**DSS-DC**

**Decision Support System for Ships in Degraded Condition**

**Funding:** European (6th RTD Framework Programme)

**Duration:** Jan 2004 - Dec 2007

**Status:** Complete with results

**Total project cost:** €4,118,890

**EU contribution:** €2,350,000

**Call for proposal:** FP6-2002-TRANSPORT-1

**CORDIS RCN:** 74292

**Background & policy context:**

Integrating technologies for waterborne driving, piloting and manoeuvring assistance to improve safety and maximise the effective capacity of the infrastructure, including the secure transportation of hazardous goods.

Designing user-friendly driver interfaces based on human-centred design philosophies taking into consideration bio-mechanical ergonomics, injury reduction measures, environment perception and effective lay-out of signalling and piloting information for improved safety in waterborne transport.

**Objectives:**

The overall objective of DSS-DC project was to minimise the risk of loss of lives, damage to the environment and loss of value caused by breakdown of critical ship systems. The focus of the project was to develop:

1. Decision Support System (DSS) for handling of ships in degraded condition:
   - loss of propulsion;
   - damage to manoeuvring systems;
   - flooding / damaged stability;
   - sealoads / hull damage / structural integrity;
   - grounding assessment.

2. Remote monitoring, decision support and crisis assistance;

3. Integrate on-board sensing and monitoring systems with modules for Technical Condition Management;

4. Consequence assessment of intentional grounding;

5. Onshore processing of data.

**Methodology:**

The project aimed at adding functionality to existing modules to make them function in an integrated environment, both on ship and shore.

The following work packages were defined:

1. Project management

2. Map processes, decision makers and information requirements
3. System specification
4. Man-machine interface and system integration
5. DSS for operation with degraded manoeuvring-/propulsion-system
6. DSS for operation with collision/hull damage
7. DSS for intentional grounding
8. Technical condition management
9. Weather and sea routing
10. Shore-ship data transfer and data handling
11. Installation and demonstration
12. Review and update system

**Parent Programmes:**
FP6-SUSTDEV-2 - Sustainable Surface Transport

**Institute type:** Public institution
**Institute name:** European Commission
**Funding type:** Public (EU)

**Lead Organisation:**

Norsk Marinteknisk Forskningsinstitutt

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**EU Contribution:** €0

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**EU Contribution:** €0

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**EU Contribution:** €0
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Key Results:

DSS has been created for ships in degraded conditions consisting of following modules:

Model for interaction and cooperation on board and on shore during emergencies

This objective has been covered through the development of a number of emergency scenarios for a tanker and a cruise ship. The scenarios have been discussed with relevant crew and used as a basis for new system architecture for cooperative decision support.

Alarm mapping and alarm prioritisation
The project also carried out a survey on a tanker and on a number of cruise ship to check how the types and number of alarms influence the work processes both in normal and emergency situations.

Physical architecture and the multi-function console
The infrastructure and the MFC illustrated above will be implemented and demonstrated on board a tanker and a cruise ship and integrated with a number of DSS modules.

Multi-function console (MFC)
A central component of DSS_DC is the multi function console. This maybe implemented as a stand alone emergency and safety management system on less complicated ships or as an integrated status and information display on more complex ships.

Degraded manoeuvring and propulsion - DMP
The degraded manoeuvring and propulsion system (DMP) is a decision support system for the master of a vessel that is restricted in its ability to manoeuvre either due to damage or environmental effects or both. The DMP will attempt to automatically diagnose the extent of any disability in the ship by comparing the control signals and the actual manoeuvres.

Hull damage and effects of weather and operation on hull strength
The Collision/Hull Damage (CHD) module will provide information on-board and on shore related to the ship’s strength in damaged or degraded condition.

Intentional grounding (DIG)
This module will provide information onboard and ashore on the likely consequences if the vessel is grounded or stranded at a given site.

Technical condition monitoring (TCM)
In general the purpose of the TCM methodology is to provide an intuitive presentation of the present technical condition of a system (plant, ship, ship-system, etc).

Weather and sea routing (WRA)
The weather and sea routing advice module (WRA) is a decision support system for the master of a
vessel to either plan a cruise or to evaluate different remaining opportunities for the vessel in a

Documents:
- Publishable Final Activity Report (Final report)

**STRIA Roadmaps:** Cooperative, connected and automated transport, Infrastructure

**Transport mode:** Air transport

**Transport sectors:** Passenger transport, Freight transport
- Decarbonisation, Societal/Economic issues,

**Transport policies:** Digitalisation

**Geo-spatial type:** Other