



REPORT

17th IALA Conference

Aids to Navigation – A Global Approach

All waters, all risks, all solutions

EXECUTIVE SUMMARY

The 17th IALA Conference – Aids to Navigation – A global approach, all waters, all risks, all solutions – was held from March 22 - 27, 2010 at the Cape Town International Convention Centre, South Africa, co-hosted by Transnet. The conference was attended by 409 delegates, plus many staff from the host country. The delegates represented 59 countries, of which 45 were IALA national members. The exhibition attracted 36 Industrial Members, displaying the latest developments in aids to navigation technology and services.

A series of 42 presentations were given under nine broad headings:

- Maritime Accidents and Near Misses
- Risk, Quality and the Environment
- The Future for Visual Aids to Navigation
- From VTS to VTM
- Maximizing the Potential of AIS
- e-Navigation
- Aids to Navigation, a Global Approach – Focus on Africa
- e-Navigation and Emerging Technologies
- Aids to Navigation Heritage

Two General Assembly meetings were held during the week, at which IALA's Strategy, financial status, the potential move of IALA Headquarters, changes to the IALA Constitution, and Committee Memberships were discussed. In the second part of the General Assembly elections took place for the 22 seats on the IALA Council, from which the new President (South Africa) and Vice President (Spain) were elected.

IALA's Secretary-General since 1994, Mr. Torsten Kruuse, retired during the Conference; his replacement (Mr. Gary Prosser from Australia, previously deputy CEO of the Australian Maritime Safety Agency and Australia's IALA Council Member) took over mid-way through the week.

The Conference also saw the launch of the revised IALA Maritime Buoyage System (MBS) booklet and the publication of the latest edition of the IALA NAVGUIDE.

The Conference identified 18 conclusions and 18 recommendations.

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17th IALA Conference
Aids to Navigation – A Global Approach
All waters, all risks, all solutions

1 INTRODUCTION

The 17th IALA Conference was held from March 22-27, 2010 at the Cape Town International Convention Centre, Cape Town, South Africa. The theme for the conference was Aids to Navigation – A Global Approach. All waters, all risks, all solutions, and the technical presentations focused on these aspects. Over 409 delegates, representing 59 countries attended the conference.



A list of participants is included at ANNEX A.

2 OPENING CEREMONY

Chaired by Mr David Gordon, Senior Manager: Lighthouse Services, Transnet National Ports Authority.



There was a spirited presentation of creative theatre with magic, tumbling, a lady being sawn in half, dance, a light show and powerful contemporary music by members of a six strong cast from the Cape College of Magic led by Monica Nyakatyia and Nzumbuzo Nkonyana.

Each IALA member's national flag was faded in on to the screen above the stage. Towards the end the 54 strong Tygerberg Children's Choir sang a cheerful Xhosa song as they trooped down the aisles from the high level entrance towards the front of the auditorium.

As a finale to these brilliant performances a single act employed a multitude of coloured scarves which, blended together, delivered the 2010 IALA Conference logo. In all, a grand start to the day's proceedings and loudly applauded.

2.1 Introduction by Conference Project Sponsor



Mr David Gordon welcomed delegates to South Africa and Cape Town, in particular, before welcoming the VIPs. He then invited Mr Khomotso Phihlela, Chief Executive, Transnet National Ports Authority, to address the Conference.

2.2 Welcome by Conference Host – Mr Khomotso Phihlela, Chief Executive, Transnet National Ports Authority



The address by Mr. Phihlela is attached at ANNEX B.

2.3 Captain Liu Gongchen, China MSA, IALA President



Honourable Mrs Barbara Hogan, Minister of Public Enterprises, Delegate and Colleagues.

It gives me great pleasure to welcome you all here to Cape Town and the 17th IALA Conference. First of all I would like to thank South Africa and especially Transnet National Ports Authority for the offer to host our Conference.

The planning of the Conference has been going on for the last four years and the cooperation in the Steering Committee has been excellent and fruitful. The programme for the presentations is of a very high standard thanks to the numerous abstracts from the membership, actually several more than we could find room for.

The Paper Selection Committee had a very difficult task to select the papers to be presented and it was with bleeding hearts that some had to be rejected. I want to thank the Committee for their hard work.

Our Industrial Members have prepared an outstanding exhibition with the latest technology and solutions. The exhibition is impressive and informative so I recommend you spend a lot of time there.

The hosts have prepared a social programme which I think will meet all your expectations and the IMC have planned the Industrial Members' evening in a way that I believe will be as unforgettable as in past conferences.

Thanks to the initiative of the IMC of the Industrial Members it was suggested to provide funding for sponsorship for five delegates. Therefore ten African countries can benefit from this sponsorship and participate in this conference. I hope they will be inspired and take the experience into account in building up their aids to navigation services when they get home.

Unfortunately our planned Keynote Speaker has had to cancel his participation because the IMO MEPC committee also begins today. With the outcome from COP 15 he had no other choice than to address the IMO Committee on day one. In addition the address from the IHO President has had to be in written statement form as he had to attend to urgent IHO matters.

However, this may be a blessing in disguise as we have managed to get the most well-known and qualified writer on maritime affairs, Michael Grey, to give us the Keynote and wake-up call instead.

Finally, I would like to thank you, the delegates for taking the trouble to come all the way to this beautiful and friendly corner of the maritime world. I hope you will take the opportunity to take on board the many fine presentations and learn of best practices with new and old technologies. The conference is also the perfect place for building networks and friendships.

It is your conference – use it, to make the best of it.

I wish you a fruitful and pleasant conference.

2.4 Opening of the Conference – The Honourable Minister Barbara Hogan (MP), Minister of Public Enterprises, South Africa



The Minister welcomed delegates and said that Cape Town was delighted to host the Conference.

She went on to assure them of a wonderful stay and was sorry that they would be unable to attend the forthcoming World Cup where Green Point, with its grand stadium and its lighthouse would be the focus of interest.

In outlining the historic importance of Cape Town she quoted Sir Francis Drake who said of the feature, “...the finest cape I have ever seen in all the circumference of the earth...” She referred also to the Cape by another name, “the Cape of Storms” with its resultant shipwrecks which have been all too familiar down the years.

The colonial history of South Africa was referred to, particularly now that South Africa is free and independent. Nelson Mandela was imprisoned on Robben Island and Robben Island Lighthouse was regarded as the light of the incarcerated and the sign of the spirit of hope for South Africa. She wishes delegates fruitful collaboration during their stay.

South Africa is a leader in commerce on the continent of Africa and Mrs Hogan congratulated Transnet National Port Authority for their organisation of this event.

In declaring the Conference open she hoped that visitors would have a wonderful time in the city.

2.5 Message from the International Hydrographic Organisation (IHO)

Dr. Mike Hadley read a letter from the IHO, which had been received just before the Conference. The letter is reproduced at ANNEX C

2.6 Keynote Speaker – Mr Michael Grey, Lloyd’s List

Michael Grey spoke about the challenges being faced by the maritime industry and the way in which many are not being tackled or are being ignored. He touched on manning, technology and IALA’s role in encouraging harmonisation.



A copy of the address by Mr Grey is attached at ANNEX D.

3 WHERE ARE WE NOW – AN IALA OVERVIEW

Chaired by Torsten Kruuse, Secretary General, IALA

3.1 Remarks by the President of IALA, Captain Liu Gongchen, China MSA

The President opened proceedings by welcoming the delegates once more.

He remarked that four years have passed since the last conference in Shanghai, China. With the support of all of you here, IALA has made great progress on the world's aids to navigation during that time. Today IALA has become a well-known international organization and holds an important position in the world of shipping.

Now I would like to invite Torsten Kruuse, Secretary General of IALA, who has made great contributions to IALA's work, to give the overview of IALA for the past four years.

3.2 Overview of IALA Events – Mr Torsten Kruuse, IALA



The Secretary-General began by outlining the workshops and seminars held since the 2006 Conference, explaining the difference between the two events, and mentioning that it was the intention that IWRAP Mk2 training courses be held on an annual basis. He then outlined the additional meetings that had taken place and the role of IALA consultancy. He then introduced Sir Jeremy de Halpert.

3.3 Global Shipping Trends – RAdm Sir Jeremy de Halpert, Trinity House

The presentation looked at how the maritime world reacted to the current recession, in the period from 2006 – 2010, and then looked forward to the year 2020.

In reviewing the current recession, it was noted that by April 2009 the shipping world was in its deepest recession since 1945 and that this appeared to have 'bottomed out' by October, giving way to a stronger than expected start to a recovery in January 2010. However, some of the graphically presented 'boom and bust' could be attributed to the fact that shipping companies have difficulty in responding to swift global changes. However, some of the reactions to current conditions, such as slow steaming and lay-ups were indicated.

It was noted that the warming in Arctic waters was giving rise to interest to shipping routes in these waters, which can produce considerable savings in distance.

Noting the process of further integration of ship systems and the increasing influence of space based technology, the presentation concluded with a word of caution about the need for resilient PNT (Positioning, Navigation and Timing).

3.4 IMO and IALA – RAdm Jean-Charles Leclair, IALA

Co-operation between IALA and IMO has remained excellent and very active during the last four years. The Association was represented at 12 IMO meetings and submitted more than 20 documents. Among the main items discussed in IMO of main interest for IALA Members were: Ships routing and reporting systems, the LRIT system, AIS, e-Navigation and many others. For at least two of them, AIS and e-Navigation, IALA is the major contributor to the work of IMO. The presentation ended with a special mention of a decision taken by the last IMO Assembly to make the IMO Members State Audit Scheme mandatory by 2015.

Conclusion: The participants took note of the intention of IMO to make the Members State Audit Scheme mandatory.

Recommendation: Encourage the IMO Member States to pass the Voluntary IMO Member State Audit Scheme and therefore to prepare for the future mandatory audit.

3.5 International Technical Co-operation – RAdm Jean-Charles Leclair, IALA

The IALA activity on technical co-operation shall not compete with the work of the Industrial Members and is limited to legal framework, administrative organization and assistance on starting a project. During the last four years, IALA assistance was required by Yemen, Latvia and the UAE. IALA also is party of the WIO Marine Highway project. Furthermore, with IMO, IALA was represented in different technical assistance missions, on administrative organization and on the implementation of LRIT and AIS. It was also noted that 10 delegates from 10 different African countries, sponsored by IMO (5) and by the IALA Industrial Members (5), were invited to attend the Conference

3.6 IALA World-Wide Academy – RAdm Jean-Charles Leclair, IALA

The aim of the IALA WWA is to gather together all training activities developed by IALA, those already existing for VTS and those developed for aids to navigation activities and others. It will give a name to the IALA training activities and a recognized representative through its Dean. At this stage, the IALA WWA is part of the IALA Secretariat and there is no specific cost involved for the Association unless it is compensated by specific incomes.

The IALA WWA includes VTS training, for which model courses have been completed and updated, AtoN training plus other specific topics, as training for risk management tools, for which model courses have to be developed. IALA WWA is in its infancy and needs the good will of all possible experts to be built stone by stone, starting by model courses and the accreditation of VTS training institutes.

The creation of the IALA WWA, which regroups all training activities developed by IALA, has been well received and all IALA members and experts are invited to participate to its development.

3.7 IALA-NET – Mr Torsten Kruuse, Secretary-General, IALA

This is an IALA project and will be implemented if the current trial demonstrates its feasibility and interest. The trial started in August 2008 and will come to an end on 1st July 2010. It is realized through a demonstrator provided to IALA and its members at no charge thanks to the generosity of Denmark and the United States. IALA-NET is a near real time AIS data exchange service through the Internet. It is a worldwide service and is only open to national authorities who provide AIS data from their own country. The service is intended to assist these authorities to fulfil their duties regarding safety, security, protection of the marine environment and the efficiency of navigation.

With regard to the secrecy of ship movements the author made clear that AIS is a broadcast system. There are already existing numerous traffic monitoring systems and these are shore-based and soon to be satellite-based. There are national systems, and regional systems such as HELCOM in the Baltic and the European Union's SafeSeaNet. Global Coastal Systems include

MSSIS, AIS-Live, Lloyd's MIU and the future IALA-NET. The reasons for the creation of IALA-NET were stated. Several private and commercial companies already monitor maritime traffic on a global mode. However, traffic monitoring includes security, safety, protection of the marine environment and traffic organization missions. These missions are part of governmental responsibilities and the information used by the Authorities in charge of the missions shall not be dependent solely upon the private sector.

Of the benefits of IALA-NET the author gave some examples: maritime safety, search and rescue, marine accident investigation, improving efficiencies of navigation, security, surveillance, traffic analysis and environmental monitoring. Access to the IALA-NET data exchange will only be allowed to countries which provide AIS information themselves to the system. In these countries access will only be permitted to Competent National Authorities.

The IALA-NET Demonstrator is accessible through the Internet to all National Competent Authorities for a test period of 15 days. Participation in the Demonstrator is free of charge. Further information can be found at: www.iala-aism.org or www.frv.dk/iala-net. Delegates were invited to submit comments through a questionnaire.

3.8 IALA Committees, Panels, Forums, Workshops & Seminars

3.8.1 Aids to Navigation Management (ANM) Committee – Captain Duncan Glass, Trinity House (Chair ANM Committee)

This Report covers the period from 2006 to 2010, commencing at the conclusion of the IALA Conference in Shanghai, in May 2006 and concluding at the Conference in Cape Town in March 2010. It is the journey from the 16th IALA Conference to the 17th.

All four IALA Committees have been flat-out since leaving the Shanghai, the Aids to Navigation (ANM) Members collectively travelling considerable distances to attend the seven meetings held during the four year period. All aiming to have finished our Work Program tasks by the time we arrive in Cape Town on the 21st March 2010! Quite a challenge when you look at the number of really demanding Tasks that were set by the IALA Council, the number of Committee meetings and the vast array of participants from all corners of the globe.

I will now try to give a brief report of the work that the Aids to Navigation Management Committee have undertaken in pursuit of their Work Program and enhancement of safety of navigation.

Items monitored by Rapporteurs

Throughout the four year journey our rapporteurs have continuously monitored a number of specific areas of particular interest and importance to IALA. These are:

- Use of the IALA Emergency Wreck Marking Buoy, including issues with the review of the Maritime Buoyage System (MBS) to ascertain the level of take-up and effective use of this new AtoN which undergoes its trial period throughout this four year period between conferences. The results have been good. The take-up is high and the effective use of the buoy to mark wrecks in an emergency has been most successful. It has been agreed to include this aids in the MBS as it is being reviewed / updated at this time, for official adoption at the forthcoming Conference.
- The use of the IALA Guidelines on Risk / Development of the IALA Risk Assessment Tool continues and we move ever closer to the definitive method of assessing risk and agreeing on the optimum mitigation using a mix of aids to navigation.
- Monitor the trends obtained from the IALA Questionnaire as we encourage all IALA Member Countries to submit their completed questionnaire on a regular basis. The Rapporteurs responsible for this item have now developed improved versions of the electronic questionnaire and are able to collate and present the outcome / trends in clear graphical format.
- Monitoring of the digital aids to navigation and new tools for AtoN Service Management, especially considering new trends, is a particularly challenging item for the Rapporteur and

committee colleagues. With so much happening in the electronic and digital world. Keeping pace with all new developments and reporting on those relevant to IALA is an important responsibility.

