CYCLADES

Crew-centered Design and Operations of ships and ship systems

**Funding:** European (7th RTD Framework Programme)

**Duration:** Oct 2012 - Sep 2015

**Status:** Complete with results

**Total project cost:** €4,209,652

**EU contribution:** €2,889,566

**Call for proposal:** FP7-SST-2012-RTD-1

**CORDIS RCN:** 105721

**Objectives:**

The CyClaDes project is designed to promote the increased impact of the human element in shipping across the design and operational lifecycle. The project brings together a multi-disciplinary team to focus on all the key steps in the lifecycle; the stakeholders; where the barriers to human element integration occur; and how to best locate, produce, disseminate, and apply human element knowledge within the overall context of shipping. The advantage is realized by supporting the integration of the human element in the design and operational life-cycle from appreciation, to concept, to design, to application, to evaluation and approval, to maintenance. The outcome will directly address pressing needs identified in the shipping industry and specifically by this call.

In the CyClaDes project the issue of "human element factors in shipping safety" is addressed by an international consortium assembled to represent critical stakeholders in the yard, supplier, operator, and seafarer communities along with industrial and/or academic experts on ergonomics and work space design, classification societies, and a flag state administration.

The consortium will evaluate the impact of the human element on shipping safety across all phases of the design and operational life cycle. The goal is to identify approaches, technologies, and innovative solutions to aid the design process, overcome implementation barriers, and improve operational procedures.

**Methodology:**

Initial analyses will be performed to identify and describe how tasks and processes are completed in the real world environment, in reference to existing guidelines when available. Qualitative and quantitative methodologies will be utilized to examine sea farer operations including those on the bridge but with a focus on the engine room and other ship areas that are typically neglected. Additional analyses will be conducted at the stakeholder level to examine barriers to guideline implementation, namely what are the factors that prohibit existing guidelines from being implemented across the acquisition, design, and deployment stages. The results will be documentation of best practices, worst practices, and problem areas of focus.

In a subsequent step these results will be utilized to develop a framework for integrating human factors into the design and operation of ships and ship systems. A crosswalk of best practices and design issues will be evaluated for implementation recommendations from the perspectives of human-centered design, resilience engineering, training methodologies, and operational procedures and tools (e.g., for inspection guidance).

The needs of specific stakeholders in the design and operation of ships and ship systems will be supported in the following ways:

- **Designers:**
  - By providing guidelines and best practices for the user-centered design of safety-relevant aspects of ships and ship systems

- **Operators and maintainers:**
• By considering end user needs during acquisitions
• By providing training for their crews
• By providing recognition of best practices
• End users:
  • By implementing methodologies and processes for incorporating user input throughout the entire design process
  • By providing novel kinds of training approaches for crew members
  • By promoting the development user-friendly work stations and processes to increase utility, usability, reduce errors, and increase user satisfaction.
• Rule-makers and authorities:
  • By developing an approach for a more comprehensive consideration of human element analysis in the context of the rule making process.
  • By providing human element training and/or tools for assessors

**Parent Programmes:**
FP7-TRANSPORT - Transport (Including Aeronautics) - Horizontal activities for implementation of the transport programme (TPT)

**Institute type:** Public institution

**Institute name:** The European Commission

**Funding type:** Public (EU)

**Lead Organisation:**

Dnv Gl Se

**Address:**
BROOKTORKAI 18
20457 HAMBURG
Germany

**EU Contribution:** €427,947

**Partner Organisations:**

Lyngso Marine A/s

**Address:**
Lyngso Alle 2
2970 HORSHOLM
Denmark

**Organisation Website:**
http://www.lyngsoe.com

**EU Contribution:** €187,205

National Technical University Of Athens

**Address:**
Heroon Polytechniou 9 (polytechnic campus)
15780 ZOGRAFOS
Greece

**Organisation Website:**
http://www.martrans.org

**EU Contribution:** €132,410

Frauenhofer Gesellschaft Zur Foerderung Der Angewandten Forschung E.v.
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Technologies:

Ship design and manufacturing
Human-centred approach to ship design

Development phase: Research/Invention

Key Results:

A human centred approach to ship design and operation

The maritime industry is beginning to consider the human aspect in shipping safety from design to operations. An EU initiative is identifying user-centred methods, technologies and solutions to support
design, removal of implementation obstacles and enhancement of operational practices.

The maritime sector acknowledges the importance of human-centred design (HCD) as a process to create solutions that take into account user requirements. However, HCD is not widely used by or known to ship / equipment designers and operators.

With this in mind, the EU-funded project 'Crew-centred design and operations of ships and ship systems' ([http://www.cyclades-project.eu/](http://www.cyclades-project.eu/)) (CYCLADES) is developing an open and interactive framework that enables key stakeholders involved in the design of ships and shipborne operations to better access current HCD guidelines, tools and methodologies as well as links to external sources, pictures and videos. The overall goal is to enhance safety and improve user experience.

During the first reporting period, the main requirements for the web-based framework were defined following an analysis of the needs and expectations of operators and designers.

Project partners looked at the current HCD outlook within and beyond the maritime industry. They identified weaknesses in existing designs and operation methods, in addition to lessons learnt and best practices that can potentially be used by the industry.

Team members developed movement sensors and software and employed eye-tracking techniques to measure the mental workload, fatigue and attention levels of crews through a series of validation studies.

Results are continuously being fed into the framework in order to make the accumulated knowledge in HCD more accessible to those designing work environments on board ships and ordering equipment.

CYCLADES outcomes are helping to improve the implementation of HCD concepts in maritime work environments and equipment design. Better access to information regarding HCD should mitigate human error at sea.

**STRIA Roadmaps:** Cooperative, connected and automated transport
*Transport mode:* Water transport (sea & inland)

**Transport sectors:** Passenger transport, Freight transport

**Geo-spatial type:** Other