This is a list of the abstracts that have been accepted for presentation at the INSLC 18 conference.

The order of the list is random. It is not an indication of a speaker schedule.

Details concerning presenter’s time schedule have yet to be determined.
Abstract:

Even the ship's speed is very essential to safety and strategic maneuvering; its availability is not so high. Since EM-log was developed, the ship's speed is theoretically measured in real time. But because of its poor information quality, it should be averaged, so the response is not enough to apply the ship's maneuvering. On the other hand, many of DAV OG SDME (Double Axes Velocities Over the Ground Speed and Distance Measurement Equipment) were developed in 1970s according to safety docking and/or landing maneuvering of VLCC (Very Large Crude Oil Carrier). Underwater acoustics technology is used to the SDME onboard. Up to now, GNSS technology also is used to the SDME onboard, and IMO requires to install DAVOG SDME more than 50,000 GT. The performance requirement of SDME or conventional Speed Log was forced, and applied to safety navigation using ARPA, AIS and/or ECDIS, but the performance requirement it is not of use to docking maneuver for masters or pilots.

The authors presented the performance of SDME in docking considering with the effect of wind using MMG simulation of several kind of vessels (VLCC, bulk carrier, container ship and PCC) in 2006. In this case we discussed the performance requirement of lateral velocity should be sufficient not only accuracy but also time response or time lag, and they are influence to trade off each other. So, this is the problem to trade off one against another. The one is information quantity such as accuracy and the other is information quality as time response, or vice versa. In this paper, we will discuss (1) the effect of not only wind but also current, (2) not only lateral velocity but also longitudinal one, according to not only safety but also strategic docking or landing maneuvering, and (3) to make a classification of performance requirement against ship’s size and kind. Finally we propose the numerical resolution of performance requirement to docking and landing maneuvering, and comparing the DAV OG SDME using underwater acoustics and GNSS technic.
Title of Paper: The Research and Development of Maritime Simulators in Light of the Manila Amendments to STCW Convention

Authors and Titles: Chen Jinbiao  
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Abstract:

The rule about the maritime simulators using [1], revised in the Manila Amendments to STCW convention, strongly affects maritime teaching, the development and using of the maritime simulators. Under kinds of simulator-designing navigation environment, trainings for sailors’ skill and assessments to sailors’ performance have been actualized for many years in China, and the newly Manila amendments has make maritime simulator applied widely in maritime training and sailors’ training. STCW convention puts BRM in sailors’ mandatory training course, and sets a higher demand on ship handling simulator about human factors especially teamwork and cooperation. Affected by large-scale, high-speed, intelligent vessels, Ship handling simulator develops to a complex and multiplex system, resulting some navigational instruments equipped in simulator aren’t necessary during simple teaching. This paper give an idea to research modular and different hardware, precise ship models, simple navigation instruments to develop economic and applied simulators; also suggests to develop simulators for special operation trainings such as LNG ship, DP, life boat, and carry out related research on remote training and e-learning as soon as possible. Berthing operation is a regular work during ship handling, and improper operation makes dock-ship collision accident occur times. Ship handing simulator can assist captions and pilots training to master docking and unberthing skill so that avoid such accident. The situation, large-scale vessel sailing in narrow channel, is a challenge in ship handing for drivers and need them to acquire assistance from many navigation instruments to finish sailing task. At usual, maritime simulator provides exercises and tests including different navigation environments, such as sailors in a team take anti-collision actions and proper measures to control a ship in narrow channel to finish a navigation task successfully, while assessors observe and record sailor’s behaviors to give a score and summarize an issue in the end. Considering the importance of simulators in sailors’ capability assessment while assessors’ subjective factors weigh lots in the result and different standard during assessing, this paper provides a model for real time evaluation of ship collision risk in narrow channel automatically, and talks about its feasibility to develop an automatic assessment system embedded in ship handling simulators. This paper also lists some problems including limitation, emerged in over-reliance on simulators in maritime teaching and sailors training.
Title of Paper: Intelligent Scenario Control Technologies Supporting Instructors during Setup, Control and Supervision of Complex Ship Handling Training Scenarios

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Abstract:

Today’s state of the art maritime simulator systems offer enormous functionalities and technical features allowing instructors generating almost any traffic scenario for education and training purpose. Multisession simulators with multiple own ship bridge configurations and a high quantity of traffic ships needs to be controlled, whereby not the simulator technology but the instructors’ capability in controlling the scenario becomes more and more the limiting factor. It becomes difficult for an instructor supervising multiple trainees’ actions, vessel handling and bridge resource management while concurrently controlling traffic situations, communications, and the scenario environment. Use of multiple instructor stations can distribute the load between instructors but increases the system and labor costs. Optimized human machine interfaced offering right options at decisive moments and objective assessment tools relieve but do not solve the core problem of overloaded instructors controlling complex training scenarios. This paper described a new and intelligent scenario control mechanism of Rheinmetall’s Advanced Nautical Simulator ANS 6000 software supporting instructors during setup, control and supervision of complex and realistic maritime training scenarios. Event derived scenario control mechanisms will allow automatic reaction of scenario traffic or alter maneuvering capabilities of the own ship due to navigation status and trainees’ actions. Injecting linked simulator traffic via Distributed Interactive Simulation (DIS) interface or injecting real traffic situations via live or recorded AIS data into the simulated scenario will offer new opportunities for realistic and efficient training by reduced instructor load.
Abstract:

This maritime paper presents an overview training process for citizens of a maritime nation to engage in the selection process to become a cadet pilot or pilot trainee, who has no formal training or career path in the maritime world prior to engaging in the process. We will consider the simulation pedagogy as it relates to teaching traditional seafaring skills, in this case pilotage, using modern simulation in a “flipped teaching” methodology.

