

Invitation

First synchronisation meeting of EU projects CASCADE/CyClaDes/FAROS

Date:

13th of March 2013 (Wednesday),
12:30h -16:30h

Location:

Germanischer Lloyd, Head Office
Brooktorkai 18, 20457 Hamburg/Germany

Local contact: Dr. Karsten Loer (Karsten.loer@gl-group.com Tel: +49 (0)40 36149-163)

Directions:

If you arrive by plane, we recommend to use public transport: <http://www.hvv.de>

- take commuter train ("S-Bahn", starts at airport), exit at "Ohlsdorf" (1 stop, 3 min)
- change to subway U1 (direction "Ohlstedt", "Volksdorf" or "Großhandorf"), exit at Meißberg (10 stops, 19 min)
- take exit Wandrahmstiege (towards front direction of train, then right, then left, cross bridge)
- ca. 5 min walk, see back of the flyer for walking directions

If you arrive by other means of transport, see flyer at

http://www.gl-group.com/pdf/E_HowToFindUs_1002_L04.pdf

Agenda:

The purpose of this meeting is to discuss common ground of the projects for the following areas in focus:

- Bridge simulation: Criteria for selection of the tasks for the crew to perform.
- Crew performance: Means and methods of assessing the crew performance.
- Risk models: Adopted methodology for development of risk models;
Specifically math modelling, population of data, and validation

The attached summary provides an indication of the topics that are covered in the three projects in these respects.

Research tools / developments	Scope / expected outcome / start and end months			
	CASCADE	CyClaDes	FAROS	Common ground
Bridge and control room simulators	<p>Scope: CASCADE addresses the study and design of bridges as an integrated whole. The bridge is seen as a <i>cooperative system</i>. This means we will consider all involved agents (human agents and machine agents like Radar, ECDIS,..) and will study as well as re-design the way in which they share the performance of tasks using shared resources. Bridge behaviour and information processing during a subset of routine, hazardous and emergency scenarios.</p> <p>Outcome: We will answer analysis questions needed to support the development of the study and design methodology and to support the study and design activities, with a particular focus on the safety and resilience of the bridge. Both types</p>	<p>Scope: Human centric design methods will be applied during the development of a conning information display which will facilitate a good understanding of the ship dynamics.</p> <p>Outcome: Prototype of a conning display that was developed with user-centred design (UCD) principles and methods. Documentation of use of methods.</p> <p>Start & end months: Nov 2013 – Sept 2015</p>	<p>Scope: We will focus on emergency events only (collision/grounding avoidance, ship crisis management/risk mitigation after accident); normal operation won't be addressed. Bridge and CR will be used to monitor crew performance and measure deviations from the norm. Bridge used for collision/grounding avoidance. CR for risk mitigation. In both cases, there will be a set of critical tasks to be performed by the crew. Ship motions, vibration and noise will be simulated during the experiments.</p> <p>Outcome: Platform for physical experiments and comparison of ship designs. Ship maneuvering, response to sea state etc. will be</p>	<p>Use of the bridge. Bridge tasks (navigation, communication etc.) performed by deck officers.</p> <p>Potentially common interest: Criteria for selection of the tasks for the crew to perform</p>

Research tools / developments	Scope / expected outcome / start and end months			
	CASCADE	CyClaDes	FAROS	Common ground
	<p>of questions will be answered (1) analytically, based on formal models of design solutions, (2) empirically, using the Physical Simulation Platform (based on TRANSAS full-scale bridge simulator) and/or (3) empirically, using the Virtual Simulation Platform.</p> <p>Start & end months: Jan 13 – Dec 13 (first round)</p>		<p>simulated.</p> <p>Start & end months: Feb 13 – May 13</p>	
Fatigue measurements / experiments	<p>Scope: We will assess the success and impact of the an adaptive bridge in terms of various key indicators incl.:</p> <p><u>Cognitive load and fatigue:</u> Established measures of fatigue include: (a) Subjective questionnaire measures such as the Profile of Fatigue Related Symptoms (PFRS) and the Karolinska Sleepiness Scale (KSS). (b) Objective measures such as</p>	<p>Scope: A combined indicator -from the assessment of the operator behaviour and cognition- will be used in a series of validation studies aimed at testing the effectiveness of design and redesign solutions used in the equipment and instruments on the bridge.</p> <p>Outcome:</p>	<p>Scope: Fatigue as such won't be measured. Because the experiments will be rather short for this condition to appear. Instead, some elements of fatigue (eg sleepiness) will be induced beforehand. Then the fatigue induced and healthy crew will be performing same critical tasks (see above); the difference will be measured using Eye Tracking Technology and other</p>	<p>Measurement of crew performance on the bridge.</p> <p>Potentially common interest:</p> <p>Means and methods of assessing the crew performance.</p>