So it is with sincere thanks to the hard-working Rapporteurs of the ANM Committee that I report on their continued commitment and achievement. It is essential that we keep abreast of technological innovation and advance and capture that, which is appropriate, for the benefit of IALA Members and the maritime environment.

The ANM Work Programme

The work that the IALA Council handed down to the Committees at the Shanghai Conference has grown inexorably over the period since May 2006, and the Committees have increased their productivity and workload accordingly.

Here are the principle tasks undertaken by the Aids to Navigation Management crew, all of which are complete, or about to be, in anticipation of arrival at the Cape Town Conference.

1. Develop guidance on aids to navigation design for waterways and channels, and a minimum comprehensive mix of Aids to Navigation, promoting Marine Electronic Highways / e-navigation, especially in congested waters, including how to react to incidents that create navigation hazards.

This has been an enormous task and has taken years to complete. The Guideline will be a really important addition to the IALA list of publications and prove invaluable to any AtoN provider designing a new waterway or channel.

2. Review existing / develop new documentation on AtoN performance, including calculation and measurement on range of lights to define product quality in cases of information for outsourcing projects, has been completed as part of the E-200 Series of documents produced by the EEP Committee. This is now the definitive reference for all such performance criteria and measurement.

3. Review the IALA Maritime Buoyage System, user requirements and safety of navigation in light of traditional aids to navigation, larger, faster, more sophisticated vessels, considering level of service and how to visualize and communicate this relationship to ensure sustainable financing, has been a huge undertaking.

I will present the details and findings of extensive consultation to the Conference in Cape Town, but suffice to say that such an important review and update of the existing IALA Maritime Buoyage System Booklet was not without its difficulties and challenges. This work has taken four years and has been the sole focus of a dedicated Working Group.

4. Develop guidance on provision of AIS as an Aid to Navigation and management of services from networks and broadcast AtoN information, including meteorological, hydrological and quality assurance of data. With so many Member Countries developing AIS as an Aid it was essential that we produced clear Guidance on this issue. Close co-operation with the other Committee's in this and almost all other tasks was very important.

5. Co-ordinate review of the IALA NAVGUIDE, including implications of new legal requirements on environmental matters, new technical developments including synchronised / sequential lights. This is the core business of the ANM Committee and takes the four years between new Editions to collect and collate the vast amount of information that goes into the NAVGUIDE. Again, the input from the other Committees and Panels is essential.

6. Develop consolidated guidance for the marking of different types of offshore structures, including their impact on AtoN, radar and communications, was started as a bringing together of the four existing Recommendations on the marking of offshore structures / windfarms / wave and tidal devices and fish farms.

However, it was found that the better option was to produce a document that included the content of each of those existing Recommendations in an integrated manner with extensive annexes describing the marking requirements.

7. Develop guidance on the use of simulation and geographical information systems (GIS) in the identification of requirements and provision of Aids to Navigation. This relatively new area was examined during the Shanghai Conference and due to its specific application it was decided to hold an IALA Workshop to consider the most appropriate use of simulation using GIS Systems in the establishment of Aids to Navigation.

The outcome of the Workshop, at IALA Headquarters in November 2007, was production of an IALA Recommendation as well as a Guideline for members to identify the benefits and uses of simulation when considering risk and mitigation factors using AtoN.

8. Produce guidance on risk identification, risk models and risk based approach to the provision of aids to navigation including performance measures and review / update the existing IALA guidance on risk management. The Committee started work on the first part of this task, but quickly realised that it is the latter part that needs attention first. Hence the existing Guideline on Risk Management has been updated and the issue of risk models and risk based approach to the provision of AtoN has been left with the IALA Risk Steering Group to avoid duplication of work and to give time to the completion and validation of the IWRAP Mk2 risk model.

9. Develop a standard quality management system for AtoN services and equipment to maintain the highest levels of service and maintain a QA management system. In the early stages of addressing this task it was clear that the subject would benefit greatly from a concentration of expertise and so a Quality Management Workshop held in Sydney. This resulted in the Guideline being produced having captured all the available knowledge on Quality Management, thus providing definitive guidance for IALA Members.

10. Develop guidance on establishing and conducting user consultancy by Aids to Navigation authorities. The process of user consultancy in identifying the risk and the user requirement is an essential part of the provision of Aids to Navigation. All IALA Members carry out user consultancy in one form or another, and so it was important that we develop a guideline to assist members in consulting users and stakeholders in order that they can follow a process that has had input from many IALA Members and represents their expertise and experience in this area. We believe that this first edition of the User Consultancy Guideline will be of great assistance to many.

The future

At the Conference in Cape Town a new Work Program for each of the four IALA Committees will be approved by the IALA Council. The tasks contained therein will be distinctly different from those described above, as technology and user requirements move forward.

The focus for the next four years will certainly be on e-Navigation and its development from a concept into a clear reality, aimed at improving safety of navigation and protection of the marine environment. I wish the Committees every success in merging today's provision of aids to navigation with e-Navigation and ensuring that the mariner and all stakeholder requirements are met.

The ANM Committee

It is essential that the Committee members, like any crew on a lengthy voyage, are provided with a plentiful supply of food and liquids, if disease – such as scurvy – is to be avoided. An evening rendezvous to replenish the members of this crew is a popular part of the IALA ANM Meetings and many participate and much important debate takes place over dinner and a glass of liquid refreshment.

The food and liquid is needed especially after strenuous exercise. There is nothing more strenuous than watching the ANM Committee playing their regular multi-national football matches – unless it is actually playing in the matches themselves. So it is due to participating in ANM

Committee that this lean, fit and sharp-eyed crew are able to produce the tremendous amount of quality work that they do!

In conclusion

It only remains for me, as the Chairman of this Committee for the past eight years, to thank all the Members for their strong support and unswerving commitment. Especially the excellent Vice Chair who, together with the Working Group Chairmen and Vice Chairmen/women, gave their all to achieve our goals.

We have been ably supported by the IALA Secretariat and express our sincere thanks for all they have done for us. Finally we wish the outgoing Secretary General of IALA, Torsten Kruuse a long and happy retirement and send him our grateful thanks for all he has done, and to his successor, Gary Prosser we send our best wishes for the future.

3.8.2 e-Navigation (e-NAV) Committee – Mr Bill Cairns, USCG (Chair e-NAV Committee)

Bill Cairns, gave a briefing on behalf of himself and Vice Chairman Dr. Nick Ward on the inaugural session of this Committee.

The Committee met 7 times and had roughly 90 participants at each meeting, represented by 24 National Members, 26 Industry Members, and 9 sister Organisations, and was organised into 5 working groups.

The Committee produced two Guidelines on the Recapitalisation of DGNSS (1060) and AtoN Information Exchange and Presentation (1072).

Six Recommendations were produced or revised as follows:

- A-123 The Provision of Shore Based AIS
- A-124 AIS Shore Station and Networking Aspect relating to the AIS Service
- A-126 Use of AIS in Marine AtoN Services
- R-135 Future of DGNSS
- R-129 GNSS Vulnerability and Mitigation Measures
- e-NAV140 e-NAV Architecture – the initial shore-based perspective

In addition, the Committee developed two Plans, the Maritime Radio Communication Plan (MRCP) and the IALA World Wide Radio Navigation Plan (WWRNP). The MRCP is provided to assist in the selection of radio communication systems required to support e-Navigation. Similarly, the WWRNP aims to build on individual National and Regional plans and identifies the Radio Navigation components which will be key to the successful implementation of e-Navigation.

The Committee also produced 41 Liaison notes with other Committees and Organizations; it was also responsible for a great bulk of the input to the IMO correspondence group on e-Navigation, including items such as the e-Navigation definition, user requirements, and specifics on the architecture. A set of 'frequently asked questions' related to e-Navigation was kept current on the IALA website. The Committee also developed a new Chapter on e-Navigation for the IALA NAVGUIDE.

The Chairman of the e-NAV Committee finished with an overview of the e-NAV WG Structure (including WG chairs and vice chairs) and the monitoring items for the 2010-2014 session.

3.8.3 Vessel Traffic Services (VTS) Committee – Mr Mike Sollosi, USCG (Chair VTS Committee)

Over the course of the 2006 – 2010 Work Programme the VTS Committee met 7 times, assembling a body of some 60 experts, representing 26 nations, four Sister organisations and all segments of the VTS realm. This diverse group produced five (5) Guidelines and four (4) recommendations, two brochures and a comprehensive VTS Manual.

The Guidelines addressed had been:

- VTS in international waters;
- Limited access areas;
- Accreditation of VTS Courses;
- Navigation Assistance Service;
- VTS radar.

The Recommendations addressed had been

- Training of VTS personnel;
- Implementation of VTS;
- Participation in the World VTS Guide;
- Technical requirements for VTS equipment.

Two brochures had been produced, which were:

- What a master can expect from a VTS;
- Fatigue, as it affects VTS operations.

The 4th edition of the VTS Manual is a comprehensive discussion of all aspects of VTS operations, administration, staffing and equipment.

Mike Sollosi thanked the Secretary-General and the Secretariat for their support and the VTS Committee members for their contributions and co-operation, particularly noting the work of the Working group Chairs and the Vice-Chairman, Mr Neil Trainor.

3.8.4 Engineering, Environment and Preservation of Historic Lighthouses (EEP) Committee – Mr Ómar Frits Eriksson, DaMSA (Chair EEP Committee)

The EEP committee has met regularly twice a year throughout the period, totalling 7 meetings of which all but one were held at IALA Headquarters in Paris.

An average of 32 participants attended these meetings, representing over 20 countries.

The Committee's scope encompasses the provision of recommendations and guidelines on all engineering, environmental and heritage aspects of Aids to Navigation Service delivery, to IALA members. The scope includes lights, power systems, training, remote control and monitoring, fixed and floating aids, as well as providing guidance on preservation, conservation and possible alternative use of traditional Aids to Navigation and related objects of historical interest.

The work program undertaken by the committee during this work term was quite ambitious, and I am proud to report that the objectives of the work program have been achieved.

A number of old IALA recommendations and guidelines were revised and amended and quite a few new guidelines were developed.

Revised Guidelines:

- Modern light sources in Traditional Optics
- Light sources in visual aids to navigation
- Sector Lights
- Plastic buoys
- Maintenance of buoys and AtoN structures
- Integrated Power Systems Lanterns
- Remote Control and Monitoring
- Ambient Light Levels at which AtoN lights should Switch On and Off

New Guidelines:

- Light Applications – Illumination of Structures
- Design of Floating AtoN Moorings
- Vertical Divergence
- 1067 Series on Power Systems
 - 0 - Selection of Power Systems for AtoN
 - 1 - Total Electrical Loads of Aids to Navigation
 - 2 - Power Sources
 - 3 - Electrical Energy Storage for AtoN
- Branding and Marketing of Historic Lighthouses
- Complementary Use of Lighthouse Property
- Agreements for Complementary use of Lighthouses

New Recommendations:

- NTraining and Certification of AtoN Personnel
- E-200 Series on Marine Signal Lights:
 - 0 - Overview
 - 1 - Colours
 - 2 - Calculation, Def. and Notation of Luminous Range
 - 3 - Measurement
 - 4 - Determination and Calculation of Effective Intensity
 - 5 - Estimation of the Performance of Optical Apparatus

The list is long.

These documents have all been approved by Council and may be found on the IALA website.

Workshops and Seminars:

- FloatAid workshop in Brest, France
- IALALITE / IALABATT in Copenhagen, DK
- Heritage Seminar in Santander, Spain

The Committee has prepared a draft work program for the next work term including topics like those displayed here

- Knowledge Sharing / Knowledge Management
- Visual Perception of lights and daymarks
- Power Systems and Energy Storage
- Remote Control and Monitoring
- Environment and safety
- Aids to Navigation Training, IALA WWA
- Heritage and Conservation
- Civil Engineering and Structures

- Arctic Engineering

Yet again, the Committee work program is an ambitious one, and it can only be accomplished through continued dedication and hard work from Committee members.

It is the work of individuals that makes up the work of the group, and I want to express a deep appreciation for the work of each and every individual contributing to the work of the EEP Committee.

Only through your hard work and late nights, has the EEP Committee succeeded in achieving its objectives; many thanks to Committee members, in particular to the chairmen of Working Groups; to the IALA Secretariat for their invaluable support; to my vice chairman Mr. Seamus Doyle from Irish Lights for his patience with me.

I urge IALA members to continue to support IALA by sending their best experts to IALA technical committees where they can inspire others and be inspired by each other for benefit of the whole Business of Aids to Navigation.

Again many thanks to you all, we meet again in Saint Germain en Laye in October

3.8.5 Legal Advisory Panel (LAP) – Mr Svend Eskildsen, DaMSA (Chair LAP)

The LAP was established by the IALA Council at the end of March 2006 and has had six meetings since, and will usually meet on the basis of one or two each year depending on the amount of business to be considered. It has discussed legal questions passed to it by the IALA Council, by the Secretary General and by the IALA Committees. Currently the Panel comprises lawyers from Australia, Denmark, Finland, France, Germany, Ireland, Norway, Sweden, the United Kingdom and the United States.

Agenda items include an initiative to share information about legal questions of common interest.

Another subject dealt with recently by the Panel concerned liability with regard to the IALA Council Members and IALA staff. It has discussed, too, the status of IALA as a non-profit organization based in France and questions created by the 1901 French law governing non-profit organisations.

The Panel has also been asked about creating a template for Memoranda of Understanding (MoUs) between IALA and other organizations, and with a host nation.

Furthermore, the Panel has worked on a risk register covering the main activities of IALA and on a risk assessment seen from the point of view of lawyers.

3.8.6 Pilotage Authority Forum (PAF) – Mr Arve Dimmen, NCA (Chair PAF)

Mr Dimmen presented the background, status of and future plans for the IALA Pilotage Authority Forum, established in 2006. He noted that the main purpose of the forum is to have an arena for pilotage authorities to address issues of common concern, and that the Terms of Reference specifies certain products that the forum should deliver. One recommendation on quality management has been approved by the Council, while the guideline for pilotage authorities has been approved in principle, and is currently in its final review before being finalised. It is based on the IMO Resolution A 960(23) Recommendations on Training and Certification and Operational Procedures for Maritime Pilots Other Than Deep-Sea Pilots.

He announced that the next meeting of the PAF will be held at IALA HQ in April 2010 and encouraged national members to attend.

3.8.7 Seminars and Workshops – Dr Mike Hadley, IALA

Mike Hadley provided an overview of the 4 Seminars and 7 Workshops that IALA had held between since the 2006 Conference. He noted the excellent participation by IALA members, with over 600 persons attending, representing on average, 19 countries at each event.

Additional meetings held during the period were also covered, as were IALA communications, including the Bulletin and the website. The presentation concluded with some statistics about the services provided by the IALA staff during the period and a record of thanks for the assistance for the assistance provided by member in responding to questions that arrive on the TCM's desk.

3.8.8 IALA Industrial Members' Committee (IMC) – Mr Steve Nell, Marine Data Solutions, South Africa, IMC President

Steve Nell, President of the IALA Industrial Members' Committee welcomed delegates and spoke highly of his committee's achievements, naming its current constituent members: Rudy Zuurbier (Vice President) of Floatex, Allen Mitchener (Tideland Signal Corporation, Lars Mansner (Sabik), Hiroshi Ueno (Nippon Koki) and John Sugarman (Australian Maritime Services).

He thanked the local organizing committee and reported that a record number of exhibition booths had been sold.