Obviously, not all countries use the same process to select maritime pilots. Maritime nations have very different selection processes, with a common result of highly skilled professional pilots following years of apprentice training. We will explore the use of simulators in vetting the process of selecting qualified cadets or trainee pilots, via simulation examination, for a permanent position in a pilot trainee program. The comprehensive fundamental pilot skills needed to prepare a candidate to mathematically score above average in a simulation exercise designed to test a candidate’s pilot skills and emotional maturity, requires a simulation pedagogy, exercise designs and training program that builds the skills sets needed to pass the exam process. The basic facets of a pilot’s skills must be presented, established and taught before the simulation stage of training. The simulation training stage then enhances and refines the elementary pilot skills bordered around the examination criteria. A selection committee needs to assess, judge and score a large pool of candidates with a rigid scoring system based on simulation exercises designed to test a candidate’s worthiness to become a pilot trainee. Therefore, an established training program with skilled instructors produces qualified pilot candidates for examination.
Title of Paper: Enhanced Situational Awareness through Multi-Sensor Integration

Authors and Titles: Michael Baldauf,
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(external Ph.D. Student MaRiSa-WMU)

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Abstract:

Collisions and groundings are the two types of casualties in shipping which occur most often and cause serious damages. At all times Officers of the watch need to be aware of any risk of collision or risk of grounding and have to comply with rules and regulations as e.g. laid down in the COLREGs, in IMO Guidelines for Voyage Planning and the Procedures Manual of a ship’s Safety Management System respectively. Maritime education and training is to support compliance with the legal framework by providing knowledge and skills and supporting application of best practice.

One important part of basic and enhanced training courses is also familiarization with and handling of equipment including transferring knowledge and experience on potentials and constraints of modern equipment its functions and functionalities. Bridge navigational equipment provides a great number of systems to support safe and efficient navigation and protection of the marine environment. The present situation is characterized by an increasing level of integration of sensors, technical systems, displays and sophisticated decisions support systems and with complex alerts to ensure sufficient situational awareness of the bridge team.

However, despite of all those sophisticated systems accidents happen. Regardless of the behavior, the actions taken or not taken by the bridge team, the grounding of Costa Concordia equipped with very modern integrated bridge navigational systems can be seen as another prominent case where alerts failed to raise the attention to take action to avoid an accident.

In this paper results of simulation studies regarding the use of bridge alerts will be presented and discussed and an innovative approach to trigger grounding warnings by implementing an additional sensor system (Forward Looking Sonar) will be introduced. The development of the concept its basic functional and technological structure to support full situational awareness will be explained and discussed in the light of the ‘Costa Concordia’ grounding scenario. Suggestions and recommendations for simulation-based test and trainings scenarios will be presented.
Title of Paper: Ship Maneuvering Simulator Training at the Iranian Maritime Training Centers

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Abstract:

Use of the ship maneuvering simulator as an optimum training tool at the Iranian Maritime Training Universities is mainly related to the coastal maneuverability or the seafarers’ education and training, so it is attractive to have an evaluation method that can be completed after each berthing and un-berthing training scenario. When a Maritime University equipped with a simulator technique as training tool, it doesn’t mean that the quality of training at the university is outstanding. One of the main advantages of ship simulator technology is the availability of that all the times and everywhere, the scenario should be as software in order to be use on the seafarer’s lab top in all places.

The most important point of this paper is going to be about the use of simulation systems, advanced maritime education and training courses at the Iranian Maritime Training Centers. The author decided to consider the role of instructor as quite important factor in order to create different scenario with the degree of realistic and the validation in visual presentation of simulator training. Simulator training exercises should be in all round field of view in order to improve the quality of presenting pictures to the trainees. It should be noted that, the author is going to describe about the quality and capability of the Iranian Maritime Universities in order to compare them with the IMO standards of Maritime Education and Training.
Title of Paper: The Use of Simulators in Maritime Counter – Piracy Training

Authors and Titles: Pancrasio Alfonso, PN (Ret.), Simulator Instructor
                            Gerardo Ramon S. Galang, Manager, Management Information and Instructional Technology Department

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Abstract:

Maritime piracy had been on the rise in the Gulf of Aden and the waters off Somalia since 2006. Passing ships proceeding to the Mediterranean via the Red Sea or entering the Indian Ocean from the Horn of Africa were attacked and hijacked by Somali pirates for ransom. For several years, the attacks continued to escalate and reached a point where they gradually and seriously affected not only the international shipping industry but also the welfare and well-being of thousands of seafarers, who were held hostage until payment of ransom is paid.

Acting on UN Resolutions issued calling upon States and other organizations to fight piracy and armed robbery, a combined maritime force was organized with specific mandate to counter piracy in and around the Gulf of Aden and Somalia. Despite the presence of a coalition of naval ships and coast guard forces coming from more than 25 countries plus navy units from NATO and the European Union as well as other independently deployed ships of other countries, however, piracy-related incidents continued to persist as the Somali pirates extended their range of operation into the Red Sea, Arabian Sea and the wider sea area of the northwestern Indian Ocean. Even the establishment of “citadels” on board ships and the employment of armed guards/security escorts could stem the rising tide of Somali pirate attacks, hijackings and hostage takings.

Filipino seafarers, among other nationals, suffered the most and were adversely affected by this global security menace. The Filipino seafarers were not only experiencing the tension, the stress and the trauma as their ships are attacked by pirates, chased upon by high speed skiffs and fired at with high-powered weapons including AK-47s and rocket propelled grenades (RPGs); they also had to bear the long and indefinite period of captivity when taken hostage; and, in some cases, they must have endured the worsening violence and threat, coercion and intimidation from the pirates as they are used as human shields from naval forces attempting a rescue and/or forced to take part in the pirates’ subsequent venture using their captured ship as “mother ship.”¹

As Filipinos with family-centered culture, the most painful of all that these hostages had to surmount is the loneliness, depression, misery and longing to be with their immediate family, friends and loved ones, who may have also been distressed by the incident. Filipino seafarers constitute about 27% of the world’s maritime labor force.⁷ Every ship that is attacked, hijacked and held hostage for ransom in the Gulf of Aden and the waters
around Somalia, there are more often than not, Filipino seafarers on board. There is no doubt, therefore, that they comprise the majority of seafarers who were held hostage since the first recorded piracy attack was carried out several years ago and even those that are still being held by the Somali pirates today.

To prepare the Filipino seafarers from the hazards of maritime piracy, the Philippine government required all departing seafarers to attend further training as part of intervention to address piracy-related issues. The POEA published Memorandum Circular No. 02 dated January 29, 2010, amending Memorandum Circular No. 12 dated September 9, 2009, which provides that as an additional requirement for processing of seafarers:

All manning agencies shall require their seafarers to undergo training on practical measures to avoid, deter, or delay piracy attacks prior to deployment. The training shall be separate and in addition to the regular Pre-Departure Orientation Seminar (PDOs) conducted for departing seafarers. All departing seafarers shall be required to attend the Anti-Piracy Awareness Training regardless of the vessel’s trade routes. The training shall be free to seafarers.²
Abstract:

The US Executive branch has declared that the cyber threat is one of the most serious economic and national security challenges we face as a nation and that America's economic prosperity in the 21st century will depend on cyber security.

