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NAVAL VESSELS AND DEFENCE TECHNOLOGY

JANUARY 2006

2006010220

ASTUTE propulsor technical innovation summary.

Warship 2005 – Naval Submarines 8; Intl Conf; 22-23 June 2005; London, UK. Organised by RINA, London,UK.
http://www.rina.org.uk/showpubl.pl?id=7104&n= 565
West, M., Vinton, P., Banks, S.
English

The pump jet propulsor for the ASTUTE class of nuclear submarines has been designed and manufactured by an industrial team led by Rolls-Royce to meet a demanding set of requirements in terms of service performance, design justification and manufacturing programme. This paper illustrates the advantages gained by forming a team and describes a number of technical innovations. The paper also features a discussion of the issues and scope of the various modelling and analyses undertaken and describes how it has even been possible for some aspects of the design to be fully accepted by the modelling alone.

Pump jets
Submarines

2006010221

Advancements in U.S. submarine escape.

Warship 2005 – Naval Submarines 8; Intl Conf; 22-23 June 2005; London, UK. Organised by RINA, London,UK.
http://www.rina.org.uk/showpubl.pl?id=7094&n= 565
Arcano, J.T., Holmes, M., Et al
English

This paper addresses advancements in submarine escape systems that allow for safe crew egress from periscope depth through 600 feet. The US Navy submarine escape system gives consideration to every aspect of survival from human physiology, through automation, escape and survivability procedures, to adverse casualty situations and distressed submarine positions of rest. This paper examines the advances in US Naval Submarine escape, rescue and survivability being implemented today.

Escape systems
Submarines

2006010222

An evaluation of the merits of non-body revolution submarine hull forms.

Warship 2005 – Naval Submarines 8; Intl Conf; 22-23 June 2005; London, UK.
Organised by RINA, London,UK.
http://www.rina.org.uk/showpubl.pl?id=7107&n= 565
Pfister, J., Nagy, D.
English

In early 2004, US Naval Sea System Command commissioned US Naval Surface Warfare Centre and Northrop Grumman to investigate the merits of two non-body of revolution hull forms in four areas: payloads, structures, powering, and manoeuvrability A body of revolution hull form was included in the study as a baseline. A traditional payload option and a modular payload option were developed for each of the three types of hull forms. This paper reviews the impacts of the payload and hull form combinations on the structural, powering, and manoeuvring aspects of the six concepts.

Hull form
Manoeuvrability
Payloads
Propulsive efficiency
Submarines

2006010223

ASTUTE class submarine movement control – an integrated approach.

Warship 2005 – Naval Submarines 8; Intl Conf; 22-23 June 2005; London, UK.
Organised by RINA, London,UK.
http://www.rina.org.uk/showpubl.pl?id=7100&n= 565
Purvis, S., Philip, N.
English

The Astute Class submarine incorporates a number of features within the manoeuvring and control systems, which are designed to improve manoeuvring performance, reliability and safety compared to previous classes of RN attack submarine. A modified approach to manoeuvring limitations was required by the adoption of split aft hydroplanes and the need to constrain autopilot demands to maintain the submarine within the Safe Manoeuvring Envelope. The paper presents the integrated approach to the 'movement function' adopted for Astute, and how this has influenced the design for performance, safety and support.

Control systems
Manoeuvrability
Submarines

2006010224

Classification of submarines.
Warship 2005 – Naval Submarines 8; Intl Conf; 22-23 June 2005; London, UK.
Organised by RINA, London,UK.
http://www.rina.org.uk/showpubl.pl?id=7103&n= 565
Petersen, L.
English

Germanischer Lloyd (GL) published "Rules for the Construction and Classification of Submersibles" many years ago. Recently GL issued the "Guidelines for the Use of Fuel Cells on Ships and Boats". Due to the fact that no other classification society has such an amount of experience with conventional submarines, GL has a unique position among classification societies. Classification of a submarine can give considerable benefit both to the Navy and to the shipyard. This paper discusses the benefits available to both parties.

Ship classification
Submarines

2006010225

Collapse pressure of watertight bulkheads.

Warship 2005 – Naval Submarines 8; Intl Conf; 22-23 June 2005; London, UK.
Organised by RINA, London,UK.
http://www.rina.org.uk/showpubl.pl?id=7098&n= 565
Reijmers, J.
English

The design philosophy governing the use of watertight bulkheads in submarines differs greatly for that used in surface ships. With one compartment flooded the modern submarine is considered to be lost. To enable the crew to be rescued the bulkheads need to be strong enough to resist the design pressure only once. With conventional tools based on bending theory the bulkhead plating will be oversized. So to optimise the structural weight advanced tools are needed to reach beyond the elastic limit. This paper describes the analysis methods used to predict the behaviour of the bulkheads in this non-linear region.

Bulkheads
Collapse
Submarines
Watertight subdivision

2006010226

Development of an onboard submarine stability tool.

Warship 2005 – Naval Submarines 8; Intl Conf; 22-23 June 2005; London, UK.
Organised by RINA, London,UK.
http://www.rina.org.uk/showpubl.pl?id=7099&n= 565
Haynes, D., Carter, I.
English

Recent submarine incidents have shown the potential application of an onboard submarine stability tool for emergency response. Recently the UK Royal Navy began to use Seagoing Paramarine as an onboard stability tool on all major warships and frigates. This paper describes the development of a Submarine version of the Seagoing Paramarine to address the different operator requirements between submarines and surface ships. In particular it presents the operator requirements, the work done to date and an example application of the tool.

Stability
Submarines

2006010227

Evolution from periscopes to optronic mast systems.

Warship 2005 – Naval Submarines 8; Intl Conf; 22-23 June 2005; London, UK.
Organised by RINA, London,UK.
http://www.rina.org.uk/showpubl.pl?id=7091&n= 565
Stevenson, A.
English

For over a century the submariner’s view of the above water scene has been dominated by the periscope through an intimate, hands-on Man Machine Interface. The advent of non-penetrating technology in the shape of the optronic mast has required a considerable re-evaluation of the operational model. This paper discusses and explores the technological, operational, manpower and support impact of moving from a traditional periscope to an optronic mast system with particular reference to the non-penetrating optronic masts for the UK Royal Navy’s ASTUTE class submarine Visual System. The steps taken and lessons learned in this process are presented.

Masts
Periscopes
Submarines

2006010228

Industrial challenges within Royal Navy submarine in service support.

Warship 2005 – Naval Submarines 8; Intl Conf; 22-23 June 2005; London, UK.
Organised by RINA, London,UK.
http://www.rina.org.uk/showpubl.pl?id=7101&n= 565
Whalley, M.
English

Supporting a modern fleet of nuclear attack and ballistic submarines poses many challenges to industry. This presentation aims to explore the key challenges and explain how both Industry and Ministry working in partnership are meeting them; the role and responsibility of Industry as Design Agent and the interface with the MoD Design Authority and also the influence of technical authority decisions on the remainder of the in service support activities. The paper concludes with a look at what the future could hold for industrial support to nuclear submarines and how might this change as new classes of submarine enter service.

Fleet management
Submarines

2006010229

MARPOL compliant management of solid waste on ASTUTE class submarines.

