Activity 2 – Defining Sea Traffic Management

Request for Work

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Background
Sea Traffic Management – the need of taking maritime transport into the digital age

Of all world trade, approximately 90% of all cargo is carried by sea freight. Carrying this cargo are some 74,000 merchant vessels above 500 gross tonnage (GT), all built according to the type of goods they are supposed to carry. Added to these cargo carriers, are some 27,000 other vessels with similar size, though lacking the cargo carrying capacity such as larger fishing vessels, cruiser and research vessels, and some 9,000 military vessels also above 500 GT. To this world total of approximately 110,000 vessels should be added a huge, yet unknown, number of smaller vessels and leisure crafts. The value of goods transported at sea was estimated to about 9 trillion US dollars in 2004 (Stopford 2009; UNCTAD 2009).

Being one of the world’s major consumer markets, within the European Union, there were some 29,000 individual calls to ports in 2010 (EMSA 2011). These calls generated some 580,000 individual movements within the territorial waters of EU member states. From the European Maritime Safety Agency’s (EMSA) yearly accident reviews, it is clear that confined waters, such as ports and their approaches, is not only where most individual vessels movements are seen, but also where most maritime accidents occur. The costs of these accidents include possible loss of lives and immediate environmental effects of maritime accidents, loss of cargo and loss of or damage to vessels. Let alone the fact that the effects may cause severe problems for the marine flora and fauna in a long term perspective.

One way of mitigating the risks of maritime accidents is the use of Vessel Traffic Service (VTS). The main purpose of VTS is to function as a decision support for navigators within a set geographic area, a so called VTS-area.

The concept of VTS is similar to that of Air Traffic Control (ATC) used for control of aircrafts’ movements in and around airports. Naturally there is a difference in medium and number of dimensions in which the monitored vessels/airplanes can move. However, whereas ATC has a formal responsibility for the safety of the air traffic, bound by international regulation, there is no international regulation governing the design and operation of a VTS (IALA 2008). A result of this is that a VTS does not necessarily have any judicial responsibility for the safety of the vessels in its operational area. The responsibility of a VTS is dependent on the requirements of each national Competent Authority and VTS Authority respectively (IALA 2008).

With regard to monitoring and control of the vessel on the high seas, compared with control of air traffic in the airspace above the same areas, there is currently no such feature for shipping. However, there are different forms of paid services such as route planning with regard to weather (so called Weather routing) and fuel optimization. These services are currently offered by commercial interests. However, no institution monitors these services with regard to their administrative/managerial function and whether these services correspond to VTS / ATC.
The maritime world should be regarded as a key cargo link in the transport chain. To optimize shipping only from its own perspective will occasionally have an opposite effect on the whole transport picture. Internal shipping efficiency may increase but this may negatively impact the overall transport performance.

For this reason we must have a holistic view regarding all e-processes that are present on a national, regional, international, federative and cross-sector basis and not deal with each of them as isolated phenomena under different umbrellas.

Moving a ship from A to B is not an exclusive navigational process, and has never been so. The future will demand greater integration with the demands and requirements imposed by other processes in an effort to perform as an improved and optimised cargo-carrying link in the transport chain. The most important processes involved in the shipping world are the:

- Nautical process,
- Practical cargo handling,
- Economic cargo handling,
- Cargo control, including customs, law and security.

These processes are not integrated to the required extent. However, there are on-going developments of new concepts such as e-Navigation, e-Maritime, e-Customs, e-Security and so on. These developments all contribute to improve the processes but by lacking a holistic approach they miss the overarching potential improvement required to make the shipping world the cost effective player that we all consider it to be.

The historical evolution of society has most often aimed at saving energy or accumulating greater wealth, with both aims occasionally progressing in harmony. The acceleration towards an information-intensive society in recent decades has created new products, services and processes that were not previously possible. Expensive and energy-consuming services for the industry can be rationalised and replaced by putting users in the centre and giving them the necessary information to personally perform the desired processes.

