# SURV 8
## Surveillance, Search & Rescue Craft

The Royal Institution of Naval Architects


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# Conference Programme

The 8th International Conference on
Surveillance, Search and Rescue Vessels

*WEDNESDAY 20th & THURSDAY 21st MARCH 2013*
*AT THE RNLI COLLEGE, POOLE, UK*

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## DAY 1 PAPERS:

**09.00-09.30** **COFFEE & REGISTRATION**

**09.30-10.05** **DESIGN AND DEVELOPMENT OF THE SHANNON CLASS ALL WEATHER LIFEBOAT**
*Peter Eyre, RNLI, UK*
This paper presents some of the significant areas of development within the design of this class. A new hull form has been developed specifically to meet the operational envelope of a modern all weather lifeboat and to incorporate a twin water jet propulsion package. Particular attention has been given to protect the volunteer crew from harmful slamming accelerations often experienced on high speed vessels. An overview of the vessel's general arrangement, machinery layout and onboard systems are also given. With insight into the design process including the adoption of Lean principals. The operational and technical trials of the vessel and its subsequent development will also be presented.

**10.05-10.40** **U.S. COAST GUARD BOAT FORCES**
*D M Shepard ,USCG Office of Boat Forces, DC, USA*
The U.S. Coast Guard operates approximately 1,700 boats that are used for a wide range of missions including Search and Rescue (SAR) and Ports, Waterways and Coastal Security (PWCS), Law Enforcement (LE) and Aids to Navigation (ATON) support. This paper will address some of the challenges in obtaining boats to meet these diverse mission needs and then describe in more detail some of the recent acquisitions.

**10.40-11.10** **COFFEE**

**11.10-11.45** **HOVERCRAFT TO THE RESCUE**
*B Russel, Hovercraft Society, UK*
The amphibious hovercraft has made a significant contribution to the search and rescue role and in humanitarian activity. In the pure search and rescue role in the UK a number of agencies, including the RNLI, use small hovercraft on adjacent tidal mudflats. However, it is in response to disasters and to overcome transport difficulties in remote areas that the greatest contribution has been made.

**11.45-12.20** **TIME FOR A RETHINK ON RIBS**
*D. Pike, Dag Pike Associates, UK*
RIBs are celebrating their 50th. Anniversary in 2013 and they have come a long way in that time. Today RIBs come in a huge variety of shapes, sizes and forms, all purporting to be RIBs but in reality only some have the characteristics of the RIB. The proposed paper would look at the original RIB concept and its virtues and ask why so many of the benefits of the original RIB designs have been lost or ignored in modern designs.

**12.20-12.55** **"PROFESSIONAL" WATER CRAFT - THE P IN PWC? AN ANALYSIS!**
*David Lane, MD of Lane, Jefferies & Associates Ltd, UK*
Personal Watercraft, speedy responsive performers, already used by recreational users and rescue services around the world e.g. the RNLI, but many other professionals are increasingly choosing Rescue Watercraft (RWCs) for their needs. Case studies of PWC use during the 2012 Olympics and Paralympic Games and by Netherlands MOD SFs will illustrate the examination of: Risk assessments, Operational environment, Navigation requirements, Adaptations for patrol and interdiction work etc., Durability and equipment platform, Fitness for purpose for Health and Safety legislation – no operations permitted without meeting exacting requirements, Operations grounded on Training Needs Analysis with uniquely different crew competencies, operational practices and especially the training regimes for operational safely.

**12.55-13.55** **LUNCH**

**13.55-14.30** **DESIGNING MODERN MILITARY HIGH SPEED CRAFT. BALANCING CAPABILITY DEMANDS WITH MILITARY REQUIREMENTS**
*Steven Lee, QinetiQ, UK*
The growth in asymmetric threats and the use of high speed craft by pirates, terrorists and drug smugglers has lead to increased use of naval and coastguard high speed vessels for counter piracy, littoral operations and drug interdiction.
The designers of Government vessels are required to comply with class and flag state requirements. Pirate and terrorist vessels are illegitimate and therefore do not have to meet these demands. This paper describes how designers in the Naval Design Partnering Team are developing concept designs to balance the requirement to match asymmetric threats on the water while meeting the restrictions placed upon them by legislation and policy. The design implications of the specific challenges are explored and potential solutions are presented which demonstrate the authors' approach to balancing these disparate demands.