Cyber threats and terrorism are ever prevalent in the 21st century and are increasing at an alarming rate. Before we in the maritime industry sound the Danger signal we need to monitor other industries and branches of the government and take proactive preventative measures to ensure no unwarranted catastrophes occur on the high seas. What better place to better prepare future and current mariners for these challenges but that in the experiential learning setting of maritime simulation.

Global and Homeland Security are relatively new terms since the millennium and came to the for-front of the world with the September 11, 2001 attacks on the World Trade Center in New York City. Shortly thereafter the maritime community embraced the concept of Maritime Security as an offshoot and has lead the charge through troubling times of terrorism and ship piracy including the infamous Maersk Alabama incident off Somalia in 2009. It now is time to take the next logical step to embrace Maritime Cyber Security (MCS).

What is cyber security? Cyber security refers to the technologies and processes designed to protect computers, networks and data from unauthorized access, vulnerabilities and attacks delivered via the Internet by cyber criminals.

With many recent stories portending to GPS spoofing, including the June 2013 project at the University of Texas where they employed GPS spoofing as they hacked and manipulated the software to disorient the navigation system on a luxury yacht. It has become relatively apparent that the high reliance on maritime electronics can have the potential for major incidents if any of these devices are fooled, jammed or zapped via Electro Magnetic pulse (EMP). How can a prudent mariner be cognizant of the spoofing or other forms of trickery? It fundamentally comes down to training and awareness. Unfortunately when you are dealing with multi-billion dollar vessels and the potential for serious damage when you attempt to do any of this training at sea it becomes readily visible that the solution resides in implementing the training through maritime simulation.
Maritime simulation is important as it imitates the operation of a real-world vessel in a safe environment. The act of simulating cyber threats and scenarios will allow us to focus on these new cases of spoofing and jamming through the mariner’s heavy reliance on Radio Frequency (RF) transmissions that can potentially be comprised.

Simulation can be used to show the eventual real effects of alternative conditions and courses of action on the vessel. Simulation is of utmost importance specifically where we need to interact in congested waterways, narrow channels, dense traffic and many other restrictions including dangerous cargoes. What simulation will allow us to do is introduce many of these potential cyber threats in a real life environment and let the mariner interact with the exercise and respond in real time.

Why is maritime simulation the perfect environment to bring forth this new arena of cyber security training? It lies in its robust ability to be adaptable to allow multiple variations of the threats while deploying totally integrated systems using a full cadre of bridge equipment including: AIS, ARPA, ECDIS, Radar, GPS and DP.

In developing the next wave of maritime education it is a logical evolution to go beyond Vessel Security Officer (VSO) and create a new role for a Cyber Security Officer (CSO) in a Maritime Cyber Security (MCS) program. This position could be an extension of the VSO or a new certification. In either direction it is necessary to have a crew member with this skill set as the assigned person on each ship. As the go to person, they would be responsible for all levels and details of cyber security and defense. Through the recently released STCW 2010 Amendments IMO has already proactively moved forward with the introduction of the Electro Technical Officer (ETO) and an Electro Technical Rating (ETR).

How do we move forward and get to that logical level of training and preparedness? First we will review existing maritime simulation and determine what equipment and systems we are using. Next how they are integrated and what built in security we have in place. From this we can start our journey on how cyber threats would be able to attack the equipment, destroy it, disable it or in the worst case scenario take command of it. In the end it is through the awareness training and education that mariners will be able to thwart these infiltrations.

Another source of mariner awareness and training must be the use of the internet and the download of potentially corrupt data through viruses, worms, phishing, spoofing and hacking. This may happen due to improper or lack of training or some circumstances an oversight due to fatigue but nevertheless it must be avoided. A similar path applies to the use of vessel email and the threat of receiving spear phishing emails purported from reliable sources with clickable links to websites that are fraudulent and will take control of your computer back door or install a virus.

In summary as we move forward we need to incorporate in the syllabi of all maritime simulation courses the basics of Maritime Cyber Security (MCS) as it is and ever present threat that will not go away. It is only through diligence and proper training and awareness that seagoing mariners will be prepared and ready to take appropriate actions.
when warranted. As we have learned in navigation law we do not want to end up in extremis and having to mitigate damages.

My presentation will cover how maritime simulation training can be utilized to develop a Maritime Cyber Security (MCS) program that can potentially lead into a Cyber Security Officer (CSO) certification.
Title of Paper: Evaluating Competencies in Non-Technical and Technical Skills during Simulator Training

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Abstract:

Evaluating competencies is one of the main objectives of STCW Convention. According to 2010 Manila Amendments to STCW Convention and Code, competencies in both technical and non-technical skills have to be demonstrated by miscellaneous methods. Approved in-service experience, approved training ship experience, simulator training, and laboratory equipment training are the methods accepted by the STCW Code.

Bridge Resource Management (BRM) training has become mandatory with the introduction of STCW Convention 2010 Manila amendments, and simulators are the core element during BRM training. There are requirements in Section A-1/12 of STCW Code while using simulators as a method for demonstrating the competence. According to Code, where simulators are used to assess the ability of candidates to demonstrate levels of competency, assessors shall ensure that: identified performance criteria are clearly and explicitly and are valid and available to the candidates; Assessment criteria are established clearly and are explicit to ensure reliability and uniformity of assessment and to optimize objective measurement and evaluation, so that subjective judgments are kept to the minimum; Candidates are briefed clearly on the tasks and/or skills to be assessed and on the tasks and performance criteria by which their competency will be determined; Assessment of performance takes into account normal operating procedures and any behavioral interaction with other candidates on the simulator or with simulator staff; Scoring or grading methods to assess performance are used with caution until they have been validated; And the prime criterion is that a candidate demonstrates the ability to carry out a task safely and effectively to the satisfaction of the assessor.

For fulfilling the requirements of that well-defined assessment procedure, an integrated competence evaluation form has been developed to be used during BRM simulator trainings. During BRM simulator training, trainees not only use their technical skills but also non-technical skills as well, so evaluation has to be integrated covering the competencies in both areas. “Non-Technical Skills Evaluation Form” was adapted to maritime domain from NOTECHS system, which had been developed and introduced initially in aviation industry and then adapted to other safety critical domains such as nuclear, healthcare and rail industries. “Technical Skills Evaluation Form” was developed by using appraisal, planning execution and monitoring phases of passage planning. This aim of this paper is to open a discussion on the effective application of this integrated evaluation approach during simulator based BRM trainings.
Abstract:

This presentation will look at various Maritime Cyber Security (MCS) issues for the maritime industry for crews, vessels, facilities and other equipment which can benefit from simulation.