IALA now has 100 industrial members and he acknowledged the valuable administrative and financial support received from the IALA and its Secretariat.

3.8.9 Presentation to Secretary-General

On conclusion of the session, Mr James Collocott, Vice President of IALA, requested the President to make some remarks about the forthcoming retirement of Torsten Kruuse, following which a plaque was presented to the outgoing Secretary-General; this to considerable applause.

The tribute paid to Torsten Kruuse by Captain Liu Gongchen is at ANNEX E.

In response, Torsten Kruuse recalled his first visit to IALA in the flat used as the Secretariat offices in Paris, near Place Victor Hugo. He attended his first meeting there of the 12-man Executive Committee (before the Council was formed) and at which, as the representative of Denmark, he was appointed the Association's Treasurer. Attendance there opened his eyes to the spirit of IALA and ever since he has met people who loved the work at IALA. He reflected that *"whatever religion or politics you all strive to achieve the aims of safe navigation and safety of the marine environment..."* He found the Council always supportive of him as Secretary General. He added, *"If IALA is bigger today it is because of the membership who sent their best experts from around the world"*. An important step had been the opening up of IALA Committees to Industrial Members. He spoke highly of his staff in the IALA Secretariat and thanked them for their support and understanding.

At this point James Collocott introduced Gary Prosser from Australia who would be taking over from Torsten Kruuse as Secretary General of IALA from 1st April 2010.

Finally, Captain Liu said that at the previous day's meeting of the IALA Council Torsten had been created an Honorary Personal Member of IALA. To close his remarks the President asked Torsten Kruuse to open the Industrial Members' Exhibition.

3.9 Opening of the Exhibition

Delegates were then invited to gather at the entrance to the exhibition, where, after short speeches by both Steve Nell and Torsten Kruuse, the Secretary-General formally opened the exhibition by cutting a ribbon with a ceremonial pair of scissors, which were then presented to him.

4 TECHNICAL SESSIONS

Nine technical sessions were held. The rapporteurs for the technical sessions were Dr Mike Hadley, RAdm Jean-Charles Leclair, Mr Mahesh Alimchandani, Mr Gerry Brine and Captain Terry Hughes.

4.1 Technical Session 1 – Maritime Accidents and near misses

Chair: Captain Duncan Glass (UK)

Vice Chair Mr Lu Yongqiang (China)

Introduction by Chair

Captain Glass welcomed delegates to the first technical session of the Conference which would look at the causes of maritime accidents, the extent to which the maritime industry was learning from mistakes and what changes can be made in the future to reduce their occurrence.

4.1.1 The MV COSCO BUSAN mishap in San Francisco Bay and potential impact to IALA, Mr Jorge Arroyo, United States Coast Guard

Presented by Mr Jorge Arroyo

In the early morning fog of November 7, 2007, the 810-foot-long container ship COSCO BUSAN struck the centre tower of the San Francisco Bay Bridge, spilling 58,000 gallons of fuel which caused considerable damage to wildlife and the environment, but, fortunately no injury or loss of life was sustained by those aboard nor by motorists transiting the bridge. As with most maritime accidents, no one action or inaction was identified as the sole cause of this accidents; but, there were certainly many factors that could have contributed to it—shortcomings in bridge resource management, electronic charts, vessel traffic services, radio communications, health and well being, language, personal responsibility. Subsequent to the accident various initiatives and policies were considered, debated, and many are now in place—clear guidance for VTS control and restricted visibility clearances, medical reporting procedures, personal piloting units, etc. The presentation provided a synopsis of this mishap, the lessons learned, and the role of digital information (radar, AIS and VDR) in the investigation and its potential impact to IALA and its members.

The key points of the presentation were:

- 1 A synopsis of the COSCO BUSAN allision & subsequent oil spill in San Francisco Bay.
- 2 An outline of the causes of the accident, as found by the USCG Report of Inquiry, included: pilot performance, poor pre-departure and in-transit master/pilot exchange and oversight, inadequate crew training and the pilotage regulator's failure to adequately oversight the pilot's medical fitness. The role of the VTS and AtoN in the mishap was insignificant,
- 3 The role of digital information in the investigation. In particular post-2000 SOLAS requirements for standardised digital sentences across multiple on-board navigation systems were important in ensuring multiple data options were available to assist the investigation including AIS and radar. IALA's role is important, as it is the only source of such data standards.
- 4 The potential issues that this and future mishaps will pose to IALA and its members. Many will rely upon IALA Recommendations and Guidelines to use and display this data and the impact on authorities' resources needs to planned for.

4.1.2 Collision avoidance in the e-Navigation environment, Dr Nick Ward, General Lighthouse Authorities of the United Kingdom and Ireland

Presented by Dr Nick Ward

This presentation showed the results of a study carried out by Helios for the General Lighthouse Authorities of the UK & Ireland into developments in collision avoidance systems, how they will

influence the future development of marine aids to navigation and how they fit into the concept of e-Navigation.

Collision avoidance is considered in the wider sense of preventing groundings and striking fixed obstacles, as well as ships colliding with other ships. A survey of the market was carried out to consider the scope and functionality of collision avoidance equipment, including the automatic identification system (AIS), as well as to consider the way in which available equipment operates in the coastal and harbour waters of the UK and Ireland.

The presentation considered existing technology of relevance to collision avoidance, including Class A and B AIS equipment, manufacturer specific aids to collision avoidance (e.g. non-standardised techniques and functions that aid detection or resolution of potential collision scenarios).

The implementation of current automated collision avoidance alarming was studied, for example whether alarms are triggered by zones or through greater algorithmic intelligence.

The key points of the presentation were:

- 1 Influence of e-Navigation on collision avoidance, including provision of a definition for, and the objectives of e-Navigation.
 - 2 Existing technology for collision avoidance including GNSS, radar, AIS, VTS and lights & buoys.
 - 3 New technologies and the need for a common information structure for both mariners and shore users.
 - 4 Implementation of collision avoidance systems. Collision risks comprised other vessels, fixed objects (e.g. structures) and floating debris (e.g. containers). New technology for collision avoidance included new technology radars, eLoran, data fusion and synchronised lights
 - 5 The benefits of e-Navigation for collision avoidance including improved situational awareness, clear, uncluttered information presentation, avoiding information overload and supporting decision making.
- 4.1.3 Do we ever really learn from our mistakes? Mrs Jillian Carson-Jackson & Captain Michael Squires, Australian Maritime Safety Authority

Presented by Captain Terry Hughes (Trinity House)

Title of presentation: VTS and VTM - when will we ever learn?

Captain Hughes advised that he would be presenting a replacement presentation for Jillian Carson-Jackson's and Michael Squires' paper but that he strongly recommended that delegates read the paper which is provided in the proceedings.

In the VTS world, do we ever learn from our mistakes? Case studies show that we could be doing much better. We continually seem to be making similar mistakes linked to similar issues – communications (clear, concise, timely); operating procedures (general, poor visibility, heightened awareness); expectations (level of service offered); etc. Why is it that we don't seem to be able to learn from these mistakes? There are a number of existing mechanisms that could be adapted, for example, IALA has produced an internationally accepted standard of training and certification of VTS personnel. The V-103 Model Courses cover all aspects of the duties required by VTS Operators and Supervisors.

Finally, we must not forget training. IALA has produced an internationally accepted standard of training and certification of VTS personnel. The V-103 Model Courses cover all aspects of the duties required by VTS Operators and Supervisors. Training should be carried out by organisations accredited specifically for this specialised training. On the Job Training and continual professional development are equally important and the progress of all operational personnel should be continually monitored and assessed.

The key points of the presentation were:

- 1 The cause of accidents. Causes of accidents can be attributable to mariner-related issues such as inadequate procedures, confusion and a lack of decision making skills; VTS issues such as poor communications (which features in 90% of accidents) and a lack of training including lack of access to simulation; proposal that mariners need VTS awareness training.
- 2 The lack of consistency in VTS and information globally; IMO Resolution A.918(22), the IMO standard for marine communication phrases.
- 3 The need for sharing of learning from incidents / near misses globally.
- 4 The need for improved communications between VTS, masters and pilots.
- 4.1.4 Enhanced radar conspicuity of small craft, Mr Peter Douglas, Northern Lighthouse Board, Scotland

Presented by Mr Peter Douglas

The sinking of the yacht 'OUZO' in the English Channel in 2007, with the loss of 3 lives, highlighted once again the vulnerability of small craft in close quarters situations with larger vessels. This incident was subject to a major investigation, which included an assessment of a number of proprietary brand radar reflectors. None of these were found to adequately meet the ISO standard for radar reflectors, and some could be considered hazardously misleading by encouraging the user to consider themselves more conspicuous than they are.

This presentation examined a number of means of both enhancing the radar conspicuity of small targets, and of other means by which small craft can reduce the likelihood of fatal interactions with large vessels. This leads onto other areas of potential benefit to National Administrations, in that buoyage and other small aids to navigation may also be given enhanced conspicuity, reducing the likelihood of accidents to vessels or damage to Aids to Navigation.

The key points of the presentation were:

- 1 Limited functionality of commercially available passive radar reflectors with none meeting international quality management standards.
- 2 Scope for improved design of reflectors such as incorporation of trihedrals & dipoles. Active radar reflectors are also an option but these currently only perform at X Band, and require power supply. There is also a need for better installation.
- 3 Lack of observance of standard rules, in particular safe speed.
- 4 Scope for design improvements to small craft. Small craft generally have very poor radar reflectivity due to wood or GRP construction. One area in need of improvement is the conspicuity of yacht masthead lights.
- 5 Scope for incorporation of radar reflection within small craft hull construction; the benefits of new technology radars – low power, improved clutter performance.
- 6 Other potential aids to avoiding collision
- 4.1.5 MAIIF Investigations, liabilities and lessons learned, Cdre David Squire, Marine Accident Investigators' International Forum (MAIIF) and editor of the Nautical Institute's *Alert!* bulletin, which aims to improve the awareness of the human element in the maritime industry

Presented by Cdre David Squire

The objective of the IMO's Casualty Investigation Code is to provide a common approach for Flag States to adopt in the conduct of marine safety investigations into marine casualties and marine incidents. A marine safety investigation is an investigation conducted with the objective of preventing marine casualties and marine incidents in the future, without apportioning blame or determining liability.

The impact of people in the maritime safety system has been with us since time immemorial but the people, systems and machines have changed, not only through increasing technology, but also because of the need for operators to maintain the competitive edge by reducing running costs. The introduction of new technology and computer-based systems has changed the way in which mariners are presented with information but some operators are reluctant to train their seafarers properly in the operation of these systems.

Most accidents result from operator error, the root causes of which can manifest themselves in a variety of ways, and many of which can be attributed to the human element. Recent investigations, carried out by MAIF members, indicate that not all of the industry is heeding the lessons from these investigations.

The key points of the presentation were:

- 1 Role of the MAIF and the Nautical Institute in relation to the topic;
- 2 The purpose of the Code of the International Standards and Recommended Practices for a Safety Investigation into a Marine Casualty or Marine Incident
- 3 Marine accident investigation.
- 4 Human element – Most accidents result from operator error, the root causes of which can manifest themselves in a variety of ways, and many of which can be attributed to the human element
- 5 Human/operator error. Human error is the cause of most accidents. Human input to design and operation of a system are a key contributory factor.
- 6 Maritime accidents – contributory factors include poor ship/system design, equipment failure through poor maintenance and seafarer fatigue and complacency and ineffective communication
- 7 Grounding incidents – contributory factors include poor bridge resource management, lack of effective passage plan, poor master/pilot communication and poor navigation. This was supported by a number of case studies from around the world, featuring one or more of the causes.
- 8 Evidence shows that we are not learning from our mistakes.

Discussion – Technical Session 1 – Part 1 (papers 1 – 5)

It was asked of all speakers: What is the role for automation given the key involvement of human error in accidents?

Cdre Squire responded that technology should take on the tasks that humans are not good at e.g. monitoring and analysis. Humans should do what they are good at e.g. interpreting information and decision-making. Captain Squire added that the problem with automation is that it turns the operator into a monitor who can then be distracted. Referenced incorrect setup of automatic pilot as a contributing factor to the problem and an example of how greater automation could be problematic.

There was no response when it was then asked if the speakers would be happy for greater use of automation in the operation of vessels?

It was observed that in the aviation sector the pilot is thoroughly trained in the use of instrumentation and so is there a need for more standardisation and training in maritime sector?

Nick Ward responded that training is critical of course but also that there is great scope for standardisation, including in relation to information displays. Terry Hughes agreed that training was very important, noting that standardisation is harder to achieve in shipping than in aviation due to greater variation in vessel characteristics / equipment.

In response to the question 'Should commanded values e.g. rudder be included in the Voyage Data Recorder, as it would greatly assist accident investigations'. Cdre Squire advised that the UK

MAIB have developed a suite of elements to be taken into account in an investigation and that it was technically possible to achieve. He agreed that it would assist investigations.

4.2 Technical Session 2 – Risk, quality and environment

Part 1

Chair: Mr André Châteauvert (Canada)

Vice Chair Captain Duncan Glass (UK)

4.2.1 World-wide green and sustainable Aids to Navigation service, Mr Hendrik Eusterbarkey, German Federal Waterways and Shipping Administration

Presented by Mr Hendrik Eusterbarkey

The main contribution of Aids to Navigation (AtoN) and Maritime Traffic Technology to the protection of the environment is by safeguarding safe and efficient vessel traffic and thus avoiding accidents and minimizing pollution. But the services are also contributing to sustainable development of worldwide navigation by saving energy and other resources.

The (AtoN) services worldwide have been improving the efficiency of their services in the last decades and will continue to do so. Some typical technical solutions for environmental optimization for visual AtoN are shown in this presentation. Further research and development will be necessary, but also a view back could be interesting in order to see what already has been achieved. The ecological footprint and the carbon footprint are criteria for sustainable performance.

It is proposed to establish an Environmental Management Framework for AtoN Services and Maritime Traffic Technology. The framework, its basic principles and its potential value is briefly described.

The key points of the presentation were:

- 1 Safeguarding safe and efficient vessel traffic is the major contribution of AtoN and Traffic Technology to the protection of the environment minimizing pollution.
- 2 However, also saving energy in operation and maintenance of AtoN and Traffic Technology services is a valid option to contribute to worldwide sustainability.
- 3 Life Cycle, the ecological footprint and the carbon footprint are relevant tools to judge the sustainability of services.
- 4 An Environmental Management Framework can be of big value and have significant benefits for AtoN and Traffic Technology providers.

4.2.2 Improvement of navigational routes in the South of Chile, Lt Cdr James Crawford, Armada de Chile

Presented by Lt Cdr James Crawford

Before starting his formal presentation, Lt Cdr Crawford explained that the Chilean Navy, and in particular its aids to navigation services, was very involved in the aftermath of the tragic earthquakes and tsunamis that hit his country earlier this year to support the population in general. Many marine aids to navigation also suffered from the earthquake and tsunami and a considerable effort of reconstruction is now underway.

In Chile, in order to improve safety to navigation new routes, new aids and equipments for navigation with state-of-the-art technology are being implemented. These are replacing all lighting systems with conventional lanterns with LED technology with up to 9 NM range, changing current Racons to pressurised equipment and buoys with a metallic floating section to rotationally moulded polyethylene buoys. AIS equipments are being also tested for their future implementation in the country.