Warship 2005 – Naval Submarines 8; Intl Conf; 22-23 June 2005; London, UK.
Organised by RINA, London,UK.
http://www.rina.org.uk/showpubl.pl?id=7102&n= 565
Young, K.
English

MARPOL and contractual requirements for the disposal of solid waste streams on Astute Class Submarines mean that the vessel will not always be able to carry out overboard discharges, as is current practice on RN submarines. The only alternative to discharge is storage. In order to optimise the overall spatial design of the vessel the decision was made to provide facilities for storage only, not overboard discharge. The biggest hurdle has not been the equipment design or arrangement but the selling of this idea to the ultimate customer who will have to spend long periods of time living with the waste and the consequences.

Submarines
Waste management

2006010230

Marine systems development – a new opportunity.

Warship 2005 – Naval Submarines 8; Intl Conf; 22-23 June 2005; London, UK.
Organised by RINA, London,UK.
http://www.rina.org.uk/showpubl.pl?id=7090&n= 565
Bolton, M., Ford, G.
English

The design of nuclear submarine secondary systems has changed little since HMS DREADNOUGHT was commissioned in 1963. This paper describes the approach to establishing a new development programme, its management, drivers and current content. It is broadly anticipated that the development programme will have a marked impact on submarine procurement and the paper will conclude with a view on the way in which marine engineering development may influence submarine design during the current build programme and beyond.

Shipboard systems
Submarines

2006010231

NATO submarine rescue system – an integrated approach.

Warship 2005 – Naval Submarines 8; Intl Conf; 22-23 June 2005; London, UK.
Organised by RINA, London,UK.
http://www.rina.org.uk/showpubl.pl?id=7096&n= 565
Yard, N.
English

Rolls-Royce are the prime contractor for the NSRS contract. The project is a collaborative venture between the governments of France, Norway and the United Kingdom to provide a fully integrated emergency response capability able to respond to a submarine sinking anywhere in the world within demanding target times. The paper describes Rolls-Royce's underlying philosophy behind the system architecture, the operating and management methodology that have been adopted and an overview of the component parts of the system.

Emergency response systems
Rescue operations
Submarines

2006010232

Risks and hazards in recovering the nuclear submarine KURSK.

Warship 2005 – Naval Submarines 8; Intl Conf; 22-23 June 2005; London, UK.
Organised by RINA, London,UK.
http://www.rina.org.uk/showpubl.pl?id=7095&n= 565
Large, J.H.
English

In August of 2000, the Russian Federation Northern Fleet nuclear powered and nuclear weapons capable submarine Kursk, whilst at periscope depth in the Barents Sea, experienced a catastrophic explosion in her forward torpedo compartment, sinking with a total loss of the 119 crew members on board. Prior to commencing with and throughout the world-first salvage operations to recover the Kursk, the condition and potential failure modes of the nuclear propulsion plants had to be assessed by reliable and novel means, as did the hazards presented by the boat, its on board weaponry, and the rough-and-tumble of forces imposed by the salvage and lift operations. The paper discusses the approach to nuclear safety assessment, how the Kursk was raised and considers the potential effect on personnel safety and the environment should the assessments been at fault.

Salvage
Submarines

2006010233

Shock qualification of electron beam welded submarine hull valves using numerical methods.

Warship 2005 – Naval Submarines 8; Intl Conf; 22-23 June 2005; London, UK.
Organised by RINA, London,UK.
http://www.rina.org.uk/showpubl.pl?id=7097&n =565
Alexander, G., Thompson, P., Et al
English

The use of electron beam welded fabrication for submarine hull valves is an exciting development offering the possibility of low defect, high integrity hull valve design at reduced cost compared with traditional cast valves. The cost of underwater shock testing every new variant of these valves could negate the through life cost. This paper describes how advanced finite element techniques, suitably validated, could accurately predict the failure modes under shock. Recent research topics which aim to develop a numerically robust valve modelling methodology are discussed and some of the key modelling issues such as validation, internal/external fluid modelling and stud fastener integrity are presented.

Electron beams
Shock
Submarines
Valves
Welding
2006010234

Submarine towing trials.

Warship 2005 – Naval Submarines 8; Intl Conf; 22-23 June 2005; London, UK. Organised by RINA, London,UK.
http://www.rina.org.uk/showpubl.pl?id=7105&n= 565
Anderson, J., Watts, S., Et al
English

Recovery of a disabled submarine on the surface covers a wide range of actions, one of which may be an emergency tow. Issues that must be addressed are the capabilities of the towing vessel and the behaviour of the towed submarine in a variety of vessel conditions and sea states. S&MO and QinetiQ. have completed a series of Submarine Class model towing trials in a ship tank and more recently in open water. The knowledge gained from such experiments (and other analytical techniques), is extremely useful to the S&MO IPT in their planning and towing of a submarine from sea into a safe port.

Submarines
Towing

2006010235

Submarine trials and experimentation – dealing with real-life data.

Warship 2005 – Naval Submarines 8; Intl Conf; 22-23 June 2005; London, UK. Organised by RINA, London,UK.
http://www.rina.org.uk/showpubl.pl?id=7106&n= 565
Bryars, J., Bayliss, J., Et al
English

A key factor to ensure safe operation is the ability to predict submarine manoeuvring trajectories. This allows computer simulation to be used to investigate safety critical operational aspects of manoeuvring, such as plane jams, without putting actual boats in danger. In order to perform validated computer simulation, submarine trials are necessary to provide actual boat, or model, data that must be correlated to simulated results. This paper details the need for submarine trials and gives some background on the planning that is performed for such trials, both model and full-scale. Methods to compare the simulation and post-processed trial data, to allow validation, are presented and benefits and shortfalls discussed. Examples are included in all cases to illustrate problems that can occur.

Ship trials

Submarines

2006010236

United States Navy submarine safety (SUBSAFE) program.

Warship 2005 – Naval Submarines 8; Intl Conf; 22-23 June 2005; London, UK.
Organised by RINA, London,UK.
http://www.rina.org.uk/showpubl.pl?id=7093&n= 565
Iwanowicz, S.E., McBride, M.S.
English

The SUBSAFE Program was established to provide maximum reasonable assurance of submarine watertight integrity and ability to recover from a flooding casualty. Now over 41 years old, the SUBSAFE Program is a highly successful program of work discipline, material control, and associated formal documentation. The program has established submarine design requirements, SUBSAFE certification requirements for unrestricted operations at sea, and certification maintenance requirements along with supporting work control, program management, and audit processes. This paper presents the evolution, structure, and implementation of the SUBSAFE Program

Safety
Submarines

2006010237

Zebra battery – the solution to submarine energy storage.

Warship 2005 – Naval Submarines 8; Intl Conf; 22-23 June 2005; London, UK.
Organised by RINA, London,UK.
http://www.rina.org.uk/showpubl.pl?id=7092&n= 565
Williamson, D., Benstead, N.
English

The ZEBRA battery represents one of the most advanced and safe alternatives to lead acid and can meet the power demands of a submarine. The paper explores and discusses the benefits of ZEBRA over lead acid, which have prompted investment from the UK MoD. Higher energy density and the prospect of significantly reduced through life costs have resulted in a programme of development work funded by the UK's Submarine Marine Engineering Development Programme. This paper presents the work being done to make ZEBRA available for Naval applications and concludes with a view of energy storage for future submarines.

Electric batteries
Submarines

2006010238

Rolls-Royce system on US Navy ship.

Motor Ship, v 86 n 1020, Oct 2005, p 10 [1 p, 1 fig]
No author given
English

The US Navy has unveiled its new advanced electric-ship demonstrator ship SEA JET. The ship will test Rolls-Royce patented AWJ-21 water jet technology. The AWJ-21 is designed to increase ship speed by making hulls sleeker through the elimination of exposed shafting, struts and rudders which also reduces overall machinery weight.