The attacks of September 11, 2001, the USS COLE just the year before, the M/V LIMBURG the year after ushered in a new era of concerns for the world and specifically the global maritime industry. Recently, the terrorist attacks and thwarted plots in the Suez Canal highlight the ever-present threat to the maritime industry from continuing deliberate assaults of all kinds. Everyone agrees, we must be ever vigilant and fully prepared to deal with whatever might come.

Although it was not much more than a decade ago, the words “Maritime Security” represented a new concept. Since then, the maritime community responded with terrorism and piracy awareness campaigns, training for seafarers and new onboard personnel responsible for vessel security. Today, with the exploding advances in technology, we need to see another spotlight shine - this time on maritime cyber security.

Maritime Sector cyber vulnerabilities need to be fully identified throughout the industry to help improve awareness of the vulnerabilities among the many stakeholders, assess the risks, potential impacts and deal with them. Once identified, we will need to train personnel and improve equipment and processes to afford as much industry resilience as possible.

This presentation will provide an overview on differences between maritime cyber threat issues and traditional cyber threat issues supporting why Maritime Cyber Security (MCS) merits capital letters, its own acronym and perhaps even its own agreed upon definition. Maritime cyber security’s (MCS) definition has not yet been agreed upon since much of marine environment information transfer is via radio frequency (RF) and not a dedicated hardline internet or directional microwave dish. A good example is positioning by satellite systems. Interference with data being sent to/from shipboard computers and technology is cyber, but MCS’s definition will likely be more complex to include traditional and evolving perceptions.

For instance, the complexities involved in live near-shore RF cyber tests leave much to consider even if legal permission could be obtained from government authorities, insurance underwriters, etc. Given those complexities, the benefits of using Navigation Simulation in such a situation are clearly demonstrated.
As we move forward, we should look toward incorporating the basics of maritime cyber security into syllabi of existing and future simulation courses.
Title of Paper: Opportunities in the Use of BCI (Brain Computer Interface) to Optimize Simulator Trainings

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Abstract:

It is obvious that the reasons of most accidents may be found in a lack of situational awareness, misleading communication and wrong decisions. For this reason the use of simulators in the shipping industry gets more and more accepted as an efficient tool to train technical and management skills of mariners. But nevertheless: in the aircraft world it is a regular “must”, in our business it seems more to be a drop in the ocean. Not everything, which is suitable for the aircraft world is suitable for shipping business – the own pattern needs to be developed.

Standardized exercises have been developed by training institutes, but the acceptance of these exercises by the trainees depends on the experience and knowledge of the mariners. Exercises which are challenging for young officers might be an easy situation for experienced masters. On the other hand also experienced sailors had been not able to make good decisions in extreme or emergency situations.

To understand what happens we have to look to the biological nature of the so called “human resource”. It means every person who has without any discussion a huge responsibility for human lives and high monetary value. To look at the very complex system of our brain in extreme situations might be an answer. The analysis of dependencies between occurrence of a specific situation and the brain activities as well as stress and workload patterns is a chance to support the design of individual or standardized trainings.

The paper will focus to the opportunity how psycho-physiological signals can be used to support and optimize simulator trainings. For this reason a BCI (brain-compute-interface) had been programmed and connected to a ship-handling simulator. Several test persons had been connected to an EEG (Electro-
Encephalogram) during a training session in a ship handling simulator, where they had to execute maneuvers as responsible tug master of a harbor tug.

For the first time, the EEG/BCI analyses are practiced in a close-to-real situation in the maritime context. The idea is to identify cognitive workload and stress deriving from critical or demanding situations. Several questions shall be answered as: Does it allow to design an efficient - because tailor-made - training lesson? Is it possible to recognize the need for individual solutions and where general means are suitable? Can it help to experience the personal limits – and develop means to handle the situation? Where are the opportunities, where are the limits in this method?

By now it is an experiment started in 2014. The paper will explain the outcomes and findings of the measurements and will give an outlook to future opportunities.
Title of Paper: Simulation-Based Model Course for Revalidation of Seafarer’s Certificate of Competence

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Abstract:

This presentation has the intention to give an overview of the results of project research carried out by Maritime Institute Willem Barentsz (MIWB), Nautical Faculty of Barcelona ( UPC) an Admiral Ushakov Maritime State University authorized by the International association of Maritime Universities (IAMU) As stated in the STCW code under part A, Chapter I, section I/11, every master, officer or radio operator holding a certificate issued or recognized under any chapter of this Convention, and intends to return to sea after a period ashore, shall in order to qualify for seagoing service, be required to establish continued professional competence. In order to fulfil this competence the STCW Code states in column 3 (methods for demonstrating competence) of the code, that most of this competences can be examined and assessed by approved simulator training. Members in the project have therefore taken the lead to design a specific simulation-based model course. At first this simulation-based course will be prepared for deck officers, because of the short period of the project. In order to fulfil the requirements for this course, members have made an initial study about what is already done according to this subject in the various countries of members of IAMU. Also a study was made of the application of simulation technology these days around the world. With the outcome of these two word-package’s a design model course, according to the IMO format was prepared. In order to assess the course, simulation exercises were developed, which are an essential part of the model course. Finally at the end of the project a course review and discussion to assure the high quality and control system was realized. The course ensures that the necessary knowledge, skills and experience are carried out in a competent manner. Main objectives of the project are:

- Develop a common academic programme using simulation methodology to review and demonstrate competence to licence the revalidation marine certification.
- Promote the implementation, development, harmonisation and unification of the maritime programme contents considering international standards for training of seafarers.
- Establish a quality assurance and control system.
• Prepare a publication as a guidance tool, of the model contents to demonstrate marine certification competence.

The main result of this project is the development of a common academic program using simulation methodology to review and demonstrate competence to license the revalidation marine certification, which will allow a greater cohesion, unification and harmonization between maritime institutions.
Title of Paper: On Maximizing Recertification Efficacy

Authors and Title: Stephen Cole, Assistant Professor

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Institution: Maine Maritime Academy
Castine, Maine, USA

Abstract:

Today’s mariners face ever increasing training and recertification requirements. In this paper we analyze these demands on the mariner’s time with the goal of identifying redundancies and obsolete requirements. It is clear that increasing and maintaining the skills necessary to safely navigate merchant vessels across the oceans of the world is of critical importance from both an economic and environmental standpoint. It is also important to recognize the impact training and recertification requirements have on the professional mariner’s scarcest resource, time at home with friends, family and loved ones.

