessel Traffic Services.
- Vessel Traffic Management System.

To this diversity of types of VTS is added the level of sophistication. So nowadays, VTS facilities range from the simplest radar-based ones to the most sophisticated centres, using the latest digital electronics and satellite communication technology.
This variety of existing VTS centres, each one with its own features and procedures has led to various operational problems which affect the VTS effectiveness. According to the COST 301 Study, main report (1988), most of the existing VTS in Europe can be considered as individual ones as a result of their historical development in the area where they have been set up by local or national authorities to deal with the local problems.

In this respect, a large variation in the services provided has been recorded, many of which cannot be satisfactorily explained by the context within which they operate. Such variations concern general information broadcasts. Since a ship in transit is receiving a number of these broadcasts from different VTS authorities, there is a need for harmonizing both the content and the format of such broadcasts.

The final report of the previous study, COST 301, defined harmonization as 'a process which, taking different systems and procedures into account, attempts to define a single self-consistent, or at least non contradictory, system and set of procedures.'

The aforesaid study investigates a number of factors that tend to encourage harmonization and co-operation between VTSs. These are:

- The character of shipping as international and a ship can experience a range of VTS centres. For an efficient operation of a ship, the services provided by VTS centres and the procedures and formats used should essentially be the same.

- Within Europe, a ship has to report many times the same information to VTS authorities located along the European coastline.

- Failure to distribute that information available on maritime traffic can result in decreased VTS effectiveness and efficiency to provide the services required.
In order to maintain confidence in the information provided by VTS, the services should be of uniformly high standard. This implies that common standards should exist for quality assurance.

The COST 301 study proposed VTS harmonization in the following areas:

a) The VTS procedures, especially procedures of communication with ships.
b) Co-ordination of VTSs by shore data exchange and then harmonization of data exchange procedures.
c) Harmonization of VTS operator’s standards.

3.3.1 Harmonization of communication procedures.

Many features of modern sea transport have led to radical changes in maritime communication. These include:

- Changes in ship design, speed and maneuverability.
- Changes in traffic patterns (traffic density).
- Increase in the proportion of ship masters and ship officers for whom English is not the native language.
- Increase in the availability of ship bridge VHF radio.
- The growth of satellite communication systems (ship to shore communication).

These changes have made a pressing need for the shipping industry to have precise, simple and unambiguous communications. However, the use of VHF voice communication by people without a communication background has opened a new area of potential confusion and errors. This has led to the development of international regulations and standards, aiming to improve communication. Examples are ITU regulations, IMO Standard Marine Navigational Vocabulary and
recommendations to use English as the standard language for maritime communications.

The issue of VHF voice communication has brought recommendations for essential maritime English to be used known as Seaspeak, concerned with ship to ship VHF voice communication.

For the European Union, COST 301 study (1988) showed that harmonization of communication procedures is feasible. Trials have promoted more widespread use of recommended procedures and have shown much willingness to co-operate among EU members.

The introduction of data processing has allowed data exchange to be controlled automatically. A major source of information is the reports from ships which would be in a format in accordance with IMO guidelines for VTS. Similar forms should be used for all kinds of communication links - including the general broadcasts from VTSs-, interactive communication ship-VTS and the reports from ships.

3.3.2 Data Exchange between Vessel Traffic Services:

In fact, recent advents in maritime communication technology have had a decisive impact on the improvement and harmonization processes of VTS communication procedures. However, further improvements need to be achieved at a regional level, particularly in the field of data exchange between regional VTSs. Such regional information links are considered to be an important step towards worldwide VTS coverage.

The harmonization of VTS communication procedures on a national level is an important tool for the implementation of RVTS as defined by the European study ‘COST 301’.
This defines the actual trend of European countries towards setting up a RVTS as
‘a result of the present day developments in the policies of many coastal states in Europe which are confronted with questions related to their seas and how they are used. Such policies concern, for example, the management of sea resources, the safety of maritime traffic, the protection of the environment and the need for an efficient maritime transport system . . . it is becoming clear that solutions cannot be implemented on a local or even a national basis. They have to be found and implemented on a regional basis involving all the coastal states bordering a coherent area of sea.’

COST 301 (1988).

The need for international co-operation and co-ordination of measures to protect and manage the sea resources, as well as to improve the safety of navigation, have been for a long time the main subjects of some international forums and conferences. A coordinated approach to the management of traffic is also contained in national laws and international regulations.

However, the idea of worldwide VTS coverage has been discussed in many VTS symposiums and it seems that it is not yet gaining the unanimity among the maritime community.

Hunt (1992) rightly points out the idea that:

‘VTS originally developed as the solution to a need. Since that time it has become an accepted part of the marine infrastructure and has expanded on the basis of need. Today there is a need for it to continue to develop and expand. The global extent of that development will be dependent upon harmonization, standardization and justification. At this time that justification does
not extend to full worldwide cover, but that is not excluded in the longer term when and if the need arises.’

3.3.3 Harmonization of VTS operator standards:

The VTS authority must ensure that the VTS staff have the necessary qualifications, knowledge and skills to perform the tasks required. At present, there is no standard of qualification and training agreed upon internationally that is necessary to achieve the various levels of knowledge and skills required by VTS functions and tasks. Furthermore, there are various levels of training requirements under each scope or type of VTS (Vessel Traffic Surveillance, Vessel Traffic Services and Vessel Traffic Management System). Therefore, presently there are no internationally recognized qualifications for VTS operators and the recruitment and training of VTS personnel are different from country to country.

Keeping in mind the role played by VTS in safety, efficiency of the traffic and environment protection, it is paramount to consider the importance of VTS operator’s skills and professionalism if the goal is to avoid confusion on the part of users dealing with more than one VTS centre during their voyages. More important is to preserve the extent of trust placed in the effectiveness and reliability of VTS.

The IMO Maritime Safety Committee circular 578 (January 12, 1993) provides guidelines on the recruitment, qualification and training of VTS operators. Such guidelines provide guidance in determining how VTS authorities can recruit, select and train personnel in order to carry out their mission to the required standards.

Taking into consideration the above guidelines, authorities are subject to their own national and local requirements and constraints in establishing training needs for
their VTS personnel. Therefore, it is not unusual to find a number of VTS centres run by sub-standard personnel which in fact constitutes another threat to the shipping and marine environment.

Hughes (1997), for example, has reported that:

‘To carry out the standardization task, the International Association of Lighthouse Authorities (IALA) is currently working on a framework that will provide a common performance standard in both training and qualifications’ (Hughes, 1997).

Three types of training are envisaged, namely: classroom, simulator and on-the-job training. These kinds of training will be discussed deeply later in this study. It is then widely accepted that having well skilled VTS personnel is a guarantee for a well functioning of a VTS facility. Furthermore, the effects of sub-standard ships and crews could be well balanced by efficient VTS facilities.
CHAPTER IV

THE DEVELOPMENT OF VTS AND RELATED SERVICES IN TANGIER

Introduction:

As mentioned earlier, the decision of the Moroccan Maritime Authority to establish a Vessel Traffic Service in Tangier is considered to be an important measure towards enhancing the level of safety of navigation and environment protection in the Strait of Gibraltar. The aforesaid system is also considered as an important component of the maritime safety and control scheme already in place within the Mediterranean region. However, in order to confirm its position within the safety scheme and fulfill its mission, the VTS of Tangier is required to be organized, structured, manned and operated properly according to international standards.

To deal with this subject, it is important to discuss the ideas and views of the planners illustrated by the project’s study.

4.1 Location and features:

The VTS of Tangier includes two stations which constitute the main arms of the system:

- A principal station at Ras-Paror, at 11 km North East of the city of Tangier.
- A secondary station located at Ras-Cires, about 60 km to the East from the Ras-Paror station.
Ras-Paror area is a flat land, situated 82 meters above Sea level, benefiting from a strategic position allowing a perfect overview towards the West, North and North East.

The total area chosen is approximately 11 hectares.

4.2 Mission of the VTS of Tangier:

Like any VTS centre, the VTS of Tangier will be assigned the responsibility of ensuring safer navigation through the Gibraltar Strait and the protection of the marine environment. The system established in Tangier has the duty to control and provide information and assistance to users, on the basis of data received from all sources and parties involved in the navigation within the waterway.

Apart from the above duties, the centre is dealing with the coordination of Maritime search and rescue operations (SAR) and pollution combating.

In order to discuss the above duties in detail, first of all it is necessary to analyze the extent of the area to be covered by the system.

4.2.1 Zone of coverage:

The definition of the zone of coverage of the VTS of Tangier has been a matter of great importance due to its influence on the efficiency and effectiveness of the whole system. Therefore, the fixation of this zone has been made on the basis of a study of the high risk areas within the Strait.

As discussed in chapter II, the risk assessment study states that the high risk areas are in fact the two borders of the Strait including the eastern and western entrances and the coastal navigational zones. These areas should then receive the priority of control and coverage. Consequently the zone of coverage of Tangier VTS is lying between meridians 5°.15’ and 6°.15’.
Figure 4.1 Radar coverage of the Strait of Gibraltar

Source: Sainsel
However, the matter related to the definition of the system coverage raises another question concerning the system’s limits of competence.

It is clear that the extension of the system coverage beyond its limit of competence will help in ensuring efficient traffic management. On the other hand, the question of sharing the responsibility between the Moroccan and the Spanish systems has to be discussed and agreed upon by the two parties, for the safe handling of the traffic. It is also a question of setting up the procedures to be followed in transferring a ship from one VTS responsibility to another and the way to exchange information.

Such matters have to be clarified and decided upon properly because they are the focus of interest for the success of the two centres in achieving their mission.

In this respect, any decision about the delimitation of responsibilities between the two systems has to be undertaken in a global approach, looking at the systems as part of one regional safety scheme for the benefit of safety of the traffic and the environment.

For this, the idea developed recently for a regional VTS can be of great benefit.

According to OPEFORM (1991, p:27), the geographical division of the area between the Spanish and the Moroccan systems can be done according to the separation scheme limits already in force since 1973.

This idea is also endorsed by the director of the VTS of Tarifa.

4.2.2 Functions of Tangier VTS:

4.2.2.1 External duties:

These duties can be listed as follows:

a) Primary functions.

b) Enforcement functions.

c) Remedial functions.

d) Other functions.
Primary functions:

According to OPEFORM(1991), primary traffic management functions are those concerned with the routine operation of the ship navigation process. There are four types:

- General rules:
  They concern the attribution to make general rules to affect the behavior of the traffic for the benefit of safety of navigation.

Three levels of decision can be identified concerning this point:

- Level one (Rule making: policy, standards)
- Level two (Implementation: infrastructure).
- Level three (Implementation: ship navigation process).

These levels are related to all parts of the organization of traffic management.

- Allocation of space:
  In all modes of traffic, the partitioning of a space and controlling its use is a common measure for the organization of traffic flow. In practice, these types of functions must be supported by rules. In this respect, the partition of the Strait between the two VTS systems for the purpose of traffic control has to be made, in order to define the area of responsibility of each centre.

- Routine control of vessels:
  Like any Vessel Traffic Service, the VTS of Tangier is entitled to record the tracks of ships, to receive their entry reports and to control their movements according to the navigation rules within the Strait.

These functions are considered part of the daily routine work of the VTS.

- Maneuvers to avoid collisions:
  For ships in difficulty, these rules exist to define actions to be taken in such circumstances. The VTS can only help in these actions by providing information about the situation of the traffic in the vicinity. It plays only an advisory role while the ship master is the final decision maker and responsible for his decisions.
Enforcement traffic management functions:

As discussed earlier, rules are the main means to influence the behavior of traffic for improved safety and efficiency. Therefore, they should be observed and complied with.

However, the VTS is entitled to ensure a full or acceptable level of compliance by all traffic. Nevertheless, there will be those who are either unaware of the rules or who choose to break them for whatever reason. The need arises then to encourage compliance with these regulations.

With acquired information, VTS can have a role in the enforcement of rules. This, for instance requires the following:

- The rules to be enforced must be identified.
- The parameters of compliance with these rules must be identified.
- The parameters of non-compliance must also be identified.

