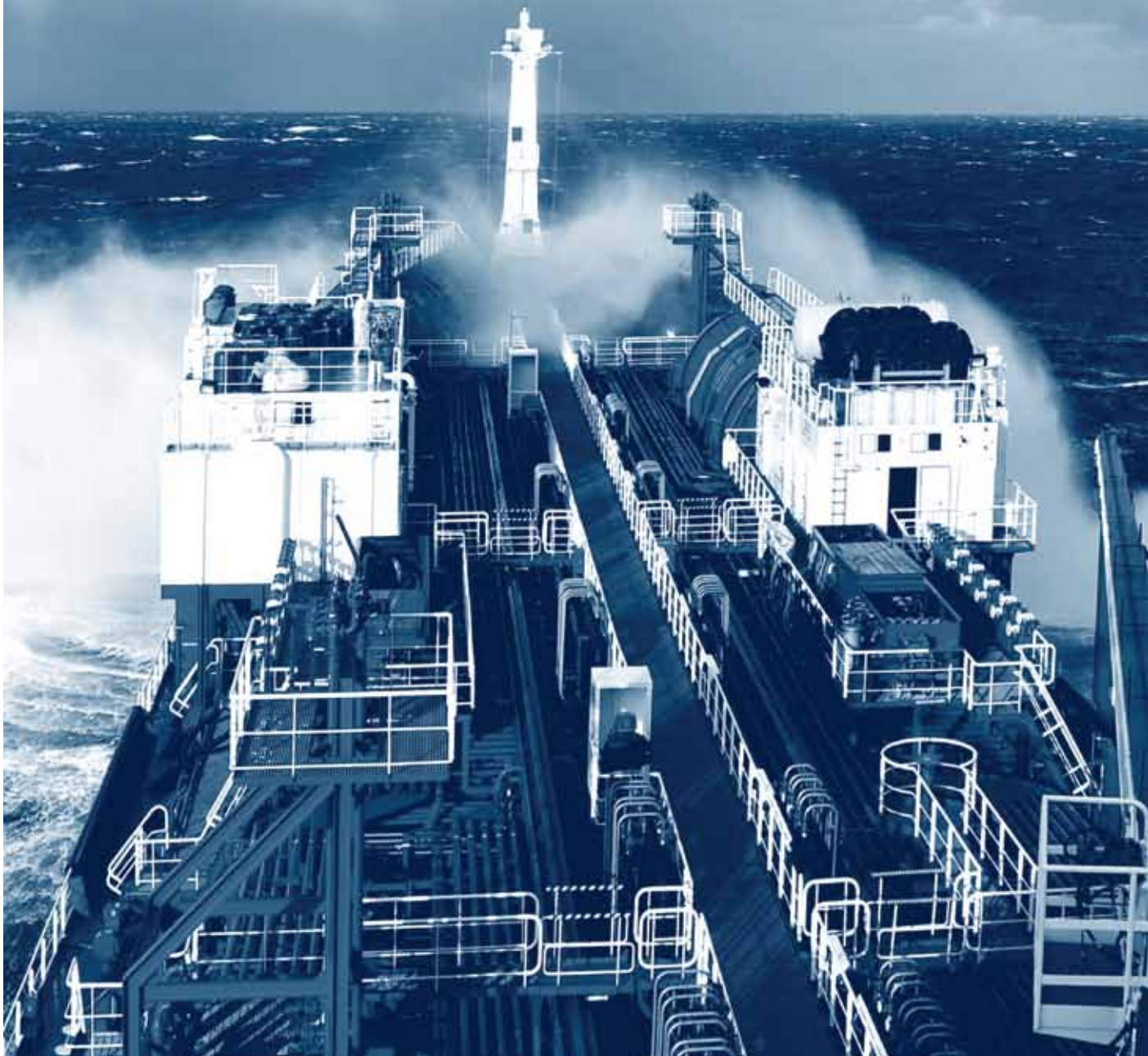




# Ship Safety Through Innovation





**SafetyatSea** is a consulting company of naval architects and marine engineers specialising in the stability, design and safe operation of ships and advanced marine vehicles.