The area of Punta Arenas contains the highest quantity of installed aids to navigation and where there is a high navigational traffic in inner waters. With the aim of enhancing specific areas due to

significant projects for the development of the country, two projects are presented, which were developed in recent years: Tortuoso Passage and Gray Channel.

- 1 The key points of the presentation were:
- 2 Significance of Magellan straight for Chilean maritime traffic.
- 3 Deployed electronic aids to navigation.
- 4 Installation of VTS.
- 5 Installation of buoys along the route.

4.2.3 Guideline for seismic-proof performance of Aid to Navigations and relative facilities, Cdr Takafumi Sato, AtoN Engineering Division, Maritime Traffic Department, Japan Coast Guard

Presented by Captain Takahashi Toshio (Japan Coast Guard)

Because Japan has suffered from many disasters due to earthquakes, safe and efficient marine transport is essential for prompt recovery from earthquake damage. Maintaining Aids to Navigation Service is, therefore, very important. In such a situation the Japan Coast Guard set a target of seismic-proof safety in 2008 and developed a guideline for seismic proof standard for Aids to Navigation facilities. This presentation provides the contents of the guideline and also introduces a seismic proof work of Bisan-seto VTS centre.

The key points of the presentation were:

- 1 Seismic-proof standard in Japan.
 - 2 Seismic proof standard for Aids to Navigation developed by the JCG.
 - 3 Improvement in seismic-proofing of Aids to Navigation facilities for.
- 4.2.4 Use of Web-Based Decision Support Technology for In-Transit Under Keel Clearance Management, Dr Terry O'Brien, OMC International

Presented by Dr Terry O'Brien

Recent developments in navigation technology make possible the monitoring and control of the under keel clearance of large vessels by optimisation of vessel speed during transit along shallow waterways.

The integration of Dynamic Under Keel Clearance (DUKC®) technology onto laptops (or smaller devices) carried by pilots and into VTS Centres enables vessel speed and predicted under keel clearance ahead to be monitored onboard and ashore. These decision support tools also allow the effect of alternative speed/sailing options on under keel clearance to be quickly investigated by pilots and masters in situations where the passage does not proceed as planned. This could include situations such as vessel breakdown, vessel delayed leaving the berth, vessel loaded in excess of its planned passage draft, vessel not performing as expected or deterioration in the environmental conditions during transit.

The accuracy of the numerical ship motion models used in the DUKC® system have been comprehensively tested against full-scale measurements conducted on more than 250 vessels of varied types, transiting a wide variety of waterways under diverse environmental conditions.

Examples are presented from Australia and Europe which illustrate the integration of DUKC® into pilot laptop and VTS Centres for under keel clearance management in port channels, rivers and coastal waterways.

The key points of the presentation were:

- 1 Optimisation of vessel speed during transit.
- 2 Predicted under keel clearance ahead to be monitored onboard & ashore.
- 3 Effect of alternative speed/sailing options on under keel clearance.

- 4 DUKC® is increasingly being used as a risk mitigation tool for under keel clearance management.
- 5 DUKC® Series 5 is web-based.
- 4.2.5 A study on the VIMSAS v QMS of AtoN service, Mr Jiang Jianyu, China Maritime Safety Administration

Presented by Mrs Jiang Xuemei (China MSA)

The presentation focused on the analysis of the special features of Voluntary IMO Member State Audit Scheme(VIMSAS) which concerned AtoN, the main difficulties in the audit and the relationship between the QMS of AtoN and hydrographic service in China MSA and VIMSAS.

It was suggested that preparation can be made for VIMSAS by setting up a framework guided by IALA Guideline No. 1054 and with the QMS of AtoN and hydrographic service in China MSA as the basis. The presentation sought to provide an answer to the first question “Advice on how the level of AtoN service is determined relative to the volume of traffic and degree of risk?” in Article 3 of Question VIII in the pre-audit questionnaire. The presentation went on to find the relative answers of the pre-audit questionnaires from the QMS of AtoN and hydrographic service in China MSA

The key points of the presentation were:

- 1 It is difficult to define the audit details as the obligations listed in SOLAS Chapter V are not all covered by specific IMO standards.
- 2 Moreover, for AtoN service, the convention stipulates only the principles and requirements in the same way as other obligations of coastal states.
- 3 In order to improve service quality, and to fit with the users’ requirements more appropriately, China MSA put forward the plan to set up the AtoN Service QMS, which is referred to IALA guideline 1052 from 2005. Until now, all the relevant documentation has been finished and the system is well implemented. We get almost all the benefits we anticipated.
- 4 Follow the IALA Guideline No. 1054, we can prepare for the AtoN auditing basing on the QMS of AtoN service of China MSA, which can lead a smooth process of auditing.

Discussion – Technical Session 2 – Part 1 (papers 1 to 5)

With regard to the modelling of under keel clearance, Professor Knudt Benedict said that he would have been very pleased to explain to his students the detail of the process supporting the DUKC® system. He regretted that it is not in the public domain and, therefore, he cannot teach the students for the benefit of safety. He then questioned the presenter on the responsibility left to the master of a ship when using the information provided by the system.

Dr Terry O’Brien replied that the DUKC® system should be considered as an aid to navigation, The system provides information that the master has to integrate into the package of all the information at his disposal, before taking the final decision. Also, as for all technology, the user has to be trained to use it. He also added that his company is responsible for the results of the calculation provided but not for the environmental conditions in a port.

Answering another question, Dr. O’Brien explained that the ship, either through the local agent or directly, has to provide all her characteristics regarding not only her physical dimensions and loading conditions but also stability criteria, in particular the GM which is very influential for some types of ship, such as container ships when they are fully loaded.

Part 2 of Risk, quality and environment

Chair: Captain Pernilla Bergstedt (Sweden)

Vice Chair Mr Michael Skov (Denmark)

4.2.6 Risk Assessment using IWRAP, Mr Ómar Frits Eriksson, Danish Maritime Safety Administration

Presented by Mr Ómar Frits Eriksson

The IALA risk management toolbox encompasses two methodologies, one of which called PAWSA and carries out a qualitative risk assessment; the other is called IWRAP and carries out a quantitative risk assessment. The two methods can be used individually, sequentially or in parallel.

While PAWSA can be characterized as mature and well proven, IALA experienced some initial difficulties with IWRAP. Further development of the tool was needed and through the dedicated effort of a team of IALA members, research institutes and universities, a revised quantitative tool, named IWRAP Mk2, was developed and validated.

The presentation described the basic principles behind IWRAP Mk2. Examples of its use in the Malacca Straits were shown and explained. The advantages of the tool were highlighted and its limitations discussed. The causation probability equals the probability that the navigator fails to take evasive action when the ship is on a collision or grounding course.

In conclusion, the way forward is to develop further the IALA risk management toolbox, which was outlined and the relevant conclusions and recommendations will be given to the IALA membership. The members were recommended to use the IWRAP Mk2 tool and provide feedback, which will assist continual development.

The key points of the presentation were:

- 1 The IALA risk management toolbox encompasses two methodologies, one of which called PAWSA and carries out a Qualitative risk assessment; the other is called IWRAP Mk2 and carries out a Quantitative risk assessment.
- 2 Basic principles behind IWRAP Mk2.
- 3 Advantages and disadvantages of WRAP Mk2.

4.2.7 Use of the IALA Ports and Waterways Safety Assessment (PAWSA) Model in a Coastal Environment, Mr Mahesh Alimchandani and Mr Paul Brandenburg, Australian Maritime and Safety Authority

Presented by Mr Mahesh Alimchandani

The global demand for Australian commodities has seen shipping activity in Australia – both at the ports and offshore – has increased significantly over recent years. Despite the recent global economic slowdown, forecasts for the long-term upward trend for commodity exports from Australia remains intact.

Shipping activity in the iron ore and petroleum rich region in the north-west of Australia is projected to increase exponentially over the coming decades. This is also the case in Queensland where natural resources – predominately coal, but soon to include LNG – are exported in increasingly large quantities.

The resultant increase in volume (and change in mix) of shipping traffic, some of it through environmentally sensitive areas, implies that the degree of risk is increasing.

While the Australian Maritime Safety Authority (AMSA) and the States already have risk mitigation measures (such as ship routeing measures, port procedures, pilotage, VTS, aids to navigation etc.) in place, the increase in shipping volumes and off-shore activity requires the risk to be re-examined.

AMSA and Western Australia's Department of Transport (WA DoT) are developing a comprehensive maritime management plan for the north-west coast of Australia. This will be

characterised by a set of recommendations, which different agencies will be responsible for implementing. For its part, Maritime Safety Queensland (MSQ) endeavours to ensure that it has the appropriate intervention plans in place to reduce risk from increases in shipping traffic to an acceptable level.

As a first step in developing these plans, a broad-based risk assessment was conducted for three designated areas in the middle of 2009, using IALA's Ports and Waterways Safety Assessment (PAWSA) model. This identified major waterway safety hazards, estimated risk levels and consequences, evaluated potential mitigation measures and has set the stage for the implementation of selected new measures to reduce risk.

Owing to the widespread consultation process, both as part of the PAWSA workshop and at a more detailed level following the workshop, the resultant recommendations will have strong stakeholder 'buy in'.

PAWSA was chosen because it is easy to use and endorsed by IALA as well as being used by many port authorities throughout the world. PAWSA also provides a consistent approach to risk assessment. The PAWSA process has proved to be a valid model for reviewing risks in Australian waterways and in comparing and deciding on appropriate mitigation measures to reduce risk.

This presentation reported on the outcomes of the three PAWSA workshops, which were very positive.

The key points of the presentation were:

- 1 There is evidence of increased shipping activity at the commodity exporting ports and off-shore in Australia. The resultant increase in volume (and change in mix) of shipping traffic, some of it through environmentally sensitive areas, implies that the degree of risk is increasing.
- 2 AMSA, working in co-operation with the states of Queensland and Western Australia, used IALA's PAWSA model to conduct three broad-based risk assessment workshops in 2009.
- 3 The PAWSA process proved to be a valid model for reviewing risks in Australia's waterways and in comparing and deciding on appropriate mitigation measures to reduce risk.
- 4 AMSA and Western Australia's Department of Transport (WA DoT) are developing a comprehensive maritime management plan for the north-west coast of Australia. For its part, Maritime Safety Queensland (MSQ) endeavours to ensure that it has the appropriate intervention plans in place to reduce risk from increases in shipping traffic to an acceptable level.

4.2.8 The MarNIS Risk Concept, Mr Cees Glansdorp, CETLE

Presented by Mr Cees Glansdorp

This presentation was partly based on the results of the EU research project Maritime Navigation Information Services (MarNIS), which was commissioned by the Directorate-General Transport and Energy of the European Commission of the European Union in the 6th Frame Work Program. The project started in 2004 and was completed in 2009. The project contained 2 major parts: Maritime Information Management and Maritime Operational Services. Some aspects of the former are discussed in the publicly available condensed final report.

The MarNIS concept has been exercised at the MRCC centre in Milford Haven, UK and proved very effective.

The intent of the presentation was threefold:

- To describe the principles of a MOS Centre that combines all the tasks of the authorities with respect to maritime traffic and transport in a member State under one roof;
- To demonstrate the concept of dynamic risk as a basis for proportional measures taken by authorities;

- To start a discussion on a risk method that is acceptable for all member States and that can be used by each member State when it is decided to implement a dynamic risk method.

The key points of the presentation were:

- 1 Maritime Operational Centre as focal point of all authorities involved with maritime matters under one roof.
- 2 SAR part according to IMO conventions.
- 3 VTM part includes monitoring, if necessary VTS and a maritime emergency manager.
- 4 Crucial decisions to be taken by a functionary similar to UK SOSREP.
- 5 Proposal for measures against High Risk Vessels when RISK is too high and the sea area suitable for implementation of remedial measures.

4.2.9 Business Case Analysis, Mr André Châteauvert, Canadian Coast Guard

Presented by Mr André Châteauvert

The Canadian Coast Guard (CCG) is constantly taking steps to modernize its aids to navigation system. In the recent years, these steps have been made in different areas from changing the nature of the aids being used, making sure that the aids still meet the needs of mariners and to effectively deliver and maintain its 17,200 aids. In concert with these changes, decisions had to be made based on accurate information and sound analysis. To this end, a detailed business case framework has been developed for the purpose of providing a common basis for making these decisions.

Under this framework, a typical business case analysis includes the following elements: Purpose and scope of the project, critical assumptions, guiding principles and constraints, a description of current situation and the list of options and associated impacts (operational delivery, life cycle management, infrastructure, human resources, and environment), a sensitivity analysis, a risk management, conclusions, recommendations, implementations and next steps. The business case framework provides directions on business rules which include cost effectiveness analysis principles and a cash flow analysis using inflation and discount rates.

The key points of the presentation were:

- 1 Decisions from national authorities have to be made based on accurate information and sound analysis.
- 2 The business case analysis framework developed by the Canadian Coast Guard can help national authorities to make sound decisions related to the selection of service providers and the modernization of equipment.
- 3 The business case analysis framework consists in an 11-step approach, each step being fully explained. This approach is conducted in a logical sequence to ensure that all required information is presented in a standardized format, to permit the national authority to arrive at a consistent and rational decision.

4.2.10 Measuring the Safety Performance of National Navigation Safety Systems, Dr Marc Thibault, United States Coast Guard

Presented by Dr Marc Thibault

Measuring the performance of national navigation safety systems presents numerous difficulties. Maritime nations, due to sustained international and domestic focus on marine safety, have safety regulations, standards, and data collection processes they can use to help them better measure the performance of their navigation safety system.

The presentation illustrated a conceptual framework that can help nations better measure their navigation safety system's performance. It applies this framework to analyze the performance of the U.S. Coast Guard's navigation safety systems in preventing marine groundings in the U.S. navigable waters between 2003 and 2009. It provided an overview of the Marine Safety System

and its relationships to the Marine Accident Chain to show the prevention of groundings extends beyond navigation safety systems. The presentation described how the U.S. Coast Guard currently measures the performance of the U.S. navigation safety system in preventing groundings and describes its limitation.

It showed how it can further improve the performance measurement of its navigation safety systems by analyzing how the frequency and severity of groundings in U.S. navigable waters varies with location. Finally, it discussed the need, challenges and opportunities for further development of a navigation safety system performance measurement system.

The key points of the presentation were:

- 1 National navigation safety systems are part of a larger national Marine Safety Systems.
- 2 Navigation accidents, such as groundings, result from one of more failures in the Marine Safety Systems.
- 3 Nations do not need to know exact probabilities of navigational accidents in order to measure navigation safety system performance.
- 4 Nations can measure the performance of their navigation safety systems by analyzing how the frequency and severity of groundings vary by location.
- 5 Measuring the frequency and severity of grounding by location will help nations better assess the performance of their Marine Safety Systems.

Discussion – Technical Session 2 – Part 2 (papers 6 – 10)

In response to a question about what effect the workshops have had on future plans in dealing with increased shipping, Mahesh Alimchandani said that as a result of the workshops, a go-ahead has been given by the Government to put in place a universal ship vetting programme and that port operators are being encouraged use this programme in order to improve deep draught quality.

When asked about the use of depth in IWRAP Mk2, Ómar Frits Eriksson said that IWRAP does take depth into account. An overlay of the sea chart is used and the depth is extracted. The draught is obtained from AIS data and that information is used to measure power/drift/drafting groundings; it is a 3D model.

