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SE3.1.1 “Maritime Operational Services (MOS)”

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Abbreviations and Acronyms

AIS	Automatic Identification System
COMSAR	Sub- Committee on Radiocommunication and Search and Rescue (of IMO)
EC	European Commission
ECDC	European Centre for Disease Prevention and Control
EEZ	Exclusive Economic Zone
EMBARC	European study for Baseline and Advanced Regional and Coastal Traffic management
EMSA	European Maritime Safety Agency
ETV	Emergency Towing Vessel
EU	European Union
GMDSS	Global Maritime Distress and Safety System
GPS	Global Positioning System
HRS	High Risk Ship
IALA	International Association of Marine Aids and Lighthouse Authorities
IAMSAR	International Aeronautical and Maritime Search and Rescue Manual
IMO	International Maritime Organization
LRIT	Long Range Identification and Tracking
MAOC-N	Maritime Analysis and Operations Centre – Narcotics
MarNIS	Maritime Navigation Information Services
MarNIS-rep	MarNIS-representative
MARPOL	International Convention for the Prevention of Pollution from Ships (of IMO)
MAS	Maritime Assistance Services
MCA	Maritime and Coastguard Agency (UK)
MEDEVAC	Medical Evacuation
MEM	Maritime Emergency Manager
MEPC	Marine Environment Protection Committee (of IMO)
MOS	Maritime Operational Services
MRO	Maritime Rescue Operation
MS	Member State (of EU)
MSC	Maritime Safety Committee (of IMO)
MSI	Maritime Safety Information
MRCC	Maritime Rescue Co-ordination Centre
MRO	Mass Rescue Operation
OPRC	Oil Pollution Response and Co-operation
PDA	Personal Digital Assistant
PSSA	Particularly Sensitive Sea Area
SAMSON	Safety Assessment Model for Shipping and Offshore on the North Sea
SAR	Search and Rescue
SHIRA	Oil spill detection using Ship Radar
SITREP	Situation Report
SLAR	Side Looking Airborne Radar
SOLAS	Safety of Life at Sea
SOSREP	Secretary Of State Representative in the UK
SRR	Search and Rescue Region
SRU	Search and Rescue Unit
SSN	SafeSeaNet
TMAS	Telemedical Assistance Service
TSS	Traffic Separation Scheme

SE3.1.1 Maritime Operational Services (MOS)



UK	United Kingdom
UNCLOS	United Nations Conference on the Law of the Sea
VMS	Vessel Monitoring System (Fisheries)
VTM	Vessel Traffic Management
VTS	Vessel Traffic Services

1. Objectives

In order to facilitate more effective support for safety and security it is envisaged that coastal States will require strengthening their capabilities for the following key elements:

- a. The ability to provide pro-active vessel traffic management to ships not only in their Territorial Sea but beyond and through into the boundaries of their Exclusive Economic Zone (EEZ);
- b. A structured and harmonized co-operation between the Member States and exchange of information between Member States and the involvement of a more effective SafeSeaNet (SSN), also with respect to incidents and accidents;
- c. The approach to cover all public interests with respect to maritime traffic and transport.

To this end it is required to consider, through innovative use of resources and technologies, the ability for shore-based operators to be able to monitor and provide the appropriate level of assistance wherever the ship may be located in the coastal waters, shifting the emphasis from remedial services towards proactive services. Through the identification of High Risk Ships appropriate measures may be taken in order to relieve the threat to the coastline and oceans. To this end it is also required to consider the establishment of the powers for taking measures against those ships.

A detailed review will be conducted of proposals to put an end to present fragmentation of measures in place where resources, systems and services are organised and strengthened into one coherent set of measures.

2. Target Stakeholders

- Policy makers interested in rationalisation or harmonisation of regulatory requirements and interactions between regulation enforcement authorities
- Maritime Administrations;
- Authorities requiring pre-reporting from shipping;
- SAR, OPRC and MAS services;
- Ship Masters;
- Port Authorities (safety and security related);
- Port Community System operators, Agents.

3. Glossary terms

Maritime Operational Services (MOS):

Coordinated services of a member State oriented to uses of the sea. These services are provided from a small number of Centres, desirably one in each member State. The services are provided on behalf of competent authorities. A MOS is a coordination centre where any authority considering a measure against maritime traffic or transport is in contact with other authorities that might be involved. The MOS constitutes the eyes and ears of any authority that has to do with maritime traffic, whether directly (Harbour Master, traffic management) or indirectly (customs, immigration, police, etc.). The services have a wide scope and include:

- Search and Rescue (SAR);
- Oil Pollution Preparedness, Response and Cooperation (OPRC);

- Maritime Assistance Services (MAS);
- Pro-active Vessel Traffic Management (VTM);
- Flag State responsibilities.

Search and Rescue (SAR)¹:

Search and Rescue (SAR) comprises the search for, and provision of aid to, persons who are, or who are feared to be, in distress. The International Convention on Maritime Search and Rescue 1979 (SAR Convention) provides for international agreement on the provision of SAR services including entering into SAR agreements with neighbouring States, establishment of common (operating) procedures and preparatory measures such as rescue coordination centres/sub-centres.

Oil Pollution Preparedness, Response and Cooperation (OPRC)¹:

The International Convention on Oil Pollution Preparedness, Response and Co-operation (OPRC), 1990 sets out the requirement to establish measures for dealing with pollution incidents, either nationally or in co-operation with other countries.

Maritime Assistance Services (MAS)¹:

IMO Resolution A.950(23) Maritime Assistance Services (MAS) sets out the recommendations for MAS, the principal purposes of which are to receive the various reports, consultations and notifications required in a number of IMO instruments; monitoring a ship's situation if such a report indicates that an incident may give rise to a situation whereby the ship may be in need of assistance; serving as the point of contact if the ship's situation is not a distress situation but nevertheless requires exchanges of information between the ship and the coastal State, and for serving as the point of contact between those involved in a marine salvage operation undertaken by private facilities if the coastal State considers that it should monitor all phases of the operation.

Place of Refuge

This is a place where a vessel in need of assistance can be assisted to take action to enable it to stabilize its condition and reduce hazards to navigation, and to protect human life and the environment.

4. Approach

Coastal States presently provide for a number of services related to maritime safety and the protection of the environment, these being agreed at international level through the International Maritime Organization and includes services such as Search and Rescue (SAR), Oil Pollution Preparedness, Response and Cooperation (OPRC) and Maritime Assistance Services (MAS). In addition to this Flag States also have obligations and responsibilities towards vessels under their flag.

In the case of SAR and OPRC the international cooperation is well established, and guidelines have been provided for the setting up of MAS. With respect to the obligations and responsibilities of flag States, these have also been clearly defined however it is recognised that the level of assistance provided may vary from State to State.

Whilst it is recognised that many services may make use of the same, or similar, infrastructure and that an incident or accident will lead to the mobilisation of often more than one of these services, it is often the case that these services are separated and even operated under the auspices of different

¹ Ref www.imo.org

authorities. In itself this should and does not necessarily lead to any major conflicts of interest however there are arguments for combining resources and seeking means for furthering the cooperation between the various services, including their resources.

Further, it may be considered that the services as outlined above provide for reactive measures. There is a growing argument for coastal and flag States to provide for more preventive and proactive measures and services for shipping in the interests of safety, security and the protection of the environment.