The focus in this paper is on Radar Recertification requirements. In particular we are interested in comparing that the objectives of this requirement with the most recent IMO Performance Standards for Marine Radars. By doing so we identify Rapid Radar Plotting as an obsolete skill, and offer alternatives for reinforcing and assessing the other training objectives of Radar Recertification, for example observing and analyzing Radar information in determining actions to avoid close quarters situations.
Title of Paper: Navy Bridge Resource Management. A Critical Look At Adopting The STCW Paragigm

Authors and Titles: James J. Fitzpatrick, Ed.D.
Floystonn “Bud” A. Weeks, USN, retired

Institution: Massachusetts Maritime Academy
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Abstract:

Drawing from the last three Naval Incidents, this paper has no new lessons to be learned; human errors keep cropping up despite the best intentions of the ship’s crew and officers. A point of fact put forward by the latest Navy Safety Center Report, which states: “there are no new lessons to be learned from the latest incident.” Strangely, the only logical conclusion one can draw from these observations is that there appears to be a need for closer examination of what the Navy is doing in the world of Bridge Resource Management (BRM).

This paper looks at The United States Navy’s rich history of Bridge Resource Management, with an eye toward formulating a strategy for adopting an STCW format. With the advent of increased costs associated with today’s ship, a fundamental requirement of protecting these assets takes on serious considerations with a more measurable outlook. BRM was considered more as an undefined tool that was not standardized throughout the fleet. The safe movement of the vessel was left up to each individual commanding officer’s approach of getting from one place to another. This is not to say that this approach was a bad one, but it put all the pressure on a one person performance and left the ship vulnerable to increased human error possibilities. The Navy culture was looking for a more tried and proven countermeasure for human error, that moved toward a standardized and predictable result, together with an acceptable tolerance for risk. Managing the underway movement of the ship is accomplished by varying degrees of guidance. Navigational embarrassments, where a ship runs aground, collides, or has an allision have focused attention on BRM as it relates to Naval assets piloting coastal areas. The authors put forth a new element of attention, as related to Naval assets, for consideration in the BRM paradigm.
Title of Paper: ©PEDANDROGY A New Theory of Learning: As related to Simulation

Authors and Titles: James J. Fitzpatrick, Ed.D.
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Abstract:

This paper puts forth a new learning paradigm found to be present in today’s undergraduate programs, specifically as the theory relates to simulation education and training. The authors draw on new psychological research and grounded classroom practicum to create a new approach to teaching students making the transition from K-12 to college level learning.

Drawing from a rich history of learning and simulation the authors address the transition period in a student’s life from child learning to adult learning and identify a new approach to teaching and learning. The authors call the new learning theory ©Pedandrogy, a study of how children transition to adult learning. Theoretical constructs are laid out along with teaching strategies for professors dealing with these students. Specific examples gleaned from the field of simulation are used for examples as well as more generic classroom approaches are set forth for discussion.
Title of Paper: Training and Assessment on Maintaining a Safe Navigational Watch for Seafarers Using Simulation System: On View of Manila Amendment of STCW

Authors and Titles: HU Shenping, Professor of Navigation Technology
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Abstract:

In China, to meet with the requirement of the Manila Amendments of STCW, the national certification system of crew has been modified. The new regulations about seafarers’ competence examination, assessment and certification have been developed and taken into effect since 2012 accordingly.

All relevant outline and programs of the seafarer examination and assessment for the requirements of the professional competence has been formulated by the National Maritime Safety Administration of China to comply with the Manila Amendments. Training and assessment on maintaining a safe navigational watch for seafarers is a newly revised core module which include the bridge resource management for deck offices and establishing watch keeping arrangements and procedures for masters and chief offices correspondingly.

As a major maritime education and training institution in China, the Shanghai Maritime University has taken the leading role for the implementation of the abovementioned new national regulations, and tried a lot for the improvement of the training and assessment on maintaining a safe navigational watch for seafarers using the navigation simulation system.

On a basic study on the mandatory minimum requirement for certification of seafarers in STCW10 for captain and officers, the contents of the course syllabus for training on maintaining a safe navigational watch for seafarers using simulation system has been discussed. The planning, designing and implementation of these curriculum programs and practical training scenario on the simulation system have been introduced together with a newly quantitative assessment standard which has been carried out to exam the trainee at the Shanghai Maritime University.

Finally, some recommendation and ideas for the improvement of trainee’s practical skill ability had been put out in a view of simulation system based on common training and assessment on maintaining a safe navigational watch for seafarers.
Title of Paper: Realistically Measuring Outcomes Using Simulation

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Abstract:

My paper looks at the critical importance of distinct objectives for Navigation Simulator Scenarios.

What I mean by distinct objectives is clearly defined guidance to the student on what each scenario is designed to experience, learn or assess.

These objectives should be clearly defined and given to the students prior to their preparation. The number of these objectives should be small and very easily understood. The student needs to know these objectives before beginning their planning. The debrief should review these objectives, highlighting success and or failure.

I would like to discuss how distinct clear objectives will improve the measurement of outcomes. Effective assessment techniques will improve when debriefing.

The paper will include examples and student feedback.

Every navigational exercise should begin with the objective of “proper, prior, planning.” Passage planning is critical to any successful scenario. Passage planning allows assessment of critical tools sometimes over looked in simulation exercises: Such as neatness, accuracy, research knowledge of navigational area.

Another objective required of every successful scenario should be teamwork. Even when one is alone on the bridge there is a team. Knowing an objective ahead of time provides the student with a clear understanding of what the instructor is looking for.

Research in this area would include and not be limited to. 1) Interviews, 2) questioners 3) Observation, 4) published information. How to fairly and objectively combine STCW assessments with simulation experiences will be discussed.

Sharing ideas in this area will be a great asset to the better use of simulation in navigational training and assessment.

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Abstract:

There is a paradox in that despite increasing levels of regulation, technology and automation at sea, human error remains a significant factor in marine accidents. Accidents within the maritime domain continue to occur at a disturbing rate regardless of efforts to introduce and maintain legislation on an international scale. Recent tragedies involving large, modern ships like the Costa Concordia serve to remind us that the skills needed by those that man the bridges of such vessels are many and varied.

