Securing the Chain by Intelligence at Sea

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DOCUMENT STATUS

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</tbody>
</table>

Document History

<table>
<thead>
<tr>
<th>Version</th>
<th>Date</th>
<th>Initials</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>29/08/2014</td>
<td>SVC</td>
<td>New document</td>
</tr>
<tr>
<td>02</td>
<td>25/11/2014</td>
<td>SVC</td>
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</tr>
<tr>
<td>03</td>
<td>09/01/2015</td>
<td>NMP/CFS/SVC</td>
<td>Reviewing of the document</td>
</tr>
<tr>
<td>04</td>
<td>13/02/2015</td>
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<td>Final draft</td>
</tr>
<tr>
<td>05</td>
<td>04/06/2015</td>
<td>CFS/SVC</td>
<td>Reviewed to include DG-MOVE remarks and photographs of different training courses.</td>
</tr>
</tbody>
</table>

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# List of contents

## Part A. General Considerations

1. Preamble (6)
2. General information (7)
3. Purpose of this document (9)
4. Objectives of the training plan (10)
5. Lessons learned (11)
6. MONALISA 2.o and the IMO and EMSA Strategy (16)
7. Maritime Safety Training (MST) (24)
8. The MST team (26)
9. Added value of MONALISA 2.0 training program (27)
10. Summary of training courses (28)

## Part B Training Courses

1. Training on SAR and Mass Rescue Operations (31)
2. Training on Safety and Mass Evacuation in Ports (42)
3. Training on Emergency Management on board Passenger Ships (49)
4. Training on Leadership and Human Factor in Crisis Scenarios (58)
5. Training on IMO/ICAO/IAMSAR Application (68)
6. Training on Firefighting and LNG (Liquefied Natural Gas) (76)

## Part C. Accreditations and mobility

1. MONALISA and MST accreditation and mobility (86)
2. The Future Master Program on Maritime Safety (86)
3. Final considerations (88)

## Part D. Annexes

- Annex 1: Abbreviations (92)
- Annex 2: Reference material (94)
- Annex 3: List of figures and tables (96)
General Considerations
1. Preamble

MONALISA 2.0 represents a paradigm and challenge for the maritime industry in the coming years and beyond 2020. The next generation of maritime transport will become more efficient, sustainable, safer and profitable by means of the emerging Information and Communication Technology (ICT) solutions based on the Internet. Nevertheless, the challenge of properly implementing ICT tools on board ships, Search and Rescue operations or critical situations at sea and in ports, forces the international maritime authorities to focus on the important role of the human element in maritime safety. Statistics show that in the vast majority of maritime incidents and accidents, the human element is considered as the primary contributing factor. Therefore, training contributes significantly to maritime safety, not only from the ship point of view, but also from the Search and Rescue and port preparedness in case of incident/accidents.

This report summarises the first steps in defining and designing a comprehensive Marine Safety Training (MST) Program under the umbrella of the MONALISA 2.0 project.

The training program is designed in consultation with key industry actors and maritime authorities’ representatives covering the STCW standards, teaching innovation developers, training providers, trainers and teachers, supply chain partners and key industry stakeholders.

The different topics covered under this program, comprise some heterogeneous and specific training actions related to the MONALISA 2.0 project. They are the core and starting point in the definition of a future “Master of Sciences” (MSc) programme referring to the Integral Maritime Safety.

The MSc is a multidisciplinary and wide knowledge transfer instrument with the objective of being offered to the different professionals in the maritime sector: Bachelors in civil marine, shipbuilding engineers, teachers, psychologists, and other maritime industry related professionals, who may know and be conscious of the relevance of maritime safety for the shipping companies, the ports, and the national and international maritime administrations. This program is also defined to contribute to the development of high professional skills of staff employed in the European shipping industry with specific challenges such as maritime safety and the reduction of environmental impacts, laying the foundation of mobility within Europe, linking education and training institutions with the maritime and port industry.

Addressing the international conventions on Maritime Education and Training (MET), this training program and its future evolution of an MSc program, will aim to follow, when appropriate, the IMO model courses, including the Manila Amendments to the current STCW convention. Other new aspects like Liquefied Natural Gas and
alternative fuels, information and communication tools to support safety management and decision-making processes during crisis scenarios, will also complement it.

The training modules will also make it possible to meet the students’ needs to move among the different institutions involved; universities and training centres in the participant countries, Sweden, Spain, and Greece. Thus, the role of the National Technical University of Athens, Chalmers University, the Technical University of Catalonia, the Technical University of Madrid and the training centres, Integral Maritime Safety Jovellanos and Valenciaport Foundation, is paramount, and it is a guarantee to meet the balance between high-level education and vocational education from a practical point of view.

2. General information

MONALISA 2.0 aims at contributing to a continuous improvement and development of efficient, safer and environmentally friendly maritime transport in the European Union by implementing a series of measures in accordance with the EU transport policies.

MONALISA 2.0 is a definite step forward in the process of further developing the EU Motorways of the Sea strategy by implementing specific pilot actions and studies that will foster the deployment of new maritime services and processes under the Sea Traffic Management concept. Sea Traffic Management (STM) is a proposed concept for enabling a higher degree of integrated performance within the sea transport ecosystem. Its goal is to increase safety, environmental sustainability, and operational efficiency of sea transport. STM relies upon involved actors to share their short and long-term intentions (e.g., estimates of when a state is to be reached) as well as information about reached states. STM is realised by four key concepts:

- Strategic Voyage Management (SVM)
- Dynamic Voyage Management (DVM)
- Collaborative Decision Making within and in relation to ports (Port CDM) and
- Flow Management.

These four concepts are supported by a fifth concept: the System Wide Information Management (SWIM), a sharing of data in a common information environment and structure (e.g., Maritime Cloud, Digital Data Streams, and Open Bridge Platform).
The content and development of these technologies have been inspired from the SESAR\(^1\) program and Airport CDM\(^2\), which contributes to safer and more efficient flight operations (EU, 2014).

MONALISA 2.0 takes its point of departure in the results and experiences from the MONALISA 1 project (2010-EU-21109-S), co-financed by TEN-T under the Motorways of the Sea, and which has received very positive feedback from both stakeholders, international bodies and the European Commission.

In MONALISA 2.0, the demonstrated results of Sea Traffic Management from MONALISA 1, are taken as an important step further towards the deployment of the concept through joint actions, e.g. by:

- Testing of specific applications and services which would allow rapid commercial deployment
- Integration of route planning tools with additional environmental information and maritime spatial planning for improved maritime safety and environmental protection
- Joint private-public action to elaborate better standards for route information exchange through a common interface and data formats allowing equipment from all manufacturers to be used for Sea Traffic Management
- Demonstrating particular/hands-on services using new technology to enhance maritime safety, making Search and Rescue and mass-evacuations more efficient than today and by addressing the urgent issue of safety in ports
- Reinforce and update staff qualifications with the aim of improving SAR, contingency and crisis management and mass evacuation from ships and in ports
- Re-using results of previous EU investments in Air Traffic Management as well as from other sectors and their application into the maritime domain.

The MONALISA 2.0 Project is implementing four activities with the aim of defining the STM concept at a European level, as follows:

\(^1\) SESAR (Single European Sky Air Traffic Management Research) is the technological pillar of the Single European Sky.

\(^2\) Airport Collaborative Decision Making is a joint venture between ACI EUROPE /EUROCONTROL/IATA/CANSO which aims to improve the operational efficiency of all airport operators by reducing delays, increasing the predictability of events during the progress of a flight and optimising the utilisation of resources.
Act. 1 – Sea Traffic Management Operations and Tools
Act. 2 – Sea Traffic Management Definition Phase Study
Act. 3 – Safer Ships
Act. 4 – Operational Safety.

The Operational safety activity will improve operative crisis management efficiency in port and at sea, paying special attention to passenger ship incidents by:

- Implementing new technologies/innovations include on-board life rafts recovery systems (OLRS), recovery of damage vessels, Sea Traffic Management, information exchange between land, SAR instruments, ships and other information sources, dynamic predictor, and evacuation apps.

- Pre-identifying risks in order to support tactical decisions and analysing the behaviour, response and the chain of responsibility in SAR operations.

- Improving interoperability among SAR services, port emergency control centres, passenger ships, VTMIS and Mission Control Centres.

- Designing dedicated training programmes with the aim of improving the level of performance of human element involved in such activities including the use of the novel technology implemented in the project.

- Several exercises and pilot tests will be deployed in order to validate the information systems and the technologies employed to support SAR, evacuation and first aids with the support of trained professionals for each purpose. The pilot scenarios will also facilitate the test of the training proposed with the aim of tuning and collecting the main outcomes of the training applied to the real-life situations, enabling its improvement for the future MSc consolidation.

3. Purpose of this document

The purpose of this document is to obtain some external points of view from institutions like EMSA and IMO in order to achieve a suitable training program in maritime safety with the aim of increasing the response to passengers vessels crisis, the coordination among organism involved, the exchange of information, and the decisions taken by clear leadership management on board, among others.
4. Objectives of the training plan

The main outcome of the training within the MONALISA 2.0 project is to implement a practical set of training courses covering operational safety with a special focus on passenger vessels’ crises, towards the proposal for a standardised and certified master program. Specifically, the objectives of the training plan developed under the MONALISA 2.0 are:

- Strengthening the cooperation in training and education of Search and Rescue functions with the rest of the actors involved in the maritime safety field.

- Updating and improving the training approach of the human element on board (crews and seafarers) for the crews to acquire the skills needed for the growing and changing tendencies in maritime industry: larger vessels, reduced crews, the use of LNG and other alternative fuels, crowded cruise vessels and more automated fleets.

- Finding a common understanding of the three pillars in the integrated maritime safety (port, ship and sea side) and working towards a coordinated response when accidents happen or for prevention and preparedness.

- Reinforcing the human element decision-making processes by means of common sense and adequate understanding of leadership issues.

- Applying the efficient use of the new technologies and tools to facilitate response, firefighting, crisis management and mass evacuation/rescue operations from large passenger ships.

After the training delivery and the tests made during the project exercises, the expected outcomes of the Maritime Safety Training Program of MONALISA 2.0 Project are:

- The verification of the improvements in the response of crew members to events referred with crowded vessels.

- Improved coordination and cooperation between crew and SAR services to reduce the loss of life in mass evacuation and rescue operations.

- Improved coordination between crews, SAR services, and port safety and protection bodies when a massive incident happens in a port facility or when
the port in proximity must assist the rescue and assistance of injured people in a maritime accident.

- The establishment of better communication and information exchange among the Authorities, the relevant parts involved and the media, in order to improve the procedures based on proper decisions.

- A final proposal for an integrated Maritime Safety Training plan, which can be incorporated within a postgraduate education program.

This training plan on Maritime Safety is not intended to modify or change the international rules on the human element training and education promoted by IMO. Rather it is looking at a more effective training approach by using the guidelines, rules and standards that the International Maritime Organisation promotes worldwide. It is also looking to make the most of the guidelines developed by adding the elements in a continuous maritime changing world, as they appear as new resources, to ensure a safer, more efficient and environmentally friendly maritime transport industry. The maritime safety and response issues in case of casualties and accidents shall complement Sea Traffic Management (STM), as the main component of the project.

5. Lessons learned

The number of vessels in European waters is constantly growing, and with it the risk of possible incidents. Moreover, the vessels size is increasing which boosts the difficulty of SAR operations and the potential consequences are greater. Between 2011 and 2013 in European waters alone, more than 5,000 incidents happened in which 1,421 passenger ships were involved. Between 2012 and 2014 there have been three relevant accidents in the world (two of them happened in Europe): Costa Concordia in Italy with 32 dead people, Sewol in South Korea resulted with more than 300 casualties and the fire of Ro-Ro Norman Atlantic with 28 victims, while she was sailing in the Strait of Otranto (Adriatic Sea).

These accidents demonstrate the existing gaps and failures in maritime transport safety, from the ordinary navigation watch keeping and navigational tasks, to the safety management after the accidents have happened. Even the technology available (which was highly developed in terms of equipment, manning, communications, etc.) was misused. There was a lack of consistency in the decision making processes, showing clear crisis management deficiencies from the ship side, and the difficulties in coordinating the response actions between the Coast Guard
services and the crew clearly indicates that something is wrong. Human factor is the main cause of incidents in spite of the safer and more developed ships and equipment.

The entities involved in the MONALISA training have propose a series of courses which will train the crew, port and SAR staff to reduce the consequences of accidents, which can involve more than 7,000 persons at a time. The topics cover SAR and MRO, mass evacuations in ports, emergency management and crowd management on board ships, leadership and human factor in crisis scenarios, IMO/ICAO/IAMSAR/ applications, firefighting and LNG. The trainees will be taught in order to place their knowledge in an exercise related to MRO, which will take place in June 2015 in Valencia organised by the Spanish Maritime Safety Agency and Valencia Port Authority and with the collaboration of Transmediterranea Shipping Company. The Integral Maritime Safety Jovellanos Centre, Chalmers University, NTUA University, Technical University of Catalonia and Valenciaport Foundation compose the team involved.

**5.1 Lessons learned after Costa Concordia Accident**

As it is well known, the Italian cruise ship Costa Concordia capsized and sank after striking an underwater obstruction off Isola del Giglio, Tuscany, on 13 January 2012, with the loss of 32 lives.
The luxury cruise was in navigation in the Mediterranean Sea (Tyrrenian Sea, Italian coastline) with 4,229 persons on board (3,206 passengers and 1,023 crewmembers). The vessel was sailing too close to the coastline, in a poorly lit shore area, under the Master’s command, when the ship suddenly collided with the “Scole Rocks” at the Giglio Island. The weather conditions were fair but a combination of high speed and proximity resulted in a disaster. In February 2015, an Italian court sentenced the captain of the cruise liner to 16 years in prison.

The lessons of the Costa Concordia incident demonstrate that human error can defy even the most advanced technology. Better planning, preparation and implementation of safety communications will ensure better outcomes during crisis situations.

This accident demonstrated the need for verifying the actual provisions contained in international instruments, such as the International Convention for the Safety of Life at Sea (SOLAS), International Convention on Standards of Training, Certification and
Watchkeeping for Seafarers (STCW) and International Safety Management Code (ISM Code), related to different issues such as:

- Bridge management, considering aspects as the definition of a more flexible use of the resources (that may be tailored made for responding to ordinary, critical, emergency conditions) and enhanced collective decision making process and “thinking aloud” attitude.