This change and shift in our daily life has been in progress for some years and will increase even more in the years ahead. With the help of smartphones, tablets and computers, we conduct our banking and postal services we buy or sell in the stock market, check in at airports, and choose the music or movie that suits our personal preferences. We are moving towards a society where we can eliminate expensive links in the process chain by means of direct access to the necessary information. There is no reason to believe that the shipping world will adopt a different approach.

**Vision & Mission**

Sea Traffic Management does not exist for maritime transport in the same way as for aviation. The aviation domain has defined a number of Performance Targets for their new advanced Air Traffic Management system (SESAR), which is currently under development. According to these Performance Targets, the Capacity will increase by 3 times; safety shall be increased by a factor of 10; the cost for Air Traffic Management shall be reduced by 50% and the emissions shall
be reduced by 10% per flight. Our estimation is that similar positive effects can also be achieved by introducing STM for the maritime domain.

**Definition of Scope**

The scope of Activity 2 is focused around the definition of Sea Traffic Management (STM). The scope of STM will be elaborated from the definition and during the analysis of current situation, the performance targets and the target concept elaboration.

The project’s definition of STM in the application for MONALISA 2.0 is: “The dynamic and integrated management of sea traffic and maritime space (including sea traffic services, management of the maritime space and sea traffic flow management) — efficiently, safely, secure, environmentally and economically sustainable — through the provision of facilities and seamless services in collaboration with all parties and involving seaborne and shore-based functions.”

**Activity objectives**

In order to take the first step towards STM, a comprehensive study in the form of a Definition phase study will be required. In the Definition phase, the framework for STM will be outlined, the target concept elaborated, analyses carried out and a plan for further development and deployment outlined. The experiences from the SESAR programme will be taken onboard in the study, a structured approach to development will be adopted and mistakes by experiences avoided. Close cooperation and adoption of experiences and results from the CISE and other relevant projects will also be incorporated in the study. CISE partners are also involved in MONALISA 2.0, which will ensure efficient collaboration between CISE and MONALISA 2.0.

Each project is controlled by the three constraints time, cost and quality. Activity 2 will be controlled by these three constraints in the following order cost, time and quality.
**Desired Outcomes**
The following are the deliverables from activity 2.

- Request for work
- Working methodology
- STM architecture framework
- Statement of work
- STM architecture description
- STM – the current situation
- STM – the performance target
- STM – the target concept
- STM strategic roadmap
- STM master plan
- STM work programme description

**Constraints and Assumptions**
To be able to achieve the aim of the activity it is required that correct competences and skills are available within the activity 2. The accomplishment is also dependent on the availability of valid information at the right time.

**Interfaces**
Activity 2 will have external interfaces to other MONALISA 2.0 activities, several reference groups, other EU projects and external parts, such as IMO. The reference groups will be used as forum for input and discussions, but also for review of activity 2 deliverables.
Activity Approach
The overall task is to elaborate STM Strategic Roadmap, STM Master Plan and recommended Work Programme for STM development phase based on the analysis of an elaborated STM Target Concept, the described Current Situation and the decided Performance Target for STM.

The work in Activity 2 shall make use of experience from Air Traffic Management (ATM) domain and the SESAR programme;

- Scale and adopt to the maritime sector,
- Learn from traffic management principles and experiences, structures, processes, methods and concepts

Activity 2 shall use experiences and findings from Activity 1, 3 and 4.

Activity 2 shall use experiences and cooperate with other relevant EU programmes like CISE and MIELE (2010-EU-21105-S).

Activity 2 shall involve domain experts, such as partners, stakeholders and advisors in the definition phase. The MONALISA 2.0 Technical Advisory Group and Reference Group will be available for reviews, solving domain issues and sharing of reference material to support the Working Areas during the elaboration of deliverables.

The internal processes, control and decision-making mechanisms in activity 2 shall be fair, neutral and balanced.

Planning approach
The planning and primary organisation of work shall be based on the execution of work in iterations or stages. Each iteration shall build on the results obtained in the previous iteration.