[www.safety-at-sea.co.uk](http://www.safety-at-sea.co.uk)

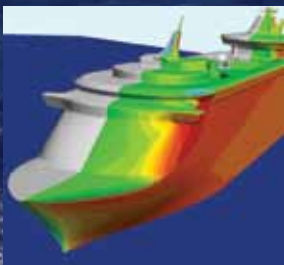


**SafetyatSea** offers specialist engineering services on ship stability and safety to owners, shipyards, navies and design offices involved in the development of innovative and safety-critical vessels.

**SafetyatSea** scientific approach used for solving practical problems, allows us to provide customers with cost effective solutions that fulfil their highest expectations. Our expertise is also extensively utilised in forensic accident investigation and applied research through various Joint Industry Projects.

**SafetyatSea** undertakes challenging engineering tasks individually and in partnership with other parties, depending on the nature and scale of the project.

**SafetyatSea** has strong historical and working links to the Ship Stability Research Centre and other departments within the Universities of Glasgow and Strathclyde allowing us to apply the latest technology and methods to the industry's needs.





# Ship Concept Design

**SafetyatSea** works with ship designers towards achieving cost-effective ship safety and performance by providing specialist knowledge and advanced numerical analysis in support of ship design development.

## **Adding value to passenger ship design**

Leading cruise shipyards and operators are increasingly undertaking the development of innovative ship concepts. **SafetyatSea** supports the development and verification of safety goals and objectives in relation to damage ship stability and ship survivability, fire safety and evacuation.

Our aim is to promote the use of contemporary knowledge and tools to ensure that safety standards are in line with modern safety expectations. We work with cruise vessel operators in the development and verification of casualty threshold requirements for flooding and fire in line with recent IMO safe return to port principles.

## **Rules compliance / safety evaluation**

- Intact stability / loading and stability
- Damage stability / probabilistic rules
- Ship's vulnerability to flooding / dynamic flooding simulation / flooding damage control
- Means of escape & evacuation plans / evacuation simulations
- Alternative design & arrangements / safety studies

## **Ship performance evaluation**

- Naval architecture, hull and appendage optimisation
- Seakeeping, green seas, slamming, passenger comfort
- Manoeuvrability and Ship Handling
- Resistance and general hydrodynamics by CFD and model testing
- Funnel and superstructure optimisation by CFD for passenger comfort
- Energy savings / dynamic energy modelling
- HVAC comfort and noise

## **Our clients include:**

Royal Caribbean International (USA), Meyer Werft (Germany), Aker Yard (Finland), Deltamarin (Finland). We are proud to be part of the team that supported Royal Caribbean International in the development of the Oasis of the Seas project.



# Consulting Engineering

**SafetyatSea** has developed an international reputation for applying advanced techniques for cost effective, on time and on budget problem solving.



Our clients believe in our ability to apply the best solution methods to meet their demands. We have developed an armoury of techniques, expertise and tools to allow the company to address anything from the financial and environmental risk of arctic shipping operations to the vortex induced vibration of a hull appendage.

## Project Types

### Naval Architecture / Ship Repairs & Conversions / Problem Rectification

- Stability upgrades
- Vibration and fatigue
- Appendages, sponsors and ducktail optimisation / CFD
- Structural strength analysis / FEM
- Energy savings / Dynamic energy modelling
- Pedestrian dynamics / Evi
- Exhaust gas emissions (CO<sub>2</sub>, SOx footprint)
- Operability analysis
- Ship handling

## Risk Assessment

- Formal Safety Assessment
- Structural degradation of bulk carriers
- Oil pollution from shipping accidents
- Safety cases / transport of dangerous goods
- Exhaust gas emissions and dispersion analysis
- Port Marine safety assessments
- Operational risk assessments
- Risk assessment of operation of ships in Polar Regions

## General dynamics

- Pedestrian movement (internal layout and passageway design)
- Vehicle kinematic analysis (port planning and design)
- Floating structures motion analysis
- Refloating / flooding simulations for salvage operations

## Our clients include:

Rolls Royce (UK), Aker Yards (Finland), Meyer Werft (Germany), Royal Caribbean Cruise Lines (USA), Color Line (Norway), Deltamarin (Finland)



# Marine Accident Investigation

**SafetyatSea** undertakes and supports accident investigations with state-of-the-art knowledge and engineering tools. Our aim is to facilitate the identification and dissemination of the lessons that can be learnt from shipping accidents.