Dr Marc Thibault was asked about the relative number of groundings set against targets, specifically on what basis are 'new' Targets presented? He replied that once the targets have been published they are not used again hence the need for 'new' ones.

When it was asked if it would it be a good idea to bring all these projects together, Ómar Frits Eriksson said yes, adding that he liked the MARNIS approach and that it might be a good idea for a future project.

4.3 Technical Session 3 – The future of visual aids to navigation

Part 1

Chair: Mr Ómar Frits Eriksson (Denmark)

Vice Chair Cdr Hideki Noguchi (Japan)

4.3.1 IALA Maritime Buoyage System, Captain Duncan Glass, Trinity House

Presented by Captain Duncan Glass

Although the maritime buoyage system (MBS) has served the maritime community well since its inception in the 1970s, after the 2006 IALA Conference in Shanghai, China, it was decided to review the system in light of changes in the navigation environment and the further development of electronic aids to navigation.

Worldwide consultation revealed that the fundamental principles of the MBS should be retained. However, due to changes in navigation practices and patterns, as well as innovations and technological developments, some enhancements to the MBS were needed.

The most significant changes in the 2010 revision are the inclusion of aids to navigation used for marking, recommended by IALA, that are additional to the floating buoyage system previously included. This is aimed at providing a more complete description of aids to navigation that may be used. It includes the Emergency Wreck Marking Buoy, descriptions of other aids to navigation specifically excluded from the original MBS, and the integration of electronic marks via radio transmission. With regards to aids to navigation, the changes provided by this revision will allow the emerging e-Navigation concept to be based upon the marks provided by this booklet.

The key points of the presentation were:

- 1 The IALA Maritime Buoyage System has served the marine world well for many years but the changes in maritime environment warranted review of the MBS.
 - 2 A survey of the maritime community was undertaken with over 600 responses received.
 - 3 The findings were extensive and these were distilled down to a manageable list. The main conclusion was that the MBS should not be changed, even though it would be better to have one system. However there was some opportunity for greater synergies between Regions A & B. There were other changes that were warranted and feasible:
 - a The MBS Booklet should be expanded to include ‘other aids to navigation’ such as lighthouses and DGNSS.
 - b The Emergency Wreck Marking Buoy should be included in the MBS. All existing marks are retained as well.
 - c The Isolated Danger Mark needed clearer guidance on its use e.g. how close a vessel can approach the mark and the extent of the hazard.
 - d New technologies should be embraced by the revised MBS Booklet, for example AIS AtoN,
 - e New graphics and layout were necessary.
 - 4 Consideration was given to changing the name of the MBS given the broadening of the document to include all aids to navigation. However Council decided the name should not change but a sub-title be added that reflected the overall scope of aids to navigation.
- 4.3.2 Evolution of Traditional Aids to Navigation in an e-Navigation World, Mr Seamus Doyle, Commissioners of Irish Lights

Presented by Mr Seamus Doyle

The Commissioners of Irish Lights are responsible for the provision and maintenance of lighthouses, buoys, radionavigation services and other aids to marine navigation in Ireland.

A key objective is to meet the requirements for safe marine transport and protection of the marine environment by providing a comprehensive mix of Aids to Navigation commensurate with the amount of traffic and the degree of risk.

The development of e-Navigation is driven by the compelling need to equip the master of a vessel and those ashore responsible for the safety of shipping with modern, proven tools to improve the reliability of marine navigation and communications. Although position fixing using GNSS is widely used, radar and visual AtoN continue to be needed to provide safe, secure and environmentally clean navigation.

The presentation considered the role, evolution and future provision of traditional aids to navigation in an e-Navigation environment from both a technical and mariner perspective.

The key points of the presentation were:

- 1 Satellite position fixing will remain the prominent method of position fixing, with a need for a terrestrial based navigation system to complement GNSS to provide position and timing.

- 2 Traditional visual aids, buoys and radar continue to be required to complement satellite systems and provide essential spatial awareness while changes in these systems should be embraced to achieve maximum cost effectiveness.
 - 3 There are opportunities to combine traditional aids with the modern electronic systems.
 - 4 The need for large lighthouse towers and major daymarks is questioned.
 - 5 Don't forget the mariner. Reduce his workload while engaging him in the task and keep him sharp on all techniques for safe navigation.
- 4.3.3 e-Navigation – The role of visual aids to navigation, Mr Malcolm Nicholson and Mr Ian Tutt, General Lighthouse Authorities of the United Kingdom and Ireland

Presented by Mr Malcolm Nicholson

The concept of e-Navigation is being developed by the International Maritime Organisation (IMO), with support from the International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA) and the International Hydrographic Organisation (IHO).

The emphasis has been on electronic aids to navigation (AtoN), particularly Global Navigation Satellite Systems (GNSS) and Electronic Navigation Charts (ENC). However 'conventional' AtoN, such as lighthouses and buoys will also be an essential part of e-navigation. The way in which visual AtoN could be integrated into e-navigation will be the subject of this paper, together with the developments taking place to improve their effectiveness. Two areas were covered in detail: the presentation of AtoN information in digital formats and the use of synchronisation and sequencing of lights to enhance their conspicuity.

All AtoN can be described in digital form and the preferred method of providing information for electronic presentation is a standard data exchange format such as XML. The presentation reviewed earlier work on the conversion of buoy data into XML and its presentation as part of an integrated navigation display. The steps necessary to implement this conversion and display in an internationally standardised form were considered.

Recent developments in the use of synchronisation and sequencing of lights to enhance their conspicuity were reviewed, using real applications such as offshore wind-farms to illustrate the effectiveness of these techniques. There is a need for further investigations into the optimum intervals between flashes, the required timing accuracy and the reliability and stability of timing sources. It was stressed that attention must also be given to the effect of synchronising and sequencing lights in complex waterways, where the viewing aspect can change substantially.

The key points of the presentation were:

- 1 Outlining how lighting technology evolved to the current situation where we are moving to e-Navigation, The development of light sources led to unmanned lights.
- 2 Unmanned lights meant the need for monitoring.
- 3 Increase in background lighting has led to the use of synchronised lights. A concern identified was that given combining red and green lights creates a white light, Testing by the General Lighthouse Authorities of UK and Ireland found that a minimum angular separation necessary to retain the distinct red and green lights in a synchronised set of aids to navigation was the equivalent of five minutes. The timing of when the visual impact of synchronisation is lost was also critical and GLA tests established that the maximum interval before this occurred was 55 milliseconds.
- 4 The data from monitoring can be passed on in a standard data format; XML is now being adopted as the standard format for internet-based data transfer.
- 5 Where are we going next? Visual Aids to Navigation are the backbone of e-Navigation. It will be critical to get the balance between the use of electronic and traditional AtoN right.
- 6 Displaying digital AtoN in the same way they appear 'out the window' will be critical to e-Navigation's success.

4.3.4 Navigational Marking of Offshore Oil & Gas Platforms during and after Decommissioning, Mr Mike Spain, Northern Lighthouse Board

Presented by Mr Mike Spain

With the progressive maturity of the offshore oil and gas industry the issue of decommissioning is becoming more prevalent. It is predicted that in excess of 100 platforms may cease production and require decommissioning worldwide each year for the foreseeable future.

This process creates man-made hazards to navigation as services are withdrawn and standard systems cease to be effective. New systems must therefore be developed to provide effective navigational marking during the decommissioning phase and, should any surface structure remain, for post-decommissioning.

This paper will present solutions developed to address these issues in the oilfields in the UK and Norwegian sector of the North Sea. Systems have been designed for platforms undergoing staged dismantling and for the long-term remnants of concrete caissons.

Given the worldwide incidence of oil and gas platform decommissioning, a global approach to effective marking of such structures should be addressed as a matter of priority.

The key points of the presentation were:

- 1 The number of offshore installations being decommissioned is increasing. Ageing infrastructure presents problems. Offshore structures increased significantly from the 1970s. There are now about 6,800 structures worldwide and there is a need to decommission about 100 per year based on design life of 30-40 years. UN conventions govern the way that these structures can be dealt with, mainly requiring removal. Some exceptions for structures to remain in place will be allowed. Removal is difficult e.g. due to water depths. The structures are commonly concrete gravity base structures and the older ones were not designed with removal intended. Later structures were designed for removal but some may not be safe for this due to instability which has occurred.
- 2 Decommissioned structures create a hazard to navigation and AtoN solutions are needed to mark these new hazards. Marking must be maintained despite power sources on the structures having to be removed. Decommissioning to seabed is normally required unless a risky meaning marking system will need to adjust to progressive decommissioning of each structure. Interim solution is a fully autonomous aid to navigation for marking the highest point of the structure. A long-term solution is available in the form of 'Rigwatcher'. Rigwatcher is an ongoing aid to navigation solution designed for replacement without maintenance personnel landing on the structure. Mr Spain outlined a case study of multiple platforms being marked with Rigwatcher which has a 10nm LED light with racon, satellite monitoring and solar power in a lifting frame suitable for long line lifting by helicopter.

Discussion – Technical Session 3 – Part 1 (papers 1 - 4)

The question was asked, 'Has the considerable amount of work by IALA members on the AtoN-e-Navigation implications been presented to the IMO Correspondence Group?' Duncan Glass responded that IALA was represented on the Correspondence Group and that IALA's work had been incorporated in the recommendations of the Correspondence Group submitted to IMO.

It was stated that in Oman there were 35,000 traditional skiffs relying on traditional AtoN and that these should not be forgotten in the implementation of e-Navigation.

The Chairman responded by endorsing these sentiments.

Part 2 of The future of visual aids to navigation

Chair: Mr Ómar Frits Eriksson (Denmark)

Vice Chair Captain Kieran O'Higgins (Ireland)

4.3.5 Aids to Navigation Design Framework for Channels, Mr Hendrik Eusterbarkey, German Federal Waterways and Shipping Administration

Presented by Mr Hendrik Eusterbarkey

The presentation was made in an attempt to fill the gap between nautical expertise and technical AtoN expertise. Both are very highly developed in IALA.

The Aids to Navigation (AtoN) for fairways/waterways including dredged channels and canals should be both relevant to the mariner and cost effective to the National Authorities. A systematic approach and the use of performance parameters for defining requirements are proposed for the design of AtoN systems. Thus the approach of the e-Navigation concept is supported, considering at the same time, that a significant part of AtoN design is based on experience and good practise.

A short overview of requirements arising from documents of international bodies like IMO and IHO is included. Planning the horizontal and vertical dimensions of an approach channel is not part of the scope of AtoN design, but there is a strong interaction. The parameter 'accuracy' for vessel positioning, navigation and fairway width and its interdependence with buoy spacing is described and a new method from Japan for calculating the drift detection when using AtoN in a channel is explained. Some basic knowledge on perception of objects by human eyes and by other means is shared.

There is a need for a common understanding as there are many varieties, which are mostly motivated by different conditions regarding waterway and traffic patterns.

IALA documentation is extensive and can provide considerable guidance and should especially be considered regarding the use of specific technologies, e.g. the use of marine lights.

Steering a ship in a waterway is a process which is determined by different factors as;

- Interaction between ship and fairway,
- Fairway width, bank clearance, fairway depth, bottom surface,
- Wind, waves, currents, tide,
- Ship manoeuvrability, speed,
- On-board-equipment,
- Capability of the navigator.

IMO Resolutions A.915(22) "Revised Maritime Policy and Requirements for a Future Global Navigation Satellite System" and A.953(23) "World-Wide Radionavigation System" show a variety of parameters. Not all of them may be applicable to all AtoN. However, the parameters reflect different properties which single AtoN or AtoN systems can have. Therefore it is useful to take some of these parameters into account when defining the requirements for a specific channel or a type of waterway.

The key points of the presentation were:

- 1 A systematic approach and the use of performance parameters for defining requirements for the design of AtoN systems support the e-Navigation concept.
- 2 The AtoN design for a fairway has to take into account the IMO and IHO requirements and waterways design (hydraulic engineering).
- 3 The accuracy for vessel positioning and drift detection is significantly depending on buoy spacing.

4.3.6 Visual Marking of Offshore Wind Farms, Mr Rainer Strengé, Mr Raven Kurtz, Mr Philip Giertz, German Federal Waterways and Shipping Administration

Presented by Mr Rainer Strengé

Offshore wind farms play an ever-increasing role in plans to expand the use of wind energy in Germany. However, from a nautical and aeronautical point of view a wind farm is a man-made obstacle which potentially affects safety. Whilst shipping traffic can be heavy at times so can aeronautical traffic, in the form of many helicopter flights including those used by the SAR services.

The large offshore wind farms planned in the German part (Exclusive Economic Zone) of the North and Baltic Seas will be 30 – 100 kilometres from the coast, in deep water, very close to highly frequented shipping routes. As a consequence, several measures will have to be carried out in particular to maintain safety of shipping. This includes the need for sufficient marking offshore wind farms.

During the approval process several conflicting demands from different stakeholders have to be considered in order to find a solution that will ensure the maximum level of safety for shipping and aviation. In addition an appropriate level of environmental protection as well as minimum burdens and low costs for the operating companies are aspired. This applies particularly to the visual marking system.

To ensure safety of navigation for both shipping and air traffic the large wind farm structures have to be clearly marked. Therefore, the German Federal Waterways and Shipping Administration have developed a "Guideline for design, marking and operation of offshore wind farms (FWA Guideline)".

The presentation introduces technical solutions for the visual marking system implemented in Germany based on IALA Recommendation O-139 and ICAO Annex 14. They harmonize the nautical and aeronautical requirements of lights while also minimising light pollution. Finally, the concept of computer-based simulations for assessing visual marking systems was considered and a short video clip was shown demonstrating this.

The key points of the presentation were:

- 1 Offshore wind farms.
- 2 Visual marking.
- 3 Obstacle light.
- 4 Short range marking.
- 5 Simulation.

4.3.7 The Wider Application of LED Light Sources into Historic Lighthouses, Mr Peter Kelly, Trinity House

Presented by Mr Peter Kelly

Over the years the transition in light source style has seen moves from the Paraffin Vapour Burner through physically large high wattage tungsten filament electric lamps then to high power High Pressure Mercury Vapour lamps down to low wattage Metal Halide and Tungsten Halogen lamps. The various light sources used over the years was discussed together with the advantages and disadvantages of using the more modern LEDs.

Some of the advantages are;

- 1 Relatively simple to operate
- 2 More robust
- 3 More efficient
- 4 Easily switched on and off.

The use of LED light sources is now widely accepted as a practical and inherently reliable method of exhibiting a navigation light from various different platforms. The application of LED light sources in historic lighthouses attempts to integrate the very modern with the traditional in as sympathetic, yet effective, a manner as possible.

This presentation reviewed the circumstances in which the employment of LED light sources is appropriate and offered solutions to the use of LED light sources in historic optical apparatus as well as the application of non-integrated solutions where it is appropriate to leave the historic optical apparatus in place and exhibit the light from self-contained unit(s).

Research into the application of a chip type of LED array is underway by the UK GLA R & RNAV Directorate (Sept 09). The application of these devices will enable the reuse of an historic optic, and when driven by a highly efficient DC drive motor (average power to drive a 1st order optic is approximately 8 watts) to be reliably powered from a renewable energy source such as photo-voltaic.