The Maritime Operational Services (MOS) concept provides for routine, enforcement, preventive, and remedial services in the search and rescue area in the form of monitoring and the co-ordination and provision of response services. MOS promotes proactive services to avoid incidents not only developing but also occurring in the first place. Functions such as SAR, VTS, enforcement, oil pollution response, risk determination, use of places of refuge through the use of temporary Maritime Assistance Services (MAS) and sending Emergency Towing Vessels (ETV) are combined in a MOS centre; people responsible for one or more of these tasks can share the same information and equipment and co-operate in performing their tasks.

The MOS concept foresees a number of existing services aimed primarily towards maritime safety and the protection of the environment provided by flag and coastal States being placed under one (virtual) roof.

In short the services and provisions to be considered include:

- Search and Rescue (SAR);
- Oil Pollution Preparedness, Response and Cooperation (OPRC);
- Maritime Assistance Services (MAS);
- Pro-active Vessel Traffic Management (VTM);
- Flag State responsibilities.

Ultimately the establishment of Maritime Operational Services, or equivalent, could have potential consequences for the following aspects:

- Legislative;
- Organisational;
- Infrastructure and Technical;
- Training and Education.

The MOS concept was developed within the EC co-funded 6th Framework project MarNIS (Maritime Navigation and Information Services).

This document has the aim to compare current practice, planned/drafted amendments and concepts having the potential to increase the effectiveness of existing services and provisions, as well as provide added value through new (or enhanced) services and provisions. This includes the individual services as identified above and argues for the additional benefit of placing these services under one (virtual) roof.

Central to this is the capability and availability of means to identify, communicate with, track and trace vessels sailing in EU waters and thereby facilitate a pro-active approach to vessel traffic monitoring in all EU waters.

An important aspect is the sharing of existing infrastructure and/or resources by authorities other than the “traditional” maritime authorities, such as Customs, Immigration and Health.

5. Existing Provisions

5.1. Search and Rescue (SAR)

The 1979 SAR Convention was aimed at developing an international SAR plan, so that, no matter where an accident occurs, the rescue of persons in distress at sea will be co-ordinated by a SAR organization and, when necessary, by co-operation between neighbouring SAR organizations.

Preparatory measures which should be taken, including the establishment of rescue co-ordination centres and sub-centres, are provided for in the Convention as are the inclusion of outline operating procedures to be followed in the event of emergencies or alerts and during SAR operations.

Other areas addressed are the requirement for the rescue co-ordination centres to have the ability to receive ship reports on their position, in order to facilitate a faster response, and to be aware of the resources available in the area.

The technical requirements of the SAR Convention, as amended in 1998 and 2004, are contained in an Annex, which is divided into five Chapters, namely:

- Chapter 1 - Terms and Definitions
- Chapter 2 - Organization and Co-ordination
- Chapter 3 - Co-operation between States
- Chapter 4 - Operating Procedures
- Chapter 5 - Ship reporting systems

The principle task of a Maritime Rescue Coordination Centre (MRCC) is to coordinate search and rescue operations. The SAR Convention would appear sufficient to provide a legal framework in combination with provisions of SOLAS regarding the obligation of masters in the vicinity of a vessel in distress.

The information as contained in the International Aeronautical and Maritime Search and Rescue Manual as amended is the basis for the operation of the SAR activities and there is an obligation to develop and execute SAR plans in each sea area. A sea area is divided in Search and Rescue Regions (SRRs) where the contracting parties take the responsibility for the organization of SAR.

5.2. Oil Pollution Preparedness, Response and Cooperation (OPRC)

The IMO International Convention for the Prevention of Pollution from Ships (MARPOL 73/78) and International Convention on Oil Pollution Preparedness, Response and Cooperation (OPRC 1990) provide a global framework for international cooperation in combating major incidents or threats of marine pollution.

Parties to the OPRC convention are required to establish measures for dealing with pollution incidents, either nationally or in cooperation with other countries. These applications can be divided into two, detection of oil spills and coordination of pollution response operations.

5.3. Maritime Assistance Services (MAS)

A Maritime Assistance Service (MAS) as defined in Resolution A950 (23) is responsible for receiving reports in the event of incidents and serving as the point of contact between the master and the authorities of the coastal State.

The original objectives of MAS are:

- Receiving reports, consultations and notifications required by the IMO instruments referred to by the relevant instruments;
- Monitoring the ship's situation if a report as referred to above discloses an incident that may cause the ship to be in need of assistance;
- Serving as a point of contact between the master and the coastal State concerned, if the ship's situation requires exchanges of information and the coastal State, but is not a distress situation that could lead to a SAR operation;
- Serving as a point of contact between those involved in a marine salvage operation undertaken by private facilities at the requests of parties having a legitimate interest in the ship and the coastal State, if the coastal State concerned decides that it should monitor all phases of the operation.

The guidelines comprise the following regarding the establishment of MAS: The establishment of MAS should not necessarily entail the setting up of a new organization. In so far as the guidelines are observed, the functions of the MAS could at the discretion of the Administration, be discharged by an existing organization, preferably an MRCC, or alternatively a harbour master's office, a coast guard operations centre if one exists or another body.

6. Maritime Operational Services

6.1. The duty of preparedness of a member State

MarNIS promoted and strongly recommends the idea that the authorities are prepared to deal with any contingency in its Search and Rescue Region (SRR) and in the case of a vessel flying the flag of that State and being in need of assistance, (but not in a situation that life of passengers and crew is endangered) in any part of the high seas, where the coastal authorities have decided that SAR resources need not to be employed. The intervention on the high seas can be based on article 194 UNCLOS, but there is also an obligation on the flag State to avoid pollution of the high seas.

Article 194 gives some general orders to States for measures to prevent, reduce and control pollution of the marine environment by stating in its first paragraph:

“1. States *shall take*², individually or jointly as appropriate, all measures consistent with this Convention that are necessary to prevent, reduce and control pollution of the marine environment from any source, using for this purpose the best practical means at their disposal and in accordance with their capabilities, and they shall endeavor to harmonize their policies in this connection.”

The wording “shall take” underlines the obligation of States to be pro-active in taking necessary measures for the prevention, reduction and control of marine pollution.

² Emphasis added.

Preparedness refers to the state of being prepared for specific or unpredictable events or situations. Preparedness is an important quality in achieving goals and in avoiding and mitigating negative outcomes. It is a major phase of emergency management.

Preparedness includes the fact that when an accident happens the MOS centre has protocols available to deal immediately with the contingencies and solves the question which parties have a role to play.

Preparedness has different aspects:

- a) the capability to know what happens at sea;
- b) the capability to assist;
- c) the capability to buy time.

6.1.1. The capability to know what happens at sea

The capability ‘to know’ that an emergency was in progress initially depended on a visual sighting, first simply of a ship at sea seen by a man on the shore who was maybe using just his eyes or maybe, later, using binoculars. In both cases such a sighting was a day-time only capability.

Wireless communications was a leap forward. The Titanic used wireless messages to inform authorities on what has happened and the urgent assistance which was required. The Titanic distress signal was picked up both by neighbouring ships and by the shore station at Cape Race, and finally overcame the limitation in the capability of shore organizations ‘to know’.

As technology developed further in the twentieth century, another frustration relating to the issue of ‘knowing’ – the ‘where’ – was gradually removed. Direction finding, followed by Decca Position Systems, LORAN C, Omega and finally, Satellite navigation and today’s GPS– which means that distress messages will, in most circumstances, precisely pinpoint the vessel in distress, not in the least through the adoption of GMDSS.

