



TRA Visions 2014

Project Abstract Template – This template is to be used for submitting an abstract explaining what your idea is all about. It should be no more than a few paragraphs and should be submitted by the 30th of November 2013.

Idea Number: **L1-4**

PILLAR / TRANSPORT MODE			
ROAD ☐	RAIL ☐	MARINE ☒	CROSS MODAL ☐
Project Related to:	☐ RA1: Environment and Energy ☐ RA2: Industry Competitiveness ☐ RA3: Logistics and Mobility Systems and Services ☐ RA4: Safety and Security ☐ RA5: Transport Infrastructures ☐ RA6: Transp. Policy Res./Socio-econ./Human sci. ☒ RA7: Vehicles & Vessels Technologies		

Project Abstract:

The work deals with the actual necessity of creating optimal ship designs under uncertainty, also referred as Robust Design Optimization (RDO). The consideration of uncertainties in the optimization process is the future trend of ship design as a more realistic scenario is taken into account. More efficient vessels are developed leading to great payoff and more environmental friendly devices. Benefits, drawbacks and possible improvements of the design process are discussed in the work. The state of the art in optimization process was tested for a hull form improvement concerning total resistance in forward speed in calm water condition. Each approach merits and drawbacks are pointed out in an investigation of which one is particularly suited for hull form development. Furthermore, an innovative method called here as hybrid method via Gauss-Markov estimation was also tested and gaps for development of the method identified. The criteria to judge pros and cons are quality of the achieved results (e.g. energy efficiency), computational effort (e.g. number of Computer Fluid Dynamics (CFD) runs needed) and sensitivity to changes (e.g. influence of slight changes on the operational conditions). The study case is an existing vessel. In addition, the optimization is focus on changes of the forebody form of the vessel (e.g. bulbous bow). The analysis is suitable to assist ship designers to create in short time optimal ship designs even under uncertainties.