The key points of the presentation were:

- 1 Flexibility of approach to the application of LED light sources.
- 2 The progression of light sources through the years.
- 3 Achieving a cost effective solution.
- 4 The effect of a small light source in a tradition optic.
- 5 Future approaches and opportunities.

4.3.8 Development of Flickering Light, Cdr Hideki Noguchi, AtoN Engineering Division, Maritime Traffic Department, Japan Coast Guard

Presented by Cdr Hideki Noguchi

Due to both the number and intensity of lights, such as port lights, security lights and city lights the light of marine aids to navigation is becoming buried in these lights and thus marine aids to navigation in such situations need to be more conspicuous. The Japan Coast Guard and Japan Aids to Navigation Association have carried out research into a new lighting method of LED including field experiments and have developed a flickering light, which is a combination of conventional flashing pattern and flicker. This flickering light has obviously an excellent conspicuity especially at close range. In addition to the research, the Japan Coast Guard also held an expert meeting on conspicuity inviting visual experts from CIE and IALA under the auspices of the Ocean Policy Research Foundation in November 2008. The presentation reports the development work of the flickering light and the result of the expert meeting. Additionally the presentation also reports the latest field experiment; using an existing lighthouse in Yokohama and its result. The experiment used a red light flashing every 4 seconds. The results showed that the Flicker type light was more apparent to the human eye than the conventional one.

The presentation showed that the flickering flash light has a good conspicuity and this effect covers three main colours of aids to navigation light, white, red and green. It is therefore said that the flickering flash light will become one of countermeasures against background lighting problem that is recently emerged as a serious problem in the visual aids to navigation field.

The key points of the presentation were:

- 1 Conspicuity.
- 2 LEDs.
- 3 Flickering Light.

Discussion – Technical Session 3 – Part 2 (papers 5 - 8)

Cdr Noguchi was asked if the Flicker light experiment showed the result for three or even five miles? He replied that the Flicker light experiment was only carried out for two miles and that this distance was found to be very useful; further experimentation will be required for greater distances.

It was observed by Ómar Frits Eriksson that an experiment with Flicker light was carried out in Copenhagen and it was found that it is largely dependent on the lamination effect on the human eye. It was also only apparent at short ranges.

Cdr Noguchi was then asked if, during the experiment, the Flicker light was ever confused with a quick flashing light? In replying, he said that out of 200 responses only one thought it was a quick flashing light but from an ambulance on the shore!

Rainer Strengé was asked if the specification, mentioned in his presentation, could be provided in the English language. The response was that the specification can currently be downloaded from the GFW website, in German. However, it is hoped that an English version will soon become available.

Hendrik Eusterbarkey then said that the HIWUS study, which deals with the impact on the environment, is available in the English language for those who are interested.

4.4 Technical Session 4 – From VTS to VTM

Chair: Mr Mike Sollosi (USA)

Vice Chair Mr Neil Trainor (Australia)

Part 1

4.4.1 A Systematic Approach to Vessel Traffic Management: Twenty Years Later..., Mr Kees Polderman, Ministry of Transport, Public Works and Water Management, the Netherlands

Presented by Mr Kees Polderman

In the late nineteen eighties The Netherlands established a systematic approach to Vessel Traffic Management (VTM) as a general concept for its national policy for safety and efficiency of maritime traffic. The concept approaches VTM as a functional, integrated structure, which should be arranged complementary to the international requirements and standards for ship borne equipment and operations, and which should be based on a methodical assessment of the (cost-) efficiency and effectiveness of the VTM structure and individual VTM instruments.

Since the XIIth IALA Conference (1990) The Netherlands has consistently advocated this systematic approach to VTM, both on a global (IMO, IALA) and a regional (EU) level. What originally started as a policy concept developed over the years in a more tangible and practically applicable approach to VTM. This development was assisted by rapid technological developments, by recognition of and fundamental developments in the role and application of VTS, and by the parallel development of new and modified international standards. In 2008 the systematic approach to VTM met broad international acceptance and found (temporary) culmination in the IMO adopted e-Navigation strategy.

The presentation highlighted international developments that have contributed to the practical application of the systematic approach and concludes with some future challenges.

The key points of the presentation were:

- 1 Systematic/holistic approach to Vessel Traffic Management (VTM).
- 2 Developments in VTM policies and technologies.
- 3 Developments in the global VTM scene; changing involvement of IALA.
- 4 Future challenges.

4.4.2 The Global Concept of Vessel Traffic Management (VTM) and its benefits to all Stake Holders within the Maritime Domain, Mr Pieter L Paap and Mr Raymond Seignette, IALA VTS Committee - WG4 on VTM (the Netherlands)

Presented by Mr Pieter Paap

In recent decades, there have been substantial changes in the global shipping environment. Consequently a great number of increasing demands, needs and requirements have been imposed upon coastal and port infrastructures, as well as on the interaction between ships and shore-based authorities and other stakeholders. New technologies provide a new dimension of capabilities that are expected to contribute positively and proactively to the decision making processes both on board and ashore, the management and monitoring of maritime traffic in all navigable waters, the development of new instruments and services, the management and the re-use of maritime and nautical data for many purposes, and as well to support the logistic chain.

The traditional traffic management instruments and measures may not be sufficient anymore to satisfy the needs of the stakeholders in the public and private maritime domain and should, in order to achieve universal harmonized, uniform and coherent practice, also be incorporated into a new wider concept. Physical and technical boundaries would no longer exist for those authorities involved in the management of maritime transport. VTS for instance, being one if not the most important of the traditional traffic management instruments, has become a global interest and the traditional services and the role of VTS both might change and expand. VTS therefore should also be incorporated in this new wider concept on a higher (global) level.

Organizations and administrations on international and national level started to develop visions and plans in order to establish integrated concepts, services and systems. However, an overall international co-ordination of a new wider concept was lacking and no guidance has been provided on this global interaction with vessel traffic and the stakeholders within a functional framework. The IALA Council recognized this deficiency and also recognized the relationship with another major development (e-Navigation) for which IMO requested IALA's support. The Council tasked the IALA VTS Committee, to develop an integrated vision and to define a substantial scope of a global concept for Vessel Traffic Management (VTM).

This presentation and the paper reflect the process and high level abstraction results of defining the scope and global concept for VTM. It should be noted that a number of substantial aspects of the concept already have been approved by the IALA Council, other aspects are still subject to further development and discussion within the IALA VTS Committee and are scheduled for the Committees Working Program 2010-2014.

The key points of the presentation were:

- 1 Criteria to develop.
- 2 The scope of the VTM concept, vision, mission and aims.
- 3 Definition of the global VTM concept, the functional framework, arrangements, measures and services.
- 4 The role and position of stakeholders within VTM and their information position.
- 5 The benefits of VTM.
- 6 The relationship between VTM and e-Navigation.

4.4.3 VTS within the VTM Concept, Captain Tuncay Çehreli, Directorate of Coastal Safety, Turkey

Presented by Captain Tuncay Çehreli

The role and the position of VTS within the VTM concept are defined as its functional contribution to the aims of VTM in its capacity to interact with other stakeholders.

The position of VTS within VTM is considered its status relative to other stakeholders and their services, in its capacity to contribute to the aims of VTM.

The existing role and position of VTS within a VTM functional framework are to be considered to identify the relationship between the VTS Authority and the other stakeholders within VTM, and to what extent they interact with each other.

This interaction may benefit other stakeholders as well as the aims of VTM when the VTS Authority can provide vital information in addition to the provision of traditional VTS services such as Information (INS), Navigation Assistance (NAS) and Traffic Organization (TOS). The more this information is valued by the receiving stakeholders, the stronger the position of VTS related to the information exchange will be. A strong position of VTS provides the VTS Authority with the opportunity to take a central role in the management of information within the VTM framework. Holding a strong information position may result in a greater contribution to the benefits of VTM.

The key points of the presentation were:

- 1 Definition and distinction of the VTS and the VTM.
- 2 The existing and future role and position of VTS within VTM.
- 3 Primary services of VTS within the VTM framework.
- 4 Benefits of VTS services for VTM.
- 5 VTS support to security in the maritime domain.

4.4.4 VTM in the Mediterranean Region: Precursors and Future Challenges, Captain Piero Pellizzari, Italian Coast Guard

Presented by Captain Piero Pellizzari.

With the ultimate aim of enhancing the maritime safety level and transport efficiency in European waters, the EU directive 2002/59/CE for the first time adopted the concept of Vessel Traffic Management as the required scope of MS National Maritime Authorities in terms of capabilities to collect, process and eventually share vessel traffic data beyond the limits of their respective VTS areas, combining non-co-operative (radar) and co-operative (AIS) information into a unique maritime traffic image.

Since then, and in parallel with on-going efforts at IMO-IALA level for an operational definition and standardization of the VTM concept, a number of specific initiatives (precursors) have been carried out at MS and EU level to support the establishment of a VTM capability, and the Italian Coast Guard has been at the forefront of these initiatives with special focus in the Mediterranean Region, in view of its strategic role in terms of maritime transportation, safety and security.

In this respect, much work has been done within the European Maritime Safety Agency (EMSA), to expand the SafeSeaNet backbone from its initial function of merely convey selected information from MS to become a fully real-time maritime data exchange and correlation system, the first steps being now a reality with the implementation of the STIRES module and the implementation of the EU LRIT Data Centre. In parallel, a fully operational Regional Mediterranean AIS Server has been established under the operational coordination of the Italian Coast Guard, to collect and redistribute AIS data over the full Mediterranean region.

Meanwhile, national systems in Italy, France and Spain, have progressively evolved from local VTS and AIS services to centralized net-centric systems, and similar systems are run in Portugal, Malta, Croatia, Greece and Turkey. Initiatives to co-operate with southern Mediterranean partners, in order to support the implementation of the required VTMS capabilities on that side also, are currently ongoing in Tunisia, Algeria, Morocco, Libya and Egypt. The full co-operation at technical, operational and political level (e.g. the UPM initiative) with these countries, as well as the harmonization of decision support requirements and National systems interfaces (beside the AIS data) is a key factor of success in driving the migration to an effective VTM.

The key points of the presentation were:

- 1 The Italian Coast Guard view of the current State-of-the-Art of VTM precursors in the Mediterranean Region.

- 2 The operational requirements for the integration of new technologies in the VTM scenario.
- 3 The drivers for the co-operation with Southern Mediterranean Countries.
- 4 The identification of the main challenges towards the implementation of a full Mediterranean VTM capability.

4.4.5 From VTS to VTM - A Portuguese Experience, Captain Jacinto de Sousa, Instituto Portuario e dos Transportes Maritimos, IP - Portugal

Presented by Captain Jacinto de Sousa

The continental coast of Portugal spans approximately 400 miles and each year about 50000 commercial vessels use these shipping lanes between north European waters and the Mediterranean or African ports.

Eight long range coastal radars, eight medium range port approach radars, eleven AIS base stations, eleven VHF radio and RDF stations are monitored at all times by a Main Control Centre or by a redundant Secondary Control Centre.

All Supervisors and Operators are ex-deck officers with previous sea experience and have been trained to the highest level of efficiency according to the applicable modules of IALA V-103 standards and recommendations

The coastal VTS (Roca Control) offers a 24 hour/365 days service that includes Information Services, Navigation Assistance Services, Traffic Organization Services and Interaction with Allied Services.

Two mandatory routing systems, TSS off Cape Roca and TSS off Cape St Vincent, as well as an Area to be Avoided in the region of Berlengas Is. are enforced in the VTS area. The area is also affected by the Western European Tanker Reporting System WETREP and the Coast of Portugal Ship Reporting System - COPREP

The VTS main national maritime database is shared with all port administrations, MRCC/SAR authorities, law enforcement agencies and other international agencies, namely EMSA/SafeSeaNet and AIS information is available to the AIS Mediterranean Regional Server.

The key points of the presentation were:

- 1 The need for VTS.
- 2 The hardware.
- 3 The Personnel and training.
- 4 The Services.
- 5 Interaction with external entities and law enforcement agencies.

Discussion – Technical Session 4 – Part 1 (papers 1 - 5)

There were no questions following this part of the session.

Part 2 of From VTS to VTM

Chair: Mr Mike Sollosi (USA)

Vice Chair Mr Neil Trainor (Australia)

4.4.6 Regional co-operation and VTS to VTM in international waters - An e-Navigation Perspective, Mr John Erik Hagen, Norwegian Coastal Administration

Presented by Mr John Erik Hagen

The increasingly interconnected global economy, the increasing volume of vessel traffic, a series of accidents and the threat from illegal activities followed by pressures from the public and the media to avert the negative impact of these is creating a need to cooperate to find common solutions to common problems. As VTS is one of the main players in the interaction between ships and shore

it could also become an important part of the solutions. Traditional traffic management instruments; however, cannot alone meet the demands of various stakeholders. VTS should therefore be incorporated into a new wider concept, Vessel Traffic Management (VTM), which in order to be fully realized requires that integrated processes, instruments, procedures and systems are put in place. These items can be linked to e-Navigation, a new concept which is now being developed to ensure a holistic approach to a wide range of services. The e-Navigation concept aims to ensure a more efficient and effective data exchange between maritime stakeholders, and by doing so, it will assist in bringing the VTM concept from paper into practice. Important key words in this respect are user needs and interoperability. A structured harmonized approach to develop further e-Navigation and VTM is required and should result in globally agreed standards, where e-Navigation and VTM solutions should comply. On the path towards a new paradigm in the international field of maritime services many interesting questions and challenges will arise along the way, some of which will be discussed in the presentation.

The major challenge for shipping is to manage the human element. Developments in communications technology will raise ship monitoring capabilities to new levels. Therefore, there is a need to create more 'value added' networks linking ship and shore.

IALA is attempting to define the scope of the VTM concept, is an important contributor to the Maritime Domain Awareness effort and has made a significant contribution to the shore aspects of e-Navigation.

IMO NAV 54 and 55 confirmed the strong links between VTM and e-NAV. The concept of VTM is about generic activities of various stakeholders to manage and reduce risk. In time, VTM will be a global concept, like e-Navigation. Therefore harmonisation, interoperability and scalability are absolutely essential.

There are some examples of regional cooperation that Norway is involved in. They are:

- EMSA North Atlantic monitoring area;
- Regional maritime traffic monitoring in the North Sea;
- Norway and the Russian Federation establishing the exchange of VTS information in the Barents Sea.

Off the coast of Norway, several routing measures exist. VTS here interacts with ships in international waters. Norway has 5 VTS in the southern portion of the country and one in the north, which monitors traffic in the Traffic Separation Scheme.

The responsibilities of Vardo VTS, in northern Norway, which carries out a monitoring role for all of Norway were outlined. Accidents and illegal activities call for monitoring outside territorial waters and LRIT will assist with this.

COMSAR 14 agreed that AIS via satellite could be a part of e-Navigation. However, there are numerous issues to be studied and discussed.

The global economy is interconnected. Shipping volumes have grown and ships are bigger. Therefore, the risk of pollution is higher.

The concepts of VTM and e-Navigation are complementary and therefore they must be developed in harmony. However the human element must be placed in the centre, so as to improve the safety of navigation and protection of the marine environment.

Following the work programme agreed by IMO MSC 86, user needs have been identified and prioritised. At COMSAR 14, it was agreed that GMDSS could be a part of e-Navigation. By NAV 56 (July 2010), the initial system architecture and gap analysis should be completed.