- Principles of Minimum Safe Manning (IMO resolution A.1047 (27) as amended by IMO resolution A.955 (23)) that should be updated to better suit to larger passenger ships. A mandatory application of these principles is also considered desirable.

5.2 Lessons learned after the Sewol Accident

The sinking of the MV Sewol happened on the morning of 16 April 2014 in route from Incheon to Jeju, Korea. The Japanese-built South Korean ferry capsized while carrying 476 people, mostly secondary school students. The 6,825-ton vessel sent a distress signal from about 1.7 miles north of Byeongpungdo. In all, 304 passengers died in the disaster and there were approximately 172 survivors, many were rescued by fishing boats and other commercial vessels near to the scene.

The Sewol investigations found that the crew was underprepared to deal with a serious incident at sea and the vessel’s owner, Chonghaejin Marine, had not given them guidance in how to execute a swift evacuation. In 2013 Sewol's operator Chonghaejin Marine spent only about $500 on safety education for its crews.
At the end of 2014, the captain of South Korea’s Sewol ferry has been sentenced to 36 years in prison for criminal negligence in his failure to evacuate passengers after the crash of the vessel. The ship’s chief engineer was found guilty of homicide for not aiding two injured crew members and received a 30-year sentence. The ferry’s 13 other crew members received sentences ranging from five to 20 years.

The trial of the Sewol’s 15 crew members for involuntary manslaughter and abandonment has revealed how the lack of a safety culture contributed to the huge death toll. Training gaps of Sewol’s crew is the most important lesson learnt from this accident. As a result of the tragedy, safety training is now at the forefront in South Korea.
5.3 Final findings

Both accidents reinforce the purpose of improving training conditions in several aspects of operational safety: communications, teamwork and crisis management. MONALISA training has included these topics as a requisite to progress in line with the introduction of the project concept of Sea Traffic Management. Crews, land based operators and SAR staff must improve the required skills in order to face the challenges of the MONALISA concept shall bring.

6. MONALISA 2.0 and the IMO/EMSA strategy

In the table 1, a comparison among MONALISA Maritime Safety Training, IMO and EMSA related topics is resumed. The confluence of objectives among the topics is a strong starting point to go ahead with this training program.

<table>
<thead>
<tr>
<th>MST IMO TOPICS</th>
<th>MST EMSA TOPICS</th>
<th>MST MONALISA TOPICS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radio Communications and Search and Rescue</td>
<td>Maritime Information System</td>
<td>Mass rescue operations</td>
</tr>
<tr>
<td>Cargo Operations and Safety Navigation</td>
<td>Passenger Ship Safety</td>
<td>Massive evacuation in ports</td>
</tr>
<tr>
<td>Implementation, Control and Coordination</td>
<td>Business Continuity Facility</td>
<td>Emergency Management and crowded management on board ships</td>
</tr>
<tr>
<td>Safety management / Culture</td>
<td></td>
<td>Leadership and human factor in crisis scenarios.</td>
</tr>
<tr>
<td>Safety regulations</td>
<td>Maritime safety package training and ship safety</td>
<td>IMO/ICAO/IAMSAR applications</td>
</tr>
<tr>
<td>Fire Protection</td>
<td>Pollution control from oil and gas in vessel and platforms</td>
<td>Firefighting and spills control on LNG installations</td>
</tr>
</tbody>
</table>

*Table 1: IMO, EMSA and MONALISA 2.0 similarities.*
6.1 IMO

IMO is constantly working on improving the safety at sea and the protection of the marine environment. The professionalism of seafarers is crucial in this matter; therefore IMO has proposed several conventions and codes referring to the human element at sea. An example of this is the revision of the International Convention on Standards of Training, Certification and Watch keeping for Seafarers (STCW) and its associated Code, as amended, which last version entered into force on 1 January 2012, with a five-year transitional period until 1 January 2017.

The “Manila Amendments” to the current STCW convention were adopted with the aim of ensuring that seafarers will receive global standards training to operate technologically advanced ships. Many of the important improvements in the Convention can be identified in the MONALISA training courses:

- Improved measures to prevent fraudulent practices associated with certificates of competency and to strengthen the evaluation process (monitoring of Parties’ compliance with the Convention).

- Revised requirements on hours of work and rest and new requirements for the prevention of drug and alcohol abuse, as well as updated standards relating to medical fitness standards for seafarers.

- New certification requirements for able seafarers.

- New requirements relating to training in modern technology such as electronic charts and information systems (ECDIS).

- New requirements for marine environment awareness training and training in leadership and teamwork.

- New training and certification requirements for electro-technical officers.

- Updating of competence requirements for personnel serving on board all types of tankers, including new requirements for personnel serving on liquefied gas tankers.

- New requirements for security training, as well as provisions to ensure that seafarers are properly trained to cope if their ship comes under attack by pirates.
✓ Introduction of modern training methodology, including distance learning and web-based learning.

✓ New training guidance for personnel serving on board ships operating in polar waters.

✓ New training guidance for personnel operating Dynamic Positioning Systems.

The 1st session of the IMO Sub-Committee on Human Element, Training and Watch keeping (HTW 1) was held from 17 - 21 February 2014, at the IMO headquarters in London. The HTW Sub-Committee has been created from the previous Standards of Training and Watch keeping (STW) Sub-Committee. One of the discussion topics focused as follows:

“Moreover following the capsize of the Costa Concordia the Maritime Safety Committee requested that Human Element, Training and Watch keeping (HTW) review the current training arrangements on board passenger ships. HTW 1 reviewed the STCW Convention regulation V/2 and the STCW Code section A-V/2 in relation to the existing training regime required for key personnel responsible for providing assistance to passengers in an emergency situation”.

The MONALISA 2.0 Training Program follows some of the IMO requirements in the Manila Amendments to the current STCW Convention, which focuses on passenger ships crisis.

6.2 EMSA

At a European level, EMSA is involved in the control of pollution and safety of ships. The Maritime information system that was developed helps to ascertain the position of the distressed vessel and the vessels around, something of paramount importance in case of mass rescue operations. The strategy to reduce atmospheric emissions from seagoing vessel is increasing the consumption of alternative fuel, as LNG, together with the increment of domestic and industrial gas consumption. Moreover, one of the main causes of vessel accident is the fire on board. Therefore, a training programme of how to prevent and react on firefighting and spills control on LNG installations, terminals and vessels seems suitable under the EMSA priorities.
Moreover, the Commission has set out a new approach for enhancing passenger ship safety on domestic and international voyages aligning the new regulation with IMO and the shipping industry proposals. Some directives as 2009/45/EC with respect to its simplification, scope and coverage for smaller passenger ships and ship built in the materials other than steel are revised. Some directives as 2009/45/EC on safety rules and standards for passengers’ ships are constantly being revising. Despite all these efforts, accidents continue happening, even less frequently, but often producing great and serious consequences, and that means that further training of crew, Coast Guard and any other organisation involved is still necessary.

6.3 Industry

Training and development of seafarers is the key to the industry’s success and the drive for safer operations causing zero incidents/accidents to staff, passengers and goods. The purpose to heavily invest and reinforce the idea of training within MONALISA 2.0 Project is to evolve towards a significant reduction in the number of incidents on board vessels and improving the capacity to respond to the risk situations properly, reducing the human factor associated to large-scale consequences. Interoperability and cooperation among the parties involved when accidents happen is crucial.

Figure 3: Marine casualties and incidents reported between 2011 and 2013.

Number of ships involved

Source: EMSA. Annual overview of marine casualties and incidents 2014
The shipping industry looks closely at the “soft skill” elements of safety and safety culture as well as operational safety, which are assessed by international organisms like IMO and EMSA. A close communication among them with the Industry, the Classification Societies and the Academia, is a warranty for obtaining better standards in seafarers’ performance and skills.

According to the Commission Communication “Strategic goals and recommendations for the EU’s maritime transport policy until 2018”, 80% of international freight is carried by sea and 40% of intra-European freight uses Short Sea Shipping. Moreover, European ports welcome more than 400 million passengers each year.

In total there are 81,584 vessels around the world with 5,186 incidences in Europe between 2011 and 2013. The total number of ships involved was 6,685 from which 1,421 were passenger ships. Passenger ships are the second highest category for vessel accidents and 80% of the accidents happened in territorial seas or internal waters.

According to EQUASIS there are 6,463 passenger ships including all kind of ferries and cruise. 273 are large (25,000-60,000GT) and 146 very large (more than 60,000GT). 1,715 vessels are between 15 - 24 years of which 76 are large and 32 are very large. And 2,880 are more than 25 years. To have an idea a vessel with 99,000 GT can accommodate 2,500 passengers and a crew of 1,000 members.

From those numbers around 410 are considered as cruise vessels. The cruise sector over the past 10 years has seen a growth of 77.3% arriving to more than 21.3 million passengers in 2013. In 2013 more than 6 million of passenger embarked in a cruise from European ports. The capacity of the fleet has also increased in 84% from 73 million bed days to 134.5 million in 2013 having Europe the 37% of it (Mediterranean 35.7 and North Europe 13.9 millions of bed days). The cruise industry generates around 114.8 million of euros on onshore visits by passengers and crew and direct expenditures of the cruise lines for goods and services. Taking into account that more than 30% of the cruise market sails in European waters, it makes crucial the recommendations of the Commission Communication:

- Promoting cooperation between European maritime training institutions for upgrading seafarers’ competences and adapting requirements to the prerequisites of today’s shipping industry.
✓ Working in partnership with training institutions and the industry towards establishing ‘maritime certificates of excellence’ (European maritime postgraduate courses) that may well go further than STCW requirements. In that context, the creation of a network of centres of excellence for maritime training in Europe (European Maritime Academy) could be considered (COM (2009) 8, final Brussels, 21.1.09).

A report produced by the European Community Shipowners’ Association (ECSA) on the subject of enhancing recruitment and training in the European maritime industry was published for the Brussels ECSA workshop, 28 September 2010.

The ECSA report’s most important finding is the discovery of an alleged increase in the number of EU officers and that this increase is attributable to the widespread adoption of tonnage taxes by EU flags. The report says that the ‘very encouraging signs’ of increased officer trainees appear to be the direct result of state aid measures which have boosted the number of ships registered with EU states and generated notable increases in cadet totals in Greece, Italy, Norway, Denmark, Germany and the UK.

**Figure 4: EU-EEA share of the world fleet**

ECSA suggests there were approximately 38,000 students/cadets in 2012, an 11% increase in a decade.
In parallel to the labour market in shipping, the objective of training must not lose sight to promoting quality of education and training in the maritime transport sector to address three specific challenges: maritime safety, reducing environmental impact and increasing competitiveness of the sector. These three challenges are directly linked to the MONALISA concept maintaining the European Maritime Industry safer, environmentally sustainable and efficient in terms of the economic factors involved, including competitiveness.

![Seafarer supply countries in figures](image)

**Figure 5: Seafarers worldwide (Source: 5 years strategy EMSA).**

With the aim of addressing the three challenges in our training courses a Workshop was held in Barcelona on the 06/11/14, during the Barcelona Midterm Conference of the MONALISA 2.0 Project.

The workshop organised by the Spanish Maritime Safety Agency (SASEMAR) and the Integral Maritime Safety Jovellanos Centre with the support of the Nautical School of Barcelona, was aimed to:

- Cruise Lines and Passenger Shipping Companies
Maritime Transport and Safety Training Centres

Other interested stakeholders like ICT providers and developers.

Within the context of MONALISA 2.0 project "Taking the Maritime Transport in the Digital Age"; the comprehensive training plan stressed the need to include the most important aspects in the field of maritime transport safety, as the plan covers some of the topics that are challenging the sector at present. The point of view of the maritime industry and especially the one dedicated to the cruise industry was considered paramount for the definition of any training plan and recycling for staff and crew of such vessels.

The industry is concerned about the importance of developing leadership skills among officers and other participants of shipping business ashore, susceptible to be involved into a team required to face and solve a crisis situation on board.

Leadership training is one of the main topics of Carnival’s internal training programme, and is structured in the following three blocks: leading business performance, leading others and leading change, being the last one the more challenging one, with which they are meeting many obstacles, especially with elder officers, as recognised by Carnival, which expressed their interest in a training course able to develop leading change skills, which would be considered a valuable complement to their internal training.

For Grimaldi, motivation is their main concern regarding leadership and team working training.

Size and capacity of passenger ships have grown greatly in recent years. When an emergency situation on a passenger vessel occurs, the role of the crew is essential to prevent panic scenes and that situation becomes uncontrollable.

The shipping companies have their own training programs that mix safety with other courses. In that way, the crew is constantly updated and assessed in safety issues. Carnival as a special case has their own training centre that covers a lot of the courses needed for their crew. Although some topics need to be made from outside of the organisation and others as LNG firefighting has not been yet included in their program.
Cruise industry is facing the difficulties in the introduction to new ICT tools to older crew members. They are looking for ICT that are useful, that means that they are easy and fast to learn.

Having an extra training doesn't help in the recruitment process as they are looking for new cadet which can take parts of their own training program. Nevertheless studying superior courses while working give an extra value boosting the promotions.

The app SafEscape, an interactive video game that allows cruise passengers to know muster and evacuation procedures, even before being on board, was very well welcomed. This app, in the form of first-person video game, gets better safety training in a funny way. With practice, the App user would achieve the standard safety knowledge (signals, sounds), with independence of the class of the cruise ship he/she is sailing. So in the future, any person will have enough information about what he/she has to do in a cruise emergency, before being a passenger.

An emergency in a passenger ship, which can carry more than 7,000 passengers and crew members, poses a formidable challenge to any maritime rescue system. Current resources (not matter in what country happens) are clearly insufficient to recover quickly and safely several thousand people from rafts and lifeboats in open sea. One could get the impression that the cruise industry believes that, once the safe evacuation of the vessel has been taken place, the rescue of the passengers is an exclusive competence of SAR authorities.

Consequently we can see that the shipping industry is quite advanced in training programmes as they consider STCW only a very basic starting point. Nevertheless, training programme like the one is being proposed fits in the shipping training systems and gives a benefit to the cadets and new crew’s staff.

7. Maritime Safety Training (MST)

The importance of Maritime Safety Training (MST) cannot be understood particularly with the current global market scenario and the implementation of the 2010 revised Standard Training and Certificate Watch keeping (STCW) Convention and Code.
Around 80 to 90 per cent of maritime accidents are ascribed to human error. Hence, it is critical that seafarers are well-educated and trained, able to follow orders, manage risks, solve problems, and must be psychologically and emotionally happy to ensure safe, secure, clean and efficient operations for safety of life at sea and the other safety and security measures supplied by staff outside vessels.