**14.30-15.05** **DESIGN DEVELOPMENT FOR 16.7M RESCUE/PATROL BOAT**
*A Nazarov, A Leeprasert, A Piamalung, P Suebyiw, W Wongkitrungrueng*
*Albatross Marine Design, THAILAND*
The paper presents case study and describes process of design development for 16.7m composite rescue/patrol boat for EMERCOM (Russia) developed by Albatross Marine Design. Design analysis and optimization is described based on parametric representation of planning craft; design envelope is studied in terms dimensions of craft, speed, range, acceleration levels, weights and costs. The craft is designed for railway transportation within imposed restrictions; these limitations are studied in relation to applicable requirements for intact and damaged stability and architecture of craft. Self-righting considerations are presented. Performance and seakeeping are reviewed based on results of calculations and sea trials of similar craft designed by AMD. Approaches in structural design and their effect on structural weight are studied with comparison of requirements imposed by different classification societies and standards. Special research is given to interpretations of requirements for such craft by Russian Register and implementation of these requirements into engineering practice reality. Construction technique is outlined and construction progress brief is presented.

**15.05-15.35** **COFFEE**

**15.35-16.10** **SHIPS' RESCUE CRAFT: AN INVESTIGATION INTO THE CAUSES AND EFFECTS OF WEIGHT GROWTH**
*C Cain, R M Cripps, A White, Longitude Engineering, UK*
In February 2011 during a routine trial, a 6.5m ship's Rescue Boat parted from its davit wire and fell 29 metres, causing a fatality. Following the accident, the Marine Accident Investigation Board found that the vessel was over 40% heavier than originally designed. This paper describes the subsequent investigation into the causes and effects of the identified weight growth. The full destructive testing of a representative Rescue Boat and the critical assessment of its structure is detailed. Practical SOLAS-based trials are also described hereby the effects of weight increase on the safe functionality of a representative craft are assessed. These trials have determined that the use of in-built buoyancy foam, in association with the wider design approaches to such craft, can lead to the possibility of water retention. Weight growth can lead to the significant erosion of lifting safety factors and can have catastrophic consequences if not managed correctly. This paper highlights the critical issues for buyers, designers, owners, operators and maintainers Rescue Boats, Fast Rescue Craft and Lifeboats.

**16.10-16.45** **PRELIMINARY DESIGN TOOL FOR THE PERFORMANCE PREDICTION OF HIGH SPEED PLANING CRAFT IN IRREGULAR SEAS**
*E M. Fay, Cotty Fay Marine Design Inc.*
A design tool has been developed to predict the performance of a planing craft in head seas. The program follows on with the work done by Zarnack, Fridsma & Martin. The new program improves the Runge Kutta integration of the differential equation to a more stable fourth order scheme. The program also improves the hull definition as well as the added mass calculation. The program predicts the heave, pitch and acceleration at constant speed in a random seaway in the time domain providing a direct comparison to full scale data. The results of the program are compared to full scale data on a number of different boats at a range of operating points and sea states.

