Background
Accident investigations indicate that an estimated 80 percent of ship accidents are caused by human error. The underlying reasons for human error are manifold, including aspects such as difficult working environment, crew qualifications, as well as lack of user-centred design principles in the design of equipment, of working spaces and/or of human machine interfaces.

The CyClaDes project
The research project CyClaDes, or Crew-centred Design and Operations of Ships and Ship Systems, started in October 2012 and was finalized in September 2015. It aims to improve the current lack of implementation of user-centred design (UCD) principles in workspace and equipment design. It is expected that better access to information regarding UCD will improve the design of workspaces on board and thereby reduce the likelihood for human error.

A multi-disciplinary team of operators, representatives from research institutes and classification societies focused on all the key steps in the life cycle of ship design. The project comprised those areas where the barriers to human element integration occur, and how to best locate, produce, disseminate and apply human element knowledge within the context of shipping.
**DNV GL contribution**

We contributed to the CyClades research project by providing insights gained from our experience in human factors assessment and hazard identification. This was complemented by our know-how in qualitative and quantitative technical and operational risk assessment of designs and our experience in developing rules and guidelines for these. Furthermore, we were responsible for the entire project coordination and communication with the EU.

**Project results**

One of the important findings of the project is that, although much knowledge and experience about UCD is publically available, this information is not widely used by or known to designers and/or ship and equipment buyers.

In order to improve on the current lack of knowledge and implementation of UCD, a number of measures have now been implemented:

- An e-learning platform has been established: [http://elearning.cyclades-project.eu](http://elearning.cyclades-project.eu). It offers lectures for different stakeholder groups such as designers, yards and ship owners.
- Existing rules, guidelines, methodologies, best practices and practical examples have been compiled and are available on the Web-based CyClades Framework at: [http://framework.cyclades-project.eu](http://framework.cyclades-project.eu).
- Practical exercises for improving ship design have been conducted and evaluated, students have been educated and networking opportunities have been created.

The project results contributed significantly to the new edition of the book *Improving Ship Operational Design* published by The Nautical Institute.

It is expected that increased knowledge about UCD, better access to information regarding UCD and broader implementation of UCD principles will improve the usability of equipment and workspaces on board. This will thereby reduce the likelihood for human error and increase the safety for ship, crew, cargo and, consequently, the environment.

**Partners**

CyClades was an EU-funded research project encompassing a consortium of 14 partners: World Maritime University, Lyngsø Marine A/S (Denmark), National Technical University of Athens (Greece), Fraunhofer Gesellschaft zur Förderung der angewandten Forschung e.V. (Germany), Chalmers tekniska högskola AB (Sweden), SSPA Sweden AB (Sweden), BALance Technology Consulting GmbH (Germany), Bureau Veritas (France), Process Contracting Ltd (United Kingdom), Ergoproject Srl (Italy), The Nautical Institute (United Kingdom), Instituto Superior Técnico (Portugal), Future-Shape GmbH (Germany) and DNV GL (Finland/Germany) – all under the coordination of DNV GL.

**FOR MORE INFORMATION, PLEASE CONTACT**

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