The maritime industry has been aware of the benefits of using simulators and simulation in a training and assessment capacity for several decades. Seafarer training and assessment has, in the opinion of this study, yet to make the transition that other high risk industries appear to have embarked upon, having learnt from harsh experience and felt the threat from Schein’s (1996: 60) ‘survival anxiety’.

This paper considers the pedagogy of maritime simulation and draws upon the use of Unconventional Simulator Exercise Design (USED) theory to focus on the paradox described above and looks specifically at the three elements of: situational awareness; decision-making and the role of communication in generating and maintaining effective Bridge Team management (BTM) on modern ships’ bridges.

Research at Warsash Maritime Academy (WMA) found, through an ethnographic action research inquiry, that there appears to be a normalization of deviation from established rules, procedures and techniques in the management of ship’s bridges. It concludes that the use of USED, focusing on communication training, partnered with greater standardization of verbal reports can lead to better inter-operability between ships’ officers. USED can overcome barriers to communication and directly enhance both situational awareness and decision-making skills through the generation of shared mental modelling.
Title of Paper: Use of Simulation-Augmented Manoeuvring in Ship Handling Simulator Training

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Abstract:
The technology of Fast Time Simulation (FTS) has great potential for teaching and learning in the maritime education & training environment. The innovative system for “Simulation-Augmented Manoeuvring Design, Monitoring & Control” (SAMMON) has been developed in the Institute for Innovative Ship Simulation and Maritime Systems (ISSIMS) working at the Maritime Simulation Centre Warnemuende MSCW. The system consists of software modules for (a) Manoeuvring Design & Planning, (b) Monitoring & Control based on Multiple Dynamic Prediction and (c) Trial & Training. It is based on complex ship dynamic models for simulating rudder, thruster or engine manoeuvres under different environmental conditions. It can be applied in maritime education and training, e.g.

- to support lecturing for ship handling to demonstrate and explain more easily manoeuvring technology details and
- to prepare more specifically manoeuvring training in Ship Handling Simulator environment, i.e. for developing manoeuvring plans in briefing sessions, to support manoeuvring during the exercise run and to help in debriefing sessions the analysis of replays and discussions of quick demonstration of alternative manoeuvres.

Within this paper selected case studies and existing solutions will be demonstrated for using the new technology for teaching and learning processes in manoeuvring / ship handling. For practical application and testing the new technology was interfaced to the ship handling simulator at Maritime Simulation Centre Warnemuende, the Simulator at World Maritime University Malmo and at the simulation centre AIDA CSMART Rostock of the cruise liner company AIDA Cruise to support briefing and debriefing processes. Samples from the use of the SAMMON technology will be shown to demonstrate the potential of this technology for advanced manoeuvring education and training.
Abstract:

In marine navigation there are two kinds of automation issues we should consider for inclusion in simulator-based training. One form of interaction with automation occurs when the watch officer expects more control from a system than it is actually setup to perform. The basis of this form is that the operator knows something about what the system is capable of doing, but is unaware of critical control settings. This could stem from misleading user interfaces or unfamiliarity with specifics of the system. In other words, there is reliable generic understanding, but operational skill with the particular device is incomplete. Solutions to this can be rectified with familiarization training in a navigation context, given a fundamental knowledge and competence in what it takes to navigate a vessel.

The other form of interaction with automation is much more elusive. It occurs when the watch officer is unaware of navigational functions that are automated in the first place. The basis of this form is that the operator does not comprehend what the vessel would require if such and such was in a manual mode of operation. What is the basis for the heading information that is so widely distributed on board – what corrections are involved in this output? What exactly is the autopilot in track control mode compensating for and adjusting to – what are that system’s dependencies? What is the speed input for the ARPA’s collision avoidance calculations – does this vessel even have a speed through the water sensor? What position information is being delivered to the electronic chart system – where else does it go, is there more than one choice of sensor? What real-time information is being accessed in order to be permitted to make the passage with subminimum under keel clearance – what is the location of the echo-sounding transducer? This form stems from expectations that are based on uninformed assumptions about what it takes to navigate a vessel. The training implication for this form is relatively severe.

Neither one of these has to be globally dysfunctional in the operator to be problematic. Awareness of automation in both forms, although less in the second form, rises and falls in conjunction with any number and combinations of factors – alertness levels, general workload, sequence of non-essential actions, unacknowledged changes in routine, condition changes not prepared for, etc. All these aspects contribute to the generalized reality of situational awareness (SA). In fact, the extent of automation that is integral to
SA suggests that automation awareness requires a focus all of its own. Training built on deep experience may make the critical difference.

Seafarers would be well-served by a new approach to SA. This should accommodate the presence of automation as a significant part of the situation of which to be actively aware. It should also recognize the ways that automation has altered the tasks it was created to support, and the new pathways to error it has created. Through practice in simulation, automation awareness can help focus on challenges such as manual skills preservation, adaptation to backup methods, knowledge and skills in solo and team-based integrated navigation, and appreciation of new error potential.
Title of Paper: The Use of Simulators for Safer, Cleaner and More Efficient Operations in Ice

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Abstract:

The use of simulators is widely used for preparing someone, be it a person or organization, for an upcoming task. There are several reasons for this. Many endeavors are costly, and the gain from a real life experience might not justify its costs. Another reason might be that the task involves hazardous elements, with potential to harm people or the environment. There is also the possibility that the experience sought occurs so infrequently, that one is unlikely to experience it under real conditions. In all of these situations, a simulated training experience can be equally good, or even better, compared to real on the job training.

At Kalmar Maritime Academy, the use of simulators has been an integrated part of the training of master mariners and chief engineers for a long time. For a master mariner student, there are numerous skills that are suitable to practice in a simulator, e.g. ARPA, radio communication and tanker cargo operations, just to mention a few. However, in recent years, the simulator has also been used increasingly to assist external companies with preparations before major operations.

This paper will explain a number of instances where the simulator has been used in preparation for operations in ice. With each example, the goals of the training will be explained, how these goals were met, as well as the lessons learned. This is done by giving an account for the preparations and execution of the training itself, which will be accompanied by the views of both course participants and course instructors. The result indicates that one of the key components of successful training is to avoid having too detailed exercises, and rather to focus on the fundamental principles of the upcoming activity. In combination with the important debriefing where more specific aspects of the operation can be discussed, a broad training leaves the participant well equipped to handle real life challenges as they appear out in the field.
Title of Paper: Bridge Resource Management: Stressing the Dangers of Over Reliance on ECDIS with Entry Level officers

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Abstract:

When the students are taking Bridge Resource Management (BRM), we as the instructors need to ensure they are comfortable with all of the bridge tools useful for navigation. It seems that students now enrolling in BRM classes are naturally gravitating towards the ECDIS and then become prone to over rely on that single piece of equipment.