Factors that affect the actual state of observance of rules should be considered.

Remedial traffic management functions: (SAR functions, pollution fighting or wreck removal operations).

Remedial functions are those concerned with the reduction in the effects and consequences of incidents.

COST 301(1988) classifies the sequence of events connected with an incident under three headings:

- **An initial event**: This is an event which affects the ship’s controllability or the general conditions of navigation in an area.

- **An evolution of events**: This includes events which affect the ship’s controllability and the environment.
During this evolution, some factors will tend to restore a safe situation, or at least reduce the severity of the consequences of the initial event. Others will tend to make the situation worse.

- **An end result**: This is when all the consequences of the initial event and its evolution have taken place. The end result could be, for example, a restoration of the original situation or it could be a casualty which has resulted in SAR, pollution fighting and wreck removal operations.'

COST 301 (1988), p100

Therefore, remedial functions are those concerned with the evolution of events aiming to produce the most satisfactory end result possible.

Remedial functions can include the following duties:

**Ship repair.**
- Provision of repair information.
- Supply of repair personnel on-board.

**Salvage.**
- Provision of information, for example, on flooding countermeasures.
- Supply of towing and fire fighting facilities.

**Radio Medical.**
- Provision of information for diagnosis and treatment.
- Supply of medical personnel on-board.

**Navigation.**
- Provision of information concerning navigation near a casualty.
- Supply of wreck marking/ removal facilities.

**Search and Rescue**: SAR resources control.

**Pollution measures:**
- Provision of information on the pollution incident itself, its content, severity and behavior.
- Control of anti-pollution measures.

Potential disasters.

- Provision of information to authorities concerned on hazards from the maritime environment.

Other functions:

The general trend in traffic management towards global control, organization and assistance of the traffic is a manifestation of the advances in technology and communication. Furthermore, these trends have been consolidated due to the increasing concern of coastal states for safety and environment protection. Therefore, it is expected that VTS functions may be extended in international waters and that any new emerging measures would have a positive effect on safety and the environment. However, any extension of VTS involvement in international waters would have to be on a voluntary basis and through IMO.

External functions are the core services provided by the VTS output. To generate this output, internal VTS duties have to be fulfilled.

4.2.2.2 Internal functions:

OPEFORM (1991), basing its analysis on the COST 301 study, has classified the internal duties of the VTS of Tangier into three principal classes:

a) Acquiring data on the state of traffic in order to produce a traffic image of the area of coverage.

b) Processing and evaluating data information.

c) Internal decision making.

Data collection:
The sources of data available to the VTS are:
- Its own sensors.
- Reports from ships.
- Reports from shore-based organizations.
- Stored data such as documents, data bases and human knowledge.

It is mentioned earlier that all information required will relate to the area of coverage of the VTS of Tangier which is defined in paragraph 4.2.1 of the current chapter. However, the centre can have access to data concerning certain situations happening outside the designated zone, when there is a chance that these situations can turn into ones influencing the area of coverage.

An example of this is a ship in difficulty outside the controlled zone but without sufficient engine power which is expected to drift to the zone of coverage and become a case of interest for the VTS centre.

As far as the relationship of Tangier VTS with other national organizations is concerned, the centre will benefit from an important meteorological flow of information made available by the SNED meteorological centre. However, these data should be completed by information related to:
- Wind velocity and direction.
- Fog intensity.
- Atmospheric pressure.

These data will be provided by the VTS's own meteorological sensors.

However, other meteorological information such as measure of tidal, drift and density currents will be made available by the Moroccan meteorological centre, the Moroccan Ports Directorate and also through co-operation with some Spanish administrations.

*Data processing and evaluation:*

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From the traffic data already collected from different sources, the VTS operator studies this information and evaluates it in order to build a traffic image for the area under its control. This traffic image is a fundamental tool that allows the VTS operator to make an objective evaluation of the traffic situation. The evaluation process is mainly based on the comparison between the processed data values and some predefined threshold.

Objectives of data treatment and processing:
The treatment of data acquired is necessary for the following reasons:
- In order to evaluate the traffic flow within the Strait.
- In order to determine the traffic situation in real time.
- In order to know the traffic routing.

COST 301 (1988) lists the following group of functions as part of the data evaluation and processing:

Correlating and assessing data from the various sources to refine the image of the traffic held by the VTS.
Preparing information for internal decision making, for example, parameters where values are to be compared with predefined limits.
Preparing information for output.


Internal decision making:

The nature of the VTS work may well require the following types of decision:
- The decision to intervene or not in the traffic.
- What type of information to use?
- Decisions on the kind of information to provide to the traffic or other shore organizations.
• Decisions on the type of supplementary information to seek from the traffic or from shore organizations.

Predefined procedures to follow will be established for many of these decisions, the output of which will have an effect on the traffic characteristics.

4.3 Organization and structure:

4.3.1 Organization:

Studying the possible type of structure for the VTS of Tangier, OPEFORM (1991) has started by defining some general observations concerning the normal operation of the system. These can be summarized as follow:

i) The mission of the VTS of Tangier will concern all Moroccan administrations that are somehow involved in the maritime sector and especially interested in VTS operations.

ii) The mission of ensuring maritime safety and environment protection can only be efficiently fulfilled if the decisions are undertaken as quickly as possible.

The administrations that will have close relationship with the VTS are the Ministry of Defense, responsible for the defense of the Moroccan territory, the Ministry of Ocean Fisheries, responsible for marine resources within the Moroccan EEZ, the Ministry of Transport, in charge of the interests of the Moroccan fleet, representing the country internationally and ensuring the implementation of IMO conventions on safety and environment protection and finally the Ministry of Public Works, responsible for the public infrastructures.

OPEFORM (1991) proposed the following organization for the VTS of Tangier:
'An interministerial committee invested with the functions of general management and co-ordination. An executive body including the VTS and a crisis unit or the VTS management alone.'

The interministerial committee will be in charge, on behalf of the Moroccan government, for establishing the general directives concerning the exercise of the missions of safety of navigation and SAR operations within the Moroccan EEZ, traffic management and pollution prevention and combating. The committee will be dealing with matters related to the co-ordination of actions of administrations involved in these missions.

In this respect, the Strait's zone will have the priority in the work of this committee which will define the responsibility of each administration and the limit of the exercise of its duties. The VTS will ensure a permanent surveillance of the Strait, gathering and updating data on the traffic and the environment. However, the crisis unit will be activated only in case of major problems involving safety and/or pollution which the VTS cannot cope with and which requires a strategic decision that can have political consequences, nationally or internationally. In this case, the crisis unit will replace the VTS management.

It should be noted that for such a system to be efficiently operational, the following matters should be clarified:

i) The limits of VTS duties.

ii) The relationship between the VTS and the crisis unit, in order to have an adequate co-ordination and exchange of information.

iii) The circumstances in which the crisis unit will be activated.

Concerning the first point related to the extent of the VTS duties, it appears important to mention that the recent draft Decree of the Minister of Ocean Fisheries
and Merchant Marine has precisely defined the essential duties of the VTS of Tangier as an important safety organ within the Moroccan maritime safety scheme.

The draft Decree states that the VTS of Tangier will be assigned the mission of organizing and controlling regularly and permanently the maritime traffic in the Gibraltar Strait. The centre will have the following duties:

- To ensure the compliance with the international navigation and collision avoidance rules.
- To co-ordinate Search and Rescue operations and pollution combating with competent authorities and safety organs.
- To acquire, process and evaluate information about the traffic and the surrounding environment.

To broadcast to all users, information related to safety of navigation and to make use of statistical data on traffic flow within the waterway.

4.3.2 Structure:

According to the draft Decree mentioned earlier, the VTS of Tangier is considered an organ of the central Merchant Marine Administration. It has the status of a central Division, according to the administrative organization of the Moroccan administration, and has the following administrative structure:
The VTS centre is planned to be operational 24-hours a day on a shift basis. Therefore, three (3) shifts will be applied:
The first shift: 8.00 am - 15.00 pm.
The second shift: 15.00 pm - 23.00 pm.
The third shift: 23.00 pm - 8.00 am.
The Director and the Deputy Director will work normal working hours. However, they will alternate as standby during the night shift.

4.4 Equipment and Manning:

4.4.1 Equipment:

As mentioned earlier in this chapter, the VTS of Tangier includes two stations:
1. A principal one at Ras-Paror.
2. A secondary station at Ras- Cires.

Before describing the type of equipment that is planned to be installed within the two stations, it is important to notice that the whole system is planned to conform with the requirements of simplicity, flexibility, reliability and latitude for extension. The centre will be fitted with all the means of modern VTS equipment in order to achieve its mission accurately: equipment for data acquisition, storage, processing and delivery to users.

In other words, the equipment needed is the technical tools for the VTS centre to fulfill its internal and external duties of providing identification, tracking and information about the traffic.

4.4.1.1 Identification and tracking:

Four types of identifiers should be distinguished:

- Internal identifier which is only valid as an internal characteristic of target within a particular system.
- Transient observable characteristics, valid for a limited duration: (position, movement (course and speed) and state of the target.)
- Inherent vessel characteristics of longer duration including type, size and shape.

External identifiers which are valid for long duration, unique to the vessel and accepted officially by recognized authorities. These are radio call sign, Lloyd’s register number, name and flag and the IMO ship identification number.

The correlation between the identifiers (labels) constitutes the processes of identification and tracking.

A general identification and tracking of traffic within an area helps to build the traffic image for the designed area of coverage. The processes of identification and tracking of a single vessel can be described as follows:

a) Detection: correlation of internal label and location.

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b) Tracking: correlation of internal label, location and movement.

c) Recognition: correlation of internal labels and one or more detailed inherent characteristics.

e) Identification: correlation of internal label, location and external label.

As soon as the target is detected, it is allocated an internal label which is automatically done by radar. This is used as the reference to which location, movement and non-unique characteristics can be related. Once an external label is obtained and correlated with an internal label, it is assumed that other forms of external labels can be obtained through shore data sources (radio call sign, ship’s name).

**Identification techniques:**

COST 301 (1988) has identified two categories of technical options for the purpose of identification and tracking, namely line of sight technique and over the horizon technique (OTH)

- Line of sight:

Three different technical methods are identified for this option:

a) Non-co-operative.
   
   - Visual.
   - Low light television.
   - Radar.
   - Satellite.
   - Radio transponder (EPIRB).

b) Co-operative by procedure.
   
   - Radio.
   - VHF-DF.
c) Co-operative by equipment.
   . Radio transponder.
   . Radar transponder.

All the mentioned options provide detection and recognition in satisfactory environmental conditions. However, in the case of low visibility, only co-operative options and patrol craft can provide full identification.

- Over-the horizon:
  a) Non-co-operative.
     . OTH skywave radar.
     . OTH groundwave radar.
     . Remote sensing-airborne (radar).
     . Remote sensing-satellite (radar).
     . Remote patrol craft or aircraft.
     . Remote platform.
  b) Co-operative by procedure.
     . Radio-satellite.
     . Radio terrestrial (HF/ MF).
     . HF/MF-DF.
  c) Co-operative by equipment: (radio transponder)

It should be noticed that non-co-operative techniques are not able to provide full identification as well as line-of-sight techniques.

**Tracking techniques:**

Tracking involves maintaining correlation between internal identifiers and the position of the target. In this case, position accuracy plays an important role for two reasons:
To enable the VTS to perform the function of giving assistance to ships navigating in narrow waterway. For that, the VTS needs not only the position of the ship but also its course and speed.

To enable the VTS to differentiate between two close targets by maintaining data correlation.

Radar remains the most used tracking sensor. It is normally combined with automatic tracking facilities and data processing.

Radars which can be found in conjunction with transponders are essentially line-of-sight sensors.

4.4.1.2 Communication techniques:

VTS as an information processing system needs two principal communication systems:

1-Ship-to-shore communication system.
2-Shore-to-shore communication system.

The technical options available for these systems are:

- Line of sight system.
- Global coverage satellite system.

3-Global coverage terrestrial system.

Each option will be discussed in detail in the next chapter.