Naval vessels
Waterjet propulsion

2006010239

Australian builder receives patrol orders.

Ship and Boat Intl, Sept/Oct 2005, p 32 [2 p, 3 fig]
No author given
English

Austal Ships of Western Australia is building six 16m aluminium monohull boats for the Water Police in the Australian state of New South Wales. Austal is also constructing 12 56m Armidale Class patrol boats for the Royal Australian Navy. This article outlines the technical particulars of these vessels.

Naval vessels
Patrol craft
Vessel descriptions

2006010240

Giving the navy the green light.

Marine Engrs Rev, Oct 2005, p 44 [2 p, 2 fig]
Smith, G.
English

To emphasis the impact caused by transferring invasive species in ballast water around the world's oceans the IMO decided to allocate a new International Convention for the Control of Ship's Ballast Water and Sediments. The new convention will require detailed ship-specific Ballast Water Management Plans (BWMPs) to be certified by a nominated body of the Maritime Coastguard Agency on behalf of the IMO. The BWMPs will need to ultimately transform

from ballast water exchange to a ballast water treatment system in the future. This looks at how the new ballast water regulation will impact UK Royal Navy and Royal Fleet Auxiliary ships.

Ballast water
Naval vessels
Regulations

2006010241

No bucks – no Buck Rogers – the state of naval shipbuilding in the United States.

World Shipbuilding, v 1 n 6, Aug 2005, p 10 [4 p, 5 fig]
Lewis, D.H.
English

The author discusses the state of naval shipbuilding in the US which is at a critical juncture. The Navy, not industry, holds the keys to success. The solution is not for the Navy to devise clever new ways of paying ever-higher process; the solution lies in re-establishing and then sustaining a fully competitive shipbuilding process.

Naval shipbuilding
United States

2006010242

DCN provides more details of SMX-22 sub concept.

Warship Technology, Oct 2005, p 6 [2 p, 3 fig]
No author given
English

DCN in France has released more details of its revolutionary submarine design concept, the SMX-22. The concept combines a larger command submarine with small combat submarines which it transports and replenishes. With a double hull architecture, the command submarine has a surface displacement of 2,700 tons, a submerged speed in excess of 17 knots and a cruising range of 8.700 miles at 8 knots.

Submarines

2006010243

ONR unveils advanced electric-ship demonstrator.

Warship Technology, Oct 2005, p 8 [2 p, 3 fig]
No author given
English

The US Office of Naval Research has unveiled an advanced, electric ship demonstrator, SEA JET, which it plans to use to investigate electric propulsion and the performance advantages of a new type of underwater discharge waterjet. The 40.53m SEA JET Advanced Electric Ship Demonstrator (AESD) will serve as a model representing a destroyer-size surface ship

Electric propulsion
Naval vessels

2006010244

Commercial hulls are start point for new UNREP designs.

Warship Technology, Oct 2005, p 14 [2 p, 2 fig]
No author given
English

Acting on an anticipated newbuilding market demand for fleet replenishment ships, Rolls-Royce has developed a series of versatile, efficient designs based on proven, commercial hull forms. The 14,000dwt and 25,000dwt underway replenishment designs embody hull forms adapted from those originally developed for ro-pax ferries and sto-ro vessels. The three new baseline variants are a 14,000dwt vessel capable of 20 knots, a similar-capacity ship of 27 knots, intended to accompany a carrier task group, and a 25,000dwt vessel able to maintain 20 knots. A general arrangement drawing of the 25,000dwt design is included in this article.

Auxiliary ships
Naval vessels
Replenishment at sea

2006010245

DML unveils new frigate design.

Warship Technology, Oct 2005, p 16 [1 p, 2 fig]
No author given
English

A new frigate design – a concept known as FC65 has been unveiled by the DML Group in the UK. The FC65 is a high speed (35 knots), long range (circa 7,000 miles) surface combatant, offering high capability in both offensive and defensive roles. Approaching 150m in length and with a displacement of 6,600 tons loaded, the vessel is powered by twin gas turbines, with four large waterjets that allow it to reach its speed capability of 35 knots.

Frigates
Naval vessels

2006010246

Type 45 reveals hidden depths.

Warship Technology, Oct 2005, p 18 [2 p, 5 fig]
No author given
English
This article outlines the capabilities of HMS DARING, the first-of-class Type 45 anti-air warfare destroyer for the UK Royal Navy. With a basic displacement of 7,450 tons and a length of 152.4m HMS DARING will be the first all-electric warship in Royal Navy service.
Destroyers
Naval vessels

2006010247

Aegir design targets future afloat support needs.

Warship Technology, Oct 2005, p 23 [2 p, 5 fig]
No author given
English
BMT Defence Services Ltd in the UK and Skipskonsulent AS in Norway have unveiled a new family of double-hulled afloat support vessels. The Aegir family is derived from a twin-skeg hull form employed in commercial tanker designs. The variants of the baseline auxiliary oiler are available at deadweight of 10,000 tonnes, 18,000 tonnes and 26,000 tons; a further auxiliary oiler replenishment variant is being offered based on the 18,000 tonne hull.
Auxiliary ships
Naval vessels
Replenishment at sea

FEBRUARY 2006

2006020482

Design and analysis facilities for warship design.

ICCAS 2005, 12th Intl Conf on Computer Applications in Shipbuilding; 23-26 Aug 2005; Busan, Korea. CD-ROM. Session B11-1 [14 p]
Wilson, P.A.
English
This paper reports on the work of a specialist group that was set up to investigate the availability of software to support the design and early stage development of warships. The methodology used was to interview existing warship designers via questionnaires and interviews. The outcome of the work was a document that identified the software deficiencies in specific areas.
Computer-aided ship design
Naval vessels

2006020483

Systems engineering and requirements. Management integrated in the design tools of naval vessels.

ICCAS 2005, 12th Intl Conf on Computer Applications in Shipbuilding; 23-26 Aug 2005; Busan, Korea. CD-ROM. Session B11-2 [14 p, 2 tab, 9 fig]
Coz, D. Le
English

A naval vessel is a combination of many complex systems. The state of the art to manage this complexity and the need for flexibility is systems engineering as a means to transform a complex project in a sum of human size projects. This standard method considers a naval vessel as an assembly of systems, each of them being a node of the product structure and successively created, specified, designed, produced, and integrated in its parent system. Systems' designers used to exchange data by mean of e-documents which are to be considered as "contracts" between a system and its parent or its siblings. Such documents are specifications (set of requirements), design data (drawings, CAD models, data) and verifications. Since written in natural language, requirement documents have proved to become so verbose that ship designers faced problems to quickly consolidate the systems data, despite intensive use of requirements management tools or e-business exchange formats. In order to simplify the syntax of requirements, to make the data exchanges easier and to improve the consolidation, an innovative data model has been developed that unifies systems identification, functional analysis, requirements writing, verification and configuration management. This model is derived from STEP compatible models and from the NF EN 1325-1 standard on value and functional analysis. It has proven its sturdiness to various systems such as hull, propulsion, weapons, sensors, auxiliaries, accommodation, controls and

crew! A requirement is the combination of a function and a criterion. A function can be easily drawn on a functional diagram.

Computer-aided ship design
Naval vessels
Systems engineering

2006020484

Advanced simulation technology to predict safe operating limits for helicopters during ship design phases.