Research tools / developments	Scope / expected outcome / start and end months			
	CASCADE	CyClaDes	FAROS	Common ground
	<p>reaction time, taken before and after work (as used in the Cardiff Seafarers' Fatigue study)</p> <p>Outcome: CASCADE will study the impact of fatigue on operations on the bridge, with the aim of maintaining bridge safety and resilience, even if the crew is fatigued. CASCADE will try to reduce fatigue onboard by adapting the information presented to the operators in a way that optimizes workload and thus minimizes fatigue.</p> <p>Start & end months: Jan 13 – Dec 13 (first round)</p>	<p>A system for monitoring the operator behaviour and cognition will be developed, assessing <u>mental</u> fatigue and alertness by movement sensors and eye-tracking techniques.</p> <p>Start & end months: Oct 2012 – Sept 2015</p>	<p>means. In this project we assume that fatigue (or rather its elements like sleepiness) and other physical/mental conditions are resulting from global design factors such as ship motions, noise and vibration.</p> <p>Outcome: Effect of environment (ship motions, vibration & noise) and sleepiness on crew performance in emergency. Human error rates / frequencies, regression models.</p> <p>Start & end months: Feb 13 – May 13</p>	
Risk models	<p>Scope: ISi-PADAS (2008-2011) developed models of car driver behaviour and applied them to support risk based</p>	<p>Scope: Risk models will be developed that describe and quantify influence of human</p>	<p>Scope: Existing risk models for ship collision, grounding, fire and personal risk (crew injuries and</p>	<p>Here we have a perfect match.</p> <p>Potentially common</p>

Research tools / developments	Scope / expected outcome / start and end months			
	CASCADE	CyClaDes	FAROS	Common ground
	<p>design. In CASCADE we use the same cognitive architecture CASCaS (Cognitive Architecture for Safety Critical Task Simulation) to model human behavior of seafarers.</p> <p>Outcome: CASCADE will extend these cognitive modelling approaches towards Distributed Cognition and nautical decision making of seafarers (Recognition Primed Decision Making theory).</p> <p>Start & end months: March 13 – Sept 13</p>	<p>element in ship accidents.</p> <p>Outcome: Risk models that address influences more adequately in risk assessments.</p> <p>Start & end months: Nov 2012 – Sept 2013</p>	<p>fatalities) will be enhanced with new elements pertaining to crew performance in emergency.</p> <p>Important to note that societal risk models (i.e. fire, grounding and collision) are well understood, whereas personal risk models are not. Therefore, this is one of the challenges in FAROS to come up with personal risk model.</p> <p>Outcome: Societal risk models enhanced with crew performance parameters. Personal risk models.</p> <p>Start & end months: Oct 12 – Aug 13</p>	<p>interest: Adopted methodology for development of risk models.</p> <p>Specifically, math model, population of data, and validation are of interest.</p>
Resilience in operation	<p>Scope: CASCADE will study the impact of fatigue on operations on the bridge, with the aim of maintaining bridge</p>	<p>Scope: CyClaDes will perform an assessment of resilience of management practices and</p>	NA	No match.