- General architecture:

The global architecture of the VTS of Tangier gives an overall picture of the technical components of the system by illustrating the followings:

a) It represents the global system as a functional entity having influence on its sea and shore partners.

b) It illustrates the internal functions discussed earlier.

c) It shows the type of equipment to be installed.

- Particular diagrams:
The following diagrams (4.3 and 4.4) represent the principal components of two important sub-systems:

- Data acquisition and communication sub-system
- Data processing sub-system.
Figure 4.3: Data Acquisition

Receivers

OPERATION CENTRE

Traffic
- X Band Radar Station
- S Band Radar Station
- Radiocomm. Station
- Transponder System

Environment
- Anemometer
- Visibilometer
- Barometer
- Thermometer
- Hygrometer
- Pluviometer

Vessels
- VHF Radio Station
- HF Radio Station
- GMDSS Receptor
- NAVTEX Emetor

Shore stations
- VHF Station
- Satellite hertzian waves

Source: OPEFORM (1991)
processing system

Module of Receivers Management

Operation Module

Data Exchange Module

Data Storage and Printing Module

Communication Module

Data Management

Local network

Data acquisition network

Specialized data exchange network

Public communication Network

Source: OPEFORM (1991)
Data acquisition sub-system:

Within this sub-system, two groups of data receivers should be distinguished, depending on the type of information acquired about the traffic or the environment.

- Traffic data receivers (Figure 4.4):

According to figure 4.5, three types of receivers will be installed: radars, VHF radio and transponders.

-Radars X and S bands: Acquire a real time information on the position of ships within the area of coverage.

-VHF Radio-communication: This is an important tool for the identification of ships through the correlation between the name of the ship transmitting the message and other information such as position, which are received by radar.

Almost all ships using the Strait are equipped with VHF transmitters.

-Transponders:

Figure 4.5 shows the transponder structure. This type of equipment provides, when asked, an automatic identification of a ship which is fitted with a transponder R/E station. Therefore, for a VTS to achieve such identification through transponders, ships should be equipped with transponder stations.

Today, most ships do not have transponders on board.

What seems to be really important for the safety of navigation in the Strait of Gibraltar is to try to convince the ferry lines which are making daily trips between Morocco and Spain, to be equipped with transponders. This will help a lot in the management of the crossing traffic, especially in the peak season.

For the moment, the situation is increasingly improving because most of the ferries operating within the Strait's area are equipped nowadays with transponder systems.
Figure 4.6: VHF Transponder System

Source: OPEFORM (1991)
• Environment data receivers:
Taking into consideration a possible integration of the VTS of Tangier into a large
eceanometeorologic system of the Strait, the local meteorological measure will be
ready to provide the following information:
- The wind velocity and direction.
- The visibility.
- The atmospheric pressure.
Furthermore, the centre will be able to measure temperature and rainfall intensity.

*Communication sub-system:*

The communication sub-system of the VTS of Tangier is clearly represented in the
figure 4.5, which distinguishes between the following:
- Communication with mobile stations.
- Communication exchange with shore based stations.
The communication link between the VTS centre and mobile stations will be made
through VHF radio communication. However, shore correspondents can communicate
with the centre through the normal means of communication, ( Telephone, fax, telex
and internet ).
• Link with mobile stations:
i) Communication with vessels:
Vessels are the principal users of the VTS service. The VHF stations that will be
installed within the centre will be able to contact any ship passing through the Strait,
within a range of 40 NM.
The installation of these stations will cover the whole area, whilst at the same time,
they will be able to have a longer outreach when the VTS is interested in ships
outside the area covered by the system.
In this respect, the VTS operator in Tangier will be on permanent watch on channel 16 (156.8 MHZ), defined as a distress and safety channel for maritime emergency calls.

Furthermore, the centre will also be equipped with a high frequency radio station (HF) which, in case of distress happening far from the area of coverage, will enable the VTS centre to communicate with any ship in difficulty.

One of the most important features of the communication sub-system of the VTS of Tangier is in fact the installation of a GMDSS receptor which will enable the centre to receive distress signals from ships in distress so that the VTS operator can conduct and participate in co-ordinated SAR operations.

The GMDSS system also provides for urgency and safety communication and the promulgation of maritime safety information, navigational and meteorological warnings and forecasts to ships.

The centre will also be fitted with NAVTEX T/R system.

The GMDSS role and functions is discussed further in the next chapter.

ii) Communication with other mobiles:

According to OPEFORM (1991), the VTS of Tangier will have a direct link with SAR and pollution combating services of the Merchant Marine Administration. These services, provided with all means of modern equipment, are considered allied units to the VTS centre.

The centre of Tangier will be linked to SAR helicopters and rescue boats through VHF radiocommunication on the following frequencies:

121.5 and 123.1 MHZ.
156.3 and 156.8 MHZ.
243 MHZ.

For the use of these frequencies, special transmission-reception stations will be installed.
• Link with shore stations (Figure 4.7):

It was noted earlier in this chapter that a link will be made between the VTS and the remote station (radars and radio VHF) in order to achieve the required quality of communication.

The use of special telephone lines for the reception and/or transmission of all messages from/to shore based correspondents will be made available in co-operation with the Moroccan administration of communication (PTT).

Furthermore, sufficient fax and telex lines will be installed.

**Data processing sub-system:**

Generally, the processing center of a VTS includes treatment and operation interfaces sub-systems. Figure 4.4 above illustrates the composition of different modules which constitute the processing unit.

The communication part of the centre is made up of the following components:
- The receivers management module, responsible for the acquisition and preparation of data from the numeric receivers.
- The processing module, in charge of the treatment and management of the functional operator interfaces.
- The data exchange module which deals with the internal data-base management of the centre and access to external data-bases.
- Recording and printing module, in charge of safeguarding information in magnetic medium and printing out this information when required.

Finally, the module of communication with the public network ensures permanent access of the centre to the telephone, fax and telex networks.
Figure 4.7: VTS Shore based Links

**OPERATION CENTRE**

- **VTS Authority**
- **Maritime Authority**
- **Customs**
- **SAR Services**
- **Hydrographic Service**
- **Pollution Control Service**
- **Coastal Maritime Radio**
- **Service for Technical Control of Ships**
- **Offshore Work Companies**
- **Professional Organizations (Fisheries) and Leisure**

**Connections:**
- **Royal Navy**
- **Police**
- **Medical Service**
- **National Meteorology**
- **Ships Database**
- **Lighthouses**
- **Port Authorities**
- **Maritime Agents**
- **Regional Mediterranean VTS**
- **Other VTSs**

**Notes:**
- **Telephone link, Telex, Fax**
- **Telephone link, Telex and Fax for particular use**
- **Telephone link, Telex and Fax to be later, transmitting by data transmission network**

Source: OPEFORM (1991)
4.4.2 Personnel:

It is without doubt that the human resource in any organization constitutes one of its most important assets, if not the most important one, especially in a safety organ such as VTS.

Taking into consideration the above principle, the Moroccan Merchant Marine Administration, responsible for the establishment and operation of the VTS of Tangier, has taken all necessary measures in order to man the centre with highly qualified personnel according to what could be defined as international qualification standards.

A training program for all personnel of the future system has been set up and most of them are presently following practical training in specialised training centers.

Before dealing with the qualification and recruitment of the personnel of the VTS of Tangier, it is of interest to discuss first, the internationally accepted level of qualifications for VTS personnel.

4.4.2.1 Training and qualifications of VTS personnel:

In section 3.3.3 of chapter III, the conclusion reached was that up to now, there is no internationally accepted standards of qualification and training for the VTS operator.

Several programs and ideas have been developed in the subject so far, but no one has been agreed upon as an international standard.

The IMO Maritime Safety Committee circular 578 (1993), together with the IALA guidelines (1993), give only guidance on training, qualification and recruitment of VTS operators and it is up to VTS authorities to decide the most suitable way to implement this general guidance according to their own realities.

Therefore, qualifications, training and criteria of recruitment of VTS operators are still different from country to country worldwide.
It should be noted that VTS operators are the personnel who effectively make use of the VTS equipment and also the persons who are required to take quick decisions while dealing with the traffic. Therefore, VTS operators can have an important influence on the effectiveness of the VTS.

From this point of view, it is important to discuss the required level of qualification and skills of this category of personnel, the level that can enable them to deal with the traffic and to respond safely and accurately to any difficult situation arising.

*Training and qualifications of VTS operators:*

The functions of Vessel Traffic Services must be identified briefly before examining the essential skills, background, qualifications and training necessary for an effective VTS operator.

As described by IMO in its VTS guidelines, VTS functions can be listed as follows:

i) Data collection.

ii) Data evaluation.

iii) Provision of information.

iv) Assistance to navigation.

v) Organization of the traffic.

vi) Support of allied activities.

Having presented the main VTS functions, IMO guidelines recommend that in order to fulfill the above tasks and duties, VTS operators have to have the suitable background, qualifications and training.

In this respect, IALA VTS committee has done considerable work in setting up an international level of training for VTS operators, especially through their guidelines. The existence of various levels and kinds of VTS makes it difficult to develop an accepted standard training program. However, great effort has been made to set up internationally accepted operational and training requirements.
Basing their study on COST 301, Barber & Hughes (1992) list the following required knowledge for a VTS operator:

i) Knowledge and use of the English language.
ii) General nautical knowledge.
iii) Specific nautical knowledge.
iv) Equipment handling expertise.
v) Legal knowledge.
vi) Local geographic knowledge.
vii) General education.'

According to the previous source, a VTS operator must have the following skills:
i) The ability to communicate clearly, concisely and correctly using modern VHF equipment. This is a vital need at the heart of an effective Vessel Traffic System.
ii) The ability to use radar tracking information and to be aware of its limitations.
iii) The ability to understand the problems of mariners navigating within its area of responsibility.
iv) The ability to create co-operation with mariners.
v) The ability to solve problems and to deal with many tasks and problems at the same time.
vi) The ability to respond quickly and effectively to developing situations.
vii) To be aware of the legal implications of VTS.

To meet these requirements, training institutions should be flexible enough in order to adapt their training program with the entry level of knowledge and skills of recruits with different backgrounds.

Therefore, the training scheme should be governed by the following principles:
- It must be flexible to deal with different levels of experience.
- It should also be flexible in order to deal with different levels and types of VTS.
- It must enable authorities to assess aptitude.
- It should include simulator-based modules.
- It should include refresher and updating training at regular intervals of time for professional VTS operators.

The overall program format should be then as follows:

**Basic training courses:** These are implemented prior to entry to specific VTS courses. This first level of training should be provided to trainees who have not covered such aspects in their previous studies. These courses cover the following subjects:

i) Communication (VHF, GMDSS, etc).

ii) Maritime (navigation, passage planning, ship handling).

iii) Radar.

**Initial VTS training:**

Objectives:

- Revision of radar theory.
- Revision of radar plotting.
- Revision of communication procedures.
- To ensure that participants are able to evaluate shore based radar data.
- Application of safe VTS operating procedures.
- To examine the role of the mariner and encourage co-operation between the mariner and the VTS operator.

**In-house training:** This must include the following:

- Familiarization with radar surveillance equipment.
- Familiarization with communication equipment.
- Familiarization with other data acquisition equipment and information storage facilities.
- Familiarization with the geographical area including tides and other navigational data.
The VTS management course:

This is a simulator-based course which has the following set of objectives:

- To develop common performance standards.
- To develop the operator's ability to evaluate data presented by shore based radars.
- To continue to develop safe VTS operating procedures.
- To develop the operator's ability to respond effectively to hazardous and emergency situations.
- To give an understanding of the legal aspects of the VTS operator's role.

In this respect, two important items should be pointed out:

1- Simulation should be used as much as possible.
2- Permanent updating courses of short periods should be programmed together with assessment of VTS operators after each training course.

4.4.2.2 Training and recruitment of Tangier VTS personnel:

The VTS centre in Tangier includes between 20 and 30 officials and technicians classified as follows:

- Director.
- Deputy director.
- Four (4) heads of services.
- Ten (10) operators and shift responsibles
- Technicians in electronics and communication.
- Secretaries

It should be noted that most Tangier VTS personnel will be appointed from officials serving in the Merchant Marine Administration or in other Moroccan administrations and who have already some VTS background.