**16.45-** **GENERAL DISCUSSION & EVENING DRINKS RECEPTION**

# Search & Rescue Craft
NLI College, Poole, UK

## DAY 2 PAPERS:

**09.00-09.30** COFFEE & REGISTRATION

**09.30-10.05** INSTRUMENTED FREE-RUNNING MODEL TESTS – THEIR APPLICATION TO SMALL HIGH SPEED CRAFT

*S Phillips, I Shin, C Armstrong & D Kyle-Spearman, Seaspeed Marine Consulting Ltd*

The use of instrumented free-running hydrodynamic models has recently enabled significant advances to be made in the understanding of high speed craft performance at sea. This paper outlines the benefits and challenges of this approach with reference to new SAR vessel designs (including the new RNLI Shannon Class all-weather fast carriageway lifeboat), to leading suppliers of fast wind-farm support catamarans who are using this technology to specify their new craft and to the designers of large ultra-fast super yachts investigating the high speed dynamic stability of their designs.

**10.05-10.40** SYNTHETIC VERTICAL ACCELERATION TIME HISTORIES FOR HIGH SPEED CRAFT

*J Hirst & S Dyne, NDP/ Thales, T Coe, NDP/ Frazer-Nash*

High speed craft invitations to tender now often include requests for whole body vibration metrics and performance information prior to detailed seakeeping analyses using numerical methods or towing tank testing. A method is required to generate typical synthetic time histories based on a concept or pre-concept level design information in order to demonstrate performance. This paper describes the development of a method to generate synthetic time histories based on craft parameters and sea conditions for both concept design work and WBV assessment purposes.

**10.40-11.10** COFFEE

**11.10-11.45** UK MOD APPROACH TO MANAGING WHOLE BODY SHOCK AND VIBRATION IN SMALL FAST CRAFT

*M Hawkins, MoD, UK & R Finnemore RN (Rtd) NCS Ltd., UK*

This paper will outline the approach that the MoD is taking to manage exposure in accordance with the law and reduce the risk of exposure to As Low As Reasonably Practicable (ALARP). The MoD is taking a multi-faceted approach addressing training, doctrine, culture, monitoring of exposure levels, health surveillance, plus introduction of equipment and technologies to reduce the risk of harm. The MoD is working in association with the MCA, RNLI and HSE who sit as non-executive members on the MoD Maritime Whole Body Vibration Project Board. This paper will be of interest to any organisation which operates or designs small fast craft in the leisure, commercial, emergency, government and military sectors.

**11.45-12.20** TECHNICAL SOLUTIONS FOR SHOCK MITIGATION ON HIGH SPEED GOVERNMENT CRAFT

*T E Coe, NDP/ Frazer-Nash Consultancy, K T Rutherford, DSTL S Dyne & J Hirst, NDP/ Thales, S Lee, NDP/ BMT- Nigel Gee*

As part of the Maritime Whole Body Vibration project the ministry of defence is investigating a variety of technical measures which could be applicable to their in service and future vessels. This paper describes the work undertaken to date to develop solutions which will reduce risk to the MoD's employees to as low as reasonably practicable. This must be done while maintaining current maritime capability and integrating with current and future infrastructure and support Two cases are considered, solutions for the in service fleet and novel systems for future craft. For the in service case the challenges of understanding the requirements and constraints that exist across a diverse fleet and developing a military specification for shock mitigating technology are discussed and the MoD's solutions presented.The paper describes the research efforts being undertaken by the UK MoD to understand the potential benefits from systems that cannot be easily retrofitted to craft and how best to integrate these into a balanced overall design.

**12.20-12.55** CONSOLE AND DASHBOARD DESIGN FOR HYDROPLANING BOATS OPTIMISING GEOMETRY FOR CONTROL SAFETY AND COMFORT

*J Ullman, HSBO Pro, SWEDEN*

This paper establishes and explains the basic design elements necessary to optimise cockpits and steering consoles on hydroplaning boats for control, vision, safety and comfort. Objectives are to optimise all aspects, from wind and spray protection, sight lines, field of vision and glare reduction to instrumentation and postural control and vessel control, even under impact exposure. Recommendations are given based on scientific research and practical experience of designing dashboards, steering consoles and wheelhouses. Presentation is in basic "cookbook" style and explaining the perceptual and biomechanical conditions defining the requirements.