Research tools / developments	Scope / expected outcome / start and end months			
	CASCADe	CyClaDes	FAROS	Common ground
	<p>safety and resilience, even if the crew is fatigued. CASCADe will try to reduce fatigue and increase resilience onboard by adapting the information presented to the operators in a way that optimizes workload and thus minimizes fatigue.</p> <p>Outcome: System resilience through people will be ensured by providing the operators with the information they need at all times (adaptive user interfaces) and controlling how information is distributed between them (i.e., to support distributed - and redundant – situation awareness).</p> <p>The cooperative system will be (re-) designed accordingly to improve its safety and resilience, especially by equipping existing systems with adaptive capabilities towards an Adaptive Bridge System (ABS) that</p>	<p>perform a comparison of methods. We will examine the links between traditional Human-Centred Design (HCD, which is well-understood) and resilience (which is a newer approach) - management of the process.</p> <p>Outcome: Produce statements on design and operational methods that fit into framework.</p> <p>Start & end months: Jan 2013- Sept 2013</p>		

Research tools / developments	Scope / expected outcome / start and end months			
	CASCADE	CyClaDes	FAROS	Common ground
	fosters local and shared situation awareness. Start & end months:			
Validation of risk models based on experiments	<p>Scope: Evaluation in CASCADE will be performed in a parallel process: evaluate the new Adaptive Bridge System (from WP5) with real seafarers according to the experimental plan and scenarios AND evaluate the predictive capability of the Virtual Demonstrator, in particular at the level of the Cognitive Seafarer Models and of the simulation of the bridge as a cooperative system</p> <p>Outcome: Evaluation of the new Adaptive Bridge System</p> <p>Start & end months: April 14 - July 14</p>	<p>NA We are not planning to perform validation of our risk based on experiments, but we would be interested to eavesdrop on these activities in the other project.</p>	<p>Scope: Risk models will be used to optimise baseline designs for ropax and tanker ships. Experiments (emergency tasks on Bridge and CR) will be conducted on baseline and optimised designs, to compare the difference and validate the risk models.</p> <p>Outcome: Error quantification in risk models. Error distributions etc.</p> <p>Start & end months: Feb 15 – Oct 15</p>	<p>Due to the weak match, the exchange on the risk models (see above) can be sufficient to cover this.</p>

Research tools / developments	Scope / expected outcome / start and end months			
	CASCADE	CyClaDes	FAROS	Common ground
Design of bridge and control room	<p>Scope: CASCADE will advance the state of the art in maritime ship bridge design on four complementary research dimensions:</p> <ul style="list-style-type: none"> (1) Human-centred bridge systems (2) Bridge design methodology (3) Design of bridges as cooperative systems (4) Human factors on bridges (5) Formal modelling of bridges <p>Outcome: Physical Simulation Platform (based on TRANSAS full-scale bridge simulator) and Virtual Simulation Platform</p> <p>Start & end months: Starting in Jan 13</p>	<p>Scope: Human centric design methods will be applied during the development of a conning information display which will facilitate a good understanding of the ship dynamics.</p> <p>Outcome: Prototype of a conning display that was developed with UCD principles and methods. Documentation of use of methods.</p> <p>Start & end months: Nov 2013 – Sept 2015</p>	NA	No match.
Ship design (other than Bridge and CR)	NA	<p>Scope: Methods will be identified that assessment how well</p>	<p>Scope: Ship hull, machinery configuration, arrangement, deck</p>	

Research tools / developments	Scope / expected outcome / start and end months			
	CASCADE	CyClaDes	FAROS	Common ground
		<p>crew needs are considered in the design and arrangements of selected deck equipment and machinery installations, as well as control panel designs.</p> <p>These methods will be applied in case studies for UCD of control panels and work space arrangements.</p> <p>Outcome: Methods for the user-centred design of deck equipment will be documented and be made available through the design framework; including documentation of method application.</p> <p>Start & end months: Mar 2013 – Mar 2014</p>	<p>layouts etc. will be optimised for safety, economics and environmental efficiency.</p> <p>Only global design changes will be made, i.e. bridge, control room etc. won't be addressed.</p> <p>Outcome: Optimised concept designs for ropax and tanker ships. This will replicate the outcome of the conceptual ship design stage.</p> <p>Start & end months: March 13 – April 15</p>	

NA – not addressed