For the operators, all are attending a specialized training program for a duration of at least 12 months.
The profiles required from the VTS staff can be described in the followings:

- **Position of Director of the centre:**

  The Director of the VTS of Tangier has been selected from high level officials of the Merchant Marine Administration.

  The initial training level required for this position is a Moroccan baccalaureate plus five years of higher education.

  Furthermore, the candidate should have been serving at least for 15 years within the Moroccan Maritime Administration and be well known for his ability to take quick and suitable decisions in complex situations involving various parties.

  These decisions can be technical, administrative or legal.

- **Position of Head of Service:**

  The candidate to this position should have a minimum level of education equal to a Moroccan baccalaureate plus one or two years of higher education in the field of electronics, communication or computer science.

  He should be able to take operational responsibilities within the limit of his function.

  He should also be prepared to lead a small group of executive employees, take suitable and quick decisions within his area of responsibility, advise and report the activities of his service to the Director of the centre.

  Finally, the candidate for this position should have an experience within the administration of at least five years.

- **Position of a VTS operator:**

  The VTS operators will be selected among officials of the Merchant Marine Administration or from the Royal Navy who have the required level of a secondary school education (baccalaureate).

  The level of qualifications and skills required from an operator within the VTS of Tangier are the same standard requirements discussed earlier in section 4.4.2.1 of the current chapter.
CHARTER V

COMPARISON OF THE MOROCCAN VTS WITH
IMO AND INTERNATIONAL STANDARDS

5.1 The level of conformity.

Having discussed already the technical, legal, organisational and operational features of the VTS of Tangier as it is planned by the Moroccan Maritime Authority, it is important, in the current chapter, to discuss the extent of conformity of the system with IMO and IALA guidelines.

As the content of the above mentioned documents has been already described in a previous chapter, the current analysis will try to discuss directly the system conformity level in the following areas:

- Organisational and technical features.
- Rules and regulations governing the VTS and traffic operations.
- The human resources.

5.1.1 Organisational and technical features:

The VTS administrative structure discussed earlier has been established in order to respond to the tasks and functions that the centre is planned to be responsible for.
A brief overview of this structure shows its ability to allow the normal management and operation of the centre. According to the organisational chart of the VTS of Tangier, the centre is structured in four main services covering all operational activities of VTS as defined by IMO:

- Radar control service.
- Information service.
- Technical and administrative service.
- Statistical service.

Furthermore, the VTS activity is completed through co-operation, co-ordination and direct access of the centre to the services of SAR and pollution control units.

Therefore, the structure of the Moroccan VTS can be considered as fully complying with IMO and IALA guidelines since the project was planned on the basis of the recommendations contained in these guidelines.

Apart from the structure of the system, the centre is planned to be equipped with all modern information technology such as data acquisition and storage, data processing and evaluation and data information delivery. In this respect, the VTS centre will be fitted with the latest technology for identification, tracking, communication and assistance to the traffic.

The fact that from the beginning IMO has been involved in the planning process, illustrates the maritime authority’s intention to establish a VTS system which is in conformity with international standards for the benefit of safety and environment protection. However, it is believed that a real assessment of the system’s quality and effectiveness has to be carried out only after several years of operation.
The actual situation of the project as being planned and established according to international standards can be considered as a positive sign for its future successful operation.

Another strategic factor in the VTS effectiveness is the human resources. It is without doubt that an adequate operation of the VTS of Tangier depends to a large extent on the qualification and skills of its personnel. This latter constitutes the next criteria of assessment of VTS conformity with international standards:

5.1.2 The human resources:

Bearing in mind the importance of the human element in the efficiency of VTS operation, the Moroccan Merchant Marine Administration is committed to take all necessary measures in order to provide the VTS personnel with a suitable level of training and skills. For that, it has set up a training program for all VTS operators.

Considering the special role of VTS operator, the training program provides at least 12 months practical training including simulation exercises and visits to some important European coastal VTS centres. Operators will also have the opportunity to have practical training during the period of trial of the VTS of Tangier.

Most of the future operators of the VTS of Tangier are chosen from radio officers who have already some experience in radio communication. Most of them have been serving within the maritime administration or as radio officers in shipping companies.

The training program for VTS operators will be run within a European training institution recognised by its high standards.
without undermining the decisive role played by the management team, the Director of the VTS of Tangier and his management staff are also appointed from high qualified personnel of the Moroccan Administration, especially the Merchant Marine Directorate of the Ministry of Transport, known by its experience in safety and environment protection matters.

Again the human resources, part of the assessment, can be considered as planned in conformity with IMO and IALA standards. However, what seems to be a crucial point for the effectiveness of the whole project is the implementation part of the training program. An effective implementation of the operator’s training program, with particular focus on its practical and simulation module, should be carried out carefully for an efficient operation of the whole VTS system.

5.1.3 The legal framework:

Being one of the most important international waterways in the world, the Strait of Gibraltar is governed by international rules and regulations dealing with safety of navigation and the use of seabed resources.

In this respect, four main international legal instruments are directly applicable to navigation through the Strait of Gibraltar. These are listed as follows:
- The International Regulations for Preventing Collisions at Sea (COLREGs) 1972.
- The Traffic Separation Scheme (TSS), approved by IMO in 1973 and which represents the application of the rule10 of the COLREGs in the Strait of Gibraltar.
- The mandatory ship reporting system decided by the IMO-MSC in its 67th session in 1997.
The above instruments discussed in detail in the previous chapters represent the core of the legal framework governing the use of the Strait of Gibraltar. They are considered to be sufficient for an adequate management of the traffic flow.

From the above analysis of the operational and legal tools available to the VTS authority of Tangier, it appears clear that the VTS centre as planned can be considered conform with IMO and international standards. The next step concerning the operation of the centre is, of course, the most important. The Moroccan VTS authority should take all necessary measures in order for the centre to fulfil its mission adequately. Among all these measures, the following are considered crucial for the future operation of the VTS of Tangier:

- The definition of the way of sharing the responsibility in controlling the Strait between the Moroccan and the Spanish VTSs is a strategic question which requires a clear decision from both the authorities concerned.

The establishment of the zone of responsibility of each centre should be decided upon in the near future. However, it should be noted that the question is more deeper than what it seems to be, because most important is the relationship between the two systems. The two centres are entitled to work together in close co-operation and co-ordination in order to realise the objectives of safety of the traffic and the environment.

- If it is assumed that the two VTS centres will be working in close co-operation, operational arrangements related to data exchange should be made. In this respect, a ship making her entry to the TSS has to report. The question arises here as to which VTS centre should it address its report because, according to the IMO guidelines, it has to report only to one VTS station and the one which has received the message can inform the other station. Therefore, matters concerning the type
of information to be transmitted and the procedure of sharing this information have to be clearly set up by the two VTS authorities.

- An efficient data exchange between the two VTSs requires harmonisation and standardisation of procedures and data forms.

The above mentioned questions are considered to be strategic for the effectiveness of both centres in achieving their mission of safer traffic and cleaner oceans. It is then recommended that necessary attention should be paid to these issues and solutions should be given in full co-ordination between the two parties concerned. Clear relationships based on co-operation and mutual partnership at all levels should be established. The most suitable type of relationship which can be envisaged is probably an adequate co-operation under the umbrella of a Regional Vessel Traffic Services (RVTS).

5.2 Impact of new technology in VTS systems:

Vessel traffic services have known tremendous development in their operational and technical practices. Nowadays, VTS system’s nature is changing rapidly following the new advents in data and communication technology. Whereas in the past, VTS capabilities were expressed primarily in terms of radar surveillance capability, a key element of VTS today is the availability of electronic data technology. This technical progress has revolutionised the VTS output, resulting in further accuracy and effectiveness.

Among others, the success of VTS is attributed to the technical progress made possible in three main areas:

- Satellite communication.
- Electronic chart or ECDIS.
- Ship identification and transponders.
5.2.1 Satellite communication:

The spectacular growth of mobile communication has been probably one of the most remarkable features of the latter part of the twentieth century. The advantages of the mobile telephone, for example, are well known as man become more free to communicate with anyone almost at any point in the world without having to be attached to a fixed location. Furthermore, this new technology provides a cost effective service.

Radio communication was the first tool in use for maritime SAR operations which marked the inception of mobile communication. As the use of radio proliferated, it was soon recognised as the single most important safety device from the very beginning of this century.

In 1973, and with the help of modern satellite technology, the General Assembly of IMO called upon its member states to convene a conference to look into the possibility of establishing a global satellite system for shipping. The conference was held in 1975 and prepared the formation of the International Maritime Satellite Organisation (INMARSAT) in 1979.

With INMARSAT, new era of various communication services of high accuracy and reliability started. Chief among these services is the establishment of the Global Maritime Distress and Safety System (GMDSS) which represents the first major overhaul of maritime emergency communications regulations since the adoption of the first SOLAS convention in 1914.

The present system, as defined by the SOLAS Convention 1974, is based on the requirement that certain classes of ship should keep continuous watch on the internationally designed distress frequencies and carry radio equipment capable of transmitting over a specified range. The master of any ship at sea should, on hearing
a distress signal, proceed quickly to assist. therefore, the effectiveness of the system depends on there being someone to receive, hear and act on a distress signal.

However, the availability of world-wide satellite communications has made fundamental changes possible in the way the maritime community approaches safety. In fact, the introduction of modern technology such as satellite and digital selective calling techniques has enabled distress alerts through GMDSS to be transmitted and received automatically over long range and in all conditions. In spite of their limitations, terrestrial radio systems will still be important under GMDSS. The new system has provided smooth and intelligent integration of terrestrial radio and satellite technology in order to make the best use of both technologies.

- **Satellite communication:**

The GMDSS includes two important components:

- The INMARSAT system: It employs geostationary satellites and operates on L-band. Ships fitted with ship earth stations are provided through INMARSAT with the following services:
  - Distress alerting and two-way communications using direct printing telegraphy and radiotelephone.
  - EPIRBs distress alerting.
  - Maritime Safety Information through NAVTEX system.

-A polar-orbiting satellite system (COSPAS-SARSAT system): It provides one of the main means of distress alerting and determining the identity and position of the ship in distress or its survivors in the GMDSS.
• Terrestrial communications:

With terrestrial communication, Digital Selective Calling (DSC) forms the basis of distress alerting and safety communications. These can be performed by both radiotelephony and direct printing telegraphy. Three services are made available through this system:

  - Long-range service (HF).
  - Medium-range service (MF).
  - Short-range service (VHF).

The GMDSS regulations set up the following communication functions to be performed by the system (Regulation IV/4):

- Alerting (Regulation IV 14.1.1-4.1.13).
- SAR co-ordinating communications (Regulation IV 14.1.4).
- On-scene communications (Regulation IV 14.1.5).
- Locating (Regulation IV 14.1.6).
- Promulgation of MSI (Regulation IV 14.1.7).
- General radiocommunication (Regulation IV 14.1.8).
- Bridge-to-bridge communication (Regulation IV 14.1.9).

5.2.2 The future role of ECDIS:

Maritime community has been always looking for improved safety and efficiency of navigation as accidents and their heavy consequences become less and less acceptable. Recent developments in modern technology have brought substantial improvements to the safety of navigation. Determination of a ship’s position in real time with sufficient precision is one of the most critical safety factors of navigation. On the one hand, satellite-based navigation
systems, such as the Global Positioning System (GPS) provide an adequate solution to the position fixing problem allowing continuous high accuracy positions to ships at relatively low cost. On the other hand, computer technology offers the possibility of having the more reliable Electronic Navigational Chart (ENC) replace the traditional paper one.

The convergence of the new technologies of GPS and Electronic Navigational Chart has produced navigation systems such as the Electronic Chart Display and Information Systems (ECDIS) with standards defined by IMO.

5.2.2.1 Role of ECDIS:

Professionals look at ECDIS as more than digitised paper chart. For them, ECDIS is a real time, automated decision aid, able to provide permanently the position of a vessel in relation to the surrounding environment and which then facilitates the determination of the appropriate course of action to avoid collision.