6.1.2. The capability to assist

As with the capability ‘to know’, the capability to assist has undergone a significant, maybe even dramatic, evolution during the last century. As such, today shore based lifeboats (whether launched from the beach or based in harbours) are of a much higher standard with respect to crew safety and technical capability than the row-boats launched from the beach last century, and the reach and dependability of operation is far greater.

Present day SAR and OPRC organizations know the ‘what’ and the ‘where’ of an emergency, all the way down to the individual units if something happens. Present technology allows any master of any ship to contact the local shore station and, with the support of GPS or AIS transponders as well as the available communication methods, to tell about his problems and where he is. This information is instantly used by the coordinating service that needs to become involved, and the service will initiate assistance, using the seaborne or airborne assets at their disposal, completely dedicated to save the lives of the persons in danger.

Naturally, though, reaching the person, raft or ship in question may take everything from 30 minutes to something measured in days, primarily depending on the type of assistance needed and, obviously, the distance from the base of Search and Rescue Units (SRUs).

6.1.3. The capability to buy time

Serious consideration should be given to this time element, especially considering that it is likely to remain constant in the future. The rationale behind this observation is that the time required to reach the target is very much dictated by physical factors that are very difficult to improve:

- Communications are already directly ear-to-ear, and instantaneous, which also means that saving time is not an issue in this relation;
- Scramble-time for helicopters and fast lifeboats is usually brief, measured in minutes. Hence, even a reduction of time consumption by a factor of two, would only save a few minutes of the total mission time, which is unlikely to have a dramatic overall impact, if at all possible;
- Air-speed of helicopters, when they are deployed, is an issue with potential for reduction of mission time, however with air speeds of up to 150 knots already, i.e. comparable with smaller fixed-wing aircraft, the prediction is that only slow evolution is to be expected;
- Scramble-time for ships is usually larger than for fast rescue boats or dedicated life boats, and could hold room for improvement, but with ship speeds limited to the range of 15 to maybe 25 knots, the really time consuming part of the operation is the transit phase itself. Considering naval architectural and hydrodynamic issues, though, any significant improvement for seagoing, seaworthy ships is unlikely to happen.

On this background, it is reasonable to find that the time-to-target cannot be changed significantly, and that such a change should not be considered in future planning. A sideline issue could of course be efficiency changes brought about by a more dense deployment of ships along the coastlines of the world, but offshore or mid-ocean will always be a lonely place, with help a long way, or time, off.

On the other hand, there should be no doubt that buying time is indeed the name of the game, if a disaster cannot be averted, or if the distance to land is great, and no other help is at close hand: having time permits that evacuation of crew and passengers is undertaken calmly and deliberately; having time permits further attempts to contain the problem, to put out the fire, to manage the damage, to protect the values at stake.

6.2. What are Maritime Operational Services (MOS)

Maritime Operational Services (MOS) have been devised as an integral part of the MarNIS concept, in the first instance directed towards EU member States, and are defined as coordinated services of a member State oriented to uses of the sea. These services are provided from a small number of Centres, desirably one in each EU member State. The services are provided on behalf of competent authorities.

The services have a wide scope and include:

- Search and Rescue (SAR);
- Oil Pollution Preparedness, Response and Cooperation (OPRC);
- Maritime Assistance Services (MAS);
- Pro-active Vessel Traffic Management (VTM);
- Flag State responsibilities.

6.2.1. The MOS centre

Many authorities are involved with maritime traffic and transport and the master of a ship, its owner, agents or pilots may encounter some or many of these authorities either doing a random check within their remit or reacting to a specific event or acting upon a specific indication that allows them to exert certain powers.

It cannot be excluded that these authorities are not aware of each other's activities, even hindering each other in the execution of their tasks, and could therefore better co-operate with each other.

Both for public authorities and for private parties it seems beneficial that any authority that considers to take any measure with regard to a ship, contacts, if possible beforehand, a MOS centre in order to check whether its action could intervene with any other local or national authority that might be involved. That requires that the authorities co-ordinate their actions and, where appropriate, act as a team.

A MOS centre is useful both for the exertion of power by any authority either with regard to any ship within their jurisdiction or with regard to a ship flying the State's flag sailing wherever on the high seas

A MOS centre is thought of as a meeting point, recommendable a real one, where any authority considering a measure against maritime traffic or transport, is in contact with other authorities that might be involved. They constitute the eyes, ears and voice of any authority that has to do with maritime traffic, whether directly (harbourmaster, traffic management) or indirectly (customs, immigration, police). It is desirable that in all EU Member States a centre is present that meets certain basic standards. Masters of ships, ship owners etc. must be able trust that, within the EU, public authorities co-ordinate their actions as to lessen the burden and reduce the time involved with the contacts with authorities.

Member States with a short coastline may consider installing one single national MOS centre. One can even imagine that member States share a common MOS centre. Member States with long ragged coastlines and/or large traffic flows along the coast may prefer to have several MOS sub-centres. In this case it would be desirable that a MOS sub-centre inform the national MOS centre about all events that might be relevant or might need international cooperation.

MOS centres based on a common minimum standard will more easily co-operate with comparable centres in other EU countries and, as the case may be, similar centres outside of the European Union.

A MOS Centre may be instructed by the Administration of a member State to assist in or take the lead in the coordination of rescue operations as a result of disasters, natural or man-made, to mitigate the consequences, such as earthquakes, tsunamis, melt -down of nuclear facilities and floods. MROs may be coordinated by a MOS.

The following figure illustrates a generic scheme of a MOS centre:

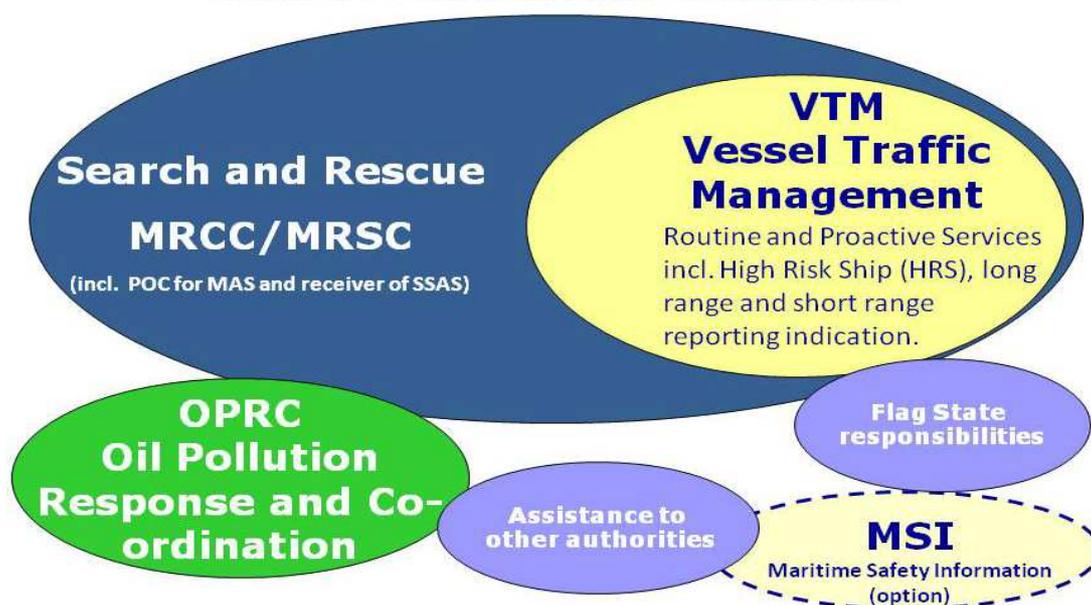


Figure 1 Overview of a MOS Centre

The MOS, as depicted in the figure above, uses different communication means to gain information about the behaviour of vessels and threatening situations on board vessels and craft at sea. The array of communication bearers, such as GMDSS and Cospas-Sarsat, is extended by the use of AIS and space AIS information on vessels. This information might indicate the position of a vessel in distress or it indicates the position of vessels that may be used in a coordinated attempt to save life or render assistance to other vessels.