ICCAS 2005, 12th Intl Conf on Computer Applications in Shipbuilding; 23-26 Aug 2005; Busan, Korea. CD-ROM. Session B11-3 [14 p, 10 ref, 11 fig]
Ferrier, B., Cox, I., Duncan, J.
English

The principle aim of the Ship/Air Interface Framework (SAIF) project is to create a tool by which ship/helicopter operating limits may be determined using the combination of federated architecture and flight simulators. SAIF is being developed as an aid to identify potential problems at the ship design stage particularly concerning dynamic interface issues. Dynamic interface is defined as the study of the relationship between an air vehicle and a moving platform. Of particular interest are the aircraft limits on newly designed ships well before construction begins which offers an opportunity to effect design modifications. The test conducted in real-time, illustrates the interface of the MERLIN (EH101) Royal Navy helicopter onboard the evolving Type 45 Destroyer. The objective is to recover the MERLIN on-board a moving vessel within reasonable safety margins regardless of the seaway. The high level architecture employed in the modification of the MERLIN flight simulator, is discussed. Individual federates are described with particular focus on the ship motion, air wake and aircraft ship based visual landing aid components. The SAIF methodology, which has been implemented with the Merlin Cockpit Dynamic Simulator, gives good performance and ship-based workloads correlation with apparent quiescent windows of deck motion. A short discussion is presented concerning the 6 Degree-of-Freedom ship motion that was created from transfer functions calculated as response amplitude operators (RAO). The ship motion federate provided a real-time playback of a time-history file, which was generated by calculating the ship response to ocean waves from a specific direction and velocity at a known significant wave height and period, as dictated by the RAO transfer functions. A brief synopsis is presented summarising development, simulation and testing of the Landing Period Designator (LPD) helicopter recovery aid as applied during the simulator test. The LPD is based on the evaluation of the critical motion parameters collapsed into a scalar function called the Energy Index. The index, an empirical relation, evaluates ship motion as a function of the air vehicle limits by a process of filters designed to determine the air vehicle responses at the instant of recovery. Undercarriage deflection to encountered deck forces and aircraft stability, were calculated. Impacts on the proposed deck limits are discussed. Percentages of improvement for operational availability are demonstrated.

Helicopters
Naval vessels
Ship design

2006020485

Propelling next generation Unrep ships.

Marine Engrs Rev, Nov 2005, p 30 [4 p, 6 fig]
No author given
English

The Rolls-Royce family of underway replenishment (Unrep) ships are based on 'navalising' commercially proven hull forms for fast ro-ro ferries. There are three baseline variants. This article reports on a full propulsion system study undertaken for the 20kt, 14000 variant which critically assessed different configuration options.

Naval vessels
Power requirements
Replenishment at sea

2006020486

A military effectiveness analysis and decision making framework for naval ship design and acquisition.

Naval Engrs J, v 117 n 3, Summer 2005, p 43 [19 p, 32 ref, 3 tab, 11 fig]
Hootman, J.C., Whitcomb, C.
English

This paper describes research that develops a new framework for performing military effectiveness analyses and design tradeoff decisions. It provides an extensive survey of literature for effectiveness analysis and multi-criteria decision making to develop a single consistent philosophy for such analyses. This philosophy is applied to a requirements and effectiveness analysis case study of a conventional submarine that is performed using response surface methods to facilitate design space visualisation and decision maker interaction. Measures of merit are developed and applied to the case study. The resulting requirements space and methods to visualise and explore it in a decision making context are presented and discussed. Finally, a framework is proposed that would facilitate the concurrent consideration of requirements and effectiveness analyses with design and technology forecasting to create a unified tradeoff environment that would provide decision makers with pertinent information to facilitate better informed requirements derivation and design selection.

Acquisition
Naval vessels
Ship design

2006020487

Engineering the total ship: a system perspective on warships.

Naval Engrs J, v 117 n 3, Summer 2005, p 63 [15 p, 29 ref, 3 tab, 12 fig]
Holden, R.
English

This paper describes warships as manmade systems. A discussion of systems in terms of their characteristics and behaviour is given and used as a foundation for a perspective of a warship as an integrated whole and an element of the naval force. The symposium series titled “Engineering the Total Ship” is used as a source of technical material to describe warships, naval operations, and the Navy organisation. A system perspective is provided that defines warships as an integrated whole made up of interacting parts. The relationship of the Navy organisation to the characteristics of warships is discussed.

Naval vessels
Systems engineering

2006020488

Operating speed profiles and the ship design cycle.

Naval Engrs J, v 117 n 3, Summer 2005, p 79 [7 p, 9 ref, 1 tab, 4 fig]
Surko, S., Osborne, M.
English

One key, but little documented and empirically supported, input in the ship design cycle is the expected operating speed profile. This real-world constraint affects many decisions regarding hull form and power systems, from fuel tanks to main propulsion and ship’s service machinery selection and operation. These decisions, in turn, ripple through the design of a ship in ways that are often hard to discern, but clearly impact acquisition and life cycle costs. Recent studies of DDG 51 operating speed profiles demonstrate that the Navy regularly operates with speed profiles considerably different than used to design the ship. In general, warships operate in standard engine order telegraph increments (e.g. Ahead 2/3) and at lower speeds than designed for.

Naval vessels
Ship design
Ship speed

2006020489

MTU extends CODAG and CODOG references.

Marine Propulsion & Auxiliary Machinery, v 27 n 5, Oct/Nov 2005, p 35 [1 p, 3 fig]
No author given
English

MTU has supplied combined diesel and gas turbine (CODAG) propulsion packages for a trio of F124-class frigates for the German Navy. This article describes the CODAG system which is based on a General Electric LM2500 gas turbine and two MTU 20V 1163 high speed diesel engines. The article also describes the CODOG system powering the US Navy's new Catamaran Sea Fighter (FSF-1), also known as the X-Craft. Two MTU 16V 595 series diesel engines and two GE LM2500 gas turbines are integrated into a 50.4MW CODOG combined drive system.

Diesel engines
Frigates
Gas turbine propulsion

2006020490

Network monitoring and remote fault diagnosis for the mechanical and electrical equipment of warships.

Shipbuilding of China, v 46 n 3, Sept 2005, p 68 [5 p, 5 ref, 2 fig]
Zhang, Y.-x., Ming, T.-f., Zhang, X.-f.
Chinese

With the development of system integrity, information, and automation technology, the mechanical and electrical equipment of warships are becoming more and more advanced and complicated. In this paper, the importance of investigation on network monitoring and remote fault diagnosis for warship mechanical and electrical equipment is discussed. According to the principle which must be followed when the network's structure is designed, the topological structure of the monitoring network is presented, and the rational pattern of the remote monitoring and fault diagnosis system for the mechanical and electrical equipment of warships is proposed. The key technologies for the system realisation, which are the database technology, network data-communicating technology, motion calculation technology, and the network safe technology, are researched in detail. Finally, the application prospects of remote monitoring and fault diagnosis technology for the warship mechanical and electrical equipment is viewed.

Fault diagnosis
Electrical equipment
Naval vessels

2006020491

Corvettes steaming ahead.

Armada Intl, n 6, 2005, p 14 [3 p, 6 fig]
Hooton, E.R.
English

There are currently some 15 corvette programmes worldwide, as every major European yard is offering both corvette and offshore patrol vessel designs, sometimes in the same hull. This article looks at some of these programmes.

Corvettes
Naval vessels

MARCH 2006

2006030732

Applicability of MARPOL standards to military ships: a practical approach.