The main outcome of sub-activity 4.6 ”Training”, within the MONALISA 2.0 project is to implement an operational/practical set of training courses covering the subjects proposed for the different fields linked to the operational safety or MST, under the scope of MONALISA concept, towards a proposal for a standardised and certified MST post graduate program. It is desired that after the MONALISA 2.0, training activities continue being a tool for the organisms involved and as a part of the training subjects of the educational institutions playing in ML2.0 project. A desired outcome of training in ML 2.0 would be to propose a ML MSc (60 ECTS) - European Credit Transfer and Accumulation System - covering the six topics, 10 ECTS each and delivered by the Chalmers University, National Technical University of Athens, Technical University of Catalonia, Valencia Port Foundation and the Integral Maritime Safety Jovellanos Centre.
The training program is defined in terms of 6 main topics in 6 different training modules. The rational implementation of the courses covers the three main pillars regarding the operational safety, response and co-operation in the maritime field, for not only the prevention of accidents but also, the response in case they happen in ports, on board and at sea.

8. The MST Team

The proposal of a training program within MONALISA 2.0 project has been a need detected since the beginning of the action. Among the 10 countries involved, several education institutions are beneficiary partners, most of them are Universities and besides, the Integral Maritime Safety Jovellanos Centre and the Valenciaport Foundation deliver specific training. The team and the training program join high-level education institutions from Sweden, Greece and Spain. This transnational effort shall make possible the mobility of students providing a meaningful, reliable and accredited training program. The different topics offered by high level institutions combined with the practical training, is a guarantee of success in terms of maritime and ports’ safety. The consideration of the specific model courses under the international conventions and their relevance with the MONALISA Project is another benefit for the Maritime Safety Training.

The team is composed by:

- Integral Training Jovellanos Centre
- National Technical University of Athens with the support of CH ALMERS University of Technology
- Technical University of Catalonia
- Valencia Port Foundation.

In order to further improve the quality and the cooperation itself we focussed on two areas. First, we try to establish and keep up academic contact on the level of institutions and the trainees. Further visits and international online seminars shall be planned. Second, we try to develop a training offer to fit the possibilities and interest of the institutions and meet the needs of the students. One result of this is that the
training centres could exchange students, knowledge or training facilities. Geographical context is also important. A Baltic trainee can learn safety aspects in Mediterranean and Atlantic and vice versa. This ensures that trainees study accordingly to their training programs or particular needs at home, and reinforce them with technics and practices at receiving centres.

9. Added value of MONALISA 2.0 training program

The MONALISA 2.0 project and the concept of Sea Traffic Management represent the consolidation of the e-navigation and e-maritime initiatives at global level, carrying the maritime transport to the digital age. These advances will not eliminate the occurrence of accidents in the maritime sector but allow preventing or responding appropriately when they happen. Within this context, the training courses have been defined as relevant to the design of an integral training plan on maritime safety, enabling to cover what, in the opinion of the Operational Safety working group, can be more problematic when accidents occur in large-scale passenger ships.

Although it is not our intention to propose modifications to the IMO ruled standard courses, the training of relevant aspects like LNG handling and fire fighting provided by external firemen on board ships are a step forward on this issue.

The use of mobile apps and tools to help evacuation of large passenger ships introduce new elements to improve evacuation and rescue operations.

The introduction of leadership and coordinated crisis management in the crewmembers enables to improve decision-making processes and a more coordinated response by the crew, service staff on board, SAR teams, and Port Safety and Civil Protection agents.

Massive rescue operations are relevant as the size of the new passenger vessels is increasing. Coast Guard and SAR services must be prepared and duly trained to face these new challenges in the maritime transport sector.

Finally, the information exchange during the response to any accident shall make possible to give a wider functionality to the maritime SWIM as the information instrument to support crises management from land, maintaining informed the governments, families and public.
Training of human element is still being the best way to avoid or reduce accidents. When the incidents are inevitable, the human element supported by the technology and knowledge may reduce the victims, environment and goods damages dramatically.

10. Summary of training courses

1. Training on SAR and Mass Rescue Operations
2. Training on Safety and Mass Evacuation in Ports
3. Training on Emergency Management on board passenger ships
4. Training on Leadership and Human Factor in Crisis Scenarios
5. Training on IMO/ICAO/IAMSAR application
6. Training on Firefighting and LNG (Liquefied Natural Gas).
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Training Courses
1. Training on SAR and Mass Rescue Operations (Spanish Maritime Safety Agency)

The present subject covers SAR (Search and Rescue) and MRO (Mass Rescue Operations) and includes a training strategy in terms of the specific requirements for those people involved in Search and Rescue operations focusing on mass rescue and crowded passenger ships. The IMO model course and other training standards and requirements from IALA and ILO are considered. The use of e-learning innovations and practical activities in specialised centres like Integral Maritime Safety Jovellanos Centre, Chalmers University and Valenciaport Foundation are also taken into account.

1.1. SAR and MRO – Training Requirements for MONALISA 2.0 applied on this topic

The training requirements for this subject have been based on the IMO and ICAO IAMSAR Manual and on the IMO Model course 3.13, Maritime Search and Rescue Administration, as well as on IMO Model course 3.15, SAR on Scene Coordinator, adapting the contents to the mass evacuation and critical situations management on large passenger ships. These requirements will define the training material in both components, theoretical and practical including the evaluation strategy.

1.2 Added Value of the training

Despite the fact that in recent years it has been a significant increase in the movements of passengers by sea (due to, among other causes, the commissioning of passenger ships with greater transport capacity), and that recurrent accidents that happens year after year, there is no a specific training course regarding the coordination and response to an MRO. This course, designed by the Jovellanos Centre under the scope of MONALISA, synthesizes the knowledge of SAR mission coordinators, SAR unit officers and passenger vessel crews, should acquire to effectively respond in an MRO scenario.

1.3 International Training Standard Requirements on SAR and MRO

International Convention on Maritime Search and Rescue (SAR). The 1979 Convention, adopted at a Conference in Hamburg, 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 organisation and, when necessary, by co-operation between neighbouring SAR organisations.
IAMSAR Manual. The IMO and the ICAO jointly develop and publish the International Aeronautical and Maritime Search and Rescue (IAMSAR) Manual, published in three volumes covering organisation and management; mission coordination; and mobile facilities.

International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW). The 1978 STCW Convention was the first to establish basic requirements on training, certification and watch keeping for seafarers on an international level. Previously the standards of training, certification and watch keeping of officers and ratings were established by individual governments, usually without reference to practices in other countries. As a result standards and procedures varied widely, even though shipping is the most international of all industries. The Convention prescribes minimum standards related to training, certification and watch keeping for seafarers whose countries are obliged to meet or exceed.

### 1.4 SAR and MRO Training Syllabus

The aim of the course is to prepare all the stakeholders of SAR operations to manage a massive rescue MRO operation. A MRO requires immediate response to assist a large amount of people in distress. Nowadays, the resources available of the SAR authorities are usually not enough to face events of this magnitude. It is necessary to put into practice well planned and carefully coordinated massive measures, and make use of quite a lot of different organisational resources.

This course is designed to train multidisciplinary groups of people involved in MROs: VTS operators, SAR personal, SAR units crew members, cruise ships officers, port authorities, police, army, customs, medical personnel, etc. Learning and discussing together will reinforce the collaboration concept essential when facing the MRO.

The course covers both theoretical and practical knowledge, but it specially focuses on practices and exercises. All the course subjects take into account the lessons gathered from the latest MRO like Costa Concordia, Sewol, Deep Water Horizon, Norman Atlantic and others, trying to avoid the past errors and learn from them.

Another key point is the use of simulators, ICT, and new technologies available like mobile apps or personal GPS beacons, not only as a part of the training but also as a tool to improve SAR and MRO. Innovation gives us powerful means to plan, manage and coordinate the SAR and MRO to be more efficient.
The methodology of the course is based upon the teaching-learning procedure. It consists of five modules, one for each day, with a theoretical part together with its correspondent practical exercise to apply the abstract concepts. New areas of knowledge are progressively incorporated, developing the whole content in an easy and intuitive way.

1.4.1 Topics to be covered

**Module 1. Communications and new technologies**

SAR and MRO terminology.
Distress alert: DSC, EPIRB, VHF, satellite, mobile phone, and other means.
Communications before, during and after the MRO.
Using VTS/MRCC simulators for MRO training.
New technologies and unregulated systems: virtual reality, mobile apps.
Training the passengers on evacuation with ICT’s.
**Practical exercise:** Communications using GMDSS simulator of Integral Maritime Safety Jovellanos Centre.

**Module 2. Units**

Air SAR units: aircrafts and helicopters.
Maritime SAR units: tugs, ships and rescue boats.
Underwater SAR units and underwater operations.
Cruise ships as SAR support unit.
New prototypes: unmanned ships, drones.
**Practical exercise:** Approach and rescue manoeuvres using Navigation simulator of Integral Maritime Safety Jovellanos Centre.

**Module 3. Castaway’s evacuation, recovering and reception**

Safety measures to avoid the ship’s evacuation.
Methods and devices for counting passengers.
Safe areas: inside and outside the ship.
Massive evacuation.
Recovering and transferring castaways.
MRO and illegal immigration.
**Practical exercise:** Evacuation and castaway’s reception at the wave pool and the exercises field of Integral Maritime Safety Jovellanos Centre.
Module 4. Operations

Planning the MRO.
MRO Coordinator.
The weather influence on SAR and MRO.
Searching procedures.
Other particular MROs.
**Practical exercise:** Basic MRO coordination using VTS simulator of Integral Maritime Safety Jovellanos Centre.

Module 5. Strategies and management

MRO strategies, regional agreements on SAR teamwork.
Remote areas, polar waters.
Relations with media.
Auditing the MRO plans.
Ship-owners and MRO, involving all the stakeholders in the MRO.
MRO drills.
Lessons learned.
**Practical exercise:** Advanced MRO coordination using VTS simulator of Integral Maritime Safety Jovellanos Centre

### 1.5 SAR and MRO Training Delivery and Management Plan

<table>
<thead>
<tr>
<th>MANAGEMENT ASPECT</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Methods for the Course Delivery:</strong></td>
<td>Theoretical part: classrooms with multimedia facilities.</td>
</tr>
<tr>
<td></td>
<td>Practical part: full mission bridge, VTS and GMDSS simulators and on field training (firefighting, survival at sea and HUET, among others).</td>
</tr>
<tr>
<td><strong>Course intake limitations:</strong></td>
<td>8 trainees per course.</td>
</tr>
<tr>
<td><strong>Staff Requirements:</strong></td>
<td>5 years of experience as SMC responsible for maritime SAR operations.</td>
</tr>
<tr>
<td>Qualifications of Instructors and Trainers,</td>
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<tr>
<td>MANAGEMENT ASPECT</td>
<td>DESCRIPTION</td>
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</tr>
<tr>
<td>IMO certified, experience, etc.</td>
<td>5 years of experience as VTS operator or supervisor in a VTS, holding IALA V 103.1 or V 103.2 Certificate.</td>
</tr>
<tr>
<td></td>
<td>5 years of experience as Instructor of Navigation/ship-handling maritime simulators.</td>
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<td></td>
<td>2 years of experience as Instructor of GMDSS.</td>
</tr>
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<td></td>
<td>3 years of experience as Instructor in firefighting.</td>
</tr>
<tr>
<td></td>
<td>3 years of experience on Survival at Sea techniques.</td>
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<tr>
<td></td>
<td>Specialist in MRO strategies.</td>
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<tr>
<td></td>
<td>Specialist in serious game.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Teaching facilities and equipment:</th>
<th>The simulators have scenario projectors, steering position, communication equipment’s and debriefing devices, among other.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>The field training has wave pool for survival exercises, firefighting area and HUET installation, among other.</td>
</tr>
<tr>
<td></td>
<td>The classrooms are equipped with screen projections, electronic board and internet connection.</td>
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<tbody>
<tr>
<td></td>
<td>A2: Instructor procedures.</td>
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<tr>
<td></td>
<td>A3: Keynotes and presentations.</td>
</tr>
<tr>
<td></td>
<td>A4: Videos.</td>
</tr>
<tr>
<td></td>
<td>A5: SARMAP and OILMAP applications.</td>
</tr>
<tr>
<td></td>
<td>A6: Access to national AIS network.</td>
</tr>
<tr>
<td>MANAGEMENT ASPECT</td>
<td>DESCRIPTION</td>
</tr>
<tr>
<td>------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Bibliography and support references, textbooks, etc.</td>
<td>IAMSAR Manual, Volume I – Organisation and Management.</td>
</tr>
<tr>
<td></td>
<td>IMO Model Course 1.28. Crowd management, passenger safety and safety training for personnel. Providing direct services to passengers in passenger spaces.</td>
</tr>
<tr>
<td></td>
<td>IMO Model course 1.29. Proficiency in crisis management and human behaviour training including passenger safety, cargo safety and hull integrity training.</td>
</tr>
<tr>
<td></td>
<td>IMO Model course 3.13. SAR Administration.</td>
</tr>
<tr>
<td></td>
<td>IMO Model course 3.15. SAR On-Scene Coordinator.</td>
</tr>
<tr>
<td>Certification if applicable:</td>
<td>At the end of the course, students who pass the assessment will receive a course certificate. At present, this certificate is neither approved nor required by the Maritime Competent Authority.</td>
</tr>
<tr>
<td>Balance of Theoretical and practical classes:</td>
<td>30/10 Theoretical: 30 hours divided into 5 modules of 6 hours. Practical: 10 hours divided into 5 exercises of 2 hours, one per module.</td>
</tr>
</tbody>
</table>

1.5.1 Trainers qualifications
One of the key points that determine the excellence of the training is to provide suitable qualified trainers. Trainers must have professional background in SAR as an officer / supervisor / responsible for maritime SAR operations; VTS in maritime and port traffic control centres; Navigation/ship-handling maritime simulators; Emergency communications (GMDSS) simulators; On-board fire-fighting; Survival at Sea techniques; Mass evacuation systems/strategies.

In general, a suitable trainer should possess the following skills: Quality presentation; Background in education; Good writing; Professionalism; Excellent communication. Availability to help students and encourage them to reach the required aims.