6.3. The roles of a MOS Centre

A MOS centre acts as centre of preparedness for maritime matters. The first area of interest is the zone in which the consequences of an accident may affect the interests of the coastal State. The coastal State has the legal opportunities for intervention. The second area is the obligation of the flag State to minimize the pollution of the high seas. This can be done to provide advice from professionals for vessels in need of assistance, such as the shipping inspectorate, classification societies and by the ship owners' appointed salvors. A MOS Centre can, if requested by the MOS Centre of the coastal State, provide assistance and information regarding the vessel in need of assistance.

A MOS Centre is the centre for executing SAR actions. The structure and the operational procedures will not be changed. The original MRCC will be a part of a MOS Centre. A MOS Centre should launch, maintain and use the information of a website for small and leisure craft, where on a voluntary basis navigators may report their intentions.

A MOS Centre is the centre for monitoring vessel traffic with the objective to detect situations that might lead to dangerous situations and to take measures to rectify. The monitoring function can also encompass behaviour of vessels in routing systems and Particularly Sensitive Sea Areas (PSSA).

A MOS Centre can be a centre where Vessel Traffic Services are provided. This can be mandatory within territorial waters but in international waters the services need to be advisory. The MOS centre may take measures according to art.18 (c) of 2002/59/EC.

A MOS Centre can instruct vessels to take another route when the vessel poses a much more than average risk, when the MOS centre notifies the master that his vessel is declared a High Risk Vessel. The measures need to be directed to reduce the risk to the coastal State. Extravagant costs to the ship owners should be avoided.

A MOS Centre plays a large role in oil pollution response operations. When a vessel is involved in an accident with a spill of chemical substances or crude oil and oil products, the MOS centre acts the centre in which strategic and operational decisions are made and implemented.

A MOS centre can instruct a vessel to go to a place of refuge. The determination whether or not a vessel needs to go to a place of refuge is dependent on the question of whether the crew of the vessel is in distress or the vessel is in need of assistance. The MOS Centre makes a risk assessment prior to a decision.

A MOS centre is the Maritime Assistance Service. The requirements of IMO Resolution A.950 are fulfilled by a MOS.

A MOS centre receives the data from CleanSeaNet for implementing further action; this may be an investigation of wilful pollution.

A MOS Centre receives covert security alerts indicating illegal acts of violence or detention, which may come from different sources. The MOS Centre determines appropriate responses on the basis of instructions of the security authority and informs these authorities according to MSC/Circ.1073.

A MOS Centre may provide services to other competent services; one of the services is the analysis of tracks of vessels in the SRR to determine whether or not vessels have fulfilled the rules of the European Maritime Space. Another is surveillance of sea areas for illegal refugees in member States bordering African States and inform the security authorities.

A MOS Centre carries out tasks for other authorities, such as monitoring fishing activities according to the rules set with respect to fisheries control, health control (free pratique).

A MOS Centre has access to SAR Co-operation Plans with Passenger Ships (MSC/Circ 1079) which are proposed to be held by SafeSeaNET and organised by EMSA.

A MOS Centre SAR component has a role as SAR Data Provider holding on 24-hour basis National EPIRB register and SAR Co-operation Plans via SafeSeaNet.

A MOS Centre may (if appropriate) co-ordinate and broadcast Maritime Safety Information (MSI) for a specific region.

The need for preventive action is based on a risk analysis of vessels plying in European waters. The procedure, as developed in the EC project EMBARC, is based on the fact that 20% of the vessels plying in European waters represent approximately 70% of the total risk.

6.3.1. MOS operating principles

The operating principles of a MOS Centre are based on the absolute priority of life saving operations above any other operation. The second priority is the prevention of the pollution of the environment.

The third priority is the saving of property. In this case the MOS Centre should attempt to use the resources of the ship owner.

When a casualty involving subsequent sinking of the vessel takes place in a sensitive area, the MOS may decide to order the owners to remove the wreck when in waters under jurisdiction of the coastal State, despite the fact that no spill might be expected and the wreck does not expose a danger for navigation.

When a situation occurs that a vessel is in need of assistance in a European SRR, but outside the area where the consequences of the vessel as it sinks will not affect the interest of the coastal State, the MOS will alert vessels to assist in saving the crew as the situation may deteriorate as to change the situation of the vessel in need of assistance in a distress situation for the crew, the coastal MOS and the flag State MOS may be both in contact with the vessel.

In all cases, when the SMC of the coastal State considers the situation has become a distress situation the flag State MOS will not be involved in any rescue operation unless requested to do so by the coastal MOS.

6.3.2. MOS operating area

The MOS operating area is in principle the Search and Rescue Region (SRR) of the member State. Monitoring of traffic needs to take place in the entire SRR using AIS, LRIT or space AIS for security reasons. Rescue operations are the treaty obligations of the member States in the SRR. Vessels in need of assistance in the area of influence of the coastal State, roughly the EEZ of the member State, will be assisted by the MEM of the MOS. Preventive actions regarding pollution can be implemented in the same area.

Flag State intervention of the MOS in international waters outside the coastal area for vessels in need of assistance is outside coastal waters.

6.3.3. The MarNIS Representative

The ultimate co-ordination or decision-making of a MOS should be done by a special functionary who gives effect to any exertion of power by an authority against maritime traffic and transport. This functionary is responsible towards the authority on behalf of which he exerts the powers. Therefore the existing powers of any national authority are not diminished in the slightest sense.

In particular with regard to authorities whose task may not be directly linked to maritime affairs, this functionary can offer the necessary expertise to get to the best result. He can advise and support the authorities in the exertion of their powers, thus making them more effective, co-ordinate where necessary and can maintain the contacts with the master of a ship. Such a centre can also be useful to implement other international agreements like those ensuing from the Maritime Analysis and Operations Centre – Narcotics (MAOC-N), concluded in 2007 between Portugal, Spain, the United Kingdom, Ireland, France, the Netherlands and Italy. An exception could be provided for cases where for reasons of important public interest or for reasons of urgency, another procedure must prevail.

To a certain extent in some member States there are precedents to such a functionary. In the United Kingdom there is the Secretary of State's Representative (SOSREP) who on behalf of the Secretary of State is able to oversee, control and if necessary, to intervene and exercise "ultimate command and control" acting in the overriding interest of the UK in salvage operations within the UK waters

involving vessels or fixed platforms where there is significant risk of pollution. In France the ‘préfet maritime’ exists with different but broadly similar powers.

It is recommended to introduce a functionary as described in all Member States of the EU in a certain standardized manner. This could imply that the tasks of the SOSREP or the ‘préfet maritime’ should be altered slightly.

6.3.3.1. The UK SOSREP

The Secretary of State’s Representative for Maritime Salvage and Intervention in the UK was created in 1999 as part of the response to Lord Donaldson’s review of salvage and intervention. On behalf of the Secretary of State for the Department for Transport he is tasked to oversee, control and if necessary to intervene and exercise ultimate command and control, acting in the overriding interest of the United Kingdom in salvage operations within UK waters involving vessels or fixed platforms where there is significant risk of pollution.