The following diagram illustrates the decision to plan for 3 iterations in relation to main deliverables. All milestones in activity 2 are also connected to the three iterations.
Decision making

The MONALISA 2.0 is cofounded, driven and organised by its participating partners. The major decision making principle is that decisions are made by consensus amongst the participants in activity 2, work packages, tasks and work areas. Decisions that cannot be made by consensus may be escalated to nearest encompassing level for mediation or decision making, and ultimately to the MONALISA 2.0 High level steering group for consideration and final decisions.

The Activity 2 deliverables shall be approved by all Activity 2 partners prior to submitting to the MONALISA 2.0 project.
Definition of Working Methodology
The work shall be driven by architecting and modelling to:

- Define and progress MONALISA2 in a structured way
- Manage internal quality, consistency and coherency

The architecture description shall be an active part of the methodology and be part of the main deliverables.

The work in Activity 2 shall be iterative to facilitate a flexible elaboration of the STM Target Concept.

Working together
The leaders and participants of internal activities should strive for establishing and maintaining an environment for successful consensus and collaboration amongst all partners. The leaders and participants should observe the following good working together guidelines:

- Encourage active participation from ALL groups and individuals
- Encourage expression of various points of view
- Expect differences of opinion - they can contribute to creative solutions.
- Look for minor points of agreement
- Be suspicious of agreements reached too easily
- Don't let a discussion continue between two people; seek comments from others.
- People should speak for themselves and be specific when referring to others
- Encourage participants to look for fresh solutions
- Seek clarification when in doubt
- Questions may open up the discussion
- Giving feedback helps learning
- Focus on what you see, not what you believe
- Be specific, rather than general
- Use feedback to inform rather than advise
- Keep it simple
- Document points of consensus, alternatives and disagreements
- Be open and firm about interests and perspectives
  - and flexible about how you address and meet them
- Always look for mutual benefits
- Jointly invent as many options/alternatives as possible
- Don’t focus too soon in a single alternative
- Separate inventing from judging/assessing/evaluating
- Use objective criteria’s
  - standards, including technical standards
- Use a fair, neutral, and balanced process
- Claims, Opinions should be justified by Argumentation that is based on Evidence (verification, validation, ..)
Writing specifications
The writing and editing of deliverable document shall be guided by writing guidelines that are developed in the activity as part of the overall methodology. The following list outlines two kinds of relevant guidelines.

- To facilitate understanding by all readers, the style shall be as simple and concise as possible. This is particularly important for those readers whose mother tongue is not one of the official languages of ML2.
- Each paragraph should cover only one idea. Paragraphs should be kept short wherever possible. If long paragraphs are needed because ideas are complicated, consider breaking them up using lists or tables. In general, use shorter paragraphs in on-screen documents than would be used in printed documents.

Preliminary Business Case
The preliminary business case will further be elaborated on, detailed and described during the definition phase of STM.

Activity Management Structure
The activity is organised in two dimensions, a matrix structure, see below figure. The first dimension is the main work breakdown structure where the work on a deliverable is organised in a Work Package. The work Package is managed and lead by a work Package Leader. A Work Package is broken down into several Tasks that are managed and lead by a Task Leader. The activity itself is governed, managed and lead by Work Package 0 and the Operational Activity Leader.
A Task is started, suspended and closed by decisions made by Operational Activity Leader.

The second dimension constitutes a grouping of competences – Work Area. A Work Area is managed and lead by a Work Area Leader. Each Work Area provides specific subject field competences to the Tasks. As such they provide a link, conduit to the partners that ultimately provide people, competences and other resources.

The Work Area 0 Coordination and Central Architecting governs, manages and leads all architecting and modelling activities. The central architecting function is governed, managed and lead by the Strategic Architect.
The Work Area 5 Communication and Dissemination acts as a focal point for interactions between the activity and external reference groups. The Communication and Dissemination Work Area is lead by the Strategic Activity Leader.
**Matrix organisation**

**Role description**
The activity defines the following activity specific roles:

**Staff Roles:**

- **Activity Leader – Operational:** governs, manages and leads the activity on a day-to-day basis
- **Activity Leader – Strategic:** Organize and coordinate communication, presentation and dissemination activities of Activity 2 subject matter.
- **Strategic Architect:** governs, manages and leads all architecting work and governs modelling work.
- **Head Modeller:** manages and leads modelling work within Activity 2
- **Modeller:** Support the subject field/matter experts and integrated architects in their development of subject matter material, using models and architecture descriptions.