### 1.5.2 Course time table summarising the contents

<table>
<thead>
<tr>
<th>Period / Day</th>
<th>Day 1</th>
<th>Day 2</th>
<th>Day 3</th>
<th>Day 4</th>
<th>Day 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st period (2.0 hours)</td>
<td>SAR and MRO terminology, Distress alert, Communications</td>
<td>7. Air SAR units</td>
<td>Safety measures to avoid the ship's evacuation, Passengers’ counting methods</td>
<td>Planning the MRO SAR mission coordinator (SMC)</td>
<td>MRO strategies and regional agreements, Remote areas, Relations with media</td>
</tr>
<tr>
<td>08:00-10:00</td>
<td>10:00-10:30 Break</td>
<td>Break</td>
<td>Break</td>
<td>Break</td>
<td>Break</td>
</tr>
<tr>
<td>10:30-12:30</td>
<td>Using simulators for MRO Training, New technologies and Unregulated systems</td>
<td>8. Maritime SAR units</td>
<td>Safe areas, Massive evacuation</td>
<td>MRO Coordinator, The weather’s effect on SAR and MRO</td>
<td>Ship-owners and other stakeholders, MRO drills</td>
</tr>
<tr>
<td>12:30-13:00</td>
<td>Break</td>
<td>Break</td>
<td>Break</td>
<td>Break</td>
<td>Break</td>
</tr>
<tr>
<td>3rd period (2.0 hours)</td>
<td>Training the passengers on evacuation with ICT’s and serious games</td>
<td>Underwater SAR units and operations, Cruise ships as SAR support unit, New prototypes</td>
<td>Recovering and transferring castaways, MRO and illegal immigration</td>
<td>Searching procedures</td>
<td>Lessons learned</td>
</tr>
<tr>
<td>13:00-15:00</td>
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</tbody>
</table>
### 1.5.3 Evaluation Process

To obtain the course certificate, trainees must attend ninety per cent of the lectures. Absence is not permitted to any practical exercise in the simulator.

Total assessment:

\[
T.A. = 0.4 \times Q + 0.6 \times C.A.
\]

\[T.A. = \text{Total assessment}\]
Q = Quiz (Examination of knowledge)

C.A. = Continuous assessment

The Quiz may include multiple-choice / true-false / short answer questions regarding theoretical contents.

Continuous assessment will assess work developed during practical lessons using the following criteria:

✓ Depth and breadth of knowledge demonstrated,
✓ Quality of thinking in evidence,
✓ Quality of communication,
✓ Leadership skills development.

1.6 Introduction of new technologies to support evacuation operations: Serious Game and its interactions with SAR

Serious games are simulations of real-world events or processes designed for solving a problem. The use of a serious game allows to the user to adopt new behaviours. In addition, it allows him playing. Thanks to the project MONALISA 2.0 and its serious game “SAFE SCAPE”, passenger will make a complete Security Drill on a virtual environment. After the training the students should have knowledge of the following topics:

✓ Identify assigned Muster Station.
✓ How to go to your Muster Station letter from different places of the ship.
✓ What to do when arrived at Muster Station.
✓ What to do during evacuation.
✓ How to react to different events.
✓ Fire.
 ✓ Ship heeled.
 ✓ Lights out.
 ✓ How to put on a life jacket.

The game will have these contents:

**Module 1: Evacuation**

Passenger Card information: Identify Muster Station.
Cabin security info: Map, security guide.
Walking to the assigned Muster Station.
The passenger count.
Walking to the evacuation points.
Evacuating.

**Module 2: Maritime Safe Trivia**

Evacuation.
General Safety.
Special needs people (child, elder, disabled) safety.
Extreme scenarios: Fire, gas, and lights out.

**Module 3: Life Jacket**

When to put on the life jacket.
How to put on a life jacket.
As it was already demonstrated in other industrial sectors, simulation is a suitable tool to obtain the adequate training level in a safe environment. The development of the commercial application "Safe Scape" will allow the training of passengers and crews in the evacuation of cruise vessels in emergency situations.

*Picture 2: Screen capture from SAFESCAPE serious game.*
2. Training on Safety and Mass Evacuation in Ports (Valenciaport Foundation)

This topic covers safety and mass evacuation operations and plans in Ports and its passenger facilities, and includes a training strategy in terms of the requirements for the people involved in the safety operations in ports focused on mass and crowded emergencies in passenger terminals or within port waters. The IMO model and other training standards and requirements from IALA and ILO are considered. The use of e-learning innovations and practical activities in specialised centres like Integral Maritime Safety Jovellanos Centre, Chalmers University and Valencia Port Foundation are considered.

2.1 Safety and Mass Evacuation in Ports – Training Requirements for MONALISA 2.0 applied on this topic

The training requirements for this topic have been inspired on the experience acquired by port practice when dealing with emergencies in port environment. Training requirements will be supported by reference IMO Model courses related to port safety as well as the different port contingency plans that ports should deploy in case of emergency. Mass evacuation in ports covers a multi-disciplinary approach, as the reasons for a mass evacuation can be very different and present different levels of emergency. For this reason the training action should focus on the identification of causes and proper management of emergency situations. Risk assessment will be a central part of the training part as strategic methodology to identify critical risks that may require a mass evacuation within the port environment. The training concepts have been adapted the contents to the mass evacuation and critical situations management in ports, passenger terminals or port waters. These requirements will define the training material in both components, theoretical and practical including the evaluation strategy.

2.2 Added value of the training

The first innovative aspect of the Massive Evacuation in Ports course is the consideration of the human factor role in crisis management. IMO already considers this in resolutions A.850 (20) and A.497 (23). However, the consideration of psychological aspects during and after emergency management is quite innovative in this type of courses. The first part of the course establishes the situations in which an emergency evacuation would be necessary when a vessel is involved in a dangerous
situation. The main new aspect in the course is the consideration of the risks associated not only to the vessel, but also to the port, its facilities and infrastructures, including the instruments that would be needed to be activated. Currently there are courses that present these perspectives in a separated structured, and the current course offers an integrated approach of both perspectives.

2.3 International Training Standard Requirements on Safety and Mass Evacuation in Ports

The training action takes as international standard reference the requirements on port safety established by the ILO Revised Draft Code of Practice on Safety and Health in Ports. Other related international training standards are well addressed in different IMO Model courses that are following mentioned:

- IMO 1.10 “Dangerous, Hazardous and Harmful Substances”.
- IMO 1.20 “Fire Prevention and Fire Fighting”.
- IMO 2.03 “Advance Training in Fire Fighting”.
- IMO 3.09 “Port State Control”.

2.4 Safety and Mass Evacuation in Ports Training Syllabus

This section provides the topics required for the training action related to mass evacuation in ports. The objectives of the training action will be to acquire the knowledge, understanding and proficiency on the following issues:

- To be able to determine and evaluate the levels and types of risks (especially those related to situations involving dangerous goods and/or fire) associated to the vessel-port interface, operations and equipment involved.
- To know the procedures defined in case a mass evacuation situation takes place in a port, taking into account the nature of the causes of such evacuation: safety (accidents) or security (illicit actions).
- To know which human, technical and organisational resources may be put in place in order to respond accordingly to the mass evacuation emergency.
To know the co-ordination management and structure and phases of the emergency response. Agents and institutions involved. Technical and information means involved.

2.4.1 Topics to be covered

Module 1. Risk Evaluation and Management

Port Safety International and National Regulation
Port Security International and National Regulation
Types of Port Contingency Plans
Port – Maritime Interfaces: Maritime, Land and Maritime-Land Interfaces
Risk Assessment Methodology: Definition of Safety & Security Aspects and Related Variables
Classification of Risks at Ports
Risk Assessment Exercise

Module 2. Human and Technical Resources for Mass Evacuation

Fire Fighting Resources
Maritime Search and Rescue Resources
Land – Port Search and Rescue Resources
Other Technical Means


Emergency Phases: Red, Blue and Green
Emergency Management Structure: Emergency Board, Functions and Responsibilities
Mass Evacuation Coordination: Port Control Centre
Coordination among Safety Agencies
Technical and Communication Means

Module 4. Practical Exercise Simulating a Mass Evacuation

A practical exercise will be conducted in class trying to reproduce the different phases of a mass evacuation emergency taking as a reference the contents of the course.
### 2.5 Safety and Mass Evacuation in Ports Training Delivery and Management plan

<table>
<thead>
<tr>
<th>MANAGEMENT ASPECT</th>
<th>DESCRIPTION</th>
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</thead>
<tbody>
<tr>
<td><strong>Methods for the Course Delivery:</strong></td>
<td>Classroom with multi-media facilities</td>
</tr>
<tr>
<td>Classrooms with multimedia facilities,</td>
<td></td>
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<tr>
<td>simulation-based classroom, laboratory</td>
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<tr>
<td>training, on field/on board training,</td>
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<tr>
<td>etc.</td>
<td></td>
</tr>
<tr>
<td><strong>Course intake limitations:</strong></td>
<td>Maximum number of workstations: 2 per room</td>
</tr>
<tr>
<td>Maximum number workstations, maximum,</td>
<td></td>
</tr>
<tr>
<td>number of trainees: 2 per room</td>
<td></td>
</tr>
<tr>
<td><strong>Staff Requirements:</strong></td>
<td>Certification on ISPS Code would be desirable for at least one trainer.</td>
</tr>
<tr>
<td>Qualifications of Instructors and</td>
<td></td>
</tr>
<tr>
<td>Trainers, IMO certified, experience,</td>
<td></td>
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<tr>
<td>etc.</td>
<td></td>
</tr>
<tr>
<td><strong>Teaching facilities and equipment:</strong></td>
<td>Two class-rooms with capacity for 50 and 30 students respectively, equipped with audio-visual resources and internet connection, including Wi-Fi. Plugs for laptops available in both rooms.</td>
</tr>
<tr>
<td>PCs, screen projection, internet</td>
<td></td>
</tr>
<tr>
<td>connection, workstations, connections,</td>
<td></td>
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<tr>
<td>piping, special wear, GPS, Communications,</td>
<td></td>
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<tr>
<td>Radio, any other special feature, etc.</td>
<td></td>
</tr>
<tr>
<td><strong>Teaching aids:</strong></td>
<td>Support material in paper and electronic format will be available.</td>
</tr>
<tr>
<td>Training manual, instructor manual,</td>
<td></td>
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<tr>
<td>audio-</td>
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</table>
### MANAGEMENT ASPECT

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>visual aids, databases, etc. Please name each teaching aid as A1, A2, An, etc. In order to be mentioned when course descriptions are required further.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Bibliography and support references, textbooks, etc.:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Please make reference to the text books and teaching materials as bibliography rules employed at educational level.</td>
</tr>
</tbody>
</table>

| IMO model courses will be taken as bibliography references as well as other related courses. |
| ILO Revised Draft Code of Practice on Safety and Health (2005) |
| IMO 1.10 “Dangerous, Hazardous and Harmful Substances” (2002 last published) |
| IMO 1.20 “Fire Prevention and Fire Fighting” (2000 last published) |
| IMO 2.03 “Advance Training in Fire Fighting” (2000 last published) |
| IMO 3.09 “Port State Control” (2001 last published) |

<table>
<thead>
<tr>
<th>Certification if applicable:</th>
</tr>
</thead>
<tbody>
<tr>
<td>If your course or module is certified, please indicate it.</td>
</tr>
</tbody>
</table>

| A certification will be issued to the students that surpass the course. |

<table>
<thead>
<tr>
<th>Balance of Theoretical and practical classes:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Example: 30/10 – 30 Theory/10 Practice on field</td>
</tr>
</tbody>
</table>

| Theory: 20 hours: |
| Practice: 5 hours |

---

2.5.1 Trainers qualifications
Trainers will be qualified in port safety and security. In particular, port operative safety supervisors as well as port facility security officers will be part of the training staff. Trainers will be qualified with official IMO ISPS certification.

### 2.5.2 Course time table summarising the contents

<table>
<thead>
<tr>
<th>Day / period</th>
<th>1st period</th>
<th>2nd period</th>
<th>3rd period</th>
<th>4th period</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(2.0 hours)</td>
<td>(2.0 hours)</td>
<td>(2.0 hours)</td>
<td>(2.0 hours)</td>
</tr>
<tr>
<td><strong>Day 3</strong></td>
<td>Human and Technical Resources</td>
<td>Human and Technical Resources</td>
<td>Human and Technical Resources</td>
<td>Human and Technical Resources</td>
</tr>
<tr>
<td><strong>Day 5</strong></td>
<td>Final Exercise</td>
<td>Final Exercise</td>
<td>Visit to Maritime Safety Centre</td>
<td>Visit to Port Control Centre</td>
</tr>
</tbody>
</table>
2.5.3 Evaluation process

Total assessment:

\[ T.A. = 0.4 \, Q + 0.6 \, C.A. \]

T.A. = Total assessment

Q = Quiz (Examination of knowledge)

C.A. = Continuous assessment

The Quiz may include multiple-choice / true-false / short answer questions regarding theoretical contents.

Continuous assessment will assess work developed during practical lessons using the following criteria:

✓ Depth and breadth of knowledge demonstrated,
✓ Quality of thinking in evidence,
✓ Quality of communication,
✓ Leadership skills developed.
3. Training on Emergency Management on board passenger ships
   (Technical University of Catalonia)

This topic covers safety management on board large passenger and cruise vessel focused on the human factor element, and includes a training strategy in terms of the requirements for the people involved in the safety management focused on mass and crowded emergencies in passenger ships. Special attention is put to the ISM standard and other Human Factor Safety Management and Training regarding large passenger ships. The IMO model and other training standards and requirements from IALA and ILO are considered. The use of e-learning innovations and practical activities in specialised centres like Integral Maritime Safety Jovellanos Centre, Chalmers and Valencia Port Foundation shall be included. At the same time, the Universitat Politècnica de Catalunya must consider university knowledge transfer and educational strategies.

3.1 Emergency Management on board passenger ships. Training Requirements for MONALISA 2.0 applied on this topic

The training requirements for this topic have been inspired on the IMO Model course 1.29 (Proficiency in crisis management and human behaviour training including passenger safety, cargo safety and hull integrity training), adapting the contents to management of crisis scenarios in passenger ships. These requirements will define the training material in both components, theoretical and practical including the evaluation strategy.