ECDIS is an important navigational aid now and for the future. It’s important to understand and integrate it with the other tools on the bridge. Since we are teaching Electronic Navigation courses with such a strong emphasis on using the ECDIS (which is justifiable for a tool with such a broad incorporation of inputs and requirements for qualification), we must understand that the student is already comfortable using the ECDIS for navigating when entering BRM. We must then take steps to ensure an equal level of comfort using other forms of navigation along with managing all the tools on the bridge…. without the aid of a computer linking all the data collected. Failure of one piece of equipment should not strike terror as it seems to do when you take the use of the ECDIS away from the current crop of future sailors.

BRM’s importance and usefulness has proven to be for ALL levels of license that take part in duties assigned to “Officer in Charge of a Navigational Watch.” Initially, I remember mostly upper level licenses were taking BRM… so it was initially tailored to those Licenses. Those with Upper Level Licenses have experience and show a more varied approach to which equipment they show reliance on. Those without experience are consistently attaching themselves to the ECDIS.

The intent of BRM is to be as realistic as possible. So what would be realistic ECDIS failures? The largest concern would be a failure of the unit itself. It could be from a power issue (surges, switch failure, etc.), Software to Hardware interface issues (Automatic updates crashing system, etc.), or Incorrect parameters/ship information entered.

A threat that seems “impossible” to many US seafarers would be the loss of GPS. If the GPS signal was lost, turned off, or corrupted… What would the affect be on the ECDIS system? Oftentimes the initial response to that question (even by those trained in ECDIS) is “then the ECDIS Unit is useless.” That’s not exactly true. There are still ways to use the system.
We must understand there are IMO Assessment requirements, but even though these requirements mandate a high level… they are the “Minimum” requirements. As assessors we need them to be at that “minimum” high level. As Teachers, we should be trying to push them to a “higher” HIGH level.

ECDIS is only one piece of equipment. We need to promote use of the ECDIS, but have the student show us they are prudent and ready to steer away from the reef that is ECDIS Failure.
Title of Paper: The Role of the Simulator

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Abstract:

The cause of collisions at sea and how bridge simulators can determine their cause and help prevent their reoccurrence can be demonstrated by the examination of two collisions at sea.

The MV Stockholm/TS Andrea Doria collision on July 25, 1956, initiated years of controversy. Was the approach of the two vessels starboard to starboard, end on or port to port? The Andrea Doria sank off Nantucket the next morning and the Stockholm limped back to New York minus 75 feet of her ice reinforced bow. How could two ships equipped with radar collide?

The collision between the MV Ziemia Lodzka and the MV Vertigo happened during the midwatch on December 7, 2005 in the Great Belt of the Baltic Sea. The Vertigo foundered in 11 meters of water. The superstructure of the vessel was above water level. Ziemia Lodzka suffered structural damage on the port bow and after anchoring continued its voyage the same day for cargo discharge and a repair yard in Poland. How could ships equipped with VHF, radar and AIS collide in 3-4 mile visibility?

It is obvious that both collisions could have been prevented by complying with the Rules of the Road. The answer, however, can be verified through research on a bridge simulator. This research was accomplished on the CAORF (Computer Assisted Operational Research Facility) bridge simulator at the U.S. Merchant Maritime Academy at Kings Point, NY.

Case studies help point out human errors and provide lessons that every watch officer should profit from. Avoiding accidents can be accomplished through bridge organization where watch officers support their masters in the safe navigation of their vessels. It is imperative that all watch officers and the master be familiar with all bridge equipment and bridge procedures in order to navigate safely as a team.

Familiarity along with intuition and instinct in the event of an emergency can be accomplished by utilizing hands-on training both ashore and aboard ship. The most cost-effective method is through simulator courses and its utilization must be greatly increased to help prevent collisions at sea.
Title of Paper: The Evolution and Changing Role of Simulation used in Teaching Bridge Resource Management Courses

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Abstract:

Recently there have been questions raised with regard to the effectiveness of Bridge Resource Management (BRM) training in reducing maritime causalities. The development of simulation usage to teach these BRM courses over time is reviewed in light of changes in the industry. Although the basics of bridge watch-keeping remain the same, the methods used to accomplish these basic tasks have changed in recent years. New technologies, added resources, such as NAVTEX, AIS, ECDIS and Integrated Bridge Systems have evolved changing bridge layouts, the method of completing a comprehensive voyage plan, the skills needed to stand a good watch and in some ways changed the role of the watch-stander. The lack of standardization of these new technologies has further complicated the task of watch-standing and instructing BRM principles. In addition to new technology on the bridge there is an added awareness of the role which the human element and leadership contributes to maritime causalities. STCW now requires the mariners to demonstrate the ability to apply leadership and team-working skills. This has led to the desire to add more human factors training in BRM courses. In order to accomplish this goal the simulator must have excellent monitoring capabilities and the instructor must possess ability to detect shortcomings in human factor praxis during a simulation exercise. Proposed changes in the use of simulation for teaching BRM are presented. The qualifications of an instructor to teach an updated BRM course are also discussed.

The questions addressed in the paper are: 1. Has the content and the presentation of the BRM courses kept pace with industry changes? 2. Is simulation being used to its fullest capability with regard to Bridge Resource Management training? 3. Is the balance between training in the cognitive domain, psychomotor domain and affective domain in BRM courses correct? 3. Is the knowledge, skills and experience required of a BRM instructor changing?
Title of Paper: Research of Ship Motion Mathematical Model Based on CFD Numerical Solutions

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Abstract:

Ship motion mathematical model is one of the key technologies in terms of development of ship simulator. However, reliable mathematical models should have at least two features: first, accurately simulate the movement of the ship; second, equations can be solved quickly by computer. The essence of traditional ship motion mathematical model is to solve a group of differential equations. Although the researchers tried to use a variety of theoretical methods to calculate these forces, such as potential flow theory etc., it is difficult to calculate the ship's hydrodynamic and external disturbance force. In practice, the value of these forces depends more on the real ship trials at sea or the ship towing tank tests. These methods are time-consuming, costly and the experimental data may contain scale effect problem.