**SafetyatSea** has a proven track record of providing specialist knowledge and advanced analysis to flag administrations and government organisations engaged in accident investigations. This has taken place in the form of technical coordination of larger teams, as sole investigator or providing in-depth concise studies for the investigating authority. All work is carried out to the highest level of professionalism and quality that our clients expect.

**Our clients include:**

- Panama Maritime Authority
- VINNOVA (The Swedish Governmental Agency for Innovation Systems)
- Marine Accident Investigation Branch (UK)
- UK DfT (Department for Transport)
- Panama Canal Authority



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### Services for Insurers & Law Firms

Our focus on Safety in Design and Operation combined with our close links to UK universities has allowed us to develop capabilities in a diverse range of areas

#### Services

- General stability and survivability issues
- Review of working practices and risk assessment
- Machinery performance and failure
- Global hull failure analysis
- Local failure analysis of cranes, hatches, container stacks etc.
- Fire modeling and design verification
- Ship handling and collision modelling
- Vessel motion, cargo shifting and stowage

The experience at **SafetyatSea** in supporting designers and owners / operators in their normal activities allows us to provide a unique perspective to accident events.

#### Expert Witness

Providing expert witness services for marine lawyers, insurers and owners

**SafetyatSea** has a proven track record of providing expert witness services for our clients involved in legal proceedings. Our clients recognise our ability to provide accurate sound and authoritative technical expertise on time and within budget.

#### Our clients include:

Mackinnons Solicitors, Brookes Bell, Ince and Co, Linklaters, Sunderland Marine Insurance, Isle of Man Police, BCP/Three Quays, Barlow Lyde and Gilbert, Scottish Boat Owners,





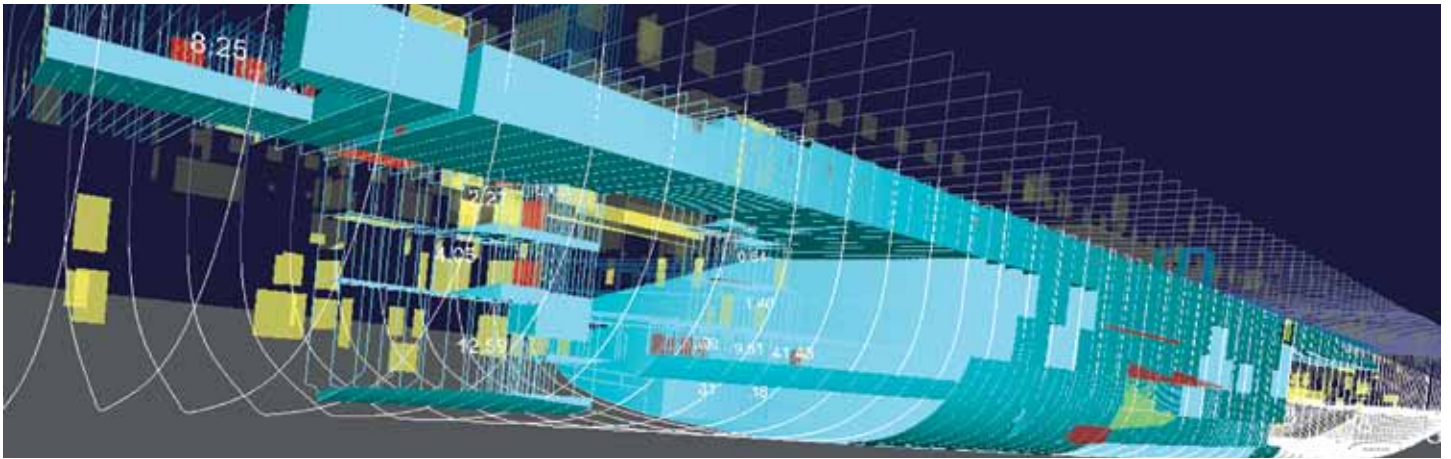
## Research & Development

**SafetyatSea's** focus on providing cutting-edge solutions to real engineering issues is made possible by its dedication to research and development.