**Appointed Roles:**

- **Work Package Leader:** manages and leads Work Package activities
- **Task Leader:** manages and leads Tasks
- **Work Area Leader:** manages and leads Work Area activities
• **Integrated Architect:** The integrated architect participates in tasks and work area activities, monitors, evaluates and reports architectural questions, risks and issues.

The roles are further elaborated on, detailed and described in the Statement of Work.

**Quality Management Strategy**
During the work and at completion the quality of the deliverables will be checked from many perspectives.
A Work area review will ensure a control mechanism relating to architecting work and ensure that, from a subject field perspective, developed work products are of high quality, consistent and coherent, with other work products.

A Work package review will ensure that developed work products are of high quality, consistent and coherent with other work products.

Before a deliverable will be released from activity 2 it will undergo a thorough review by all partners in Activity 2 and relevant reference groups to insure quality.

The quality management strategy is further elaborated on, detailed and described in the Statement of Work.

**Configuration Management Strategy**
Projectplace automatic configuration management will be used during the elaboration of the deliveries.
The releases of deliverables at the end of each iteration will be managed by WA0.

The configuration management strategy are further elaborated on, detailed and described in the Statement of Work.

**Communication Plan**
A stakeholder engagement strategy will be elaborated, that will describe how stakeholders will be identified and contacted. There is also a task in the activity that will work with communication and Infographics. This work will be coordinated by WA5.

The communication plan is further elaborated on, detailed and described in the Statement of Work.

**Project Plan**
The iteration plan including task and the resource plan are the main documents for the project plan together with the documents that describes the methods that shall be used. The iteration plan will be one of the first task do be completed during the initiation of the activity work.
The project plan is further elaborated on, detailed and described in the Statement of Work.
Time schedule
As described above will activity 2 be divided into three iterations, with start November 2013 and ends December 2015.
During the first iteration, from November 2013 to February 2014, the focus will be on the current situation analysis. During the next iteration from March 2014 to December 2014, the focus will be on Performance Targets Development and Target Analysis. During the third iteration the focus will be on Strategic Roadmap Development, STM Master Plan and Work programme for the Development Phase. It is possible to make changes and updates in all documents during all three phases, if required.

The time schedule is further elaborated on, detailed and described in the Statement of Work.

Project Controls
Monitoring and reporting according to MONALISA 2.0 Project handbook.
39 partners from 10 countries
taking maritime transport into the digital age

By designing and demonstrating innovative use of ICT solutions
MONALISA 2.0 will provide the route to improved

SAFETY - ENVIRONMENT - EFFICIENCY

Swedish Maritime Administration ◦ LFV ◦ SSPA ◦ Viktoria Swedish ICT ◦
Transas ◦ Carmenta ◦ Chalmers University of Technology ◦ World Maritime
University ◦ The Swedish Meteorological and Hydrological Institute ◦ Danish
Maritime Authority ◦ Danish Meteorological Institute ◦ GateHouse ◦ Navicon ◦
Novia University of Applied Sciences ◦ DLR ◦ Fraunhofer ◦ Jeppesen ◦
Rheinmetall ◦ Carnival Corp. ◦ Italian Ministry of Transport ◦ RINA Services ◦
D’Appolonia ◦ Port of Livorno ◦ IB SRL ◦ Martec SPA ◦ Ergoproject ◦ University
of Genua ◦ VEMARS ◦ SASEMAR ◦ Ferri Industries ◦ Valencia Port Authority ◦
Valencia Port Foundation ◦ CIMNE ◦ Corporacion Maritima ◦ Technical
University of Madrid ◦ University of Catalonia ◦ Technical University of Athens
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