The genesis of the SOSREP in the UK was based on the following conclusions:

- The involvement of Ministers in operational decisions is not a practical option;
- The trigger point for intervention is when there is significant threat of pollution to the UK’s pollution control zone, territorial waters or coastline;
- Officers of MCA as a whole should play a much larger role in operations in response to a threat of significant pollution than had been the case in the past;
- They should be able to take early steps to make salvage assistance available;
- They should be trained to acquire specialist knowledge of salvage and counter pollution;
- There is a clear need for compatible powers to shipping in respect of pollution from or involving off shore installations.

Key is the major change in relation to salvage operations in that the ‘Ultimate Control’ of any salvage operation where there is a threat of significant pollution of the UK environment must be exercised by a SOSREP acting in the overriding public interest.

The SOSREP should be on-site and able to act without delay and free to act without recourse to higher authority. The new elements were that for the first ever there would be one person specifically identified to act as the SOSREP at all times and that for the first time the SOSREP could not choose to ignore a situation.

6.4. MOS and Search and Rescue (SAR)

6.4.1. IMO International Convention on Maritime Search and Rescue, 1979

Important for MOS, it is noted in the SAR Convention that parties are encouraged to enter into SAR agreements with neighbouring States involving the establishment of SAR regions, the pooling of facilities, establishment of common procedures, training and liaison visits. This principle is taken forward and strengthened in the MOS concept.

The use of AIS networks facilitated the tracking of vessels, and this was of great benefit for SAR purposes. The position of a vessel could be readily determined as well as the position of vessels that

could act as Search and Rescue Unit (SRU). Of great benefit are voluntary reporting systems to find positions of vessels which were able to assist a vessel in peril or take survivors on board. The AMVER system has obtained innumerable benefits for the safety of life at sea but state of the art systems may perform better and reduce the number of fatalities at sea.

Rescue coordination and the availability of SAR resources enable MOS centres. As an example the RNLI in the UK and Ireland set a standard of 10 minutes launch time. The life boat needs to be capable of reaching people in distress at 100 nm from the coast and be able to reach 90 % of the casualties within 10 nm of the shore within 30 minutes of launch.

The potential of AIS makes it suitable for VTM purposes. This dual use and the existing infrastructure of MRCCs lead to the suggestion to combine the functions of VTM and SAR. The functions of SAR need not to be changed, since these functions are performing satisfactorily. The MRCC is now a part of a MOS Centre.

6.4.2. Mass rescue operations

In COMSAR /CIRC.31, IMO provided guidance for Mass Rescue operations (MROs). MROs are floods, earthquakes, acts of terrorism, casualties in the off shore oil and gas industry, accidents involving releases of hazardous substances and major aircraft and or ship accidents are examples which may need to use the same resources as would be used to carry out mass maritime or aeronautical rescue operations. If there is a multi jurisdiction, multi-mission and possibly international responses to a major incident it is necessary that there is a need to know who is in charge and the roles of all who are involved and in what way interactions between the rescuers need to take place.

Again preparedness is critical to preventing heavy loss of life. This depends on levels of cooperation and coordination, planning, resources and exercises that are required for preparedness.

A MOS Centre might act as a coordination centre for MROs. The structure of saving life at sea should be maintained. Planning of MROs should begin as soon as MOS centre may act as a centre to coordinate MROs. Further guidance for planning may be found in the annexes of the circular.

6.4.3. MOS and leisure craft

Most of the activities of present day MRCCs are directed to problems or rescue operations of the crew of leisure craft. Between 80% and 95% of the number of operations is directed to leisure craft and often the involvement leads to a rescue operation.

MarNIS made proposals for a more efficient reporting scheme for leisure craft. The scheme has three components: website to report intended cruises and the safe return to the homeport, to download regional weather information and a presentation layer for MOS operators to display positions of leisure craft equipped with B-AIS . The use of the website is fully compatible with small hand held devices, such as a PDA.

6.4.4. MOS and Medivac

The SAR component of a MOS shall also handle information with regard to medical issues. Medical assistance at sea is an integral part of rescue including provision, on request from Masters of ships, medical advice and initial medical assistance and, as required, to make arrangements for medical evacuations for patients. A MOS centre should establish a relationship with a maritime Telemedical

Assistance Service (TMAS) to ensure that medical advice can be provided to Masters at sea within its SRR 24 hours a day. (Ref docs. IMO MSC/Circ.960 and IAMSAR manual).

6.5. MOS and Oil Pollution Preparedness, Response and Cooperation (OPRC)

Oil spilled at sea threatens individual organisms, resources in the immediate vicinity and the ecosystem as a whole. It also poses a potential threat to the shore and to estuaries. Damage to the ecosystem will depend *inter alia* on the quantity and type of oil, the location where the oil is spilt and the time of year. Effects may be direct or indirect.

It is recommended that OPRC operations be incorporated in the “under the one roof” principle of MarNIS so that coordination between other emergency response activities such as Search and Rescue can take place in a timely and efficient manner. Whilst respecting the priority placed on the saving of lives, much can be gained where joined resources are implemented as at early an opportunity as possible.

The reasons for attempting to combat an oil spill while it is still at sea are to protect individual organisms, resources in the vicinity of the slick and the marine environment and to minimize the quantity of oil which comes ashore or into estuaries. In particular everything possible should be done to prevent oil being washed ashore on mud flats and salt marshes as they constitute the most sensitive parts of the European areas and are difficult, if not impossible, to clean up.

In order to decide whether or not a response is necessary, or what sort and extent of response is appropriate, the threat posed by the oil must be evaluated. This requires techniques for predicting the behaviour of the oil, which in turn will rely on timely information about the type and quantity spilled, the location of the spill and weather conditions. Advice on sensitive resources likely to be impacted by the spill will also be needed.

Because of the considerable uncertainty which usually surrounds a spill, and the difficulty of predicting the damage which may be caused to a resource by oil, the assessment of the threat will be tentative at first, becoming more firm as information become available. The response teams, however, will not be able to wait for a firm assessment and an element of judgement will normally be necessary during at least the first stages of the response.

6.6. MOS and Maritime Assistance Services (MAS)

The allocation of MAS functions to an MRCC could from a practical view point be an advantageous and effective solution but would require the personnel to be well trained in distinguishing between circumstances causing a ship to find itself in a distress situation and circumstances placing a ship in a difficult situation but not in distress as defined in the SAR Convention and procedures arising there from. It should be recalled that the MRCC concept entails co-ordination of SAR operations. By contrast, MAS, within the scope of the above resolution, is responsible only for receiving and transmitting communication and monitoring the situation.

The fact that the resolution recommends that every coastal State is to establish a MAS should not prevent neighbouring coastal States from combining their resources under suitable arrangements to operate a joint MAS. Conversely a coastal State should be able to establish more than one MAS if necessity so warrants.

When one compares the MOS centre as a monitoring and response centre and the objectives of MAS there is a large degree of similarity.

The MEM is responsible for the organization of response actions in case a threat occurs to the interests of the coastal State. The MEM organizes response to vessels in need of assistance when they are in other SRR but outside the area where the interests of the coastal State are affected.

The MEM gets instruction from the MarNISrep when fundamental decisions need to be taken. Information on incidents and accidents are reported to the MOS Centre and the SMC and the MEM determine whether it is a case for SAR or it concerns a case of a vessel in need of assistance.