Intl Conf Safety Regulations & Naval Class; 23-24 Nov2005; London, UK. Organised by RINA, London, UK.
http://www.rina.org.uk/showpubl.pl?id=7154&n= 565
Gazzoli, S., Vaccarezza, F.
English

In the interest of environmental awareness, Navies are requiring that their vessels comply with MARPOL standards. However, MARPOL was not designed to cover naval ships and a certain degree of adaptation is necessary in order to tune its requirements with Navies' practices and procedures. As a complement to its RINAMIL (Rules for the classification of Naval ships), the Italian classification society RINA carried out such an adaptation which was implemented on Italian Navy's fleet. This paper discusses the applicability of MARPOL to naval ships, outlines the customisation carried out by RINA and presents some examples of applications based on the experience with Italy's Naval fleet.

MARPOL Convention
Naval vessels
Standards

2006030733

Assessing the treatment of the human element within the naval class regime.

Intl Conf Safety Regulations & Naval Class; 23-24 Nov 2005; London, UK. Organised by RINA, London,UK.
http://www.rina.org.uk/showpubl.pl?id=7162&n= 565

Earthy, J., Jones, B.S., Rattenbury, N.
English
Human-system issues are some of the most difficult to address in the design and operation of warships, being pervasive and associated with many stakeholders. Initiatives such as human factors integration have brought about a more systematic consideration of the human element. However, many challenges remain. As an independent body, Class can have a useful role to play in consideration of the human element. The adoption of commercial standards provides a source of practical examples of the application of the standard. Equipment that has proved perfectly serviceable in the merchant ship world may not prove compatible with naval operation. Maintenance and support strategies are also very different. The trade-offs to be made are discussed.

Human factors
Naval vessels

2006030734

CVF structural safety certification.

Intl Conf Safety Regulations & Naval Class; 23-24 Nov 2005; London, UK.
Organised by RINA, London,UK.
http://www.rina.org.uk/showpubl.pl?id=7161&n= 565
Dodkins, A., Moss, C., Wise, B.
English

The UK Ministry of Defence (MoD) are required to operate vessels that meet safety requirements equivalent to those specified by statute. In order to achieve this MoD naval authorities have been established in a number of key hazard areas, including hull structure. In conjunction with this the MoD has been working with classification societies to develop naval class rules and processes based on commercial certification methodologies. This paper discusses the approach that the Aircraft Carrier Alliance (ACA) has adopted with regard to meeting the MoD's Safety Regulations for Structure through Naval Class.

Classification society rules
Hulls
Naval vessels

2006030735

Classification – processes for managing safety and risk during procurement and upkeep.

Intl Conf Safety Regulations & Naval Class; 23-24 Nov 2005; London, UK.
Organised by RINA, London,UK.
http://www.rina.org.uk/showpubl.pl?id=7151&n= 565
Pomeroy, V.
English

This paper focuses on the continued development of classification rules to specifically address naval platforms and the opportunities offered to navies and suppliers in a different approach to standards and specifications, without constraining innovation. The paper outlines an approach to defining an appropriate standards policy and implementing it throughout the platform life cycle, with the benefit of established practices for demonstrating conformance with the requirements and thereby reducing project risk. Based on recent experience with procurement projects and ships in operation the paper describes changes that have been introduced since the first publication of Lloyd's Register's Naval Ship Rules in 1999.

Classification society rules
Naval vessels

2006030736

Experience from a classification society working with naval regulatory regimes.

Intl Conf Safety Regulations & Naval Class; 23-24 Nov 2005; London, UK.
Organised by RINA, London,UK.
http://www.rina.org.uk/showpubl.pl?id=7150&n= 565
Wilson, B., Humphrey, R., Eide, M.
English

It has been seven years since Det Norske Veritas inaugurated its Naval Craft Technical Committee and established the first DNV Rules for Naval Vessels. In this time, through its activities with a number of navies, DNV has gained important experience in working with a variety of naval regulatory regimes. This paper focuses on approaches of various naval regulatory regimes, how DNV interacts with the navies and the challenges presented to class and navies to deliver naval ship safety. The merits of a navy with a well defined regulatory and supervisory body are discussed and the mechanism by which the classification society interfaces with a naval authority is explored.

Classification society rules
Naval vessels

2006030737

Development of a NATO “Naval Ship Code”.

Intl Conf Safety Regulations & Naval Class; 23-24 Nov 2005; London, UK.
Organised by RINA, London,UK.
http://www.rina.org.uk/showpubl.pl?id=7152&n= 565
Rudgley, G., Boxall, P., Et al
English

When formulating class rules for merchant ships the classification societies use the guidelines given by the IMO; specifically the SOLAS convention. When drawing up class rules for naval ships, there is no similar legislation in place. NATO has established a specialist team on "Naval Ship Safety and Classification" which is charged with developing a "Naval Ship Code". The Code aims to fill the void by providing the framework for navies to gain assurance that acceptable levels of safety are achieved. In doing so, the Code will replicate the link between IMO and classification societies and promote improved ship design and a greater consistency and transparency of standards. In this paper, the authors summarise progress to date on establishing the safety framework, the goal-based methodology for rule development and the initial development of the technical chapters.

Naval vessels
Ship classification

2006030738

Fire protection: regulation and risk.

Intl Conf Safety Regulations & Naval Class; 23-24 Nov 2005; London, UK.
Organised by RINA, London,UK.
http://www.rina.org.uk/showpubl.pl?id=7159&n= 565
Martin, A., Grier, R.
English

By tradition, warship fire protection has been addressed in a different manner to merchant practice. Warships appear to rely on active measures to defeat fire while merchant vessels may be seen as focussing on containment. This paper begins by examining the regulatory systems governing fire insulation operated by the merchant marine, class societies and the UK Ministry of Defence. As these systems interact there exists the potential for mismatches between naval and commercial requirements when ships are designed for the RN and RFA. The paper concludes by reviewing the progress made with the prediction of fire spread using the SURVIVE code, demonstrating how the tool can be used to inform the risks of adopting different fire insulation schemes.

Fire protection
Naval vessels
Regulations

2006030739

Germanischer Lloyd rules for naval submarines – certification of AIP systems.

Intl Conf Safety Regulations & Naval Class; 23-24 Nov 2005; London, UK.
Organised by RINA, London,UK.
http://www.rina.org.uk/showpubl.pl?id=7155&n= 565
Würsig, G., Petersen, L., Pauli, H.
English

In early 2005 Germanischer Lloyd published the Rules for Sub-Surface Ships (GL Rules Part III Naval Ship Technology, Chapter 2) in a preliminary version. These rules are based on GL experiences in classification of submersibles, submarines and certification of Air Independent Propulsion Systems. The classification principles which are the bases for the recently published GL rules for "submarines" are described with special focus on approval of the pressure hull and important subsystems of the submarine. The safety principles behind the rules are highlighted and explained by practical examples. Reference is made to several GL certified AIPs in military submarines and research submersibles.

Classification society rules
Submarines

2006030740

Regulation in the Royal Australian Navy: an update.