**12.55-13.55** LUNCH

**13.55-14.30** THE TEST COXSWAIN: THE HUMAN ELEMENT WITHIN TEST & EVALUATION

*J Hill & T Dobbins, FRC International Ltd, UK*

The acquisition of smaller marine craft has previously been a relatively simple process. Compared to displacement vessels, planning craft are much more dependent on the skill of the coxswain, e.g. throttle input, to operate them safely and effectively. This increased role of the coxswain highlights a procurement issue; a good coxswain can make a bad boat look good, whilst a poor coxswain can make a good boat look bad. Both scenarios potentially result in poor procurement decisions, reduced safety and increased through-life problems/ costs. To support the Test & Evaluation (T&E) process, a Test Coxswain education and training course has been developed, leveraging expertise from the aviation Test Pilot community.

**14.30-15.05** INFORMATION ARCHITECTURE FOR FAST RESPONSE CRAFT - COMMAND & CONTROL & HUMAN SYSTEMS INTEGRATION

*T Dobbins[1], F Forsman[2,3], J Hill[4], T Brand[5], J Dahlman[2], D Harris[6], A Smoker[7], J Stark[8] & S MacKinnon[9]*

*1-STResearch, UK; 2-Chalmers University, SWEDEN; 3-Swedish Sea Rescue Society, SWEDEN; 4-Trident Marine Ltd, UK; 5 - VMT, CANADA; 6 - HFI Solutions Ltd, UK; 7-NATS, UK; 8-US Navy, USA; 9-Memorial University, CANADA*

Command and Control (C2) is required for safe and effective maritime operations. To facilitate effective decision-making and C2, it is essential that the crew can access the required information. It is therefore essential that the appropriate information architecture is used. Navigation, being an essential aspect of C2, has seen a radical change from paper charts and individual instruments to computer systems capable of sophisticated data fusion to provide enhanced situational awareness. The development of the required information architecture is not a software/engineering issue, but rather lies within the human factors domain as it requires an understanding of how humans perceive information, how they use mental model(s), and subsequently make safe and effective decisions.

**15.05-15.35** COFFEE

**15.35-16.10** DEVELOPMENT OF THE NEW DUTCH LIFEBOAT WITH A COMPARISON OF THE ARIE VISSER CLASS PARENT HULL TO THE NEW SAR1906 OF THE NH1816 CLASS

*J. Nieboer, Damen Shipyards Gorinchen, THE NETHERLANDS*

In 2009 the KNRM (Dutch life boat association) started the development of the next generation lifeboat. At that moment the KNRM had 10 vessels of the Arie Visser Class, RIB-type vessels of 19 meter length. These vessels had proved to be a very reliable and capable rescue boats. But the technical University of Delft has designed a revolutionary new hull shape, the Sea-Axe, which improves the seakeeping and the safety of the crew, as well as the performance of the vessel, a great deal. For the new generation lifeboat the objective was to implement this new hull shape in the design and to test it together with the Arie Visser class for seakeeping, resistance, maneuverability and course stability. The presentation and paper will focus on the comparative tests of the parent hull (Arie Visser class) and the new design, the SAR 1906 of the NH1816 class.

**16.10-16.45** SPECIAL DESIGN FEATURES AND EXPERIENCES WITH A NEW STERNRAMP OPERATED LIFEBOAT/DAUGHTERCRAFT

*Nick Parrot, Marine Specialised Technology Limited, UK, Holger Freese, German Maritime Search and Rescue Service, GERMANY*

The paper starts with the description of special owners requirements - for an inherent self righting, stern ramp operated, all weather offshore capabel craft with survivor cabin, also for baltic winter use. The builders will describe his approach to the project, the technologies employed to assist both from a naval architecture perspective and mechanical engineering point of view.

**16.45-** GENERAL DISCUSSION

International Conference

# SURV 8

*20 - 21 MARCH 2013*
*RNLI COLLEGE, POOLE, UK*

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