These activities are conducted under contract from Government organisations, individual companies, as part of European research programmes or through internally funded projects.

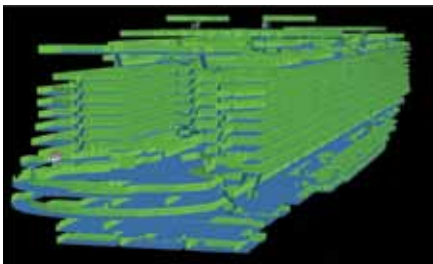
From its inception in 1999 as a spin out company from the University of Strathclyde, **SafetyatSea** has placed research and development at its heart. Many of the new products and methods of problem solution arise from research projects allowing us to make advanced technologies available to our clients. Much of this research has been used to shape today's regulatory framework through flag administrations and the International Maritime Organization (IMO). This activity has been the foundation and continuation of the ethos of the company: **safety through innovation.**

Many of the research and development activities in the company have been initiated and inspired by our work with the Industry. The experience and feedback from our Clients in conjunction with our scientific background has helped us to develop new ideas and approaches for meeting today's evolving engineering challenges.



# Software

**SafetyatSea's** commitment to safety and innovation in ship design has led to the development of unique software tools that allow the evaluation of safety performance as part of the design process and continuously during operation.



Software development at **SafetyatSea** is carried out under the Lloyd's Register TickIT certification and quality assurance scheme.

## Proteus

A non-linear code to predict ship motions in realistic environments in intact and damaged conditions;

The code is used routinely in ship concept design to assess the level of survivability of a passenger ship after water ingress due to collision or grounding events and to identify measures to reduce the risk of capsizing or sinking. This is a key aspect of the risk based design process. Proteus is also used extensively in accident investigation and litigation cases.

## EVI

A pedestrian dynamics simulation tool utilising multi agent modelling techniques and continuous space.

The tool has been used extensively for the assessment of escape and evacuation arrangements on ship layouts.

Most recently **EVI** has being used for undertaking fire risk assessment in conjunction with fire engineering calculations

## iStand

While software systems capable of rapid stability calculations have been available for some time, there has long been a need for a Decision Support System capable of providing timely and useful advice to the bridge in time of crisis.

**iStand** answers this need by being the first system of its type capable of assessing the criticality of the situation in terms of evacuability and flooding and providing useful guidance to the bridge based on the situation in hand rather than pre-computed static advice. **iStand** was developed as part of our research work in EC Framework Projects and was first implemented on Royal Caribbean International's 'Oasis of the Seas'. **iStand** builds on our experience of nearly 10 years starting with the delivery of stability software for military vessels.





### Professor Dracos Vassalos

BSc, MBA, PhD, CEng, FRINA, FIMarEST

#### Chairman

[d.vassalos@safety-at-sea.co.uk](mailto:d.vassalos@safety-at-sea.co.uk)

Dracos is the Chairman of **SafetyatSea**, having previously held the role of Managing Director since the company's inception in 1999. As well as chairing the Board Professor Vassalos is responsible for strategic business development and for the promotion of Design for Safety through the company's commercial and research activities, the latter in close collaboration with and as Director of the Ship Stability Research Centre (SSRC), a world-leading Centre of Excellence in the Department of Naval Architecture and Marine Engineering of the University of Strathclyde. As University staff he is holding the Chair on Maritime Safety, served as Head of Department for 10 years (1997-2007), been Chair of the STAB Conferences and Workshops (1996-2006), Chair of the ITTC Stability Committee in Waves (1996-2002), Chair of WEGEMT (the European Association of Universities in Marine Technology 1999-2001). He has won a string of prizes and awards, including over 100 large scale research projects amounting to some £20M, is the owner of 4 patents, the author of some 400 technical publications and author/editor of 7 books/Conference proceedings. Professor Vassalos lectured world-wide promoting Design for Safety and Risk-Based Design a theme he has instigated and promulgated through SSRC. He is also the Founder and Chairman of the International Standing Committee of the "Design for Safety" Conference and of the "Risk-Based Approaches in the Maritime Industry" Workshops and a long-standing member of the UK delegation to IMO for ship stability.