Intl Conf Safety Regulations & Naval Class; 23-24 Nov 2005; London, UK.
Organised by RINA, London,UK.
http://www.rina.org.uk/showpubl.pl?id=7153&n= 565
Di Pietro, V., Mechanicos, M., Page, D.
English

The need to reinvigorate the Navy regulatory system has arisen from changing community expectations, a need for transparency, greater expansion of the use of commercial support, and the responsibilities associated with a parent navy role for new platforms by the Royal Australian Navy (RAN). Over the past five years the RAN regulatory process has developed and matured, and is currently expanding from its origins as the Navy Technical Regulatory Framework. The expanded Navy Regulatory System (NRS) now looks at capability as a whole, and incorporates eight regulatory areas comprising operations, technical, environment, safety, health, personnel and training, infrastructure and finance. This paper provides an overview of the NRS, as a part of the Safety Management System – Navy, and its interaction with its components such as the Technical Regulatory Framework and how the Royal Australian Navy is addressing the challenge.

Naval vessels
Regulations

2006030741

Simulation of damaged warship motion in irregular waves.

Intl Conf Safety Regulations & Naval Class; 23-24 Nov 2005; London, UK.
Organised by RINA, London,UK.
http://www.rina.org.uk/showpubl.pl?id=7160&n= 565
Laskowski, A., Jankowski, J.
English

The simulation of the motion of a damaged warship in irregular waves can help to estimate the warship's chances of survival in different damage scenarios. The simulation of warship motion in irregular waves is normally used to analyse the warship motion in specific sea or warship states. A warship in damaged condition is an example of a specific warship state. In this case additional forces - generated by moving water in damaged compartments must be taken into account. The paper presents the theoretical background of Polski Rejestr Stakow developed simulation software, based on the conducted studies, and the program itself which can support commander's decision making process in emergencies on naval vessels and craft. The tool can be applied both in training and in vessel operation.

Damage
Naval vessels
Ship motions

2006030742

Standards mapping in support of fire safety certification.

Intl Conf Safety Regulations & Naval Class; 23-24 Nov 2005; London, UK.
Organised by RINA, London,UK.
http://www.rina.org.uk/showpubl.pl?id=7158&n= 565
Jarvis, J.
English

Fire safety, for both ship and submarine, represents a significant danger with potentially severe consequences and is therefore defined as one of the 'Key Hazard Areas'. As such, the Ship Safety Board requires particular safety assurance by means of naval authority safety certification, and MESH IPT is the certifying section for fire safety. In order to fulfil its role, the IPT applies current risk assessment techniques with reference back to the relevant fire-related Defence Standards and also the fire-related clauses of the commercial standards. This paper describes the development of a cost effective software tool that significantly increases the ability of MESH IPT in meeting its objectives.

Fire safety
Naval vessels
Risk analysis
Standards

2006030743

The application of the classification process to government vessels.

Intl Conf Safety Regulations & Naval Class; 23-24 Nov 2005; London, UK.
Organised by RINA, London,UK.
http://www.rina.org.uk/showpubl.pl?id=7149&n= 565
Wiernicki, C.J., Ashe, G.M., Fireman, H.
English

This presentation focuses on the general approach for applying classification processes to government vessels using the recent experience with the X-Craft as a basis for discussion. It summarises the approach to applying this tool on naval craft and will address how the requirements fit (or do not fit) together. In addition, valuable lessons learned from the ongoing applications are presented.

Naval vessels

Ship classification

2006030744

The assurance afforded to a risk-based naval authority certification regime by commercial and naval class.

Intl Conf Safety Regulations & Naval Class; 23-24 Nov 2005; London, UK.
Organised by RINA, London,UK.
http://www.rina.org.uk/showpubl.pl?id=7157&n= 565
Roberts, G., Smalle, A., Et al
English

With the ever increasing movement towards the procurement of warships constructed in accordance with class rules, developed specifically for naval vessels. Consequently, where a Ministry of Defence Platform Integrated Project Team considers it relevant, a vessel can be constructed in accordance with a classification society's rules but will also have to comply with relevant naval authority regulations. This paper describes the work undertaken by BMT Defence Services Ltd and Lloyds Register on behalf of the UK Ministry of Defence, to determine the level of confidence provided to the naval authority by a vessel being maintained in either commercial or naval class.

Classification society rules
Naval vessels

2006030745

Understanding the regulators and certification authority requirements in a concurrent naval environment – the Astute Class submarine experience.

Intl Conf Safety Regulations & Naval Class; 23-24 Nov 2005; London, UK.
Organised by RINA, London,UK.
http://www.rina.org.uk/showpubl.pl?id=7156&n= 565
Roberts, T., Harding, R., Jesson, A.
English

Provision of safety cases for ship, nuclear and munitions has been and remains a daunting task when considering the often differing demands of regulators, naval authorities and safety assessors. Faced with these demands, the Astute project has had to react positively to assure all stakeholders that Astute Class Submarines will

present a risk that is ALARP. The paper provides lessons learnt in understanding and applying the demands of modern safety cases, certification and adaptation to continuous improvement in a concurrent engineering environment. The paper also discusses how future ship safety cases may be addressed in terms of a 'working' safety case that will clearly identify measures to be taken to maintain and ensure that risk to submarine crews, third parties, third party property and the environment remains ALARP.

Regulations
Safety
Submarines

2006030746

Evolution of U.S. naval surface combatant design and acquisition policies.

SNAME Trans, v 122 2004, p 460. CD-ROM. [54 p, 48 ref, 12 fig]
Hootman, J.C., Tibbitts, B.F.
English

US Naval ship design has experienced fundamental changes over the past 50 years due to the challenges posed by new threats, new missions, and new technologies. In addition, fiscal constraints and significant reduction in in-house engineering staff have had to be contended with. In today's defence environment, the Navy realizes that it must do more with fewer financial and human resources than it has in the past. The Navy must determine where best to allocate its limited resources, as well as the appropriate balance of design effort, control, and risk sharing between the government and industry. This paper shows that a spectrum of approaches to ship design and procurement exists. These range from the Navy doing everything at one extreme, to industry doing everything at the other. Over the past 50 years, there have been many attempts to find the appropriate balance between these two extremes, but no single strategy has withstood the test of time. The fundamental conclusion of this paper is that as the Navy continues to reduce its engineering staff, it is essential that it remain an informed buyer. The Navy must be able to identify and articulate its requirements, understand what engineering resources are available, both in-house and external, evaluate the costs and benefits of different strategies, and be able to judge its own work, as well as the work of industry to ensure that ships continue to be designed safely and effectively to meet the Navy's needs. Only through these efforts and the continued dedication of public and private sector partnerships can the US Navy continue to produce the most militarily effective fleet in the world.

Acquisition
Naval vessels
Ship design

APRIL 2006

2006040986

Updating ANZACs to meet changed strategic posture.

Jane's Navy Intl, v 111, n 1, Jan/Feb 2006, p 26 [6 p, 7 fig]
Scott, R.
English

Even before the first ANZAC frigate entered service for the Royal Australian Navy (RAN) almost seventeen years ago, RAN began to consider a raft of capability enhancement options to exploit the growth potential inherent in the platform and combat system. Many of these aspirations have now been embodied through a series of incremental update packages, with a further major ship self-defence upgrade now under contract for implementation later this decade.
Combat systems
Frigates
Naval vessels
Upgrading

2006040987

Capital gains: RNZN makes step change in capability.

Jane's Navy Intl, v 111, n 1, Jan/Feb 2006, p 32 [4 p, 5 fig]
McKinnon, P.
English

This article looks at the Royal New Zealand Navy's Project Protector, New Zealand's biggest naval shipbuilding programme since the Second World War, placing seven new warships on the order books. The Project Protector fleet will consist of one multirole vessel (MRV), two offshore patrol vessels (OPVs) and four inshore patrol vessels (IPVs).