Furthermore, ECDIS can have other uses, for example, for monitoring living and non-living marine resources or serving as an investigation tool in maritime accidents.

5.2.2.2 Future prospects of ECDIS:

The introduction of ECDIS has coincided with the operational introduction of GPS and DGPS. Although advantageous for the operation accuracy of the ECDIS, such precise system brings with it another problem. This is related to insufficient accuracy of today’s paper chart, from which the electronic version will be derived, compared with the GPS and DGPS accuracy.

Therefore, for the interests of safety and the protection of the marine environment, the ECDIS database should be under the control of a national charting authority. This problem is actually under review and discussion.
ECDIS performance standards were approved by the IMO Sub-committee on Safety of Navigation in September 1993, endorsed by the Maritime Safety Committee in May 1994 and adopted by the IMO Assembly in 1995 with the consideration that when provided with a “Backup” (reduced portfolio paper charts), the ECDIS may be accepted as an adequate and up-to-date chart required by regulation 20 of the SOLAS Convention.

5.2.3 Ship identification and transponders:

A transponder is a receiver-transmitter device which, when interrogated, enables an automatic identification of a ship that is itself equipped with a transponder T/R station. Two principal types of transponders are identified for maritime use:

- Radar transponder.
- Radio transponder.

- Radar transponder:

Several types of radar transponders have been manufactured and tested but not one of them is known as an operational success. In radar transponder technology, the transponder is fitted with transmitters and receiver antennas, thus the transponder system is interconnected with radar by two kinds of links: one from the radar to the transponder and the other the return back to the radar.

Target identification is achieved by the transmission of a signal on one frequency which opens up a receiver tuned to the radar band on all ships within range, followed at a precise time interval by the normal radar transmission on the bearing of a required target. The response will be generated only by those ships which receive the radar transmission at the precise time after the receiver has been opened.
More than one ship can respond when they are on the same bearing as the target.

The transmitter station then proceeds by elimination in order to eliminate the unwanted ships, either by taking account of the time difference of the response or by interrogating a second time after the change in a ship’s position has taken place.

The use of the radar transponder has resulted in rather difficult technical problems because there is still difficulty in the identification of particular ship from a group of vessels.

- **Radio transponder:**

  Under the 1988 amendments to the SOLAS Convention 1974, there is a requirement for the radio transponder to make use of Digital Selective Calling equipment (DSC).

  The shipborne DSC is itself a transponder system for shore-to-ship communication. On a receipt of a call, a response is automatically generated and indication is made of the frequency to be used for further communication. Target discrimination is achieved in this case by transmitting a call to a defined area in which the target is supposed to be. Ships within this geographical area will respond indicating their identity and position. To enable the targeted ship to be identified, either the geographical area is restricted and/or the target’s course is included.

  The IALA VTS Committee has set up the following operational requirements for a transponder to be used with VTS:

  - It should be able to identify and pool participating ships sailing within the limits of a VTS coverage.
  - The identification capacity should be at least 20 ships per minute.
  - The polling capacity should be at least 20 ships per minute.
- It should have an automatic reporting capability.
- It should have a tracking capability of all ships in the VTS area of coverage.
- It should make use of existing equipment already on-board ships and minimise the use of additional shipborne equipment.

5.3 Other roles of a modern VTS centre.

5.3.1 Port state control:

From the adoption of the first version of the SOLAS Convention in 1914, just after the Titanic disaster, the parties to this Convention have shown an increasing concern about safety at sea and the protection of the marine environment.

The implementation of all international instruments dealing with these safety matters, including SOLAS, MARPOL, LOAD LINE, COLREGs and others, has been always an important concern for member signatories. There has been always a strong conviction among member states that it does not make any sense to produce international standards which are not enforced.

In this respect, Port State Control (PSC) has been one of the most important tools of law enforcement.

Through the PSC concept, port states have a legitimate interest in the safety of passengers and crew on board foreign ships calling at their ports. They have also a particular interest in the safety of cargo on board these vessels as far as pollution prevention and pollution combating are concerned. Therefore, port states are allowed, under the above-mentioned framework, to carry out verification and control of the existence and validity of the safety certificates on board ships. The certificates should be accepted unless there are clear grounds for believing that the condition of a ship or its equipment does not correspond to the relevant certificates.
The inspections and surveys should be carried out by nominated surveyors or recognised organisations and conducted according to procedures defined by the SOLAS- PSC regulation.

Without going further into the discussion of PSC requirements, the principal concern here is to discuss the role that VTS can play in port state control implementation.

As an information system, port VTS normally has all the necessary information concerning ship’s arrival at port, ship characteristics, cargo and people on board etc. Having these information available, port and maritime authorities can plan a survey to be carried out on targeted ships and at a suitable time. Thanks to the VTS data, port states can carry out their control without any delay to ships because, in the absence of these information, delays to ships can result in disastrous losses for ships which in turn will affect ports as well through penalties and loss of reputation and business.

The availability of information about the expected traffic calling at the port can serve also to inform the ship’s next port of call for further control improvement. Control efficiency for improved safety can be achieved also in the case of coastal VTS delivering and receiving regular information to/from a neighbouring VTS within the umbrella of a regional VTS of common database about ships, certificates, ship’s history of incidents or technical failures. Furthermore, a black list of substandard ships can be created. These can lead to efficient combating of substandard ships and substandard navigational practices. VTS information is also a valuable tool for safety prevention and SAR operations.

The exchange of information among VTSs is an appreciated tool which is expected to facilitate dramatically the Port State control implementation.
5.3.2 Pollution control:

The main mission of Vessel Traffic Services is to ensure the safety of navigation and the protection of the environment. Therefore, pollution control is one of the most important tasks of VTS. The role of the system in pollution combating and pollution reduction is unquestionable.

J. Van Tiel (1996) illustrates this through the following example:

'Undoubtedly, the high level of safety in Dutch waters is partly due to the safety net-the traffic management system- that has been built up in the Netherlands over the years. Rules of behaviour and routing measures, marine markings and radio positioning systems, pilots and Vessel Traffic Services have all made a contribution to this high level of safety, each in their own way.'

The contribution of VTS to pollution control is made through the following activities:

- By acting as an information centre, VTS gathers information on traffic: Ship's capacity, type and quantity of cargo on board, position and course etc and makes it available for users.
- By monitoring the movement of ships in order to provide navigational advice, safety information and meteorological data to the traffic for collision and pollution prevention.
- Keeping track of ship ballast, survey and control of dumping operations and the quantities dumped at sea. In this case VTS can play a decisive role in safeguarding the special and sensitive areas under certain conventions.
- Reporting all relevant information on dumping activities within its area of responsibility to the authorities concerned.
- In case of pollution accident, VTS collaborates closely with Pollution combating services and can play the role of on-scene commander by co-ordinating the activities of all parties involved in clean-up operations.

In general, VTS has the potential to flexibly act and react on facts and circumstances. Such potential makes it more than just another aid to navigation. It has also a significant risk-reducing potential and surely offers an economic advantage.
CHAPTER 6

CONCLUSION AND RECOMMENDATIONS

Conclusion

The establishment of the VTS of Tangier is considered as an important step towards completing and strengthening the safety scheme within the Strait of Gibraltar.
Recent changes in the region confirmed the right timing of the project to provide the region with efficient safety systems capable of safeguarding the traffic and the environment from eventual hazardous events.

Moreover, recent projects launched through the Strait attest the need for such systems, for instance, the Maghreb-Europe gas pipeline for the export of the Algerian gas, already in operation from 1995 and the expected project of a tunnel link between Europe and Africa through the Strait of Gibraltar which has reached the final stage of the technical studies.

Such projects put more responsibility on both VTS centres which will be forced to strengthen their quality level and adapt themselves to the new operational environment marked by a steady increase in traffic volume, the introduction of huge vessels and high speed hovercrafts as well as the existence within the TSS of different types of duty vessels for the realisation of the aforesaid new projects.
Furthermore, the two systems are asked to adjust their operational methods and procedures in order to perform their missions in adequate synergy and harmony.

It is believed that an efficient operation of the two VTS systems depends, to a large extent, on the level of co-ordination which can be achieved.

In fact, it is not conceivable to have separate handling of traffic within such narrow passage. A global view of safety and pollution problems and their adequate solutions have to be envisaged in a global approach.

Furthermore, it should be borne in mind that the experience of the international maritime community concerning safety and pollution combating shows that these sort of problems knows no political borders and are inherently international. Therefore, solutions have to be found and implemented internationally.

The trend is towards co-operation among members of the international maritime community, as the level and frequency of disasters become less acceptable.

The new emerging International Safety Management (ISM) Code and Port State Control (PSC) are important features of this international awareness for safety and pollution combating.

In this respect, VTS, as an information centre, is expected to play an important role in the implementation of these instruments and will continue to compensate for unsatisfactory safety standards of ships and crews. Such VTS role depends also on the level of co-ordination among VTS centres located within the same area or region.

Nowadays, the establishment of regional VTS (RVTS) is considered as important step towards enhanced traffic management and efficient implementation of international safety standards.
Regional Vessel Traffic Services (RVTS) concept:

Cost 301 (1988) defines RVTS as:

'A tool shared in common by the coastal states in a region, to acquire and provide information on maritime traffic throughout the whole area of interest or concern. Such information could be used directly by a RVTS to support its own roles in traffic management. It could also be used, for example, by local VTS to assist them in carrying out their functions in their local areas.'

The concept of a RVTS is not a new one, many reporting systems around the world are operating as RVTS.

The functions of RVTS are assumed to be the same as is the case in a normal coastal VTS, however, RVTS may have a responsibility over larger areas and bear the responsibility of acquiring data of all features concerning its area of concern. This data concerns ships and all navigational aids, off-shore activities, hydrographic and meteorological conditions, as well as all the necessary means of remedial actions available in the region such as SAR, pollution containment, radio medical and salvage.

In summary, RVTS acts as a regional maritime safety and information unit as well as a co-ordination centre for the whole region. It keeps an available data-base about maritime activities of a region and manages the regional remedial resources to respond to any incident happening within its area of responsibility.
RVTS organisational requirements:

Being an information and co-ordination centre, a RVTS needs to meet a number of requirements:

In order to operate properly, a RVTS should be based on an agreement made on a regional level attesting to the need and usefulness of services that it provides. Furthermore, there should be some form of authority set up to operate and manage the activities of the system.

In fact, the establishment and operation of RVTS can be achieved only through political agreement among states sharing common interests in the effective management and use of their coastal seas and their resources.

COST 301(1988) believes that the existence of a RVTS would imply the existence of some form of regional political forum.

In the Mediterranean region, safety and pollution prevention have acquired increasing importance due to the enclosed nature of the Mediterranean, classified as a special area under MARPOL Convention, and the volume of pollutant materials carried daily via the Mediterranean and the Strait of Gibraltar.

Following this awareness, a RVTS has been established for the Mediterranean region under an EU programme, which includes four European Mediterranean countries, such as France, Spain, Greece and Italy.

This aforesaid regional VTS concerns mainly the northern coast of the Mediterranean. However, it is believed that, as far as maritime safety and pollution matters are concerned, the objectives of a RVTS can be better achieved if the
co-operation is extended to include the southern Mediterranean coast. In this respect a RVTS for the whole Mediterranean basin can be envisaged in the long run.

COST 301 programme 8 identified this global need and qualified it as a long term objective. The finding of the study states that ‘during its promotion activities, COST 301 programme 8 identified a general willingness to co-operate, on a regional basis not only within COST 301 countries, in improving maritime safety and preventing pollution.’ Suggestions were made within the same study for the first steps that should be taken towards reaching this long-term objective.

Following this result, it is believed that the Moroccan VTS can be an important component of this Mediterranean safety scheme for improved safety and environment protection covering the whole Mediterranean basin.

Recommendations

As a result of the study, it is strongly recommended that the following actions be undertaken:

6.1 The definition of the area of responsibility of each centre should be decided upon in the near future before the VTS of Tangier starts operation. This matter is paramount for an adequate operation of both VTS systems and should be clearly solved by a joint-Moroccan and Spanish committee.