6.6.1. MOS centre and Places of Refuge

A Place of Refuge means a place where a vessel in need of assistance can take the action to enable it to stabilize its condition and reduce the hazards to navigation, and to protect human life and the environment.

The MOS centre deals with the issue of Places or Refuge. This has been an important issue lately. The underlying issue is the question of the procedures to be followed when a vessel is in need of assistance. Is there a need to send the vessel to sea or will be a place of shelter along the coast provided? Taking a damaged vessel to a place of refuge would have the advantage of limiting the coastline subjected to oil pollution, but the area of the place of refuge may be more subjected to intense pollution.

The decision to use a Place of Refuge is consequently a political decision, which needs to be taken by the MarNIS Rep. Once a decision has been taken the MEM and the experts gathered from the shipping inspectorate, class, and the representatives of the ship owner needs to implement a strategy to minimize the damage to environment and vessel.

The legal context for intervention is provided by among others, by UNCLOS Art.221 and the intervention Convention. The MOS Centre should operate in conformance with the Guidelines recommended by IMO in Resolution 949 of March 5th, 2004.

An important issue is the determination of the state of the vessel. Are there persons in distress? If that is the case rescue operations have always precedence over any other operation. The master may decide with the assistance of the SMC of the SRR where the accident happened whether the vessel is in need of assistance. In special cases the SMC may decide that he launches a rescue operation on the basis that the vessel is in a remote place outside the range of rescue craft or helicopters. A fixed wing aircraft may be sent but an active role in the rescue of persons is not to be expected. A patrol vessel or cutter may be sent, but it may take three days to reach the vessel in need of assistance. The situation may deteriorate under the influence of bad weather and the master may ask to take the crew and passengers off the vessel. When space AIS indicates the position of vessels that may assist in case that the crew and passengers of the stricken vessel needs to abandon vessel the rescue vessels may be close to the vessel and take the crew and passengers on board. For accidents closer to the coast and near to SAR resources, the SMC might alert the SAR resources and use the resources when it is ascertained that people on board are gradually slipping into a distress situation.

6.7. MOS and Pro-active Vessel Traffic Management (VTM)

6.7.1. Pro-Active Vessel Traffic Management

MOS coordinates the determination of updated ETAs of ships that are bound for a European port; takes care of the retrieval of ships' AIS tracks through the storage of these tracks in a regional data centre that acts as a repository; makes use of environmental areas more effectively through the introduction of Risk Indices and the concept of High Risk Ships, which might ultimately enable the replacement or enhancement of static routing measures

6.7.1.1. VTM, monitoring and VTS

The MOS centre should also act as a Vessel Traffic Management (VTM) centre. The term VTM is used rather than Vessel Traffic Services (VTS), the reason being that the definition of VTM is wider. VTM in a MOS Centre consists of vessel traffic monitoring and as the case may be, VTS. Vessel traffic monitoring is the observation of traffic in the littoral sea. This monitoring process enables the coastal State to detect anomalous behaviour of vessels and the MOS is able to investigate the situation and act as required. VTS is in essence the provision of information to the vessels of the traffic flow as well as advice and instructions, if need be. VTS operators may provide information to the vessel in such a way as to influence the master of a vessel sufficiently, whereby it is desirable for the VTS operator to do this without the need to give instructions. It is to be understood that outside the territorial sea a VTS operator is not capable of giving instructions to vessels. According to UNCLOS, the principle of freedom of the High Seas should not be violated and remains the overarching principle.

6.7.1.2. Monitoring

A major change in the philosophy of observing vessel traffic was the introduction of AIS. AIS enables a shore-based facility to monitor traffic in an area undreamt of in the pre-AIS era. The use of radar to observe traffic was augmented with a relatively cheap sensor system and when the base stations were put in a network, it was possible to monitor large coastal areas. Some disadvantages of the use of AIS as opposed to radar also became clear as AIS is essentially a co-operative system whereby there is certainly no guarantee that all vessels will be detected, even if required to carry an AIS, due to malfunction, incorrect input or wilful "switching off".

All SOLAS vessels at sea are required to carry an AIS transponder, however the MOS centre is unable to monitor vessels without AIS base stations. B-AIS is developed for vessels with no mandatory carriage requirement, but there is an increasing proportion of yachts, work ships, small fishing boats and other leisure craft equipped with B-AIS.

The non-co-operative sensor system of radar sensors may have as a drawback that the identity of a vessel is not known however all vessels within range and with sufficient radar reflection can be detected. Sophisticated technical systems are developed to attach an identity on the vessel so that radar targets can have a label.

Modern fusion software is able to represent a vessel by one icon and is able to indicate the quality of the presentation of the vessel on a situation display.

The coastal authorities need to make a decision of the systems to be utilized in order to satisfy the obligations under the monitoring directive and security aspects will influence their final decisions. There is a plethora of systems which are able to measure penetration of objects in the coastal zone and

these sensors can be combined to a system that indicates security threats, as terrorism and criminal threats are becoming increasingly important.

The notion VTS is established by IALA and recognized by IMO (Resolution A.857 (20) Guidelines for Vessel Traffic Services). It is used in approaches and in ports to provide information to the traffic and to observe compliance to the rules.

When the passage of a vessel through the territorial sea is not considered innocent, the coastal State can refuse passage. One of the reasons to refuse passage is that the vessel commits a wilful act of pollution. Accidental pollution gives the coastal State the right to refuse passage and give the vessel instructions as to where to go. Passage through the territorial sea which is not continuous and efficient may also lead to intervention of a coastal State since the passage is not innocent.

The coastal State may adopt rules and regulations related to safe navigation during innocent passage. These measures may comprise Traffic Separation Schemes (TSS) and routing measures as well as VTS. It is held that violations against the rules of TSSs and VTSs do not necessarily make the passage non-innocent. The coastal State has other instruments to avoid danger to its interests.

The information flows of stored information to vessels is such that most navigational hazards to the vessel are known by the master and that VTS information should be given to the vessel on demand of the master of a vessel or when a MOS operator detects a situation in which the situation of the vessel regarding the probability of collision or grounding becomes imminent.

These considerations lead to the following conclusions:

- The implementation of full VTS functions in a VTS in international waters is impossible under present international law;
- VTS may not give instructions to vessels sailing in international waters. VTS may give information to the passing traffic but needs to report contraventions of international law to the flag State;
- There is a need to monitor traffic flows for vessels that may threaten the interest of the coastal state even when they are in international waters and the coastal State may apply the instrument of the Intervention Convention;
- There is a need to monitor traffic flows in order to detect a distress situation to rescue life in distress at sea;
- There is a need to monitor traffic flows in order to detect vessels in need of assistance and to take appropriate measures to remove the risk to the interests of the coastal State;
- There is a decreasing need to provide vessels with traffic information sailing in international waters, based on the improved and accurate information that is available on the bridges of passing vessels;
- There is more to win to monitor all traffic sailing along the coast in international waters for symptomatic events than to monitor all vessels in a delineated area. Some events may lead to actions initiated by the coastal State such as a SAR and the application of the Intervention convention with possible large consequences as well as the identification of vessels in need of assistance;
- VTS may be established in international waters to provide information to the traffic flow. The establishment of a VTS should comply with the recommendations of IALA and IMO regarding VTS.

6.7.2. Risk-based approach

Central to the pro-active approach to VTM is the use of dynamic risk calculations. The risk assessment model SAMSON (Safety Assessment Model for Shipping and Offshore on the North Sea) determines the yearly risk based on a traffic database, traffic patterns, different models and accident statistics. The risk calculated with the model is summarized over all traffic participants and all environmental conditions. In order to calculate the risk for an individual ship for the prevailing environmental conditions the different models used in SAMSON are converted to dynamic models.