VTM and e-Navigation can only be achieved if there is the will and cooperation at the highest levels of national maritime administrations. This can be problematic as often, the responsibilities for different functions lie with different national departments. Norway has started a process to examine the national implication of implementing e-Navigation.

The key points of the presentation were:

- 1 The global economy
 - 2 VTS in a wider context
 - 3 VTM and e-Navigation
 - 4 User needs
 - 5 Interoperability
- 4.4.7 Research on applying AIS information in Qiongzhou Strait VTS, Mr Qiu Zhixiong, Mr Zhang Yaowei, Mr Wang Pingzhuang & Mr Liangyu Lin, China Maritime Safety Administration

Presented by Mr Shianshe Ma (China MSA)

In order to bring AIS information into full play, enhance the function of VTS and improve the efficiency of VTS, this paper describes the current situation of Vessel Traffic and VTS in Qiongzhou Strait, analyzes the problem of Qiongzhou Strait vessel traffic services and supervision, and provides an idea of applying AIS information to realize the intelligent management of VTS, which is also applied to the upgrading of Qiongzhou Strait VTS. Application of AIS information would effectively solve problems existing in Qiongzhou Strait VTS at present and improve the quality and the efficiency of traffic service.

The key points of the presentation were:

- 1 VTS.
 - 2 AIS.
 - 3 Vessel traffic.
 - 4 Qiongzhou Strait.
- 4.4.8 Lessons learned on VTM concept, Mr Francesco Frau, SELEX Sistemi Integrati -Italy

Presented by Mr Francesco Frau

A number of nation-wide integrated maritime surveillance and managing systems are now in advanced phase of deployment by SELEX Sistemi Integrati. The 'Lesson learned' during the first period of operation, on true traffic management requirements and standardisation were presented and discussed, from the manufacturer's point of view.

Satellites are the new tool for maritime surveillance. If set-up correctly, VTM can influence shipboard decision-making. Satellite technology and sensor correlation can be used to detect anomalous behaviour. The last satellite of the Cosmo Sky-med constellation is expected to be launched in the period of the Conference; the expectation on satellite imagery support to VTM was discussed as a conclusion.

The key points of the presentation were:

- 1 Presentation needs for effective Traffic Picture display have to be able to support Traffic Management.
- 2 Use of existing technologies for system architecture on such a wide scale and global capability of data exchange and interoperability.
- 3 Technical support to normative standardisation and the applicability of 'ad hoc' technical solutions that may induce 'for convenience' a desired behaviour, on statistical basis, that cannot otherwise be imposed.
- 4 The 'on board' component of the communication chain.
- 5 Anomalous detection at sea, using satellite detection and to assist authorities.

6 Information distribution is not a technical problem, but an issue of the requirements of authorities. Technology can deliver whatever an authority wants.

4.4.9 How to react to VTM requirements by electronic means? Mr Dirk Eckhoff, German Federal Waterways and Shipping Administration

Presented by Mr Dirk Eckhoff

In the past different applications today summarized under VTM have been integrated step by step into various AtoN or VTS systems. These applications are in use by VTS operators today.

To avoid putting more workload on the operators by new VTM functions, additional automatic functions or software tools were installed. In addition an upgrade of an operator's human machine interfaces became necessary.

For the implementation of the new applications engineers extended the systems, embedded components, installed new stand-alone equipment or connected systems to remote information sources. Each time the interface between the existing systems and the new applications had to be specified and implemented once again.

Most of new installations are now overlapping with the old systems in that they are accessing the same data but not using the same system hardware.

Not to end up in a heterogeneous cloud of systems the German Waterways and Shipping Administration decided about 10 years ago to develop a system structure which can be extended and upgraded in a more economical, time and resources saving manner.

The presentation presented a system structure which is open for future extensions of VTM applications. More system features and the future challenges of its implementation and management were described.

The key points of the presentation were:

- 1 VTM interconnects the processes of various stakeholders in the maritime domain.
- 2 More electronic support is required to acquire, process, distribute and present the data needed for the VTM processes.
- 3 The German Administration developed a system structure which is open for future extensions of VTM applications.

4.4.10 Emergency situation management in the Turkish Straits, Mr Tayfun Yalcin, Directorate General of Coastal Safety - Turkey

Presented by Mr Tayfun Yalcin

Risk management is a continuous and developing process which runs throughout the strategy and involves three phases: "risk mitigation", "action plans for emergency situations" and its "implementations". The last two phases are the subject of emergency situation management.

Emergency situation management is a discipline that involves preparing for an emergency situation before it occurs as a part of risk management.

The presentation identified the experience of The Turkish Straits VTS in emergency situation management with concrete examples, as well as providing an introduction of The Turkish Straits and its VTS.

The key points of the presentation were:

- 1 Risk mitigation.
- 2 Action plans for emergency situations and their implementation.
- 3 Emergency situation management.

4.4.11 VTS to VTM – Is there a need for further training?, Captain Terry Hughes, Trinity House

Presented by Captain Terry Hughes

The roles of the ship master, pilot and VTS Operator were outlined. He then provided an overview of the international regulatory framework in relation to VTS, with the remark this was all too confusing to a ship's officer.

It was clearly stated that the definition of VTM did not mean more vessel control. VTS would remain a core element of VTM but noting that clarity was required about the concept of VTM. However, for the moment not any changes to the current VTS model courses are expected.

It was asserted that for VTS to be successful in VTM, all personnel must be trained to the IALA model courses and additionally, the training organisation must be accredited; this with the caution that this did not mean manufacturer training.

Currently there is no requirement for a change in the provision of VTS primary services and therefore no knock-on effect on the training of personnel. However, schools of thought predict the possibility that, during the development process of the VTM concept, the delivery of the primary services of VTS (INS, TOS, NAS) may change as a result of the enhanced information position of the VTS.

A number of developments that have taken place during the last decade may have consequences for VTS personnel due to a foreseen shift in operational tasks to be executed. These developments include:

- increasing ship traffic, larger ships, an increased diversity of shipping and an increasing pressure on the availability of clear water ship domains due to, inter alia, the establishment of offshore renewable energy installations utilisation for other purposes (e.g. wind farms);
- rapid development and availability of modern and more efficient technologies for navigation, communication and information exchange. As a consequence, of an increasing availability of valid information and the increasing reliability of technical equipment on board for decision-making, it is expected that the vessels will become more self-sufficient.
- an increasing public demand for an improved monitoring and surveillance of traffic in sensitive areas.
- anticipated monitoring of the overall traffic image on a tactical level. This may require additional competences from VTSOs, such as assessing vessel traffic dynamics, supervisory control, allocation of space etc.

At present some of these trends are already recognisable in VTS operations in many traffic areas. However, it should be noted that no specific attention has yet been given to the identification of such a set of appropriate competencies.

The key points of the presentation were:

- 1 VTS.
- 2 VTM.
- 3 Operations.
- 4 Training.

Discussion – Technical Session 4 – Part 2 (papers 6 - 11)

In response to a question from the floor, Terry Hughes stated that VTM is not about control but that VTM would lead to more control of vessels is a common misunderstanding. The Chairman, M Sollosi and P Paap agreed with this reply.

Tuncay Cehrehli added that the confusion was due the letter 'M', which stands for management. It meant the management of stakeholder activities; VTM was not a body, but a concept. He did not foresee 'VTM Operators'.

Pieter Paap commented that VTM and e-Navigation are complementary concepts.

4.5 Technical Session 5 – Maximising the potential of AIS

Chair: Mr Win van der Heijden (The Netherlands)

4.5.1 Implementation of AIS into River Information Services for Inland Navigation, Mr Stefan Bober and Mr Wilfried Rink, German Federal Waterways and Shipping Administration

Presented by Mr Stefan Bober

AIS (Automatic Identification System) has become an important component for the exchange of navigation related information between ships and between ships and shore. To serve the specific requirements of inland navigation, AIS has been further developed to Inland AIS within the scope of vessel tracking and tracing systems for inland navigation. The implementation of Inland AIS into RIS (River Information Services) supports services such as onboard navigation, vessel traffic management, fairway information service, calamity abatement or transport management.

An Inland AIS project in Germany dealing with passing arrangements in narrow fairways on the river Weser will be described to show the benefits of Inland AIS for inland navigation in different applications.

The presentation covered onboard applications like enhancement of the tactical traffic image and assistance in passing arrangements in narrow fairways as well as the shore based services like VTS, electronic ship reporting or lock management. Examples of the usefulness of inland AIS on ECDIS were shown, particularly with tight bends having strong currents. Consequences and perspectives for further developments will be addressed and discussed.

The key points of the presentation were:

- 1 River Information Services.
- 2 Inland Navigation.
- 3 Vessel Tracking and Tracing in Inland Navigation.
- 4 Inland AIS and ECDIS.
- 5 Traffic Regulation.

4.5.2 Achievement of AIS AtoN in Turkey, Mr M Celalettin Uysal, Directorate General of Coastal Safety - Turkey

Presented by Mr M Celalettin Uysal

In addition to the existing 85 remotely controlled AtoN in Turkish straits, a new project based on AIS-AtoN is aiming to extend the coverage to whole Turkish waters. This is a pilot application for 185 AtoN spreading from Western Black Sea to Aegean Sea Regions, targets to collect information on AtoN and vessel traffic. Beyond remote-controlling, the Directorate General of Coastal Safety is planning to use this information for both improving the system itself and using the benefits of AIS.

In addition to remote monitoring and control, the system can send local AIS messages to individual ship or all vessels by benefiting from multi directional communication through Aids to Navigation device and it can expand the functions of a conventional AtoN.

By using the system,

- a Information from AtoN and all other local AIS messages broadcast will be transferred to the Remote Monitoring Centre (RMC).
- b Messages produced in RMC and automated AIS-AtoN messages can be broadcasted to AIS receiver units within the range.
- c The dynamic data and information flow from local sensors which connected to AIS AtoN can be broadcasted in AIS message format and will be shared with RMC.

- d Two way data transmission for the remote control of the AtoN, AIS-AtoN and its connected units will be enabled.
- e RMC software will collect, process and evaluate the information for system management purposes.

The key points of the presentation were:

- 1 Introduction of Turkish National Aids to Navigation Authority.
 - 2 National Solutions for Remote Control of Aids to Navigation and AIS AtoN service.
 - 3 General Instruction of AIS Aton Network for Turkey and Basic Remote Control Functions.
 - 4 General Technical Specification of AIS Aton for Turkey.
 - 5 Extra gain with the Project of AIS AtoN Network for Turkey and its advanced features.
- 4.5.3 The application of OSNT-AIS monitoring reception of AIS offshore station system, Mr Jie Fang, Ms Jial Cheni and Mr Chen Guowei, Shanghai Maritime Administration

Presented by Mr Lu Yongqiang (China MSA)

The presentation introduced monitoring reception of AIS offshore station system and its application of being used to test utilization and coverage of received signal link of base station. The theory of this system is that: large amounts of data which were received by AIS offshore station were displayed in the electronic charts to show the coverage and effectiveness of signal reception in the specific route by using mass calculation, and different colours were used to display different layers corresponding to the signal utilization, moreover time being showed was stratified by day, month, quarter respectively.

Several traditional methods to monitor coverage of AIS offshore stations and test the coverage and effectiveness of AIS were discussed. In order to monitor the coverage of AIS offshore stations accurately and evaluate the utilization of AIS signals in certain area or section of the channel, an OSNT-AIS monitoring reception of AIS offshore station system has been developed. This software, which can be used to calculate and display the coverage of AIS base station, has proved to be quite stable.

The key points of the presentation were:

- 1 AIS.
 - 2 Utilisation and coverage.
- 4.5.4 AIS Binary Messages – Developments in the Baltic and progress in IMO, Mr Markus Porthin, VTT Technical Research Centre of Finland, Mr Rolf Zetterberg, Swedish Maritime Administration, and Mrs Sanna Sonninen, Finnish Transport Safety Agency

Presented by Captain Markus Porthin and Mr Rolf Zetterberg

The Automatic Identification System (AIS) is a powerful tool for ship identification and tracking. However, AIS could be exploited more efficiently to improve the preparedness of the authorities in case of an accident and the situational awareness onboard ships as well as reduce the workload on ship bridges by minimising the need for VHF communication and facilitating the fulfilment of reporting obligations. In the Baltic AIS trial project (AISBALTIC), five new AIS Application-Specific Messages, also known as binary messages, were developed based on the operational needs of the authorities in the Baltic Sea countries. The worldwide development work was coordinated by a Correspondence Group established in 2008 by the International Maritime Organization (IMO). As a result, the IMO Sub-Committee on Safety of Navigation prepared in 2009 a new draft SN Circular to guide the use of 15 new and two previously published AIS Application-Specific Messages.

The results of the AISBALTIC project, the CG and other related projects in e.g. USA and Japan reveal the potential of the AIS Application-Specific Messages. The communication enabled by the exploitation of AIS Application-Specific Messages ensures that the quality and quantity of available information both onboard and among authorities is significantly improved. As the information

content of the developed new messages originates from the present deficiencies in information exchange, improved conditions will ensure improved level of maritime safety, better preparedness of authorities in case of an accident and truly contribute to the protection of the marine environment.

The key points of the presentation were:

- 1 The AIS can be exploited more efficiently by the use of AIS Application-Specific Messages (a.k.a. Binary Messages).
 - 2 In the AISBALTIC project, a thorough survey was carried out in the Baltic Sea countries, resulting in five new Application-Specific Message proposals for international implementation.
 - 3 The international development of new Application-Specific Messages has been coordinated by IMO through an inter-sessional correspondence group in 2008 – 2009.
 - 4 IMO Sub-Committee on Safety of Navigation has submitted a draft SN Circular containing 15 new AIS Application-Specific Messages to the Maritime Safety Committee for approval in May 2010.
 - 5 AIS Application-Specific Messages is one of the first concrete solutions to the implementation of IMO's e-Navigation strategy.
- 4.5.5 New opportunities with AIS information from satellite - Experience from the Norwegian AIS satellite project, Captain Jon Leon Ervik, Norwegian Coastal Administration

Presented by Captain Jon Leon Ervik

In 2009 Norway launched an AIS satellite that follows a polar orbit, passing over east Atlantic and Pacific Ocean. The Norwegian AIS satellite in polar orbit gives good coverage and AIS information for huge areas in the Arctic and the Antarctic waters, the coast of New Zealand, Africa and Europe; the update rate is every 90 minutes.

The presentation outlined results so far and potential use of information gained. Is AIS information from satellite a useful contribution to the e-Navigation concept? Will AIS information be a useful contribution to safety, statistic, security and protection of the environment, including VTS in international waters? Can AIS information from satellite be a supplement to LRIT?

AIS information combined with other information such as LRIT, radar and ship reporting systems can contribute to detect abnormal behaviour. The presentation gave examples concerning this.

The key points of the presentation were:

- 1 The challenge.
 - 2 User needs.
 - 3 Combination of different sensors.
 - 4 AIS information from satellite.
 - 5 Opportunities.
- 4.5.6 Practical aspects of the use of AIS information, Raul Escalante, HIDROVIA SA - Argentina

Presented by Raul Escalante

Hidrovia SA is a private firm that since 1995 has had a concession from the Ministry of Public Works of Argentina to realize the dredging and maintenance of Aids to Navigation in a stretch of approximately 1.000 km of the main waterway of Argentina from the Ocean just in front of Montevideo, (Uruguay) to Santa Fe (Argentina) situated some 800 km upstream. Hidrovia SA was awarded, at the end of 2009, an extension of this contract to attend an additional stretch of the Parana River from Santa Fe to Corrientes that is located some 640 Km upstream.