6.2 The current SAR and pollution combating resources should be strengthened by the acquisition of a new tug boat capable of performing both SAR and oil recovery duties. The current SAR boat ‘Tarik’ should remain mainly as a backup unit. A SAR helicopter with the necessary capacity is needed to perform quick
intervention when the necessity arises along the Moroccan Mediterranean territorial sea.

6.3 A training facility for VTS operators, SAR, pollution and firefighting employees should be established. It is recommended to set up these training programs within the high institute for maritime studies (ISEM). The ISEM, as World Maritime University branch is the suitable place for developing such studies.

6.4 For practical VTS training, a training unit should be developed within the VTS of Tangier. This unit should include two control rooms equipped with radar consoles and communication links capable of receiving 8 to 12 trainees. For simulation training, it is suggested, for the time being, to be performed in a foreign simulation centre such as the centres of Rotterdam and Hamburg.

6.5 As far as SAR and pollution combating training are concerned, a practical training program should be set up for all SAR, pollution and firefighting personnel. It should be scheduled once a month.

6.6 According to IMO-MSC 67/22/Annex13 concerning Mandatory Ship Reporting System in the Strait of Gibraltar (Appendix 2), the language used for ship reports in the system will be English, using the IMO Standard Marine Communication Phrases (SMCPs). Likewise, Spanish or Arabic in case of Morocco can be used if necessary. Therefore, the VTS operators of the centre of Tangier should follow advanced English language programme in order to develop their language skills.

6.7 A work station within the centre of Tangier should be dedicated to The control and management of the crossing traffic between Morocco and Spain. This
will allow significant risk reduction and enhance the level of compliance with the COLREGs.

6.8 The Moroccan VTS authority is urged to prepare the VTS of Tangier to join the Mediterranean RVTS.

6.9 As a first step towards full co-ordination with the Mediterranean RVTS, it is recommended to set up a data-base link and data interchange between the centre of Tangier and the one in Tarifa. This co-operation should be extended to SAR and pollution combating activities as well.

6.10 To achieve an adequate co-ordination of the Spanish and Moroccan centres, a joint committee of VTS authorities should be formed to deal with matters related to harmonisation of procedures and methods, co-ordination of SAR and pollution recovery, when needed, and to solve conflict of responsibilities that may occur.

6.11 Co-operation should be extended to the field of practical training, such as joint field training, simulation courses and exchange of visits. The joint VTS committee should play an important role in co-ordinating these activities.

6.12 Considering the threat faced by the Atlantic coast from increasing levels of pollution, the current safety centres along the Moroccan Atlantic coast should be converted into an efficient network of VTSs and co-ordination centres. These should be equipped with the necessary means of SAR and pollution combating.

6.13 Six VTS centres are sufficient to monitor the flow of traffic and should be set up in the following locations:
- Larache.
- Kenitra-Mehdia.
- Casablanca.
- Agadir.
- Laayoune.
- Dakhla.

6.14 The aforesaid centres should share a common data-base and act in a co-ordinated manner.
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APPENDIX 1

IMO-Resolution.A.578 (14)
Guidelines for Vessel Traffic Services
RESOLUTION A.578(14)

Adopted on 20 November 1985
Agenda item 10(b)

GUIDELINES FOR VESSEL TRAFFIC SERVICES

THE ASSEMBLY,

RECALLING Article 15(j) of the Convention on the International Maritime Organization concerning the functions of the Assembly in relation to regulations and guidelines concerning maritime safety and the prevention and control of marine pollution from ships,

RECALLING ALSO resolution A.158(ES.IV) entitled "Recommendation on Port Advisory Services" and resolution A.531(13) entitled "General Principles for Ship Reporting Systems",

BEARING IN MIND that Member Governments are responsible for the safety of navigation and the prevention of pollution in areas under their jurisdiction,

BEING INFORMED that vessel traffic services have been provided in a number of areas and have made a valuable contribution to safety of navigation, improved efficiency of traffic flow and reduced risk of pollution,

BEING ALSO INFORMED that a number of Governments and international organizations have requested guidance on vessel traffic services,

RECOGNIZING that the level of safety and efficiency in the movement of maritime traffic within a vessel traffic service area is dependent upon close co-operation between those operating the vessel traffic service and participating vessels,

RECOGNIZING ALSO that the use of differing vessel traffic service procedures may cause confusion to masters of vessels moving from one vessel traffic service area to another,

RECOGNIZING FURTHER that the safety and efficiency of maritime traffic would be improved if vessel traffic services were established and operated in accordance with internationally approved guidelines,

HAVING CONSIDERED the recommendation made by the Maritime Safety Committee at its fifty-first session,

1. ADOPTS the Guidelines for Vessel Traffic Services set out in the Annex to the present resolution;

2. URGES Member Governments to ensure that vessel traffic services within their territorial seas are operated in accordance with national law and do not prejudice the right of innocent passage through such waters and to ensure that vessels outside territorial seas are able to use, on a voluntary basis, the service provided;

3. RECOMMENDS Member Governments to encourage masters of vessels navigating in an area for which a vessel traffic service is provided to make use of such service.
ANNEX

GUIDELINES FOR VESSEL TRAFFIC SERVICES

PREAMBLE

1. These Guidelines describe operational procedures and planning for vessel traffic services (VTS). The Guidelines do not address liability or responsibility - which should be considered by the authority establishing a VTS - nor do they create new rights to enact legislation which impose requirements on shipping.

2. VTS authorities are urged to ensure that vessel traffic services within territorial seas are operated in accordance with national law and do not prejudice the right of innocent passage through such waters and to ensure that vessels outside territorial seas are able to use, on a voluntary basis, the service provided.

3. No provision of these Guidelines shall be construed as prejudicing obligations or rights of vessels established in other international instruments.

4. VTS authorities or those planning VTS are recommended to follow these Guidelines, as appropriate to their needs, in the interests of international harmonization and improving maritime safety.

5. These Guidelines describe the possible functions of VTS and provide guidance for designing and operating VTS once it has been decided that such a system, whether simple or highly sophisticated, is necessary. They further aim at international harmonization and address the procedures used by VTS taking into account current practice. They are based on relevant recommendations and resolutions adopted by the Organization, in particular Assembly resolution A.531(13) entitled “General Principles for Ship Reporting Systems”.

CONTENTS

These Guidelines contain the following chapters and sections:

Chapter 1 — Objectives and procedures

Section 1 Vessel traffic services

Section 2 VTS authority

Section 3 Elements of a VTS

Section 4 Functions of a VTS

Section 5 Procedures

Section 6 Personnel

Section 7 VTS publication for users

Chapter 2 — Planning a VTS
CHAPTER 1 — OBJECTIVES AND PROCEDURES

1 VESSEL TRAFFIC SERVICES

A VTS is any service implemented by a competent authority, designed to improve safety and efficiency of traffic and the protection of the environment. It may range from the provision of simple information messages to extensive management of traffic within a port or waterway.

1.1 The reasons for establishing a VTS may include:

assistance to navigation in appropriate areas;
organization of vessel movements to facilitate an efficient traffic flow in the VTS area;
handling of data relating to ships involved;
participation in action in case of accident;
support of allied activities.

1.2 A VTS is particularly appropriate in the approaches to a port, in its access channels and in areas having one or more of the following characteristics:

high traffic density;
traffic carrying noxious or dangerous cargoes;
navigational difficulties;
narrow channels;
environmental sensitivity.

2 VTS AUTHORITY

2.1 VTS authority is the authority operating a VTS. It may include a governmental maritime administration, a single port authority, a pilotage organization or any combination of them.

2.1.1 The authority establishing a VTS should delineate its area of coverage, declare it a VTS area and disseminate to mariners full details concerning the area of operation, including the limits of the areas where participation of vessels is required or recommended, the services provided and the procedures to be followed (see section 5). It should also state the classes of ship which are required or recommended to participate and indicate the VTS centres responsible for the VTS tasks.

2.1.2 The authority should establish appropriate qualifications and training requirements for VTS operators in accordance with section 6.

2.1.3 The VTS authority should ensure that the effects of vessel traffic services, routeing, aids to navigation, pilotage, etc. are fully integrated.

2.1.4 The VTS authority should in general limit the functions of a VTS operating outside port areas and their approach channels to those of providing an information service and navigational assistance service to vessels for the purposes of safety of navigation or the protection of the environment.
2.1.5 Care should be taken that VTS operations do not encroach upon the master’s responsibility for the safe navigation of his vessel, or disturb the traditional relationship between master and pilot.

2.1.6 When planning or designing a VTS, the authority should take into account the factors and criteria of chapter 2.

3 ELEMENTS OF A VTS

3.1 General

A VTS consists of the following elements:

- VTS organization;
- vessels using VTS;
- communications.

3.2 VTS organization

3.2.1 The VTS organization should be equipped with communications facilities and, where appropriate to the tasks performed by the VTS, have surveillance radar and other equipment. The VTS organization should be equipped to use the appropriate frequencies, as prescribed in appendix 18 of the Radio Regulations, including the international distress, safety and calling frequencies.

3.2.2 VTS centres are centres from which VTS are operated.

3.2.3 VTS operators are the appropriately qualified persons who perform the functions of the VTS (see section 4).

3.3 Vessels using a VTS

3.3.1 1974 SOLAS Convention vessels participating in a VTS will be fitted with navigational and communications equipment in accordance with chapters IV and V of that Convention, as amended.

3.3.2 The decisions concerning the actual navigation and manoeuvring of the vessel remain with the master. Neither the sailing plan (see paragraph 5.3.1) nor requested or instructed changes to the sailing plan can supersede the decisions of the master concerning the actual navigation and manoeuvring of the vessel, if such decisions are required according to his judgement by the ordinary practice of seamen or by the special circumstances of the case.

3.3.3 If voluntary or compulsory pilotage exists in the VTS area, pilotage plays an important role in such a VTS. The function of a pilot is to provide the master with:

- assistance in manoeuvring his vessel;
- local knowledge both concerning navigation and national and local regulations; and
- assistance with ship/shore communications, particularly where there are language difficulties.
3.4 Communications

3.4.1 Communications between the VTS centre and the ship should be established and follow the appropriate communication procedures of the Radio Regulations. These communications generally involve VHF radio links which can be duplicated or complemented, for example with traffic signals. The number of appropriate channels required should be kept to a minimum but will depend upon the density of radio traffic.

3.4.2 The language used should enable the VTS authority and the ship to understand each other clearly.

3.4.3 In local areas the primary language may be the appropriate working language of the country where the system is established, but English should be used where language difficulties exist, in particular where requested by the master or VTS operator. For services established in areas where there are ships of many nationalities, English may be designated as the working language.

3.4.4 The IMO Standard Marine Navigational Vocabulary should be used where possible.

4 FUNCTIONS OF A VTS

4.1 General

The functions of a VTS may include:

- data collection;
- data evaluation;
- information service;
- navigational assistance service;
- traffic organization service;
- support of allied activities.

4.2 Data collection

Data collection may include:

- gathering data on the fairway and traffic situation by appropriate equipment, e.g. hydrological and meteorological sensors, radar, VHF direction finder, etc.;
- maintaining a listening watch on the designated maritime safety and distress frequencies;
- receiving ships' reports;
- obtaining reports on ships' conditions with regard to hull, machinery, equipment or manning and where relevant on hazardous or noxious cargo carried.

4.3 Data evaluation

Data evaluation may include:
monitoring the manoeuvres of ships for compliance with international, national and local requirements and regulations;

interpreting the total traffic situation and its developments;

monitoring the fairway situation (hydrological and meteorological data, aids to navigation);

co-ordinating the information flow and distributing relevant messages to the participants or organizations concerned;

collating information for statistical purposes.