3.2 Added Value of the training

The course in Emergency Management on board Passenger Ships puts a stress on the recommendations of Chapter V of Section A-V/2 of the STCW Code 95/10 regarding the need to deep on the training on contingency plans, especially in those with risk of affecting the structural integrity of the ship and its watertightness. This is complemented by specific training in the optimal management of passenger ships' specific material resources such as the M.E.S or also human resources such as the SERS (Ship Emergency Response Service), which are provided by Classification Societies and are mandatory for passenger ships constructed on or after January 1, 2014. All these actions haven't so far had a relevant role in IMO Model Course 1.29 which only includes the mandatory standards of the Code. However, accidents such as occurred recently in passenger ships have shown non-coordination aspects, delay
in information management and lack of familiarity with life saving appliances, so it is believed desirable to strengthen training from educational institutions in this regard.

### 3.3 International Training Standard Requirements on Emergency Management on board Passenger Ships

The standards of competence that have to be met by seafarers are defined in Part A of the STCW Code in the Standards of Training, Certification and Watch keeping for Seafarers Convention as amended in 1995 and 2010. The IMO Model course 1.29 (Proficiency in crisis management and human behaviour training including passenger safety, cargo safety and hull integrity training) covers the competences to achieve those standards set out in Chapter V Section A-V/2 parts 3 and 4.1.4. The course covers the minimum standard of competence for masters, chief mates, chief engineers, second engineer officers and any person having responsibility for the safety of passengers in emergency situations.

### 3.4 Emergency Management on board passenger ships Training Syllabus

The detailed teaching syllabus is based on the minimum required topics specified in IMO Model course 1.29. This is based on the theoretical and practical knowledge specified in the STCW Code. It is written as a series of learning objectives that the trainee is expected to reach, once the course is completed.

The teaching syllabus has been written in learning objective format in which the objective describes what the trainee must do to demonstrate that knowledge has been transferred.

The competence to be acquired is the good management of crisis situations (STCW’95 and 2010 amendments. Section A-V/2 parts 3 and 4.1.4).

The knowledge, understanding and proficiency to be acquired are:

- ✓ A deep appreciation of the layout of the ship and how the crew is organised
- ✓ Plan for the best use of resources
- ✓ The ability to lead intervention in emergencies.
The training objectives of the course are:

- Describe the role of planning and crew preparedness in ensuring emergency preparedness
- Describe the role of drills and debriefing in maintaining emergency preparedness and promoting situational awareness
- Explain how to plan for the best use of resources
- Explain the importance of communication, stress effects and decision making in leading intervention in emergencies.

### 3.4.1 Topics to be covered

Familiarity with the ship plans, emergency plan procedures, coordination with the ship and the business office, safety and firefighting equipment, emergency drills, planning an exercise, leadership skills, human behaviour, task assignment, communication with passengers and other crew members.

With the training, the student will:

- Know how to describe the ship plans, including decks, doors, staircases numeration, emergency exits and all of the particularities of the ship
- Know how the emergency procedures have to run
- Know how the emergency equipment is used, how is checked and stowed in order to be prepared for an emergency
- Know how to plan realistic drills
- Know the basic leadership skills: how to lead a group, making decisions, assignment of tasks and motivation
- Know how the passengers will react and the basic symptoms to identify panic and stress
- Know the mustering procedures
- Know how to give orders and information to passengers and other crew members and what kind of information is given
Know-how to communicate with passengers and other crewmembers.

Module 0: Human behaviour

Threat of danger. Sequence of emergencies passenger response. Stress effects in passengers and crewmembers.

Module 1: Organise shipboard emergency procedures

Passenger safety knowledge. Familiarity with the ship plans, layout and Identification System for Decks and Spaces. Identify the escape routes or alternatives means of escape and where all the emergency equipment is located. Familiarity with the emergency plan procedures. Contingency Plan on Board. Contingency Plan on the Land Station. Coordination between the Ship and the Land Station. Emergency drills, with task assignment and list of objectives to accomplish before starting a voyage. How to plan the drills, depending on the two ways that the drills can run. Realising drills. The procedures, the objectives to accomplish, the participation of the crew and the passage and the discussion about the exercise once the exercise has finished.

Module 2: Emergency resources

How the emergency equipment is used. Where the emergency equipment have to be located and stowed. Checking the emergency equipment. Methods for making good use of emergency equipment. Resources that may be limited or missing in an emergency.

Module 3: Leading intervention in emergencies

How to lead and direct others in emergencies. Take decisions. Motivation of passenger and other crew members. The importance of clear and concise instructions and reports. The need to encourage an exchange of information with, and feedback from, passengers and other personnel. Communicating language. Elemental use of English and other languages. Use other passengers to translate in other languages. Use of hand signals, gestures or objects to give information when the communication is difficult.
### 3.5 Emergency Management on board passenger ships Training Delivery and Management plan

<table>
<thead>
<tr>
<th>MANAGEMENT ASPECT</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methods for the Course Delivery:</td>
<td>Classrooms with multimedia facilities for the theoretical part and on field training (on board) for the practical exercises.</td>
</tr>
<tr>
<td>Course intake limitations:</td>
<td>The maximum number of trainees attending each session will depend on the availability of instructors, equipment and facilities available for conducting the training. This number should not exceed that which will allow sufficient opportunity for each trainee to have adequate practical instruction.</td>
</tr>
<tr>
<td>Staff Requirements:</td>
<td>Trainers should be qualified personnel who understand the specific objectives of the training and have experience of the procedures established for the ships for embarking and disembarking passengers, for loading and discharging cargo and for closing hull openings.</td>
</tr>
<tr>
<td>Teaching facilities and equipment:</td>
<td>For tutorial sessions, an ordinary classroom or lounge, mess room or cinema aboard should be provided for instruction. In case of be developed on shore a classroom with enough space for all the trainees. In all cases an overhead beamer connected to pc and audio visual equipment for videos may be required. It would be interesting to be provided with internet. For the practical sessions, training and exercises should be held on board ship and documented in accordance with regulations v/2 paragraph 4, regulation I/14 and section A-I/14; from SOLAS convention.</td>
</tr>
</tbody>
</table>
| Teaching aids:                           | A1 - Instructor manual (part d of IMO model course 1.28)  
A2 - overhead transparencies  
A3 - videos  
V.1 basic instincts (passenger mustering and crowd control) code nº.603.  
V.2 shipboard familiarization code nº.593.  
V.3 crowd management |

Training manual, instructor manual, audio-visual aids, databases, etc. Please name each teaching aid as A1, A2, An, etc. In order to be mentioned when course descriptions are required further.
### Management Aspect

<table>
<thead>
<tr>
<th>MANAGEMENT ASPECT</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Audio-visual examples may be substituted by other similar audio-visual material at the discretion of the training provider and administration.)</td>
<td></td>
</tr>
</tbody>
</table>
| **Bibliography and support references, textbooks, etc.:** | RIMO references listed in IMO model course 1.28 / 1.29.  
W internet websites references listed in IMO model course 1.28 / 1.29.  
T textbooks listed in IMO model course 1.28 / 1.29.  
B bibliography listed in IMO model course 1.28 / 1.29.  
Own material developed by UPC for support the teaching team |
| **Certification if applicable:** | UPC is going to present to administration the documentary evidence that training issued to every person is qualified under the provisions of STCW 95 / 2010 MLC regulation V/2 for mandatory minimum requirements for the training and qualifications of masters, officers, ratings and other personnel on passenger ships. |
| **Balance of Theoretical and practical classes:** | It is proposed a balance between 30 theories and 10 practices on field. |

### 3.5.1 Physical Resources: Class Rooms, Simulators, Laboratories, etc.

For tutorial sessions, an ordinary classroom or lounge, mess room or cinema aboard should be provided for instruction. In case of be developed on shore a classroom with enough space for all the trainees. In all cases an overhead beamer connected to PC and audio visual equipment for videos may be required. It would be interesting to be provided with Internet.

For the practical sessions, training and exercises should be held on board ship and documented in accordance with regulations V/2 Paragraph 4, Regulation i/14 and Section a-i/14; from SOLAS Convention.

### 3.5.2 Trainers Qualifications

It is recommended that trainers should be merchant Captains or Officers with a minimum education in safety standards. Nautical faculty professors/lecturers and senior lecturers from public educational institutions; being taught Safety related subjects with professional certifications, would be the best option.
Despite this, trainers should comply with the minimum training requirements for personnel nominated to assist passengers in emergency situations on passenger ships.

### 3.5.3 Course time table summarising the contents

<table>
<thead>
<tr>
<th>Day / period</th>
<th>1st period (2.0 hours)</th>
<th>2nd period (2.0 hours)</th>
<th>3rd period (2.0 hours)</th>
<th>4th period (2.0 hours)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day 1</td>
<td>Module 0: Human behaviour</td>
<td>Module 0: Human behaviour</td>
<td>Module 0: Human behaviour</td>
<td>Module 0: Human behaviour: practical cases</td>
</tr>
<tr>
<td>Day 2</td>
<td>Module 1: Emergency procedures</td>
<td>Module 1: Emergency procedures</td>
<td>Module 1: Emergency procedures</td>
<td>Module 1: Emergency procedures: practical cases</td>
</tr>
<tr>
<td>Day 3</td>
<td>Module 2: Emergency resources</td>
<td>Module 2: Emergency resources</td>
<td>Module 2: Emergency resources</td>
<td>Module 2: Emergency resources: practical cases</td>
</tr>
<tr>
<td>Day 5</td>
<td>Global review</td>
<td>Theory Evaluation</td>
<td>Practical full emergency drills</td>
<td></td>
</tr>
</tbody>
</table>
3.5.4 Evaluation process

To obtain the course certificate course, trainees must attend ninety per cent of the lectures. Absence is not permitted to any practical exercise in the simulator.

Total assessment:

\[ T.A. = 0.4Q + 0.4C.A + 0.2\text{Final C.A.} \]

T.A. = Total assessment
Q = Quiz (Examination of knowledge)
C.A. = Continuous assessment
Final C.A. = Final assessment
The Quiz may include multiple-choice / true-false / short answer questions regarding theoretical contents.

Continuous assessment will assess work developed during practical lessons using the following criteria: capacity of implication, role assumption, understanding of each paper in the exercise, capacity of problems resolution.

Final assessment stands for the evaluation in the last full exercise.
4. Training on Leadership and Human Factor in Crisis Scenarios
(Technical University of Catalonia)

This topic covers the leadership and team working skills required in crisis scenarios, as well as those that would help to avoid critical situations. Developing leadership skills will help many of other tasks in MONALISA 2.0 project to succeed in real scenarios.

The aspects considered are leadership, human factor, motivation, effective communication, conflicts management, crisis management, task and workload management, sense-making, decision-making, intellectual stimulation, change adaptation, maritime sociology, multicultural crews, teambuilding, authentic leadership, leadership development and sustainable leadership practices.

4.1 Leadership and Human Factor in Crisis Scenarios – Training Requirements for MONALISA 2.0 applied on this topic

The training requirements for this topic have been inspired on the IMO 1.39 Model Course Leadership and Teamworking (GlobalMET Ltd., 2014), The Human Element: a guide to human behaviour in the shipping industry (Gregory & Shanahan, 2010), The Handbook for Teaching Leadership (Snook, Nohria, & Khurana, 2012) and Leadership (Northouse, 2013), adapting the contents to the mass evacuation and critical situations management in ports, passenger terminals or port waters. These requirements will define the training material in both components, theoretical and practical including the evaluation strategy.

4.2 Added Value of the training

This topic covers the leadership and team working skills required in crisis scenarios, but also those that would help to avoid critical situations. Developing leadership skills will help many of other tasks in MONALISA 2.0 project to succeed in real scenarios. The main contribute of this course is that includes the needs highlighted by the cruise industry, both in the workshop “Training needs of the cruise industry regarding maritime safety: new challenges in the ICT domain” (Barcelona 06/11/14) as in our direct talks to major companies. The new elements developed versus IMO model course are: the skills to lead change on board, the deep understanding of cultural differences and how to deal with them, the training of the skills to work under pressure in a group environment (keeping focused on safety, customer and results), and to manage properly group interactions, as well as a set of tools to manage conflicts effectively.
After the exercise that will take place in Valencia, the trainees that are going to participate in the exercise too, will meet with the trainer in order to carry out a session to look for improvement areas using the innovation process model learnt in the course and to analyse the communication and possible conflicts that occurred based on the new knowledge and capabilities acquired. The outcomes of this session will be included in the deliverable of the Sub-activity.

### 4.3 International Training Standard Requirements on Leadership and Human Factor in Crisis Scenarios

Currently, the only mandatory non-technical skills requirements within the maritime domain are those provided by the International Maritime Organisation at the STCW (Seafarer’s Training, Certification and Watchkeeping) Code 1978, with the 2010 amendments that introduced for the first time, Human Element, Leadership and Management training requirements.

IMO Model Course 1.39 has developed the leadership and teamworking skills requirements for the operational level. There is still no IMO Model Course issued for the management level.

Tables A-II/1, A-III/1 and A-III/6 of this code specify the minimum standard of competence for controlling the operation of the ship and care for persons on-board at the operational level.

Tables A-II/2 and A-III/2 of this code specifies the minimum standard of competence for controlling the management of the ship and care for persons on board at the management level.

### 4.4 Leadership and Human Factor in Crisis Scenarios Training Syllabus

The detailed teaching syllabus is based on the minimum required topics specified in IMO Model course 1.39. It is also based on the theoretical and practical knowledge specified in the STCW Code.