Naval shipbuilding
Naval vessels

2006040988

Fuel cell system.

Schip & Werf de Zee, n 1, Jan 2006, p 30 [4 p, 12 fig]
Regensdorf, U.
English

This article describes the German submarine type U212A, the world's quietest designed and built submarine, capable of staying submerged for weeks based on the installed fuel cell system.

Fuel cells
Submarines

2006040989

Development of a family of fast monohulls for rapid deployment of logistics and troops.

FAST 2005, 8th Intl Conf on Fast Sea Transportation; 27-30 June 2005; Saint-Petersburg, Russia. Organised by IMarEST Saint-Petersburg Branch and Saint-Petersburg State Marine Technical Univ. CD-ROM [8 p, 3 ref, 16 fig]
Bricknell, D.J., Vedlog, P.-E.
English

Since the deployment of the fast aluminium catamaran 'Jervis Bay' by Australia in the late 1990s, many countries have shown an interest in fast naval logistics. Many different hull forms including catamarans, trimarans, pentamarans and monohulls have been investigated and further trials by the USA of large fast theatre support vessels have been undertaken. This paper describes the development of a family of fast monohulls exhibiting very low resistance whilst being capable of simple steel construction. The family of designs can be configured to deliver capability either within the operational theatre or between operational theatres, is designed to operate at an average speed greater than 40 knots and is capable of both long self-deployment range and high payload. High deadweight reconfigurable cargo space with rapid on and offload is an integral feature of the craft. Troop capability and aviation facilities are also included. These vessels complement fast air logistics and slower conventional marine logistics and deliver large payload over long ranges. The family of fast monohulls is a further development of the P2500 class of fast commercial ro-pax, ro-ro, and passenger craft developed by Rolls-Royce to meet the growing demand for fast, sea-kindly and cost effective transport. Comparisons with ship designs in this class show that the Rolls-Royce P2500 family of fast logistics vessels offer favourable powering characteristics whilst achieving high levels of passenger comfort through improved seakeeping. This paper describes the original P2500 Ro-Pax, the large, long-range, fast logistics vessels and a smaller but highly capable vessel for intra-theatre operations.

High speed vessels
Logistics support ships
Monohulls

2006040990

ASV designs combine speed and load carrying capacity.

Warship Technology, Jan 2006, p 14 [2 p, 1 tab, 4 fig]

No author given
English

Two manned models of Air Supported Vessels (ASV) fast platforms, suitable for commercial and naval use, have been successfully tested as part of the EU 5th Framework R&D project EFFISES. Four different ASV main configurations have been investigated, covering ASV monohull and multi-hulls. The combination of high speed, high efficiency, excellent load carrying capability and comfortable ride should appeal to navy use in general.

High speed vessels
Model tests
Naval vessels

2006040991

A new method of evaluating the vulnerability of naval vessel to shock loadings.

J Ship Mechanics, v 9 n 6, Dec 2005, p 76 [9 p, 7 ref, 3 tab]
Jiang, F., Feng, Q., Wang, Y.
English

The survivability of a naval vessel to shock loadings is one of its main performance factors. The correct evaluation for the vulnerability of a naval vessel after shock is the premise to design, to manage and to optimize this important factor. In order to overcome some shortcomings of former analysis methods, a new method is presented in the paper, which regards evaluating vulnerability as a classification problem to solve. The technique of Support Vector Machine is applied and the model of predicting the vulnerability of a naval vessel after shock is established according to limited training samples. As an illustrative instance, the vulnerability of a naval vessel's subsystem is evaluated, which shows this new method is highly effective and it is likely to be applied extensively in the study of naval vessel survivability.

Loads (forces)
Naval vessels
Shock
Survivability

2006040992

Numerical simulation of a ship ventilation to collect landing craft air cushion.

FAST 2005, 8th Intl Conf on Fast Sea Transportation; 27-30 June 2005; Saint-Petersburg, Russia. Organised by IMarEST Saint-Petersburg Branch and Saint-Petersburg State Marine Technical Univ. CD-ROM [6 p, 2 ref, 15 fig]
Grosjean, F., Kerampran, S.
English

The warship “Mistral” (200 x 32 meters, 21 300 tons, pod propulsion), is designated to receive Landing Craft (LC) on her docking floor. She is able to host 4 classical LC or 2 LC Air Cushion. The propulsion of these LCAC generates very hot exhaust gases and the ventilation of the docking floor must therefore be optimised. This optimisation has been tested by the commercial CFD code Fluent.

Computational fluid dynamics
Naval vessels
Stern landing vessels
Ventilation

2006040993

Technology identification and assessment process (TIAP) for US Navy environmental systems at the Naval Surface Warfare Centre, Carderock Division.

MEETS 2006, Marine Environmental Engng Technology Symposium, Common Issues, Common Solutions – Government Industry Partnership; 23-25 Jan 2006; Arlington, VA, US. Organised by American Soc Naval Engrs. CD-ROM [10 p, 8 ref, 1 tab, 3 fig]
Shen, D.
English

The Environmental Quality Division of the Naval Surface Warfare Centre, Carderock Division (NSWCCD) is the main clearinghouse of technical information on shipboard environmental protection systems for the US Navy. This paper highlights NSWCCDs role in the context of the broader Navy and describes how the NSWCCD team collects information on, assesses, and evaluates environmental systems for US Navy use. The paper focuses on the methodology by which information and data is collected on these systems, and lists a number of specific products and deliverables.

Environmental protection
Navy

2006040994

The adaptation of a commercial-off-the-shelf (COTS) solid waste incinerator for use aboard US Navy aircraft carriers.

MEETS 2006, Marine Environmental Engng Technology Symposium, Common Issues, Common Solutions – Government Industry Partnership; 23-25 Jan 2006; Arlington, VA, US. Organised by American Soc Naval Engrs. CD-ROM [9 p, 7 ref, 10 fig]
Marx, S., Nguyen, T., Et al
English

Aircraft carriers generate large amounts of paper, cardboard and textile wastes and need an incinerator to supplement other solid waste processing equipment, which includes pulpers and plastics wastes processors. The commercial off-the-shelf (COTS) TeamTec Golar Model GSA500CSW incinerator was selected to replace obsolete MIL-SPEC incinerators, which have significant safety problems and high repair costs. The Golar incinerators, however, have also had some reliability and safety problems. The most critical problems were the rapid deterioration of exhaust stacks and catastrophic flue gas fan failures. Therefore, NAVSEA and the type commanders developed a ship alteration package that calls for the installation of a new exhaust stack and an upgraded MKII version of the incinerator. The new stack will be routed to minimise direct impingement by the hot exhaust gases and have materials that are more resistant to high temperatures. The MKII incinerator design is the product of an extensive design and testing effort by TeamTec and NAVSEA and has many improvements. The most significant change was the addition of a shredder/conveyor/stoker system that automatically loads the shipboard waste into the incinerator, smoothing the flow of waste and minimising temperature spikes. The final prototype unit was tested successfully in September 2004.

Aircraft carriers
Incinerators

MAY 2006

2006051237

High speed naval combatant – propulsion enablers.