### Dr Kieran Dodworth

BEng, PhD, MIMarEST, CEng

#### Managing Director

[k.dodworth@safety-at-sea.co.uk](mailto:k.dodworth@safety-at-sea.co.uk)

Kieran is the Managing Director of **SafetyatSea**, a post he has held since March 2009. Previous to his current role he held the position of General Manager from 2005 and Project Manager from first joining the company in late 2001. Dr Dodworth was employed in the offshore industry prior to joining **SafetyatSea**, working for several consultancy firms based in the UK in the area of non-linear dynamics of offshore structures. He studied for a PhD in damaged vessel hydrodynamics at the University of Strathclyde which he achieved in 2000. His undergraduate degree was in Naval Architecture and Small crafts from the University of Strathclyde which was completed in 1995. His areas of expertise are in aero/hydrodynamics and marine structures and he is responsible for the development and technical output of the company in these areas. He has also carried out a considerable body of work in the area of seakeeping and vessel dynamics and is one of the company's specialists in this field. He has advised clients on a number of important legal cases and carried out accident investigations on behalf of flag states for major vessel losses.

### Dr Tom Allan

BSc, DSc, CEng, FRINA

#### Non Executive Director

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Tom is a Non- Executive Director of **SafetyatSea**. Previous to this role he was a Director of the UK Maritime and Coastguard Agency and was the former Chairman of the International Maritime Organization's (IMO) Maritime Safety Committee in addition to being the UK Permanent Representative to IMO. Dr Allan is currently Chairman of the Cruise Ship Safety Forum for the cruise industry; Chairman of the International Association of Classification Society's (IACS) internationally formulated Independent Appeal Board; Chairman of the Lloyd's Register Technical Committee. He is also a member of the Royal Caribbean International Maritime Safety Board. Dr Allan has a consultancy role with Pole Star Space Applications Ltd amongst others and he is a visiting Professor at, Greenwich and Dalian (China) Universities. Dr Allan has been awarded the IMO International Maritime Prize and the United States Coast Guard Distinguished Public Service Award for services to the maritime industry.

### Dr Chris Doo

BEng, PhD

#### Offshore Business Development Manager

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Chris is Offshore Business Development Manager (Aberdeen) for **SafetyatSea**. Previous to joining **SafetyatSea**, in March 2010, Dr Doo has been employed in the Offshore Oil & Gas and Renewable Energies sectors where he held the role of Key Account manager for a leading specialist engineering consultancy. Since 2005 Dr Doo has been involved in Front-end, development and operations projects across the supply chain working with Operators, contractors and vendors in the fields of Process and Flow Assurance, Technical Safety, Detailed Design and Dynamic Analysis.



Pictures from left to right

- 1 Professor Dracos Vassalos,
- 2 Dr Kieran Dodworth,
- 3 Dr Tom Allan, 4 Chris Doo,
- 5 Tomasz Grzes, 6 Dr Luis Guarin,
- 7 Dr Andrzej Jasionowski, 8 Anthony York.

Prior to 2005 Dr. Doo completed his PhD in the field of Marine propulsion systems at University of Strathclyde which he achieved in 2004. His undergraduate degree, completed at University of Glasgow, was in Aerospace Engineering where he specialised in the area of aerodynamics of re-entry vehicles. Between degrees Dr. Doo spent time as a contractor for Rolls-Royce where he completed a number of projects at graduate level.