4.4 Information service

An information service is a service provided by broadcasting information at fixed times, or at any other time if deemed necessary by the VTS centre, or at the request of a vessel and may include:

broadcasting information about the movement of traffic, visibility conditions or the intentions of other vessels, in order to assist all vessels, including small craft that are participating in the VTS only by keeping a listening watch;

exchanging information with vessels on all relevant safety matters (notices to mariners, status of aids to navigation, meteorological and hydrological information, etc.);

exchanging information with vessels on relevant traffic conditions and situations (movements and intentions of approaching traffic or traffic being overtaken);

warning vessels about hindrances to navigation such as hampered vessels, concentrations of fishing vessels, small craft, other vessels engaged in special operations, and giving information on alternative routeing.

4.5 Navigational assistance service

A navigational assistance service is a service given at the request of a vessel or, if deemed necessary, by the VTS centre, and may include assistance to vessels in difficult navigational or meteorological circumstances or in case of defects or deficiencies.

4.6 Traffic organization service

This is concerned with the forward planning of movements in order to prevent the development of dangerous situations and to provide for the safe and efficient movement of traffic within the VTS area, which may be accomplished on the basis of sailing plans. This service may include:

establishing and operating a system of traffic clearance and reports for specific movements and conditions, or establishing the order of movement;

scheduling vessel movements through special areas such as those in which one-way traffic is established;

establishing routes to be followed and speed limits to be observed;
designating a place to anchor;
organizing vessel movements by means of advice or instructions, such as requiring
a vessel to remain in or proceed to a safe position or other appropriate measure,
whenever the safety of life or protection of the environment or of property warrants
it.

4.7 Support of allied activities

Support of allied activities may include:

co-ordinating the information flow and distributing the relevant messages to the
participants or organizations concerned;
supporting activities allied to those of the VTS authority such as pilotage services,
port services, maritime safety, pollution prevention and control and search and
rescue;
calling upon and requesting action by rescue and emergency services and, if
appropriate, participating in the actions of these services.

5 PROCEDURES

5.1 General

5.1.1 Every VTS authority should establish and apply procedures based on these Guidelines
to the extent required by its functions and needs.

5.1.2 Every vessel participating in a VTS on a voluntary or compulsory basis should as
far as possible follow the procedures applicable to that VTS.

5.1.3 Reporting procedures should be clear and simple and should contain only essential
information so as to avoid imposing an undue burden on masters, officers of the watch and
pilots.

5.1.4 When detailed and extensive information has to be exchanged with one ship which
is not relevant to other ships, the VTS operator may decide to communicate with that ship
on an alternative VHF channel.

5.1.5 To avoid an unnecessary repetition of information by the ship, basic information should
be reported once, be retained in the system and be supplemented or updated according to
requirements and should be made available to shore services as appropriate.

5.1.6 All ships participating in a VTS should, unless otherwise permitted by the VTS
authority, maintain a continuous listening watch on the appropriate frequency of the VTS.
This listening watch should be kept at the position from which the ship is navigated.

5.1.7 Status of the message

Any VTS message directed to a vessel should make it clear whether it contains
information, advice or instruction.

5.1.8 Information broadcast by VTS

The times of regular broadcasts of VTS bulletins should be clearly published in relevant
nautical publications and should take account of the transmission times of neighbouring VTS centres. They should be drawn up in a standard format and should only contain essential information (see section 7). Bulletins broadcast in special circumstances should be prefaced by an appropriate announcement. Information can also be requested by a vessel.

5.2 Initial contact - identification

5.2.1 Generally, the ship contacts the VTS centre by VHF and this is the first direct link between the ship and the VTS. This initial exchange of data enables the ship to provide certain preliminary information, where appropriate (see paragraph 5.2.2.1). It also enables the ship to request certain specific data from the VTS operator. In most cases a ship will identify itself in its dialogue with the VTS operator. This identification may be assisted by technical means such as shore-based radar or VHF direction finder.

5.2.2 A vessel's arrival in a port area is normally anticipated, as the agent will have given an estimated time of arrival (ETA) and requested a berth or anchorage. In the case of vessels carrying dangerous substances, MSC/Circ.299 (December 1980) on "Safe transport, handling and storage of dangerous substances in port areas", which recommends notification of specific information, should be followed as well as any local rules that may be applicable.

5.3 Reporting within a VTS

Ships participating in a VTS should report, if required, at the designated positions and times in accordance with the agreed reporting format. As far as practicable, the master should ensure correct and timely reporting. Vessels not required to report but wishing to avail themselves of the services offered by the VTS should follow the relevant procedures. The types of report and the format described in the General Principles for Ship Reporting Systems* should be used where necessary within the VTS procedures. Not all types of report described below are relevant to every VTS. VTS authorities should ensure that the number of reports vessels have to produce is limited to the minimum compatible with the tasks to be performed by the VTS.

5.3.1 Sailing plan

5.3.1.1 A sailing plan normally consists of the estimated time of arrival in the VTS area or departure from a berth or anchorage in the VTS area. The VTS authority should specify the additional information required in the sailing plan for all ships or for special ships according to local circumstances. In exceptional circumstances the sailing plan may be amplified at the request of the VTS centre.

5.3.1.2 The VTS centre may advise changes to the sailing plan to take account of the traffic situation or special circumstances.

5.3.1.3 After the sailing plan is agreed between the vessel and the VTS centre the vessel is permitted to participate in the VTS and should, as far as practicable, try to maintain the plan.

5.3.1.4 If special circumstances or the safety of traffic so require, the VTS centre may request the vessel to follow a changed sailing plan, indicating the reasons for its request. Such changes should be limited, as far as practicable, and may include:

- time of passing the next reporting point or another specific point;
- extra position reports;

* Assembly resolution A.531(13).
a new destination;
remaining at a specified location;
request not to enter the VTS area;
request to stay alongside the berth; and
request to follow a certain route.

5.3.1.5 When special circumstances or the safety of traffic so require and when the VTS operator has the authority, a vessel may be instructed to maintain a specific sailing plan or implement changes to the sailing plan in accordance with paragraphs 5.3.1.4 and 3.3.2.

5.3.1.6 If a vessel does not carry out the action indicated in paragraph 5.3.1.4 or 5.3.1.5 the reasons should be reported to the VTS centre.

5.3.2 Other reports

5.3.2.1 When there is no automatic tracking after reception of the sailing plan and identification of the ship, position reports are necessary to update the movement data of a ship. Ships may be required to send position reports at prescribed positions.

5.3.2.2 If the sailing plan cannot be maintained the vessel should send a deviation report to the VTS centre and an amended sailing plan should be agreed between the vessel and the VTS centre.

5.3.2.3 The vessel should send a final report when leaving the VTS area or arriving at its berth or anchorage in the VTS area.

5.3.2.4 Any other report prescribed by the VTS authority should be made in accordance with the reporting principles adopted by the Organization. For example, a "deficiency report" is a report which should be made to inform the VTS centre of defects, damage, deficiencies or other limitations.

5.4 Assistance to navigation

When a vessel requests navigational assistance or when such assistance is deemed necessary by a VTS centre, the VTS operator should ensure positive identification and location of the vessel by reliable means and obtain other relevant information. After the identification and location are established, the messages on navigational assistance should be sent at short intervals. When the vessel needs no further navigational assistance, clear notice should be given to the VTS centre. In open waters navigational assistance will mainly consist of a description of surrounding traffic, warnings with respect to collision and grounding risks and, if necessary, advice on course. In confined waters navigational assistance will usually also include position data (e.g. distance to a "reference line" or to a "way point").

5.5 Traffic rules

In certain places traffic rules exist. Such rules may cover the movement of special ships, limitations in a channel or passing or overtaking situations. Where such rules exist, and where the VTS operator has the authority, the VTS operator may need to issue instructions to ensure that traffic complies with these traffic rules as appropriate.
6 PERSONNEL

The VTS authority should ensure that VTS operators have the qualifications and have received specialized training appropriate to their tasks within the VTS and meet the language requirements mentioned in paragraph 3.4, in particular with regard to VTS operators authorized to issue traffic instructions or to give navigational assistance.

7 VTS PUBLICATION FOR USERS

7.1 A VTS authority should ensure that the local traffic movement rules and regulations in force, the services offered and the area concerned are promulgated appropriately.

7.2 The publication should be convenient for use by mariners and should, where possible, include chartlets showing the area and sector boundaries, general navigational information about the area together with procedures, radio frequencies or channels, reporting lines and reporting points. Where the VTS operates beyond the territorial sea, the limit of the territorial sea should be clearly indicated on the chartlets.

CHAPTER 2 — PLANNING A VTS

1 The safety of maritime traffic in a VTS area is necessarily a co-operative activity between those ashore and those at sea. It is therefore important, whenever a VTS is being planned and designed, that, amongst others, the mariners' views on the need for and operation of the service are taken into account. The level of need should also be considered. This will assist in the effective implementation of VTS and facilitate the co-operation of all the future participants and promote confidence in the procedures to be followed.

2 When considering the introduction of a VTS, the authority should verify that its operation will be in accordance with international and national law.

3 When planning a VTS, the VTS authority should be guided by criteria such as:

   .1 the general risk of marine accidents and their possible consequences and the density of traffic in the area;

   .2 the need to protect the public and safety of the environment, particularly where dangerous cargoes are involved;

   .3 the operation and economic impact on users of the system and the marine community as a whole;

   .4 the availability of the requisite technology and expertise;

   .5 existing or planned vessel traffic services in adjacent waters and the need for co-operation between neighbouring States;

   .6 existing or proposed traffic patterns or routing systems in the area, including the presence of fishing grounds and small craft;

   .7 existing or foreseeable changes in the traffic pattern resulting from port or offshore terminal developments or offshore exploration in the area;

   .8 the adequacy of existing communications systems and aids to navigation in the area;
.9 consultation of interested parties and assessment of proposed procedures;
.10 meteorological factors such as weather and ice conditions;
.11 hydrological factors such as tides, tidal ranges and currents; and
.12 narrow channels, port configuration, bridges and similar areas where the progress of vessels may be restricted.

4 A VTS area can be divided into sectors but these should be as few as possible. The boundaries should be indicated in appropriate nautical publications.

5 Area and sector boundaries should not be located where vessels normally alter course or manoeuvre or where they are approaching convergence areas, route junctions or where there is crossing traffic.

6 VTS centres in an area or sector should use a name identifier.

7 Reporting points should be clearly identified, for example by number, sector, name and a geographical position or description. They should be kept to a minimum and be as widely separated as possible.
APPENDIX 2

MSC 67/22/Annex 13
Mandatory Ship Reporting System
“In the Strait of Gibraltar”
Traffic Separation Scheme area
ANNEX 2

MANDATORY SHIP REPORTING SYSTEM "IN THE STRAIT OF GIBRALTAR"
TRAFFIC SEPARATION SCHEME AREA

1 CATEGORIES OF SHIPS REQUIRED TO PARTICIPATE IN THE SYSTEM

Ships of the following general categories are required to participate in the reporting system:

1. all ships of 50 metres or more in length overall;

2. all ships, regardless of length, carrying hazardous and or potentially polluting cargo, as defined in paragraph 1.4 of resolution MSC.43(64);

3. ships engaged in towing or pushing another vessel where the combined length of the ship and tow or pushed vessel exceeds 50 metres;

4. any category of vessel less than 50 metres in length overall which is using the appropriate traffic lane or separation zone in order to engage in fishing; and

5. any category of ships less than 50 metres in length overall which is using the appropriate traffic or separation zone in an emergency in order to avoid immediate danger.


2.1 The reporting system will cover the area (appendix 1) between longitudes 005° 58'(W) and 005° 15'(W). This area includes the traffic separation scheme "in the Strait of Gibraltar" and in designated inshore traffic zone.

2.2 The reference chart which includes all the area of coverage for the system is Spanish Hydrographic Office 105.

3 FORMAT, CONTENT OF REPORT, TIMES AND GEOGRAPHICAL POSITIONS FOR SUBMITTING REPORTS, AUTHORITY TO WHOM REPORTS SHOULD BE SENT, AVAILABLE SERVICES

The ship report short title "GIBREP", shall be made to the ship reporting centre located at TARIFA. When the Tangier VTS is in operation in Morocco, ships sailing in the area of coverage shall notify TANGIER TRAFFIC, in accordance with the terms which will be established in the future. A double report should be amended.

