MONA LISA 2.0 SECURING THE CHAIN BY INTELLIGENCE AT SEA
ACTIVITY 2
Towards a concept on Sea Traffic Management

Presented by
Mikael Hägg, Mikael Lind
What do we want to achieve?

SAFER SEA TRANSPORTS
EFFICIENT SEA TRANSPORTS
(PORT-TO-PORT)

LEADING TO

REDUCED ENVIRONMENTAL IMPACT
Enabling EU skies to handle 3 times more traffic
Reducing the environmental impact per flight by 10%
Improving safety by a factor of 10
Cutting ATM costs by 50%

Goals of SESAR (Single European Sky ATM Research)

Similar benefits for the maritime sector can be achieved by implementation of Sea Traffic Management – to study and demonstrate those benefits is included in MONALISA 2.0
Sea Traffic Management: Development

Use Enterprise Architecture:
- Legal & Business perspective
- Operational perspective
- Information and technical perspective

=> Holistic view of the system
### KPA Groups

**High Visibility**
Effects are societal and of political nature

**Medium Visibility**
Effects are on the business level, users and operators

**Low Visibility**
Not a direct users on maritime users and customers

### STM Key Performance Objectives

**SAFETY**
- Increase Port/Voyage Safety
- Increase Accident Prevention
- Reduce Accidents Impact

**SUSTAINABILITY**
- Decrease Overall Fuel Consumption
- Decrease GHG emissions from Vessels/Ports
- Decrease Marine Spills

**EFFICIENCY**
- Reduce Congestion in Voyage Phases
- Minimise Administrative Burden
- Facilitate Just-in-Time

**SECURITY**
- Increase Voyage and Port Security
- Increase Information Exchange Security

**COST EFECTIVENESS**
- Reduce Total Cost of Owner Ship
- Increase Overall Revenue of Maritime Transport

**PREDICTABILITY**
- Increase Degree of Predictability
- Increase Situational Awareness
- Increase Port-to-Port Predictability

**CAPACITY**
- Reduce Navigation and Port Delay Times
- Increase Vessel and Port Throughput

**INTEROPERABILITY**
- Increase the Application of Standards and Uniform Principles
- Facilitate Technical and Operational Interoperability

**FLEXIBILITY**
- Increase the STM Ability to Accommodate non-Scheduled Voyages

Co-financed by the European Union
Trans-European Transport Network (TEN-T)
Sea Traffic Management: Objectives

- Increased degree of ...
  - information transparency and information sharing
  - actor collaboration
  - integrated performance and just-in-time operations

- within the shipping industry and
- within the multimodal chain of transports

for reaching effects for the transportation system as a whole
Performance Targets

Organize according to:
- Key performance areas
- Focus areas
- Key performance objectives
- Performance Indicators

Five strategic enabling concepts:
- Flow management
- Strategic voyage management
- Dynamic voyage management
- Port CDM
- SWIM

building on three technical enablers:
- Route exchange
- Voyage ID
- Geo-location
Business perspective: Stakeholder benefits

**KEY STAKEHOLDERS**
- Regulating associations
- Maritime Administrations
- Society
- Service providers
- Terminals
- Service Providers (port)
- Cargo Owners
- Ship/shipping agents
- Ship owners
- Vessel operators
- Shipping companies

**EXPECTED BENEFITS**
- Increased coordination
- Increased surveillance
- Reduced carbon footprint
- Increased market potential
- Green steaming
- Increased awareness
- Increased safety
- Optimal use of infrastructures

Actors need to collaborate in order to gain benefits
Activity 2 demonstrations
(Validation of Port CDM and SWIM)

Test bed 1:
SWIM-enabled STM services demonstrated in the Horten-Moss strait (the most trafficked strait in Norway)

Test bed 2:
SWIM-enabled STM services demonstrated for Port CDM in Port of Gothenburg and Port of Valencia
ACTIVITY 2 STM Target concepts:
- Port CDM
- Flow Management
- Strategic Voyage Management
- Dynamic Voyage Management
- SWIM

ACTIVITY 1 services to validate:
- Single reporting area
- Green routes (route validation & optimization)
- Enhanced monitoring
- Dynamic No-Go areas
- Tactical route exchange
- Deep Sea Shore Based Assistance

Formal Safety Assessments (FSA)

Simulator Tests
European Maritime Simulator Network (EMSN)
1. **Strategical Voyage Management** is to optimize the initial planning phase of a voyage so that the voyage-planner achieves an up-to-date awareness of all external elements relating to the undertaking and success of the voyage.

2. **Dynamic Voyage Management** is a fourfold process providing:
   - Validation
   - Optimization
   - Enhanced Assistance
   - Situational Awareness

The optimization creates prerequisite for “just-in-time” JIT operations arriving and departing from ports.
Flow Management

The overall objective of the concept:

*is to optimize and increase safety of the sea traffic flow during all planning and executing phases*

- FM focuses on the whole traffic flow
- The two concepts for Voyage Management look at individual voyages, but are using information from FM when optimizing the specific routes
- Optimizing traffic is achieved by using a *coordinating attitude*, not control, hence leaving the final decision to the Master
- The FM concept should not contradict COLREG nor UNCLOSE
Port Collaborative Decision Making (Port CDM)

Port CDM function for enabling four collaborative arenas enabling sustainable transports as a whole:

- Collaboration among actors operating within the port
- Collaboration between the port and actors realizing sea voyages
- Collaboration between the port and actors realizing inbound & outbound transportation (besides sea voyages)
- Collaboration between ports within each collaborative arena
Port CDM
– enabling the collaborative port

Increased predictability ETB/ETD
Improved turn-around-time
Increased port efficiency
Optimized use of berths/resources
Reduced waiting/anchoring time
System Wide Information Management (SWIM)

- Inspired by SWIM in aviation
- A concept for system wide information management for the shipping industry that could be technologically implemented in different ways covering several communication channels
- Common information sharing environment

Sea Traffic Management Services

Other types of services for intra- and intermodal traffic/transport management

System Wide Information Management (SWIM)
Enabling Sea Traffic Management by SWIM

Share information
Match capacity & needs

SWIM
Enabled by e.g. Maritime Cloud, OBP, iHubs, OGC

Services on demand

Strategic Voyage Mgmt
Dynamic Voyage Mgmt
Port CDM
Flow Mgmt

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Trans-European Transport Network (TEN-T)
INCREASED "COMMON" SITUATIONAL AWARENESS
Summary: key findings

- Five strategic enabling concepts
- Federated approach to information sharing
- Actors participating in demonstrators for validation
- Roadmap for innovating the maritime sector
FROM NEED TO KNOW
TO
NEED TO SHARE

INCREASED COLLABORATION
AND INFORMATION SHARING

SUSTAINABLE SEA TRANSPORTS
Mikael Hägg  
Chalmers University of Technology/Swedish Maritime Administration  
Mikael.Hagg@Sjofartsverket.se  
+46 761 12 70 90

Mikael Lind  
Viktoria Swedish ICT / Chalmers University of Technology  
Mikael.Lind@viktoria.se  
+46 705 66 40 97