#### 4.4.1 Topics to be covered

**Module 1. Leadership Introduction**

Concepts and leadership models
Positive effects of a good leadership and potential risks of a bad leadership aboard
The study of leadership today
What is the relationship between personality and effective leadership?
Factors that influence how we lead and prefer to be lead
Know/do/be learning structure

Module 2 Human factor and legislation

Human factor concept
Human limitations
Human error
International maritime conventions

Module 3. Motivation

Concepts and main theories
Primary and secondary motives
Extrinsic and intrinsic motivation
How to increase motivation aboard
Cultural values regarding motivation

Module 4. Leading change

Locus of control
Uncertainty avoidance
Proactivity and change leadership
Innovation management
Change adaptation: Adopting new procedures and technologies (emerging ICT technologies and older crew members)
Human Resources Development Plan
Situational Leadership
Transformational leadership
Side-effects of technology and overconfidence risks

Module 5. Communication

Components of communication
Barriers to effective communication
Types and styles of communication
Active listening
Effective feedback
Questions
Good communication climate
Module 6. Conflicts management

Intergroup relations
Conflicts ladder
Realistic Conflict theory
Social Identity
Favouritism and rejection
Hard profiles

Module 7. Crisis management

Critical thinking during crises
Obtaining and maintaining situational awareness
Sense-making

Module 8. Task and workload management

Task workload
Time management (prioritisation, time and resource constraints, ABCD theory
importance vs. urgency)
Duties aboard planning and co-ordination.
Personnel assignment
Appraisal of work performance
Stress assessment
Rest and fatigue management
Meeting management

Module 9. Decision-making

Human decision making
NDM vs. HB
Decision making under risk
Group decision process
Groupthink
Decision support systems
Decision Support Tools in MONALISA 2.0

Module 10. Developing leaders
Mentoring
Collateral coaching
Awareness of self-competence

**Module 11. Maritime sociology**

Total institution
Life on board
Crewmember relations with the outside world

**Module 12. Multicultural crews**

Cultural awareness
Pros and cons of multicultural crews
Cultural differences (attitudes, behaviours, beliefs, interpretations and reactions)
Cultural dimensions
GLOBE Project
Cross-cultural communication
Improving cross-cultural relationships

**Module 13. Teambuilding**

Group processes
Group structures
Group motivation
Team skills
Teams in crisis scenarios
Group Cohesion
Group efficacy

**Module 14. Authentic leadership**

Authentic Leadership
Behaviour skills for a successful leadership

**Module 15. Sustainable Leadership Practices**

Sustainable leadership pyramid
### 4.5 Leadership and Human Factor in Crisis Scenarios Training Delivery and Management plan

<table>
<thead>
<tr>
<th>MANAGEMENT ASPECT</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Learning objectives</strong></td>
<td>Trainees will be able to demonstrate that they know the tools for developing the leadership and team-working skills required in crisis scenarios, as well as those that would help to avoid critical situations. They will be able to demonstrate effective leadership behaviours that will allow improving: communication, team building and organisation of resources, decision-making, crisis management and conflicts management.</td>
</tr>
<tr>
<td><strong>Methods for the Course Delivery:</strong></td>
<td>Classrooms with multimedia facilities and simulation-based classroom.</td>
</tr>
<tr>
<td><strong>Course intake limitations:</strong></td>
<td>The maximum number of trainees attending each session will depend on the availability of instructors, equipment and facilities available for conducting the training. This number should not exceed that which will allow sufficient opportunity for each trainee to have adequate practical instruction.</td>
</tr>
<tr>
<td><strong>Maximum number of workstations, maximum number of trainees</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Staff Requirements:</strong></td>
<td>Trainers should be experienced instructors in the interactive teaching of leadership and team working, ideally with knowledge of Psychology, and should be as well Nautical Graduates, who are aware of the special nature of maritime operations and have knowledge of shipboard situations, maritime accidents analysis and maritime sociology, including multi-cultural crews and communicational difficulties on board.</td>
</tr>
<tr>
<td><strong>Teaching facilities and equipment</strong></td>
<td>For tutorial sessions should be provided an ordinary classroom or lounge, with internet connection and multimedia facilities. For practical sessions it would be required an ordinary classroom or lounge with enough space for role-playing exercises, and a navigational simulator.</td>
</tr>
</tbody>
</table>
**Teaching aids:**

Training manual, instructor manual, audio-visual aids, databases, etc. Please name each teaching aid as A1, A2, An, etc. In order to be mentioned when course descriptions are required further.

<table>
<thead>
<tr>
<th>Teaching aids</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1 – Instructor Manual (Part D of IMO MODEL COURSE 1.39)</td>
</tr>
<tr>
<td>A3 - Overhead transparencies</td>
</tr>
<tr>
<td>A4 - Leadership questionnaires (ALQ, BFI, Leadership questionnaire developed by UPC)</td>
</tr>
</tbody>
</table>

**Videos:**

<table>
<thead>
<tr>
<th>Videos</th>
</tr>
</thead>
<tbody>
<tr>
<td>V1- The Human Element DVD Training Resource</td>
</tr>
<tr>
<td>V2 – Captain Phillips</td>
</tr>
<tr>
<td>V3 – The Endurance</td>
</tr>
</tbody>
</table>

**Bibliography and support references, textbooks, etc.**

<table>
<thead>
<tr>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>R1- IMO references listed in IMO Model Course 1.39.</td>
</tr>
<tr>
<td>E1- Electronic media listed in IMO Model Course 1.39.</td>
</tr>
<tr>
<td>E3- <a href="http://www.thersa.org/events/rsaanimate">http://www.thersa.org/events/rsaanimate</a></td>
</tr>
<tr>
<td>B1- Handbook developed by UPC</td>
</tr>
<tr>
<td>B2- BIBLIOGRAPHY listed in IMO Model Course 1.39.</td>
</tr>
</tbody>
</table>

**Certification if applicable:**

UPC is going to present to administration the documentary evidence that training issued to every
If your course or module is certified, please indicate it. A person is qualified under the provisions of regulation STCW Convention, 1978, as amended, tables A-II/1, A-III/1 and A-III/6 to train leadership and team-working skills.

Balance of Theoretical and practical classes: It is proposed a balance in between 20 hours of theoretical part time allocation and 20 hours of practical part time allocation.

### 4.5.1 Trainers qualifications

Trainers should be experienced instructors in the interactive teaching of leadership and teamworking, ideally with knowledge of Psychology, and should be as well Nautical Graduates, who are aware of the special nature of maritime operations and have knowledge of shipboard situations, maritime accidents analysis and maritime sociology, including multi-cultural crews and communicational difficulties on board.

### 4.5.2 Course time table summarising the contents

<table>
<thead>
<tr>
<th>Day / period</th>
<th>1st period</th>
<th>2nd period</th>
<th>3rd period</th>
<th>4th period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day 1</td>
<td>1. Leadership introduction (T+P)</td>
<td>1. Leadership introduction (T+P)</td>
<td>2. Human factor (T+P)</td>
<td>Exercise with simulators (P) +3. Legislation (T)</td>
</tr>
<tr>
<td>Day 3</td>
<td>6. Conflicts management (T+P)</td>
<td>7. Crisis management (T+P)</td>
<td>8. Task and workload management (T+P)</td>
<td>9. Sense-making (T+P)</td>
</tr>
</tbody>
</table>
This is a proposal of a time table; it must be adjusted according to the specific training plan needs, taking into account the actual level of knowledge and skills of the trainees.

The instructor is expected to adapt times to special requirements of trainees, reducing the time allocation on aspects already attained by them and increasing time allocation at topics where they show more difficulties.

**Picture 5: Leadership and human factors in crisis Course held at Barcelona in April 2015.**

### 4.5.3 Evaluation Process

To obtain the course certificate course, trainees must attend ninety percent of the lectures. Absence is not permitted to any practical exercise in the simulator.

**Total assessment:**

\[
T.A. = 0.4 \times Q + 0.6 \times C.A.
\]
T.A. = Total assessment  
Q = Quiz (Examination of knowledge)  
C.A. = Continuous assessment

The Quiz may include multiple-choice / true-false / short answer questions regarding theoretical contents.

Continuous assessment will assess work developed during practical lessons using the following criteria:

1) Depth and breadth of knowledge demonstrated,  
2) Quality of thinking in evidence,  
3) Quality of communication,  
4) Leadership skills developed,  
5) Teamwork skills developed.
5. Training on IMO/ICAO/IAMSAR applications: VMS assisted on Scene SAR Administration (National Technical University of Athens)

This training course is based on the IMO Model Course 3.15 “SAR ON SCENE COORDINATOR (IAMSAR MANUAL VOLUME III) 2014 EDITION”. It aims to provide knowledge to those who may be designated to perform the duties and responsibilities of a Search and Rescue On - Scene Coordinator (OSC) for a search and rescue incident. Furthermore and in an effort to benefit from the overall Mona Lisa framework, VMS assistance elements will be introduced thus enhancing and facilitating the SAR procedures. It is evident that the training implements innovative elements from IAMSAR and ICAO but at the same time also being developed in the Mona Lisa project. The National Technical University of Athens will realise the program having secured the contribution of the Hellenic Navy. The Hellenic Navy operates the central Marine Rescue Centre (MRC) in Greece and delegates Port State Control Centres to specific actions. Finally the VMS assistance part is a contribution of Chalmers University and is based on simulation exercises and real SAR scenarios they are currently running, on how to get the most out of the cloud based maritime information system in SAR incidents.

5.1 Training Requirements for MONALISA 2.0 applied on this topic

This course co organised with the Hellenic Navy is based on the IMO Model Course 3.15 “SAR ON SCENE COORDINATOR (IAMSAR MANUAL VOLUME III) 2014 EDITION”. The contents will be adapted to Hellenic navy practices and enhanced through the VMS IT systems and the exercises performed by The Chalmers University. It will be structured in an entry level and an advanced level. Both parts will consist of theory and exercise/practical.

5.2 Added Value of the training

Search and Rescue operations are taking place massively every day in the Mediterranean Sea, due to the big flow of refugees / immigrants from Asia and Africa to the south entrance of the European Union. As these incidents are spread over the whole Mediterranean and the rescue teams are often nearby sailing ships and boats, the need of training people receiving from the MRC orders and translating them to the often on voluntary basis acting rescuers, will greatly enhance safety.

5.3 International Training Standard Requirements

As mentioned above, the course will be based on the IMO Model Course 3.15 SAR ON SCENE COORDINATOR. It is generally intended for masters and navigational officers at management level of seagoing vessels as well as officers of the Navy and Port State
Control with SAR responsibilities. The advanced level of the course is intended for the same people above with a need of detailed skills of On-Scene Coordination, i.e. designated or prospective SAR On-Scene Coordinators of actual or potential SAR response resources.

Taking the above into consideration the trainees should be:

- Familiar with the basic principles to be observed in keeping a navigational watch on board a seagoing vessel, according to the STCW Code section A-VIII
- Able to understand and use the standard marine communication phrases (SMPC).
- Familiar with operational procedures according to GMDSS.

Other IMO references are:

- International Convention for the Safety of Life at Sea (SOLAS) 1974, as amended.
- GMDSS Handbook.
- STCW 1978 Convention, as amended.

5.4 IMO/ICAO/IAMSAR applications Training Syllabus

The SAR training course will be focused on training students in principles and techniques of a structured approach (like the OODA loop) to deal competently and successfully with any unexpected and unwanted situation not limited to distress situations only.

At the entry level the specific objective of this course is that trainees completing this section will obtain a clear view of all relevant functions within a SAR mission. Thus, at the end of the entry level trainees should be familiar with responsibilities, tasks and the interaction with resources and facilities. Furthermore after the completion of the basic course, trainees should be able to understand and follow advice given by an MRCC in conjunction with SAR missions properly, rendering assistance on board any vessel or when additionally requested to undertake the initial duties and responsibilities as On-Scene Coordinator as defined in IAMSAR, Vol III.
Participants of the advanced level of the course, which will be also delivered in the frame of the MONALISA Training course, will acquire a closer overview of the challenges of an OSC in more complex SAR missions. They will be skilled with different means to meet these challenges and to respond with a properly adjusted plan to conduct SAR and render assistance as an On-Scene Coordinator.

5.4.1 Topics to be covered

The course will be divided in two levels (Entry level and advanced level) each one consisting of 3 modules. The practical part for each level will follow the theory and will utilise simulator and Search and Rescue Control Centre demonstrations.

A. ENTRY LEVEL

Module 0 Introduction
Course Overview and practical information
Objectives

Module 1 Overview and Basis of a SAR Service
Definition of Terms
International and National Legal Basis
Manuals

Module 2 Rendering Assistance (SAR mission) SAR operations with Refugees in the Mediterranean
Ways and Notifications of Distress Alerts
Responsibilities and Tasks
Immediate Action
Search Areas and Pattern
Communications

Module 3 Training and Consolidation of Above Listed Topics
Table top exercises and/ or
Simulator exercises (simple search tasks)
B. ADVANCED LEVEL

Module 4 Team Work

On OSC Platform
With partners involved
VMS assistance on SAR administration
Other facilities

Module 5 Problems for an OSC Arising from Complex SAR Missions and Tools to cope with
Documentation
Communication
Delegation
Command and Control

Module 6 Training and Consolidation of Above Topics
Table top exercises and/or
Simulator exercises

5.5 Training Delivery and Management plan

<table>
<thead>
<tr>
<th>MANAGEMENT ASPECT</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learning objectives</td>
<td>At the entry level the specific objective of this course is that trainees completing this section will obtain a clear view of all relevant functions within a SAR mission. Participants of the advanced level will acquire a closer overview of the challenges of an OSC in more complex SAR missions. They will be skilled with different means to meet these challenges and to respond with a properly adjusted plan to conduct SAR and render assistance as an On-Scene Coordinator.</td>
</tr>
<tr>
<td>Methods for the Course Delivery:</td>
<td>Theoretical part: classrooms with multimedia facilities.</td>
</tr>
<tr>
<td>MANAGEMENT ASPECT</td>
<td>DESCRIPTION</td>
</tr>
<tr>
<td>--------------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Practical part: full mission bridge, VTS and GMDSS simulators and videos from SAR exercises.</td>
<td></td>
</tr>
<tr>
<td>Course intake limitations:</td>
<td>Maximum number of workstations, maximum number of trainees</td>
</tr>
<tr>
<td></td>
<td>20 trainees per course.</td>
</tr>
<tr>
<td>Staff Requirements:</td>
<td>Officers of the Hellenic Navy and Commercial Navy with experience in SAR operations and administration NTUA research staff with academic and practical experience in safety and human factor issues.</td>
</tr>
<tr>
<td>Teaching facilities and equipment</td>
<td>Simulators</td>
</tr>
<tr>
<td></td>
<td>Video screens</td>
</tr>
<tr>
<td></td>
<td>Video recording facilities</td>
</tr>
<tr>
<td>Teaching aids:</td>
<td>A1: Training manual</td>
</tr>
<tr>
<td></td>
<td>A2: Instructor manual</td>
</tr>
<tr>
<td></td>
<td>A3: Keynotes and presentations</td>
</tr>
<tr>
<td></td>
<td>A4: Videos</td>
</tr>
<tr>
<td>Bibliography and support references, textbooks, etc.</td>
<td>IMO Model Course 3.15 SAR ON- SCENE COORDINATOR (IAMSAR MANUAL, VOLUME III) 2014 EDITION</td>
</tr>
<tr>
<td></td>
<td>IAMSAR MANUAL, VOLUME III</td>
</tr>
<tr>
<td></td>
<td>IMO references (R)</td>
</tr>
<tr>
<td></td>
<td>R1 International Convention for the Safety of Life at Sea, 1974 as amended</td>
</tr>
<tr>
<td></td>
<td>R2 International Convention on Maritime Search and Rescue, 1979, as amended</td>
</tr>
<tr>
<td></td>
<td>R3 International Aeronautical and Maritime Search and Rescue Manual, Volumes I, II and III as amended</td>
</tr>
</tbody>
</table>
### MANAGEMENT ASPECT | DESCRIPTION
--- | ---
R4 GMDSS Handbook  
R5 STCW 1978 Convention, as amended  
**Textbooks and other References (T)**  
T1 Manual for use by the maritime mobile and maritime mobile satellite services, ITU  
T2 Destruction and Creation, Boyd, John R., 1976

**Certification if applicable:**
If your course or module is certified, please indicate it.
At the end of the course, students who pass the assessment will receive a course certificate. At present, this certificate is neither approved nor required by the Maritime Competent Authority.