3.1 Format

The information requested from ships shall be provided in the standard reporting format, given in paragraph 2 of the appendix to IMO resolution A.648(16).
A ship may elect, for reasons of commercial confidentiality, to communicate that section of the GIBREP ENTRY report which provides information on cargo (line P) by non-verbal means prior to entering the system.

3.2 Content

The report from a ship to the VTS should contain only information which is essential to achieve the objectives of the system:

1. Information considered essential:

   A - Name of the ship, call sign, IMO identification number;

   C or D - Position;

   G and I - Last and next port of call;

   P - Hazardous cargo, class and quantity, if applicable; and

   Q or R - Breakdown, damage and/or deficiencies affecting the structure, cargo or equipment of the ship or any other circumstances affecting normal navigation, in accordance with the provisions of the SOLAS and MARPOL Conventions.

2. Information considered necessary:

   E and F - Course and speed of the ship;

Note:
On receipt of a position message, operators of the VTS will establish the relation between the ship's position and the information supplied by the facilities available to them. The information on heading and speed will facilitate the VTS operator's task of identifying a ship within a group.

3.3 Geographical position for submitting reports

Ships entering the area of coverage shall report to the TARIFA Traffic VTS when crossing the limits mentioned in paragraph 2.1 or when leaving the ports or anchorages in the area.

3.4 Authority

The shore-based authority is Tarifa VTS which forms part of the Area Search and Rescue and Pollution Control Co-ordination Centre (CZCS Tarifa).

The CZCS Tarifa is a Co-ordination Centre under the authority of the Spanish Government Search and Rescue and Maritime Safety Division. The Division, administered by the Ministry of Development, is entrusted, among other responsibilities, with providing services relating to maritime search and rescue, vessel traffic control and assistance, and prevention and control of pollution of the marine environment.
3.5 Services offered

TARIFA VTS broadcast regular information regarding warnings to mariners and traffic, navigational and weather conditions in the area, in Spanish and English.

4 INFORMATION TO BE PROVIDED TO PARTICIPATING SHIPS AND PROCEDURES TO BE FOLLOWED

In addition to the general information stated above, TARIFA Traffic could provide a particular vessel with information regarding her position, course and speed or the identification of the traffic in her vicinity. The ship should request this additional information.

5 RADIOCOMMUNICATION EQUIPMENT REQUIRED FOR THE SYSTEM, FREQUENCIES ON WHICH REPORTS SHOULD BE TRANSMITTED AND INFORMATION TO BE REPORTED

The radiocommunication equipment required for the system is that defined in the GMDSS for sea areas A.1 and A.2.

.1 The system will be based on VHF voice communications and will be interactive with an interchange of data between ships and the ship reporting centre. The channels defined are channel 16 and 10, with the channel 67 as a supplementary option.

.2 In special circumstances, the hectometric wave band may also be used for the interchange of information between the ship and the VTS.

.3 Information of commercial confidentiality may be transmitted by non-verbal means. Details are as follows:

FAX: + 34 56 68 06 06 (available by auto-link)
TELEX: 78262
Radio telex selective call: 0994
Answerback: SATAR
Frequencies scanned: 4179 kHz, 6269 kHz, 8297.6 kHz, 8298.1 kHz, 12520 kHz, 16688.5 kHz

.4 The language used for reports in the system will be English, using the IMO Standard Marine Communications Phrases* (SMCPs) where necessary or Spanish, if appropriate.

.5 Communications associated with reporting in accordance with the requirements of this system will be free of charge.

* Trials of the SMCPs will commence after 6 June 1997.
6 RULES AND REGULATIONS IN FORCE IN THE AREA OF THE SYSTEM

6.1 The International Regulations for Preventing Collisions at Sea, (COLREGs) 1972 are applicable throughout the area of coverage of the proposed system.

6.2 The TSS "In The Strait of Gibraltar" has been approved by IMO and therefore rule 10 of the COLREGs applies.

7 SHORE-BASED FACILITIES TO SUPPORT OPERATION OF THE SYSTEM

7.1 The Tarifa VTS (TARIFA TRAFFIC) is provided with the following facilities:

.1 Telephone, facsimile and telex communications;
.2 2 sets of VHF radiocommunication equipment with digital selective calling (DSC);
.3 1 set of radiocommunication equipment in MF/HF bands with DSC;
.4 2 sets of radiocommunication equipment with radiotelex in MF/HF bands;
.5 3 real-time display consoles for "S" and "X" band radar signals and raw video from remote radar stations;
.6 2 display consoles for monitoring and viewing; and
.7 1 VHF radio direction finder in marine and aeronautical bands.

7.2 The remote station at Ceuta is provided with the following facilities:

.1 1 VHF radio direction finder, marine and aeronautical bands;
.2 5 sets of VHF transmitters and receivers (3 marine band, 1 aeronautical band, 1 digital selective calling);
.3 1 "X" band radar facility; and
.4 1 "S" band radar facility.

7.3 The remote station at Cape Trafalgar is provided with the following facilities:

.1 1 VHF radio direction finder, marine and aeronautical bands;
.2 5 sets of VHF transmitters and receivers (3 marine band, 1 aeronautical band, 1 digital selective calling);
.3 1 "X" band radar facility; and
.4 1 "S" band radar facility.
8 ALTERNATIVE COMMUNICATION IF THE COMMUNICATION FACILITIES OF THE SHORE-BASED AUTHORITY FAIL

8.1 The system is designed to avoid, as far as possible, any irretrievable breakdown of equipment which would hinder the functioning of the services normally provided by the Tarifa VTS.

8.2 The most important items of equipment and power sources are duplicated and the facilities are provided with emergency generating sets as well as with UPS units. A maintenance team, on call, 24 hours a day, stands ready to repair to the extent possible any breakdowns which may occur.

8.3 The location of radar antennae ensures that, in the event of failure of the facility, coverage by another station will be provided.

8.4 In addition, the coast radio stations at Tarifa and Algeciras, operated by the Telephone Company, can be used as an alternative, so as to ensure VHF/MF communication with ships in case of need.
APPENDIX 1

COBERTURA GEOGRÁFICA DEL SISTEMA - LÍNEAS DE NOTIFICACIÓN.
APPENDIX 3

Decree project of the Ministre of Merchant Marine and
Ocean Fisheries on the Organisation and duties of the VTS of
Tangier
Projet d'arrêté du Ministre des Pêches Maritimes et de la Marine Marchande relatif aux attributions et à l'organisation du Centre d'Organisation et de Contrôle du trafic maritime

Le Ministre des Pêches Maritimes et de la Marine Marchande,

- Vu le Dahir n° 1.59.351 du 1er Jumada II 1379 (2 décembre 1959) relatif à la Division Administrative du Royaume, tel qu'il a été modifié et complété;

- Vu le Décret n° 2.62.345 du 15 Safar 1383 (8 Juillet 1963) portant statut particulier des cadres d'administration centrale et du personnel commun aux administrations publiques, tel qu'il a été modifié ou complété;

- Vu le Décret n° 2.75.832 du 27 Hijja 1395 (30 Décembre 1975) relatif aux fonctions supérieures propres aux départements ministériels tel qu'il a été modifié ou complété;

- Vu le Décret n° 2-94-858 du 27 décembre 1994 relatif aux attributions et à l'organisation du Ministère des Pêches Maritimes et de la Marine Marchande, notamment son article 13,

**ARRETE**

*Article premier* - Il est institué un Centre d'organisation et de contrôle du trafic maritime dont le siège est fixé à Tanger.

*Article deux* - Ce Centre est chargé d'assurer l'organisation et le contrôle permanent et régulier du trafic maritime dans la zone du détroit de Gibraltar.
A ce titre, il:

- veille au respect par les navires des règles de circulation maritime dans le dispositif de séparation du trafic du détroit de Gibraltar, conformément à la réglementation en vigueur;

- assure en coordination avec les services compétents, les opérations d'assistance, de sauvetage en mer, de recherche et de prévention de la pollution par les navires;

- réceptionne toutes informations en provenance des navires et procède à leur analyse;

- recueille et traite les données concernant la situation des voies de navigation maritime et du trafic;

- diffuse l'information relative à la sécurité de la navigation auprès de tous les intéressés et assure l'exploitation des données statistiques sur la navigation et le trafic dans la zone du détroit.

**Article trois** - Le Centre d'organisation et de contrôle du trafic maritime comprend:

- le service de surveillance par radar;
- le service d'information pour le contrôle des navires;
- le service administratif et technique
- le service des statistiques.

**Article quatre** - Le Centre d'organisation et de contrôle du trafic maritime visé à l'article premier du présent arrêté est assimilé aux Divisions de l'Administration Centrale, et ses services, aux services de l'Administration Centrale.

**Article cinq** - Les nominations aux fonctions de Directeur du Centre d'organisation et de contrôle du trafic maritime, de Chef de Service prévues aux articles 3, et 4 ci-dessus, ont lieu dans les mêmes conditions que celles prévues par le décret n° 2.75.832 du 27 hijja 1395 (30 Décembre 1975) sus-visé; et les indemnités afférentes aux dites fonctions sont allouées aux intéressés suivant la même procédure.

**Article six** - Le présent arrêté sera publié au Bulletin Officiel
PROJET D’ARRÊTÉ RELATIF AUX ATTRIBUTIONS ET À L’ORGANISATION DU CENTRE DE CONTRÔLE DU TRAFIC MARITIME DANS LE DÉTROIT DE GIBRALTAR

NOTE DE PRÉSENTATION

Le Royaume du Maroc a décidé d’implanter sur le Détroit de Gibraltar, près de Tanger, une Tour de Contrôle du trafic maritime appelée : VTS, Vessel Trafic Services (Services de Trafic Maritime) qui constitue un nouveau jalon sur la voie des actions engagées pour exercer les responsabilités d’État côtier comme le prévoit la réglementation en vigueur adoptée au niveau mondial par l’Organisation Maritime Internationale.

Cette Tour vise à doter le Maroc d’un moyen nouveau lui permettant d’assurer la sécurité de la navigation maritime au large des côtes marocaines.

Le VTS Tanger sera mis en place dans le but d’améliorer et de renforcer la sécurité maritime, l’efficacité du trafic, et de protéger l’environnement marin.

Pour lui donner une assise juridique officielle, il a été décidé de le doter d’une structure opérationnelle présentant la garantie d’un fonctionnement permanent 24h sur 24 comme il est requis par les normes en vigueur.

C’est pourquoi un projet d’Arrêté a été élaboré, il viendra capitaliser le patrimoine organisationnel du Ministère des Pêches Maritimes et de la Marine Marchande.
Le projet d'Arrêté comporte deux parties sur le plan de la nomenclature.

La première est consacrée aux textes en vigueur en vertu desquels l'Arrêté est proposé, faisant référence à 4 Dahir et Décrets fondamentaux régissant notamment la division administrative du Royaume; et le statut particulier des cadres d'administration centrale.

La seconde partie du projet, réservée aux dispositions spéciales concernant l'organisation du VTS en tant qu'organe de Contrôle, consacre à chaque élément organisationnel un article spécifique.

L'Article 1 détermine le siège du VTS qui va être implanté près de Tanger, un site le mieux adapté aux équipements qui y seront installés.

Pour ce qui est de son rôle, il est à signaler que l'Article 2 réservé à ce volet prévoit de manière précise les différentes missions de la Tour de Contrôle ayant trait de façon générale à l'amélioration de la sécurité de la navigation maritime et à la prévention de la pollution marine.

Concernant les structures de cet organe, l'Article 3 confère au VTS 4 services devant normalement assurer son fonctionnement dans les conditions normales.

Les deux derniers Articles comportent les dispositions relatives à l'assimilation du VTS à une Division de l'Administration Centrale, et à la nomination de son Directeur.

Le projet d'Arrêté s'efforce de garantir le bon fonctionnement du VTS et permet d'institutionnaliser un organe, le premier de son genre en Afrique, et dans la région Nord Est de l'Atlantique Nord, qui contribuera à faire respecter les normes internationales relatives à la circulation maritime.