In order to use risk in the daily practice of MOS and to minimise risk of vessels, a method has been designed that fulfils a number of requirements of international environmental law. IMO has accepted the Guidelines on the incorporation of the precautionary approach in the context of specific IMO activities [Resolution MEPC 67]. The important issue is that the precautionary approach shall be applied where there are threats of serious or irreversible damage. It should not be used as a reason for postponing cost effective measures or prevent environmental damage. A precautionary and anticipatory rather than a reactive approach is necessary to prevent the degradation of the marine environment. This requires, inter alia, precautionary measures and a comprehensive approach to the damaging impacts from air, land and water.

MarNIS has defined the notion of alert vessel. This vessel is defined as having much more risk than the average ship and enabling the coastal authorities to take steps. An average value of the alert value is for good weather about €20 and the under limit of an alert vessel is €50. The limit is thought to be depending on the weather. When the weather is bad, >BF9 the limit value is €500.

The alert values are automatically calculated. The AIS is used to convey the position of the vessel. The dimensions of the vessel are provided by the AIS, which are sent at regular intervals. The MMSI number is used to identify the vessel and to retrieve the nature and the weight of the cargo which is necessary to calculate the alert value. The repeat time of the calculations is less than 1 minute. Consequently updates of the alert values are provided in less than one minute, depending on the size of the area in the traffic displays in front of the MOS operator.

6.7.2.1. The instructions of the MOS operators

The MOS operator may (on behalf of the competent authority) decide whether or not he makes a vessel a High Risk Ship. There are factors assisting in the decision. One of the reasons of leaving the vessel untouched is the presence of TSS. The options to develop an alternative track are not many. If the MOS-operator thinks he should declare a vessel a High Risk Ship (HRS) he should do so. The MarNIS rep may give an approval to declare a vessel HRS for defined cases. In extraordinary cases the MarNIS rep can give his consent to declare a vessel a HRS.

It is customary that an authority issues orders after the report that the vessel is declared a High Risk Ship. When the master has acknowledged the receipt of the report the MOS operator may give instructions to the master of the HRS.

But on what grounds are the instructions of the MOS operator are based? In accordance with the principles laid down in MEPC/392/MSC 1023 the guiding principle is that the distance from the coast is based on a minimization of the risk costs and the exploitation costs of the vessel.

The principle mentioned above can be applied at various routes along the Atlantic coast. If the IMO community abstains from static TSSs the environment as well as the operators can benefit from a win-win situation.

6.8. Other functions of a MOS

The “Common EU Maritime Space” as discussed in the Blue Book introduces the concept that a ship which is checked in a European port with respect to the fulfilment of the requirements of the authorities need not be checked in the next port. This certificate is used to get exemption of a number of inspections and notification procedures. MOS issues certificates on behalf of the authorities in accordance with the concept of the “Common EU Maritime Space” when it can be proved that these ships making a voyage in the maritime space didn’t anchor, stop, go alongside another ship when at sea and that no other fast vessels have been alongside, even when the speed of the ship has not been changed.

MOS may provide ENC updates and with the increasing use of AIS-B by small craft, a MOS centre may provide important safety information via a dedicated website. This may be exploited by leisure craft as well as small fishing vessels.

MOS supports decision making on the response to (large) catastrophes through the provision of detailed information in time to the policymakers.

MOS simplifies coordination of calamity response in a member State using all available national resources and international resources that can be used calling on the specific agreements (Bonn, Helsinki, Lisbon and Barcelona).

6.8.1. Monitoring for customs

In maritime transport, voyages from one port of an EU Member State to another, even without calling at any intermediate non-EU port or free port or meeting another ship *en-route*, are always considered international also when cargo transported is Internal Market cleared goods. A vessel is considered to leave the customs territory when it leaves a Community port for another Member State port.

These administrative procedures involve a wide set of EU and international legislations which include, in particular, customs and tax rules, immigration, trade, statistics, environment and waste, phytosanitary veterinary and health protection, security and safety. They have different objectives and rationales, and they apply either to the transport service, the vessel and its crew or to the goods themselves.

However, they all hinder the free circulation of goods inside the Internal Market. In 2002, the Commission services presented a guide to customs procedures for Short Sea Shipping in order to make industry aware of the different procedures in the customs field applicable to Short Sea Shipping. The simplified customs procedure of an "Authorized Regular Shipping Service" has been made available to operators but most of them would like a further improvement of this facilitation, e.g. to have it linked to companies or routes instead of ships. A survey conducted by Finnish customs found that only 43% of liner services have authorized regular service permits.

Administrative procedures involved in shipping goods by sea within the EU today add to the transshipment costs and complexities associated with multimodality.

Key for introducing such simplification is the availability of a means in order to make sure that goods remain in initial conditions. Actually the main reason put forward for maintaining controls on Internal Market goods transported by sea, is the high risk of smuggling or frauds when the vessel leaves the port via uncontrolled contacts with other vessels or calls in foreign ports. However the rapid progress in positioning and communication technologies provides the technical means to check if a maritime

journey has been performed as declared by the ship Master. It was suggested to use the ship surveillance systems for this purpose.

There are tools available however to provide assistance in determining the most appropriate sensors and the opportunities for continuous tracking of a vessel in all waters. Such a tool is the so-called satellite toolkit (STK – ref.MarNIS) that can assist in determining what satellites may provide information about the whereabouts of vessels when they are outside the detection range of AIS base stations. It is assumed that this information supplements the space AIS information.

When a custom office in one of the member States receives a (port arrival) notification they might wish to check the statements of the master. When they request the national MOS, the MOS operator may gather the data of the track of the vessel and may assess whether or not the vessel has called in a port that is not reported (that will occur very seldom) or has had an illegal contact with another vessel in international waters (that will occur seldom). The results of the assessment are reported to the custom office.

The satellite toolkit is a tool that predicts what satellite can be used for space observation of a particular sea area. The tool consists of a representation of suitable satellite orbits and when a special sea area is indicated the tool determines which satellites may be used within a proper time frame. The density of satellites is such that orbits at the desired area at the desired timeframe are presently occurring but the situation is slowly improving with time.

If this technology is used to check positions of vessels in the frame work of checking the use of the European maritime space the Synthetic Aperture Images need to be correlated with other information such as AIS information or Radar information from shore based installations. The information of space AIS can also be used when this system is up and running.

A worthwhile addition to the surveillance system is the use of small unmanned planes with Side Looking Airborne Radar on board that stream the position data and the radar images to shore and then to the requesting MOS centre to be analyzed. The small planes may be stationed in area with known coverage problems of AIS.

These tools may be used on request of a MOS operator when making a recommendation to for example customs about the track of a vessel that navigates from one European port to another. These tools are operated by commercial providers. The time elapsed between the request of an image and the availability of the image may vary between 2 and 12 hours.

The MOS centre may have more expertise to assess the images of the toolkit, since they can also utilise the results of AIS and space AIS. MOS operators may be more experienced judging the “behaviour” of vessels than custom officers.

6.8.2. Monitoring for health authorities

The ECDC (European Centre for Disease Prevention and Control) is responsible for the surveillance of infectious diseases in the European Union and maintain the databases for epidemiological surveillance. Data are collected by the ECDC for case-based reporting from the Member States for the routine surveillance of the 46 diseases (listed in the Decisions 2002/253/EC and 2003/534/EC) plus SARS, West Nile Fever and Avian Influenza.