**Balance of Theoretical and practical classes:**
Example: 30/10 – 30 Theory/10 Practice on field  
30/10 Theoretical: 30 hours divided into 5 modules of 6 hours. Practical: 10 hours divided into 5 exercises of 2 hours, one per module.

---

#### 5.5.1 Trainers Qualifications

The qualification of the trainers is of paramount importance for the success of the training courses. Therefore emphasis will be given to this selection process and the trainers should have professional background and experience in safety issues. As mentioned in the table above Officers of the Hellenic Navy / Port State Control and Commercial Navy with experience in SAR operations and administration will teach and will be assisted by NTUA research staff with academic and practical experience in safety and human factor issues.

#### 5.5.2 Course time table summarising the contents

<table>
<thead>
<tr>
<th>Day 1</th>
<th>Day 2</th>
<th>Day 3</th>
<th>Day 4</th>
<th>Day 5</th>
</tr>
</thead>
</table>

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73
<table>
<thead>
<tr>
<th>Period</th>
<th>Introduction</th>
<th>Immediate Action</th>
<th>Communications</th>
<th>Team Work (1)</th>
<th>Training and Consolidation (1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st period</td>
<td>Introduction Course Overview</td>
<td>Overview and basis</td>
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<tr>
<td>(2.0 hours)</td>
<td></td>
<td>of a SAR service</td>
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</tr>
<tr>
<td>2nd period</td>
<td>Rendering SAR Assistance</td>
<td>Search Areas and</td>
<td>Training and</td>
<td>Team Work (2)</td>
<td>Training and Consolidation (2)</td>
</tr>
<tr>
<td>(2.0 hours)</td>
<td></td>
<td>Pattern (1)</td>
<td>Consolidation (1)</td>
<td></td>
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<tr>
<td></td>
<td>Responsibilities and Tasks</td>
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</tr>
<tr>
<td>3rd period</td>
<td>Rendering SAR to refugees in the Mediterranean</td>
<td>Search Areas and</td>
<td>Training and</td>
<td>Problems for an</td>
<td>Training and Consolidation (3)</td>
</tr>
<tr>
<td>(2.0 hours)</td>
<td></td>
<td>Pattern (2)</td>
<td>Consolidation (2)</td>
<td>OSC arising from</td>
<td></td>
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<td></td>
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<td></td>
<td>complex SAR</td>
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<td>incidents and</td>
<td></td>
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<td>tools to cope</td>
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<td>with such</td>
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<td></td>
<td>Challenges</td>
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</tr>
</tbody>
</table>

Picture 6: Post graduate NTUA students in the frame of the Training Project.

### 5.5.3 Evaluation Process

- The learning objectives described in the detailed teaching syllabus will provide a sound base for the construction of suitable tests for evaluating trainees’ progress.
As the SAR course content is aimed at the acquisition of practical skills, the evaluation will have a form of a test that will include:

- The recall of facts or information, by viva-voce or objective tests
- The practical demonstration of an attained skill
- The oral or written description of procedures or activities
- The identification and use of data from sketches, drawings, maps, charts, etc.
- Carrying out calculations to solve numerical problems
- The writing of an essay or report
- Assessment of performance on a simulator

- Participation in the real exercise in Valencia with instructors and trainees and evaluation of the whole course. Demonstration in this event of videos from the course.
6. Training on Firefighting and LNG/Liquefied Natural Gas. (Spanish Maritime Safety Agency)

This topic covers the required skills for fire fighters that need to act in a distressed vessel located not only within the port facilities but also in offshore conditions, anchored or sailing. The boarding of personnel and the transfer of firefighting material must be done by rescue boat or helicopter. In the event that the distressed vessel would be a LNG tanker or a LNG powered vessel, the training will provide fire fighters knowledge on the LNG properties and the special risks associated with this fuel in potentially predictable scenarios, as well as the technical options and tactics to mitigate any incident.

6.1 Training on Firefighting and LNG (Liquefied Natural Gas) – Training Requirements for MONALISA 2.0 applied on this topic

The firefighting training requirements for this topic have been inspired on the “Provision of marine training for coastal fire & rescue services” 2005 Model course of the UK fire & rescue Maritime Incident Response Group (MIRG) of the Maritime and Coastguard Agency (MCA).

The LNG training requirements have been inspired on the suggested competency standards of the SIGTTO and the DNV standard for certification no. 3325.”Competence related to the on board use of LNG as fuel” April 2013.

6.2 Added Value of the training

The use of LNG as a fuel for ships is seen as one of the main options to address the present and future environmental and commercial challenges in the shipping industry due to the recent restrictions to the air pollution generated by ships in emission control areas (ECAS). There is not standardised training in LNG emergencies apart from the Guidelines on Safety for LNG- fuelled engine installations in ships. MSC 285 (86) IMO Resolution, therefore a hands-on LNG emergency training is required. The lack of experience of land-based fire fighters in marine firefighting, the difficulty and the special feature of these kinds of challenging interventions, make necessary specific training actions in order to create a specialised team, prepared for such interventions involving helicopter or boat operations.
6.3 International Training Standard Requirements on Training on Firefighting and LNG (Liquefied Natural Gas)

The Maritime Safety Committee, recognising a need for the development of a code for gas-fuelled ships, adopted the Interim Guidelines on safety & training for natural gas fuelled engine installations in ships (Guidelines on Safety for LNG-fuelled engine installations in ships. MSC. 285 (86) IMO Resolution)

Regarding the bunkering of LNG, the International Code of Safety for ships using gases or other low flashpoint fuels (IGF Code) will define requirements for the bunkering systems on board the receiving vessel and general operational requirements regarding the preparation, post processing, responsibilities and communication focusing the (receiving) gas-fuelled ship. No specific operational guidance taking into account all types of bunkering modes and training requirements for each kind of transfer system for all facilities involved are considered. The whole operational crew of a LNG fuelled cargo and LNG bunkered passenger ship should have necessary training in LNG safety, operation and maintenance prior to the commencement of work on board.

DNV has developed a standard describing what the objectives for training should be, and what technical contents a training course should cover.

The “Training on firefighting & LNG” course from Jovellanos Centre follows partially those guidelines.

6.4 Training on Firefighting and LNG (Liquefied Natural Gas) Training Syllabus

The aim is to develop the most comprehensive training for land-based fire fighters with hands-on “hot fire” training to cover any emergency situation that can be produced in coastal waters.

The Jovellanos Centre “Training in firefighting & LNG” programme is focused on the risks associated with fighting LNG spills and fires as well as on the dangers of using the wrong marine firefighting techniques (e.g. collapsing vessel by applying large amounts of water). It has four basic modules:

✓ Firefighting.
✓ Sea survival.
✓ LNG.
✓ Helicopter Underwater Escape Training.

Developing the task 4.6.6 “Training in fire-fighting & LNG” will help many of other tasks in MONALISA 2.0 Project to succeed in real scenarios.

### 6.4.1 Topics to be covered

✓ Sea Survival. Lifesaving appliances.
✓ Rescue boat embarkation operations and procedures in the water.
✓ The role of the shore-based firefighting services.
✓ The fire control plan on board vessel.
✓ The ship stability.
✓ The firefighting system on board ship.
✓ Heliborne operations. Material and personnel transfer to the distressed vessel.
✓ The IMDG Code.
✓ LNG fires control using water, foam and dry chemical powder.
✓ Firefighting techniques and tactics in various parts of the ship.
✓ Types of incidents involving LNG.
✓ LNG characteristics and LPG comparison.

### 6.5 Training on Firefighting and LNG (Liquefied Natural Gas) Training Delivery and Management plan

<table>
<thead>
<tr>
<th>MANAGEMENT ASPECT</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methods for the Course Delivery:</td>
<td>Theoretical part – classroom</td>
</tr>
<tr>
<td></td>
<td>Practical part – fire ground</td>
</tr>
<tr>
<td>Course intake limitations:</td>
<td>The maximum number of trainees will be 16 in order to allow to each trainee to take part of each hands-on exercise</td>
</tr>
<tr>
<td>MANAGEMENT ASPECT</td>
<td>DESCRIPTION</td>
</tr>
<tr>
<td>------------------------</td>
<td>-------------</td>
</tr>
<tr>
<td><strong>Staff Requirements:</strong></td>
<td>The instructor in charge should:</td>
</tr>
<tr>
<td></td>
<td>- Hold a nautical degree/master</td>
</tr>
<tr>
<td></td>
<td>- Have underway experience as seaman</td>
</tr>
<tr>
<td></td>
<td>- Be especially skilled with fire-fighting equipment</td>
</tr>
<tr>
<td><strong>Teaching facilities and equipment:</strong></td>
<td>Classroom with multimedia facilities (pc, internet access, blackboard, slide projector)</td>
</tr>
<tr>
<td></td>
<td>Training facilities:</td>
</tr>
<tr>
<td></td>
<td>✓ LNG pit capable of withstanding temperatures in wide range (from -170°C to 1300°C) and protected from heat radiation by water curtains.</td>
</tr>
<tr>
<td></td>
<td>✓ LNG isolated tank with cryogenic pipeline.</td>
</tr>
<tr>
<td></td>
<td>✓ Multipurpose built indoor pool with dunker (helicopter simulator) for helicopter underwater escape training.</td>
</tr>
<tr>
<td></td>
<td>✓ Big multipurpose built outdoor pool for sea-survival training with fast rescue craft, self-contained propeller boat, survival suits, winches, harnesses, inflatable life-jackets and wave generator.</td>
</tr>
<tr>
<td></td>
<td>✓ Ship's simulator for fire-fighting &amp; hazardous materials simulator</td>
</tr>
<tr>
<td><strong>PPE &amp; FF equipment:</strong></td>
<td>✓ Dry powder hand-held portable extinguishers.</td>
</tr>
<tr>
<td></td>
<td>✓ Foam equipment (foam concentrate, inline foam inductors, low-med ex foam nozzles, hi ex foam generator)</td>
</tr>
<tr>
<td></td>
<td>✓ Water nozzles, water hoses, hydrants, fire pumps.</td>
</tr>
<tr>
<td></td>
<td>✓ Fire fighter bunker gear (safety gloves, safety boots, vhf communications, intrinsically safe torches, firefighting helmet, and infra-red thermal camera).</td>
</tr>
<tr>
<td></td>
<td>✓ Self-contained breathing apparatus, emergency breathing system.</td>
</tr>
<tr>
<td><strong>Teaching aids:</strong></td>
<td>A1 – instructor manual</td>
</tr>
<tr>
<td></td>
<td>A2 – course slides / transparencies</td>
</tr>
<tr>
<td></td>
<td>A3 – videos</td>
</tr>
<tr>
<td>MANAGEMENT ASPECT</td>
<td>DESCRIPTION</td>
</tr>
<tr>
<td>----------------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>An, etc. In order to be mentioned when course descriptions are required further.</td>
<td></td>
</tr>
<tr>
<td><strong>Bibliography and support references, textbooks, etc.:</strong></td>
<td>✓ LNG shipping suggested competency standards (SIGTTO).</td>
</tr>
<tr>
<td></td>
<td>✓ DNV standard for certification no. 3325 – Competence Related to the on board use of LNG as fuel.</td>
</tr>
<tr>
<td></td>
<td>✓ Resolution MSC 285(86) - interim guidelines on safety for natural gas-fuelled engine installations in ships.</td>
</tr>
<tr>
<td></td>
<td>✓ International Code of safety for ships using gases or other low flashpoint fuels (IGF Code).</td>
</tr>
<tr>
<td></td>
<td>✓ Provision of marine training for coastal fire &amp; rescue services” 2005 Model course of the UK fire &amp; rescue Maritime Incident Response Group (MIRG) of the Maritime and Coastguard Agency (MCA).</td>
</tr>
<tr>
<td></td>
<td>✓ Various sources and technical documentation from Jovellanos Training Centre.</td>
</tr>
<tr>
<td><strong>Certification if applicable:</strong></td>
<td>The desired aim would be to take part of one of the six topics (10 ECTS) of the MONALISA 2.0 Master (60 ETC).</td>
</tr>
<tr>
<td><strong>Balance of Theoretical and practical classes:</strong></td>
<td>12.5 hours theory.</td>
</tr>
<tr>
<td></td>
<td>27.5 hours practice.</td>
</tr>
</tbody>
</table>

**6.5.1 Trainers qualifications**

The following are the minimum qualifications for the Trainers in the MONALISA “Training on firefighting & LNG” course. The instructor in charge should:

✓ Hold a Nautical Degree/Master (certificate of competency, issued by IMO white list flag state).
✓ Have underway experience as seaman.
✓ Have successful completion of a comprehensive training in firefighting and be familiar with the use of the current firefighting equipment.
✓ Have experience as fireman or port/industrial plant operator.
✓ Be especially skilled in the particular facilities employed in the training course.
✓ Have knowledge of the specific Field Performance Standards currently in force and the STCW requirements on LNG, if applies.