FAST 2005, 8th Intl Conf on Fast Sea Transportation; 27-30 June 2005; Saint-Petersburg, Russia. Organised by IMarEST Saint-Petersburg Branch and Saint-Petersburg State Marine Technical Univ. CD-ROM [10 p, 4 ref, 7 tab, 11 fig]
Mountford, P., Roberts, T., Et al
English

The Transmissions Group of the Marine Propulsion Systems Integrated Project Team are the subject matter experts in mechanical power transmission systems for UK Royal Naval surface and sub-surface maritime platforms. Using Marine Engineering Development Programme funding, the Group has undertaken a wide ranging series of studies dealing with propulsion enabling technologies to power surface platforms at higher top speeds. This paper will identify the various systems, prime mover through to transmission into the surroundings, capable of powering a vessel of 5000 Tonnes, in both monohull and multilhull configurations, beyond 35 knots maximum speed. It will produce a range of propulsion options and identify the developmental requirements to fully understand and exploit candidate technologies.

High speed vessels
Naval vessels

2006051238

Considerations in the selection of propulsion systems for fast naval ships.

FAST 2005, 8th Intl Conf on Fast Sea Transportation; 27-30 June 2005; Saint-Petersburg, Russia. Organised by IMarEST Saint-Petersburg Branch and Saint-Petersburg State Marine Technical Univ. CD-ROM [8 p, 7 ref, 19 fig]
Mungo, F., Bricknell, D.J., Tate, A.
English

This paper considers the technologies and propulsion products appropriate for ships operating beyond the main resistance hump. Whilst many inshore craft have operated in this regime for many years, increased interest in larger, fast naval vessels has developed in the past few years both in fast logistics and now in fast combatants. Many commercial ferries operate regularly above the main resistance hump. Initially this was implemented with high-speed diesel powered aluminium catamarans, then with larger gas turbine powered monohulls and in the near future with stabilised monohulls or trimarans. Surface Effect Ships (SES) have appeared in the passenger market but only infrequently and usually at very high speeds. Recently the USA has acquired fast commercial craft for naval use and some Scandinavian countries have embarked on a build programme for small fast littoral craft. New classes of fast attack craft, larger and faster corvettes and large ocean-going fast littoral combatants are now either in design or in active consideration by many navies. A greater variety of hull forms are used for fast naval craft than for the more conventional frigates or destroyers. Systems and equipments applicable to monohulls, multi-hulls (both catamarans and stabilised-monohulls) and SES are all considered in the context of a propulsion system that suits the particular hull forms. Prime-movers (gas turbines and high-speed diesels), transmissions (electric and geared), and propulsors (propellers and waterjets) are reviewed in relation to the current available technology and the near future anticipated capabilities. Experience gained with existing fast combatants and with respect to the designs for future propulsion system configurations is also described.

High speed vessels
Naval vessels
Power plant selection

2006051239

The GOWIND 170 corvette.

FAST 2005, 8th Intl Conf on Fast Sea Transportation; 27-30 June 2005; Saint-Petersburg, Russia. Organised by IMarEST Saint-Petersburg Branch and Saint-Petersburg State Marine Technical Univ. CD-ROM [9 p, 1 tab, 15 fig]
Patrick, L.
English

The expanding market for corvettes has led DCN in France to develop a new generation of vessels. The DCN corvettes, named GOWIND, have been designed

in order to meet today's naval needs of a developing maritime nation. This versatile family is composed of three different basic versions of respective displacements 1250t, 1700t and 1950t. After a brief description of the family, this paper focuses on the 1700t GOWIND 170 corvette. Design to cost was used in the design of the corvettes after an analysis of the needs of the potential customers. Moreover, the best architectural options were considered for a fast littoral warship. For the propulsion, waterjets have been selected for the efficiency at high speed and the draft reduction. Different propulsive arrangements have been studied in order to find the best solutions for the range of maximum proposed speeds (30-35knt). As regard to the helicopter operations and the combat system performances, the design has paid special attention to the seakeeping performances with the adoption of a stabilisation system based on two pairs of fins and interceptors. The military performances have been highly improved with innovative solutions to reduce the RCS (unique mast, flush deck SSM, RCS lights, suppress of the funnels…) and the IR signature (cooling of exhaust gases). The reduction of the acquisition cost has been achieved by the optimisation of the design according to the different functions: propulsion aft of the ship, living spaces in the middle and weapon system forward in order to optimize the architecture and the shipbuilding.

Corvettes
Naval vessels

2006051240

Russian experience of creation of fast naval ships.

FAST 2005, 8th Intl Conf on Fast Sea Transportation; 27-30 June 2005; Saint-Petersburg, Russia. Organised by IMarEST Saint-Petersburg Branch and Saint-Petersburg State Marine Technical Univ. CD-ROM [38 p, 1 tab]
Shlyakhtenko, A.
English

High speed vessels
Naval vessels

JUNE 2006

2006061490

Sea trials put Norway's new frigate through her paces.

Jane's Navy Intl, v 43 n 10, 8 March 2006, p 29 [2 p, 3 fig]
Glassborow, K.
English

This article describes the first of Norway's new class of frigate, KNM FRIDTJOF NANSEN, recently handed over to the Royal Norwegian Navy. The frigate is the first warship in the world to operate the SPY-1F radar.

Frigates
Naval vessels

2006061491

Innovative M80 'Stiletto' unveiled by builder.

Warship Technology, March 2006, p 6 [2 p, 4 fig]
No author given
English

M80 Stiletto, a high speed, carbon fibre vessel with a unique patented 'Double-M' hull design is described. The M80 demonstrator model was built under a contract with the US Department of Defence Office of Force Transformation and will undertake a series of trials to examine the advantages to be gained from new types of military vessels that combine advanced hull forms and new materials.

Composite materials
High speed vessels
Naval vessels

2006061492

Propulsion motor advances drive all-electric ship development.

Warship Technology, March 2006, p 11 [3 p, 5 fig]
No author given
English

Applying electric propulsion to frigate-sized and larger warships has stimulated advances in power electronics, AC drive systems and propulsion motor technology. This article looks at some recent developments.

Electric propulsion
Naval vessels

2006061493

Air warfare destroyer builds up a head of steam.

Warship Technology, March 2006, p 15 [1 p, 2 fig]
No author given
English

This article gives details of the Australian Navy's Air Warfare Destroyer which is being built to meet the Project Sea 4000 requirement for an anti-air warfare ship with ballistic missile defence capabilities.

Destroyers
Naval vessels

2006061494

Class moving further into classification of combatants.

Warship Technology, March 2006, p 20 [3 p, 3 fig]
No author given
English

Naval vessels have traditionally been constructed in accordance with navies' own standards and specifications. The requirement to meet today's expectations for safety assurance has led many navies to adopt recently introduced naval rules now provided by several of the leading classification societies. This article looks at the rules developed by Lloyd's Register of Shipping, the Italian classification society RINA and the American Bureau of Shipping.

Naval vessels
Ship classification

2006061495

Indian Navy committed to ambitious naval programme.

Warship Technology, March 2006, p 27 [5 p, 7 fig]
No author given
English

More than 60 warships and submarines are to be acquired by the Indian Navy in the next 15 years, making it one of the largest warship procurement programmes anywhere. This article outlines the vessels to be built.

India
Naval vessels

2006061496

Austal targets small combatant market.

Jane's Defence Weekly, v 43 n 15, 12 April 2006, p 32 [1 p, 1 fig]
Bostock, I.
English

Austal Ships in Australia has released details of a new multi-role corvette aimed at both blue and brown water navies requiring minor warships of compact design.

The corvette measures 72m in length, has a moulded beam of 19.1m and a deadweight of just 250 tons, which can be traded off for less fuel and more payload as required.

Corvettes
Naval vessels