With the development of computer science, it is possible to obtain the numerical solution of the ship’s hydrodynamic based on CFD principle which has been widely used in the field of ship design. Firstly, build hull model by hull lines data. And then, reasonably mesh. After that, set the computational domain and solve the equations. Numerical solutions of the ship's hydrodynamic and various disturbing forces can be solved without the impact on the scale effect problem. The disadvantage of CFD is also time-consuming and hard to be introduced to the ship simulator.

Therefore, considered the advantages of their respective aspect, this paper attempts to obtain the CFD numerical solutions of the ship based on CFD commercial software-ANSYS Fluent (Our team have bought the license in 2011). Then, these numerical results will be modeled and substituted into the traditional mathematical model of ship motion in order to simulate the motion of ship. By this way, the accuracy of the mathematical model of ship and the computer simulation speed are well balanced.
Title of Paper: Center Console or Bridge Wing Simulation: Do I Have to Make a Choice

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Institution: American Cruise Lines

Abstract:

While the cost of simulators has decreased dramatically over the years, and the functionality and realism of said systems have increased dramatically, budgetary concerns always play a part in the type of simulator an institution, organization, academy school or company ultimately purchases. Centerline Simulators work well for Academies training entry level personnel and tug and towboat operators. Bridge Wing Simulators appear to be preferred by pilot organizations where docking, undocking and “close in” work is the norm.

Years ago, this author was faced with budgetary limitations and space restrictions that made a “full mission” simulator a financial and space available impossibility. This led to one of the first small space simulators that made use of projection boxes with mirrors that greatly reduced the throw distance necessary to provide a usable visual scene. It met with great resistance from simulation purists that were unwilling to let go of a big box simulator with a projection screen and a great deal of open, underutilized space. While this type of simulator may still be the most realistic and provide the best fidelity, the move to small space simulators has moved ahead at a brisk pace.

Recently, when faced with a similar situation that included reduced space and a tight budget, a solution was needed to provide both centerline and bridge wing training for specific vessels. This need for operating on a centerline and on either the port or starboard wing required a creative solution that provided for both training objectives in a single simulator. This paper discusses the requirements, the hardware and software refinements required, the simulator developed and the overall results of initial and subsequent training. Current and expected training objectives as well as how the “transition” between conning on the centerline and conning on the bridge wing is achieved will be discussed.
Title of Paper: Training and Assessment on Maintaining a Safe Navigational Watch for Seafarers Using Simulation System: on a View of Manila Amendment of STCW

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Abstract:

In China, to meet with the requirement of the Manila amendments of STCW, the certification system of crew certificate and health certificate issued have been modified since 2012, and new regulations about seafarers’ competence examination, assessment and certification have been developed and taken effect. The seafarer examination outline for competence has been formulated by China Maritime Safety Administration to comply with the amendments.

Training and assessment on maintaining a safe navigational watch for seafarers is a newly core module which include watch keeping and bridge resource management for deck offices and establishing watch keeping arrangements and procedures for masters and chief offices, correspondingly.

On a basic study on mandatory minimum requirement for certification of seafarers in STCW10, a course syllabus for training on maintaining a safe navigational watch for seafarers using simulation system has been discussed. It includes the planning, designing and implementing of a global-based curriculum program and training scenario on the simulation system. Then, a newly quantitative assessment standard has been carried out to exam the trainee in Shanghai Maritime University. Finally, some recommendation on how to improve trainee’s practical ability had been hold out in a view of simulation system based on common training and assessment.
Title: The Application of Shiphandling Simulators in Navigation Close Proximity Maneuvers

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Abstract:

Shiphandling simulators have been widely used and applied in teaching, training, navigation safety, assessment, and evaluation. Our paper, combined with examples, will probe effective methods and best practice when using shiphandling simulators for mariners with regards to ship operations in narrow channels and other close proximity maneuvers. Furthermore, we will discuss the limitations for simulator use in this application.
Title of Paper: Reflective Self-Assessment

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Abstract:
This paper will explore the use of instructor controlled surroundings and events when training students who are in a Bachelor of Science degree program while simultaneously studying to qualify as officers in charge of a navigational watch. The emphasis of my discussion will be on the upper level students in the Bridge Resource Management course and the practical bridge watches when they are aboard the college’s training ship and embarked on the annual training voyage.

A trend in higher education is to focus on realistic measurement of an individual’s knowledge and proficiency. In order to do this, we create, deliver, and debrief experiences that allow experts to educate and then measure the resulting performance. It is essential that the student’s experience be formed to address multiple dimensions of declarative and procedural learning. Well planned and executed training opportunities can help lead the student to high levels of reflective self-assessment thus improving the overall educational experience.
Title of Paper: Simulation based Practice Training with a new Safety and Security Trainer

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Abstract:

Nowadays more attention must be paid to maritime safety and security challenges. Considering the evidence of accident statistics and that more than 80% of accidents are caused by human factor, adequate Maritime Emergency Management both on vessels and ashore becomes more essential and must be reviewed in detail.

Real time simulators have proved beneficial for ship handling training on well equipped bridges over the last decades. A new type of simulator has been developed for training as well as research specific aspects of Maritime Safety and Security. The implementation of this simulation system displays a design concept developed in 3 D visualisation created by Rheinmetall Defence Electronics (RDE) of Bremen in cooperation with Wismar University (HSW) and the Maritime Simulation Centre Warnemuende (MSCW). The MSCW has recently master-minded a new type of simulator called the Safety and Security Trainer (SST7). An integrated support and decision system, called MADRAS, has been interfaced into the SST7 to assist officers coping with safety and security decisions during vessel manoeuvres.

The SST simulator was designed with both an interface to the Ship Handling Simulator (SHS) and Ship Engine Simulator (SES). With the bi-directional system, complex simulation training can be carried out at the MSCW. The entire complex ship is now available for training, the ship handling process on bridge (SHS) combined with engine processes in engine room (ER) and engine control room (ECR) as well as emergency management and procedures inside the vessel (firefighting, water inrush and other measures according to ISPS. Functional tests developed for the system are in progress and running successfully. Two comprehensive training courses with the SST in combination with SHS and SES have been carried out in 2011, a further Emergency Management Course presented in 2013 and a special designed Security Course will be carried out at the MSCW in 2014, successfully tailored for the needs of a large international shipping company.

The innovative concept of the SST includes the procedure entailed while integrating into the complex environment of full mission ship-handling- and ship-engine-simulators. Selected results of a case study dealing with the implementation of training scenarios specifically for security aspects will be demonstrated and discussed during the Conference.