Health surveillance tasks include:

- Search, collect, collate, evaluate and disseminate relevant scientific and technical data;
- Coordinate and ensure the integrated operation of the dedicated surveillance networks;

- Develop integrated data collection systems covering all MS and all notifiable communicable diseases, maintain the databases for surveillance and establish EU-wide standard case reporting;
- Initiate applied scientific studies and projects for the feasibility, development and preparation of its activities;
- Closely cooperate with the organizations operating in the field of data collection;
- Monitor trends of diseases across Europe in order to provide a rationale for public health actions in MS and disseminate the results to stakeholders for timely public health actions at EU and MS level;
- Support strengthening of national surveillance systems.

A MOS centre can contribute to the objectives of the ECDC as follows:

If health authorities or ECDC detect a threat to the health of passengers and crew or to other persons they may request the MOS to track a vessel in the European reporting area so as to avoid the crew or passengers coming in contact non infected people until the health authorities decide that the danger to persons has decreased to exist. MOS operators may send progress reports of the position of the vessel to the parties who have requested the information.

6.8.3. Monitoring for fishing authorities

Vessel Monitoring Systems (VMS), position and identity information of fishing vessels, are used in all coastal member states and make it possible to follow objects when entering other countries territorial waters and search and rescue regions (SRR). The information is transmitted via Inmarsat C or Argos (satellite communication system) systems every second hour and displays position or position/course/speed. VMS is not compatible with the AIS format, but might be linked together with integrated AIS and radar information.

6.8.4. Security monitoring

6.8.4.1. Security assessment of vessels at large

The MOS Centre has an overview of vessels in its monitoring area. Information of the position of vessels outside the range of terrestrial AIS may be provided by space-AIS with each orbit of the AIS satellite when this satellite downloads the collected AIS information to a ground station. The MOS receives the relevant information from the ground station and displays the information on a traffic display.

The MOS operator should be able to assess the distances sailed and report to the security authorities any suspicion of illegal behaviour of the vessel concerned. The MOS operator should take the instantaneous weather conditions into account and estimate the speed of the vessel under extreme weather conditions to avoid unnecessary reporting.

6.8.4.2. Unlawful acts

The MOS may become aware of a vessel known or believed to be subject to unlawful interference. The MOS should declare an Alert Phase and advise the security authorities. The MOS starts the preparation for a possible SAR-operation as appropriate. See also MSC 1073 and IAMSAR manual Vol. 2.

Special signals have been developed for use by ships under attack or threat of attack from pirates or armed robbers. Piracy/armed robbery attack is a category of distress message for all classes of

selective call equipment. For their own safety, ships may have to covertly send out the piracy/armed robbery message. When the MOS becomes aware of such a situation, it should declare an Alert Phase, advise appropriate responsible agencies as specified in the plans of operation and begin preparations for possible SAR operations as appropriate. If the ship has covertly sent a message care should be taken in any communication sent back to the ship as not to warn the pirates.

6.9. MOS and Flag State responsibilities

MOS needs to put an organization in place that can respond to any serious situation, by immediately activating an organization that can support decisions to safeguard the environment, and the vessel itself.

MOS acts in case the possible consequences of a calamity might affect the interests of a coastal State as a calamity response organization under the guidance of a maritime emergency manager. This manager is implementing major decisions from the MarNIS Rep. This is a person that takes decisions about the fate of the vessel as and when required on behalf the Administration. The intervention is made under the Intervention Convention.

If the vessel according to the coastal authorities of the SRR is in need of assistance, but there is no threat to life at sea, international law determines that the flag State is responsible for adverse effects of the vessel to the environment. If it is ascertained that the State responsible for the SRR, will take no action since there is no danger for life the obligations of the flag State come to the forefront and based on art 219 UNCLOS, the flag State can give instructions to the vessel to avoid adverse consequences for the environment, such as spilling cargo oil or sinking of the vessel with bunkers and cargo oil.

The MarNIS representative needs to make decisions on a vessel flying the flag of the flag State, what needs to be done to prevent pollution of the environment.

Close contact between the coastal MOS and the flag State MOS is essential to determine the responsibilities of both centres, where the safety of life at sea is the most important issue. The recurrent question is whether the crew and passengers of the vessel is in danger of losing their lives or the vessel is in need of assistance.

The flag State MOS may support the MOS of the coastal State with information on the casualty when it is requested. The shipping inspectorate may provide technical details of the construction and operation of the vessel important for a balanced response of the coastal State.

6.10. MOS and e-Navigation

The definition of e-Navigation according to IMO is as follow:

The harmonized collection, integration, exchange, presentation and analysis of marine information on board and ashore by electronic means to enhance berth to berth navigation and related services for safety and security at sea and the protection of the environment.

E-Navigation is a subject that is under discussion in IMO, supported by the work of the navigation committee of IALA. A strategy is now in development to implement e-navigation in the period beyond 2012.

The core objectives of the E-navigation concept are to:

1. facilitate safe and secure navigation of vessels having regard to hydrographic, meteorological and navigational information and risks;
2. facilitate vessel traffic observation and management from shore facilities where appropriate;
3. facilitate communications, including data exchange, among ship to ship, ship to shore, shore to ship, shore to shore and other users;
4. provide opportunities for improving the efficiency of transport and logistics;
5. support the effective operation of contingency response and search and rescue services;
6. demonstrate defined levels of accuracy, integrity and continuity appropriate to safety critical system;
7. integrate and present information on board and ashore through a human machine interface which maximizes navigational safety benefits and minimizes any risks of confusion; or misinterpretation on the part of the user;
8. integrate and present information on board and ashore to manage the workload of the users, while also motivating and engaging the user and supporting decision-making;
9. incorporate training and familiarization requirements for the users throughout the development and implementation process;
10. facilitate global coverage, consistent standards and arrangement, and mutual compatibility and interoperability of equipment, systems, symbology and operational procedures, so as to avoid potential conflicts between users; and
11. support scalability² to facilitate use by all potential maritime users.

It is assumed that a MOS centre will play a role in checking whether the right information is used on board. This information consists of up-to-date chart information, but it may check whether nautical port information is available to be used by the vessel.

² In [telecommunications](#) and [software engineering](#), **scalability** is a desirable property of a system, a network, or a process, which indicates its ability to either handle growing amounts of work in a graceful manner, or to be readily enlarged.

7. References

1. IMO Resolution A.851(20) - General Principles for Ship Reporting Systems and Ship Reporting Requirements Including Guidelines for Reporting Incidents Involving Dangerous Goods, Harmful Substances and/or Marine Pollutants;
2. IMO Resolution A.857(20) - Guidelines on VTS;
3. IMO Resolution A.949(23) - Guidelines on places of refuge for ships in need of assistance;
4. IMO Resolution A.950(23) - Guidelines on Maritime Assistance Services;
5. IMO International Convention on Maritime Search and Rescue, 1979;
6. IMO International Convention for the Prevention of Pollution from Ships, 1973 (MARPOL 73/78)
7. IMO International Convention on Oil Pollution Preparedness, Response and Co-operation (OPRC), 1990
8. United Nations Convention on the Law of the Sea (UNCLOS), 1982
9. MarNIS Deliberable DHA9-B1 - Messaging in SSN++, NSW, PSW, PEPs, PCS and the MarNIS node
10. MarNIS Deliberable DHA3.2 – Maritime Operational Services