### 6.5.2 Course timetable summarising the contents

<table>
<thead>
<tr>
<th>Schedule</th>
<th>Day 1</th>
<th>Day 2</th>
<th>Day 3</th>
<th>Day 4</th>
<th>Day 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>08:00-09:30</td>
<td>Course Introduction / Theory: LNG Properties &amp; Characteristics</td>
<td>Theory: BLEVE &amp; RPT</td>
<td>Theory: LNG Carriers (ship design and equipment)</td>
<td>Theory: Ship’s stability (The effect of water on board)</td>
<td>Theory: Helicopter Safety</td>
</tr>
<tr>
<td>09:30-10:00</td>
<td>Coffee Break</td>
<td>Coffee Break</td>
<td>Coffee Break</td>
<td>Coffee Break</td>
<td>Coffee Break</td>
</tr>
<tr>
<td>11:00-11:30</td>
<td>PPE donning</td>
<td>PPE donning</td>
<td>PPE donning</td>
<td>PPE donning</td>
<td>PPE donning</td>
</tr>
<tr>
<td>11:30-13:30</td>
<td>Practice: LNG discharge; Characteristics Explanation</td>
<td>Practice: Gas detection on LNG vapour cloud, LNG evolution after different aspects (water application, temperature dependence, buoyancy changes)</td>
<td>Practice: Fire-fighting equipment familiarisation</td>
<td>Practice: Fire in accommodation. Firefighting techniques on board vessels. SCBA control pressure.</td>
<td>Practice: Embarkation of firefighting equipment and personnel from a rescue boat into a ship on fire</td>
</tr>
<tr>
<td>13:30-14:00</td>
<td>Lunch</td>
<td>Lunch</td>
<td>Lunch</td>
<td>Lunch</td>
<td>Lunch</td>
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<tr>
<td>Time</td>
<td>Activity</td>
<td></td>
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<tr>
<td>--------------</td>
<td>---------------------------------------------------------------------------</td>
<td></td>
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</tr>
<tr>
<td>14:00 - 16:00</td>
<td>Practice: Material immersion, Cryogenic experiments</td>
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<tr>
<td></td>
<td>Practice: BLEVE demo</td>
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<tr>
<td></td>
<td>Practice: Fire in LPG rack-manifold</td>
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<tr>
<td></td>
<td>Practice: Fire in engine room. Fire in pump room.</td>
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<tr>
<td></td>
<td>Practice: The survival suit donning. HUET practice I.</td>
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</tr>
<tr>
<td>16:00 - 16:30</td>
<td>Break</td>
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</tr>
<tr>
<td>16:30 - 18:00</td>
<td>Practice: Spill on land / Spill on water</td>
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<tr>
<td></td>
<td>Practice: ESD activation on bunkering simulator</td>
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<tr>
<td></td>
<td>Practice: LNG firefighting techniques</td>
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<tr>
<td></td>
<td>Practice: Dangerous Goods Incident on board</td>
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<tr>
<td></td>
<td>Practice: HUET practice II.</td>
<td></td>
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</tr>
</tbody>
</table>

*Picture6: LNG Course held in Jovellanos Centre in April 2015.*

### 6.5.3 Evaluation Process

To obtain the course certificate course, trainees must attend ninety percent of the theoretical part. Absence is not permitted to any practical exercise in the fire-ground.

Total assessment:

\[
T.A. = 0.4 \ Q + 0.6 \ C.A.
\]

T.A. = Total assessment

Q = Quiz (Examination of knowledge)
C.A. = Continuous assessment

The Quiz may include multiple-choice / true-false / short answer questions regarding theoretical contents. 80% of correct answers are required.

Continuous assessment will assess work developed during practical training using the following criteria:

1) LNG hazards awareness
2) Correct use of personnel protective equipment (PPE)
3) Development of firefighting techniques in a safely manner
4) Active participation during practical training
Accreditation and Mobility
1. MONALISA and MST accreditation and mobility

The key role in quality assurance of the learning process at a transnational level is played by ECTS (European Credit Transfer System), a student-centred system that is based on the student workload required to achieve the objectives of a programme of study or in our case, training program. These objectives should preferably be specified in terms of learning outcomes and the competences to be acquired.

Recognition of the study period may start with the signing of the learning agreement, which aims to recognise the credits in the different institutions involved.

ECTS Transcript of Records is a document that shows the students’ performance by listing the courses studied, the credits acquired and the grades awarded locally and in correspondence with ECTS.

The ECTS is required to deliver a complete master program or a second cycle masters, worth 60 - 120 ECTS (1 to 2 years). 60 ECTS per academic year represents about 1,500 to 1,800 hours of study. If this model of accreditation is finally applied, other subjects can also be provided by other institutions. The dedication of the students must be distributed between lectures, on the field (practical training) and individual study supported by e-learning platforms.

The result of the master proposal in Maritime Safety will be presented as a final report after the practical training has been completed in the first semester 2015.

2. The Future Master Program on Maritime Safety

In a globally competitive world, continuous training is the key to productivity, employability and social stability.

It is being recognised that a benefit is generated when education becomes the fourth pillar that complements research, business and the public sector, thus realising the “quadruple helix” where academia, industry and government operate in a coordinated way, bound together by proper training in order to accelerate value creation in certain economic activities.

Maritime Industry needs procedures and processes carried out by specialised personnel with specific skills and knowledge. In particular, “safety aspects” in the
sectors involved, ships, ports and maritime administrations, require special attention. Port Authorities, shipping companies, logistics operators and many other public and private entities do need trained people in safety for a safer, sustainable and efficient transport, enhancing the competitiveness of the sector, effectively facing the upcoming challenges that represent potential threats and risks.

Now, it is clear that such challenges have an EU (and global) dimension, whilst the issue of shaping proper competences and expertise is, at present, mainly addressed at a local level.

A general need for a uniform education and training provision, in relation to the further Motorways of the Sea (MoS) deployment, has already been clearly expressed in the last MoS Coordinator (Valente de Oliveira) Report, where it is stated that “new training for the numerous professions linked to maritime transportation, logistics and operations in harbours must be implemented”. Now, recalling that insisting on education, training and lifelong-learning is fundamental, it is of the same importance to recognise the value of a good level of initial training that could be matched and complemented.

The main important issue in the definition and design of the MSc program will be the integration of operational safety topics at sea with focus on the interaction between societal interests, human actors, on-board technology, leadership, and safety for involved people and the high-level education subjects.

The public concerned by the various actions, presented below, will be higher education institutions, especially maritime academies, universities and specialised training centres.

Trainees enrolling in the specific Maritime Safety Master Programme in Europe will benefit from innovative modules, specially designed by teachers and recognised experts, supported by the results obtained during the training tests under MONALISA 2.0 exercises. With the aim of improving the quality of staff skills and performance in the maritime transport sector, a MASTER PROGRAMME dedicated to students of maritime academies as well as officers, other professionals linked to the safety, competitiveness, and sustainability of maritime industry may be the next step from this Maritime Safety Training Program.
The work to be done is already huge in defining the final number of exchangeable credits, the balance between academy and practical time investment, the complementary contents and costs.

Beyond the results on the training performed in MONALISA 2.0 exercises, the evolution of the Maritime Safety Program will require of the opinions from the consulted advisors at IMO and EMSA, the advisory groups, the industry and other relevant stakeholders including the 39 partners in the project.

3. Final considerations

Considering the most recent maritime transport accidents, human element continues to be the most important factor. If decision-making processes supported by suitable tools on board, at land and in ports are applied, the negative impacts of maritime incident can reduce the loss of lives, vessels and goods. A reduction in the occurrence of accidents may also be reached.

The introduction of new technologies and strategies in the decision-making processes in maritime transport must be faced by means of training. Standardisation of training is a real need because of the global dimension of this industry.

The MONALISA 2.0 project and its extension will continue providing standards in Sea Traffic Management with the adoption of e-navigation components. The challenge of the human element involved is to adapt and introduce the new know-how and knowledge in a proper way. The three aspects of maritime transport Sea/Ship/Port need to be integrated in different ways. This training approach must be the first step forward and toward to these purposes.

One of the most important aspects to devise any plan of training is its level of closeness with the real needs of the sector to which it is addressed. This task is not trivial. It requires an analysis from a multidisciplinary group that on the one hand is linked to the Academy, and on the other hand the industry in which trained persons shall perform the activity.

MONALISA 2.0 saw the need to incorporate a section of training regarding the implemented, technological innovations and the new maritime traffic management systems. In addition, the operational safety activity found that other aspects of the training of seafarers have already surpassed the level of current university education.
The training should be updated with new content with an emphasis on emergency management in large passenger ships, the use of tools based on information and communication systems, the use of new fuels like liquefied natural gas, leadership and massive rescue and evacuation operations, both at sea and in port.

This report has in a general way gathered some considerations based on the growth of the maritime industry, not only in the number of vessels, but also in their large size, their degree of technical sophistication and the needs of staff and crews, that even though they are smaller, should be better formed and be more competent. Taking the recent accidents into account, it shows that the sector is far from reaching the levels of reliability and the minimum of unwanted accidents. In this era where technology is the hallmark, accidents such as the Costa Concordia and the Sewol, among others, should not happen, and if they occur, the parties involved should minimise the human, material and environmental damage.

The opinion of institutions such as IMO and EMSA must be also taken into account. This training plan has suggested six as relevant issues, to be dealt from the MONALISA 2.0 project and they have been raised so that they comply with international standards in the field of maritime training. The objective is that this training plan can be accredited and approved by the participating institutions, and in the future, relevant maritime administrations. In addition, it is intended to be the basis of a broader training plan in maritime safety, which evolves to a master's degree that combines operational aspects and a vocational training program.

The opinions of external advisors regarding this report on the training requirements will be a part of the final reports for each module. At the end, each module can incorporate in its final report the level of effectiveness and solutions to the identified needs. Validation parameters shall be evaluated during the execution of the exercises on operational safety planned for the project and the students, who mostly will be part of the volunteer team and will be a valuable source of information with respect to the usefulness, quality and effectiveness of the courses. Once the training has been completed and tested through the exercises, instructors, trainees, stakeholders, crews, SAR and safety port personnel shall complete a survey that will allow us to measure the training key performance indicators (TKPI) that will be part of the final reports.
Annexes
Annex 1: Abbreviations

ATM    Air Traffic Management
BLEVE  Boiling Liquid Expanding Vapour Explosion
CEO    Chief Executive Officer
DNV    Det Norske Veritas
DVM    Dynamic Voyage Management
EBS    Emergency Breathing System
ECDIS  Electronic Chart Display and Information System
ECTS   European Credit Transfer and Accumulation System
EMSA   European Maritime Safety Agency
EQUASIS European Quality Shipping Information System
ESD    Emergency Shut Down
FAL    The Convention on Facilitation of International Maritime Traffic
GMDSS  Global Maritime Distress Safety System
GPS    Global Positioning System
HMI    Human Machine Interface
HUET   Helicopter Underwater Escape Training
IALA   International Association of Marine Aids to Navigation and Lighthouse Authorities
IAMSAR International Aeronautical and Maritime Search and Rescue
ICAO   International Civil Aviation Organisation
ICS    Incident Command System
ICT    Information and Communications Technology
ILO    International Labour Organisation
IMO    International Maritime Organisation
IMO NAV IMO Sub-Committee on Safety of Navigation
IMO MSC IMO Maritime Safety Committee
JRCC   Joint Rescue Coordination Centre
LNG    Liquefied Natural Gas
LPG    Liquefied Petroleum Gas
LRIT   Long-Range Identification and Tracking
<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
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<tbody>
<tr>
<td>MARPOL</td>
<td>International Convention for the Prevention of Pollution from Ships</td>
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<td>MET</td>
<td>Marine Education and Training</td>
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<tr>
<td>MRCC</td>
<td>Maritime Rescue Coordination Centre</td>
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<td>MRO</td>
<td>Mass Rescue Operation</td>
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<td>MSc</td>
<td>Master of Sciences</td>
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<td>MSI</td>
<td>Maritime Safety Information</td>
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<tr>
<td>MSP</td>
<td>Maritime Spatial Planning</td>
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<tr>
<td>MST</td>
<td>Maritime Safety Training</td>
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<tr>
<td>OBP</td>
<td>Open Bridge Platform</td>
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<td>OLRS</td>
<td>On-board life raft recovery systems</td>
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<td>OSC</td>
<td>On-Scene Co-ordinator</td>
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<tr>
<td>Port CDM</td>
<td>Collaborative Decision Making within and in relation to Ports</td>
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<td>PPE</td>
<td>Personal Protective Equipment</td>
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<td>RFID</td>
<td>Radio Frequency identification</td>
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<tr>
<td>SAR</td>
<td>Search and Rescue</td>
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<td>SCBA</td>
<td>Self Contained Breathing Apparatus</td>
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<tr>
<td>SES</td>
<td>Safe Evacuation System</td>
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<tr>
<td>SMC</td>
<td>SAR Mission Coordinator</td>
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<tr>
<td>SOLAS</td>
<td>International Convention for the Safety of Life at Sea</td>
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<tr>
<td>STCC</td>
<td>Sea Traffic Coordination Centre</td>
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<tr>
<td>STCW</td>
<td>International Convention on Standards of Training, Certification and Watch keeping for Seafarers</td>
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<td>STM</td>
<td>Sea Traffic Management</td>
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<tr>
<td>SVM</td>
<td>Strategic Voyage Management</td>
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<td>SWIM</td>
<td>System Wide Information Management</td>
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<tr>
<td>TKPI</td>
<td>Training key performance indicators</td>
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<tr>
<td>VTMIS</td>
<td>Vessel Traffic Maritime Information System</td>
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<tr>
<td>VTS</td>
<td>Vessel Traffic Service</td>
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Annex 2: Reference material

[1] Safety First: Lessons from the Costa Concordia Disaster; Ben Zingman, Ph.D, CEO of Ben Zingman Communications and an adjunct professor in the Strategic Public Relations Program of the George Washington University's Graduate School of Political Management.


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[16] State of the art cruise industry report 2014-CLIA.

[17] The world merchant fleet in 2013 statistics from EQUASIS.

[18] EMSA 5 years strategy
Annex 3: List of figures and tables

Figures
Figure 1: The Costa Concordia Accident (10).
Figure 2: Sequence of the Sewol Accident (12).
Figure 3: Marine casualties and incidents reported between 2011 and 2013 (16).
Figure 4: EU-EEA share of the world fleet (18).
Figure 5: Seafarers worldwide (19).
Figure 6: The Maritime Safety Training Program (22).

Sources:
Figures 1: own elaboration. Figure 2: own elaboration. Figure 3: source EMSA Annual Overview of Marine Casualties and Incidents 2014. Figure 4: source 5 years strategy EMSA. Figure 5: 5 years strategy EMSA. Figure 6: own elaboration.


Cover photo: Abdón Durán

Tables
Table 1: IMO, EMSA and MONALISA 2.0 similarities (13)
39 partners from 10 countries
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