### **Tomasz Grzes**

MEng

Branch Technical Manager

[t.grzes@safety-at-sea.co.uk](mailto:t.grzes@safety-at-sea.co.uk)

Tomasz is the Branch Technical Manager for **SafetyatSea** Oddział w Polsce. Tomasz has graduated with MEng from Technical University of Gdansk in 1999. His areas of expertise gained in Gdynia Shipyard (Poland) and in several consultancy offices based in Poland. He was worked on a large number of container vessels, car carriers and other types of ships in the full extend of design process. He was responsible for stability performance evaluation, hull lines designing and theoretical documentation from the initial design to the delivery of the vessel. He has carried out number of inclining experiments. At **SafetyatSea** he has been involved for over 5 years in initial design stability evaluation of yachts, car carriers and cruise vessels. In relation to the latter, he has been carrying out advanced evacuation analysis, damage motion analysis, inclining experiments and stability work aimed at the assessment of SOLAS'2009 probabilistic stability regulations in various concept ship designs. Tomasz is responsible for the technical output of **SafetyatSea**'s Gdynia office.

### **Dr Luis Guarin**

MEng, PhD, CEng

Director, Safety Engineering

[l.guarin@safety-at-sea.co.uk](mailto:l.guarin@safety-at-sea.co.uk)

Luis is the Director of Safety Engineering of **SafetyatSea**, a post he has held since March 2009. Previous to his current role he held the position of Project Manager from 2006 and Project Engineer from first joining the company in 2002. Dr Guarin studied for a PhD in ships' seakeeping and green sea loading in extreme sea conditions at the University of Strathclyde, which he achieved in 2002. His involvement with the University continued until 2006, where he held a part time post as research fellow at the Ship Stability Research Centre (SSRC), where he worked on the development and implementation of risk assessment techniques in the evaluation of ship safety, mainly in concept ship design. His work contributed significantly to SSRC's extensive output in EC-funded research on risk-based design and safety. Dr Guarin's undergraduate degree was in Structural Ship Design from the Technical University of Gdansk, which was completed in 1997. He has conducted several Formal Safety and Risk Assessments on behalf of regulatory and industry bodies on subjects such as safety of passenger ships and tankers operating in Polar Regions, air and oil pollution from ships, structural degradation of bulk carriers, as well as fire protection and LSA alternative arrangements on ships including Ro-Pax, cruise, mega-yachts and special purpose ships. He has also been involved in safety assessments and audits of Organisations Recognised (RO) to undertake statutory and class surveys of ships.

### **Dr Andrzej Jasionowski**

MEng, PhD, CEng

Director, Research and Product Development

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Andrzej is the Director of Research and Product Development and the Technical Manager of the Ship Stability Research Centre of the University of Strathclyde, where he is also a lecturer. He graduated from the Technical University of Gdansk (MEng, 1997), and University of Strathclyde (PhD, 2002). His expertise includes ship hydrodynamics, damaged ship dynamics, stability, risk assessment, inductive inference, modelling uncertainty, and numerical algorithms development. He is the Author/ of 34 journal and conference papers.

### **Anthony York**


BEng, MRINA

Director, Concept Design and Naval Architecture

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Anthony is the Director of Concept Design and Naval Architecture. He has a BEng in Naval Architecture from the University of Strathclyde, and joined the company as a consultant when it was formed in 1999. Anthony has considerable experience in the field of stability assessment (both intact and damaged) for a variety of ship types, and the detailed application of both deterministic and probabilistic stability standards (SOLAS'2009). He has worked on a large number of Ro-Pax and Cruise Liner conversion projects, and has been involved in a number of vessel accident investigations such as the MS al-Salam Boccaccio 98, and is a member of the Joint Panel of Experts in the re-opened TRIDENT fishing vessel investigation. He has extensive model testing experience in the area of Stockholm Agreement compliance, and has been directly involved in a number of concept designs for both Cruise and Ro-Pax platforms.

 Supporting **Ship Concept Design** for owners and shipyards

 Applying advanced methods in **Consulting Engineering** for problem solving

 Leading **Research and Development** for flags, owners and industry associations

 Expert analysis and advice in **Accident Investigations** for flags, P&I clubs and lawyers

 Delivering innovative **Software** for onboard decision support and design for safety



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