Understanding that the implementation of AIS on ships and AtoN opened the possibility of using the information provided by passing ships for other purposes additionally to safety of navigation this paper presents advances in practical aspects of using AIS information. This presentation is a follow up of the paper presented at the XVIth IALA Conference held in Shanghai, China, 'AIS as a management tool in a waterway' May 2006. It follows concepts expressed in IALA Guideline 1050 and other Guidelines in preparation.

The objectives of the presentation were:

- a to share knowledge on practical aspects of using AIS transponders on AtoN:

As a first step during 2005 Hidrovia SA installed 16 AIS transponders on River Plate buoys. The second step comprises the installation of 84 additional AIS transponders on AtoN by the end of 2010.

Taking into consideration that, as the results of IALA 2008 Questionnaire indicates, not many countries in the world had at that time AIS transponders installed on AtoN Hidrovia SA considered that their practical experience could be helpful for other Services that intend to advance in this field

- b to present examples on using AIS information:

Collected AIS data transmitted by ships has been used to:

- i. analyze ship impacts on AtoN and other structures and the identification of vessels involved and probable causes of impact;
- ii. study lateral distribution of ships navigating through a cross section in different positions of the waterway (straight channels, curves);
- iii. study the behaviour of ships in the waterway depending on ship's speed;
- iv. determine efficiency of length and width of crossing areas in waterways;
- v. double check passing ships along the waterways for the purpose of collecting tolls.

The main conclusions presented were that for implementing AIS technology on AtoN it is very important to overcome operational problems and that the use of AIS transponders on AtoN as well as AIS data from ships greatly improves the knowledge required for the proper design of the waterway and other important purposes.

The key points of the presentation were:

- 1 AIS transponders on AtoN.
- 2 Use of AIS information.
- 3 Operational AIS problems.
- 4 AIS Training course.
- 5 Design of crossing areas.

Discussion – Technical Session 5 – Part 1 (papers 1 - 6)

In response to the question as to whether he is concerned about VDL loading and had any FATDMA planning been carried out, Mr M Celalettin Uysal said that Turkey has not experienced any problem with VDL loading and that in answer to the second question, yes some planning has been undertaken and that the matter is still under consideration.

Markus Porthin was asked what could be the best way to introduce command signals for ship manoeuvring into AIS, to which he replied that all that is needed is a link and a piece of software so that the commands are automatic. In principle this should not be a problem. Rolf Zetterberg added that if it is thought that the messages are useful then they could well be approved by IMO.

Asked whether there are any plans for Norway to distribute their AIS satellite data on a global basis, Jon Leon Ervik said that that Norway does not have a policy in Norway on this. However, it is prepared to share data eventually, whilst, at the same time, respecting other nations privacy.

When asked how information will be provided to mariners in rivers, Rolf Zetterberg indicated that there will be mandatory equipment on board.

Part 2 of Maximising the potential of AIS

4.5.7 AIS Traffic Analysis – The Risk Assessment Process for Aids to Navigation, Captain Roger Barker, Trinity House

Presented by Captain Roger Barker

Changing mariner requirements were traditionally considered through use of port statistics, user consultation and the professional knowledge of those making the assessment.

Implementation of the Automatic Identification System (AIS) has meant that vessel traffic routing information is now readily available.

This routing information means that significant improvement in the AtoN assessment can now be made which can also result in a more cost effective operation where the appropriate Aid is deployed, thus ensuring maximum efficiency with no detriment to the safety of the mariner and general requirements of the user.

AIS provides a variety of ship data, including draught, length and type. The ability to sort and filter AIS data elements, along with the use of Geographical Information Systems, assists authorities in decision-making. AIS data, used to form one of the layers in an appropriate Geographic Information System, can be combined with a vast assortment of other data including information regarding leisure vessel tracks, new offshore developments and changing hydrography, for example, to provide up to date information to underpin the assessment of current and future needs. The use of AIS information to assist in the consideration of emergency wreck or obstruction marking can mean that a cost effective assessment can be made with regards to the level and speed of response required.

AIS as an aid to navigation is a valuable tool. But, before a decision can be made on whether an AIS aid to navigation (physical or virtual) should be deployed, the ability of shipboard equipment to display such aids, must be considered.

Notwithstanding the advantages of improved information available, care must be taken when assessing the data. The advantages and limitations of the data must be considered when making decisions informed by this information.

The key points of the presentation were:

- 1 AIS traffic data can mean better informed decisions on AtoN deployment.
- 2 AIS traffic data can provide for more efficient deployment of emergency resources.
- 3 Advantages and disadvantages must be considered in using AIS data.

4.5.8 Manipulation and analysis of AIS data using a Geographical Information System (GIS), Mr Gerry Brine, Australian Maritime Safety Authority

Presented by Mr Gerry Brine

GIS has developed into a powerful tool used to visualise and analyse patterns and relationships in spatial data.

AIS data can be classified as spatial data as it has a geographical component to it in the form of latitude and longitude coordinates generated by a vessel's position fixing system (e.g. GPS).

This presentation showed how AMSA is utilising AIS data and GIS tools to enhance maritime safety planning processes and incident response. In particular, it showed how AMSA is using three different methods of GIS manipulation and analysis on AIS datasets:

- 1 Filtering of the AIS data, based on a time interval, and demonstrating how it can adversely affect the integrity of the data.

- 2 The use of density analysis of AIS point data to ascertain the coverage achieved by an AIS base station. The shortcomings of this technique in regard to heavily used navigation routes were also addressed.
- 3 Manipulation of AIS data to analyse vessel traffic over a specific area of interest to identify patterns not evident when viewing raw vessel tracking data.

The many diverse uses of GIS were also demonstrated.

The presentation also outlined an AtoN metadata schema which will enable AtoN information to be:

- viewed logically with minimum effort;
- easily shared;
- reported with minimum effort (for mariner's benefit) e.g. Notices to Mariners;
- easily converted to GIS formats for visual/spatial representation (e.g. Google Earth).

The key points of the presentation were:

- 1 AIS and GIS tools can play a key role in enhancing AtoN network planning and efficiency and incident response.
 - 2 Effective analysis of AIS data requires a sound understanding of the potential shortcomings in the data.
 - 3 AIS data can play an important role in government activities outside its core safety of navigation role.
 - 4 There are benefits of having a common AtoN information standard most of which can be realised through GIS tools.
- 4.5.9 New components of e-Navigation frame - MIP AIS and Integrated AIS, Professor Shufang Zhang, Dalian Maritime University

Presented by Professor Shufang Zhang

e-Navigation requires international harmonisation. As domestic vessels are not required to comply with international regulations, they generally have a different set of rules. Therefore, coordinating the requirements for SOLAS and non-SOLAS vessels is important for safety in all waters. Non-IMO Convention ships in coastal and inland waterways are generally using the monitoring and management systems based on the public wireless mobile communications. However, these systems cannot achieve ship identification. In order to provide a solution to this restriction, an automatic identification technology based on the public wireless mobile IP network - MIP AIS is put forward. The principle of the system is to realize researched technology and experiments with MIP-AIS were demonstrated indicating that MIP-AIS is feasible.

In order to achieve mutual identification for the MIP-AIS ships and IMO convention AIS ships, an integrated AIS, termed IAIS, technology was also proposed. This technology is useful for the navigation and collision avoidance of all kinds of ships in the same waterway; the monitoring centre can give the unified management for all the ships in a single-mode. The presentation described the Integrated AIS system principle, the on board terminal and the monitoring centre management system. Experimental results were given.

This new concept is believed to add a new component to the e-Navigation framework by providing a method for the collaboration/co-operation of domestic shipping with the international community.

The key points of the presentation were:

- 1 AIS.
- 2 MIP-AIS.
- 3 Integrated AIS.
- 4 e-Navigation.

4.5.10 The Case for a New Digital Communication Service between Ship and Shore, Mr Ornulf Jan Rodseth and Mr Bjornar Kleppe, MARINTEK e-Maritime - Norway

Presented by Mr Arve Dimmen

A study on various communication systems' capability, including AIS and land-based digital radio systems, to meet the ship-to-shore and ship-to-ship needs for possible e-Navigation services, was presented.

The pros and cons of using satellite systems were also presented.

The conclusion was that e-Navigation services will emerge and will demand more bandwidth. Satellite technology will not be able to provide coverage in all areas. AIS cannot carry particularly high data loads. This is meant to be wake-up call: IALA has secure appropriate frequencies to implement secure and reliable communication systems, in order for e-Navigation to be robust in the future.

The key points of the presentation were:

- 1 Emerging e-Navigation communication requirements.
- 2 A need for additional digital bandwidth for ship/shore communication.
- 3 Combined satellite/coastal communication infrastructure gives benefits.

4.5.11 The Future Potential of AIS AtoN, Mr Michael Card, Zeni Lite Buoy Co., Ltd., Japan

Presented by Mr Michael Card

This presentation described the potential for the future use of AIS AtoN. The introduction was a brief summary of the history of development of the modern AIS AtoN, and current uses. The main portion of the presentation was a description of the future potential of the AIS AtoN and the benefits which will result for navigators and for shore authorities. Current work on binary messages and the effect on AIS AtoN selection and performance characteristics were included. Future possible bridge systems were mentioned but not described.

The presentation closed with a brief discussion of the physical realisation of the modern AIS AtoN, the applicable international standards, and the considerations for competent authorities. The presentation was concerned mainly with the real AIS AtoN; Virtual AIS AtoN is not discussed in detail.

The key points of the presentation were:

- 1 The future potential of the AIS AtoN will be realised in four areas:
 - a Navigation.
 - b Environmental data.
 - c Vessel surveillance.
 - d SAR.
- 2 The broadcast of met-hydro data may become the most important function of AIS aids to navigation.
- 3 AIS Message 21 will possibly replace racons. As the use of AtoN AIS and AIS messages continues to increase, it is clear that the manufacturers of navigation display systems for vessels must consider what data to process and how to display it.

4.5.12 Enhancing Maritime Safety and Security through Satellite AIS, Mr Peter Mabson, ExactEarth, Canada

Presented by Mr Peter Mabson

The use of AIS in the maritime world has proven its worth as a safety system and more recently has been used in the monitoring of shipping off the shores of nations around the world. Its assistance with vessel traffic management, search and rescue and environmental identification has

benefited all involved in maritime affairs. However, AIS has been limited to a maximum range of approximately 50 nautical miles, which is line of sight. This is about to change since it is now possible to obtain AIS information through the use of satellites and gather data on shipping globally. ExactEarth is able to accurately identify shipping in all parts of the globe for the purpose of search and rescue, environmental identification, vessel traffic management and vessel monitoring. It was shown how the technology is able to overcome all impediments that have been considered limitations in the use of AIS space technology; it can now provide a ship's identification, position, course and speed from its class A transponder and allow interested maritime organizations to display shipping in near real-time applications.

The key points of the presentation were:

- 1 Provide vessel identification, position, course and speed of class A AIS transponder equipped ship globally.
- 2 Provide continuous identification of shipping in a given area that can assist with more rapid response to vessels in distress.
- 3 From historic information, identify vessels that caused environmental damage anywhere in the world.
- 4 Monitor shipping destined for ports and provide control for facility use and management.

Discussion – Technical Session 5 – Part 2 (papers 7 - 12)

The opinion of the panel was sought on the legal issues associated with the sharing of AIS vessel data, particularly as more uses were being found for AIS data. It was never expected that AIS data would be used so widely. It was suggested that a legal framework must be in place.

Peter Mabson agreed and said that Exact Earth was providing this data only to national authorities and that too only the identity, course and speed. His company was working with the Canadian government to resolve legal aspects of sharing AIS data.

Gerry Brine added that AMSA had a vessel tracking policy in place, which addressed the sharing of AIS data. AIS data could be shared with other government agencies and port authorities who had a genuine reason to obtain this data. The policy had been in place for some time and had been approved by AMSA's General Counsel, taking into account AMSA's own charter.

As regards to a suggestion that Message 21 would replace racons in the longer term, there were no other views expressed from the panel or the floor.

4.6 Technical Session 6 – e-Navigation

Chair: Mr Bill Cairns (USA)

Vice Chair Dr Nick Ward (UK)

Part 1

Introduction by Chair

The Chairman introduced the session by saying that e-Navigation affects all IALA Committees and that this afternoon's session will focus on development and early implementation of e-Nav.

- 4.6.1 Advanced usage of AIS and e-Navigation, Cdr Hitoshi Hatakeyama, Navigational Safety System Development Office, AtoN Engineering Division, Maritime Traffic Department, Japan Coast Guard

Presented by Captain Toshio Takahashi

AIS has been installed in all vessels which are subject to the carriage requirement, beginning in July 2002 and being completed in July 2007, in accordance with the SOLAS agreement. In Japan, shore-based AIS stations were installed with a view to maximise capability but it is believed that the potential of AIS has not been fully utilised yet. This presentation provided the current status of AIS usages and activities for advanced AIS utilisation in the future.

The key points of the presentation were:

- 1 Provision of information for safety of navigation.
- 2 Enhancement of efficiency in vessel traffic.
- 3 Activities being undertaken by Japan for advanced usage such as:
 - a. Study of binary messages for international use commenced in 2004 culminating in a Safety of Navigation Circular being issued by IMO NAV Sub-Committee;
 - b. Study of AIS AtoN to address lack of clarity of standards for AIS AtoN;
 - c. Study on ENSS address limitations of AIS Minimum Keyboard Display.
- 4.6.2 Integrated Aids to Navigation Management, Monitoring and Information System - Possible Component of e-Navigation, Eng Marek Ledochowski and Marek Dziewicki, Maritime Office, Gdynia and Mr Artur Baranowski, Sprint Ltd - Poland

Presented by Eng Marek Ledochowski

The idea to create a single and simple way for managing and monitoring different aids to navigation systems has appeared when technical development enabled such a solution.

It was decided to link traditional aids to navigation, dGNSS and AIS into one holistic system (application) for managing and monitoring.

This approach will have significant impact as a single source of navigational information on future e-Navigation, which is a new concept in designing IT systems used in navigation.

The additional task is to create a live and holistic image of the maritime traffic overview fed by a system of Aids to Navigation installations including AIS and local radio-navigation augmentation status. It is assumed that other important maritime information must be displayed as well. Display system is based on multi touch technology – extremely friendly for users. The concept also includes mobile applications usage.

The key points of the presentation were:

- 1 The rationale and timing of the project.
- 2 System architecture concept. The system enables AtoN status data, DGPS broadcasts and AIS data and MSI to be integrated in a database for subsequent use various users with different needs e.g. maintenance management, navigation safety management. System architecture diagram showed the communications links and hardware.
- 3 User interface concept based on touch screen technology giving flexibility to easily change, layer and filter the data displayed. The system is called the 'Polish Single Window'.
- 4 Conclusions.
 - a. Integrated solution, that will impact e-Navigation;
 - b. IMO categorisation used for parameters.
- 4.6.3 e-Navigation and Safety Back-up for Port Pilotage, Captain John Elyett and Mr Neil Trainor, Maritime Safety Queensland - Australia

Presented by Neil Trainor

In October 2006 a new deep draft departure channel, 10 kilometres long, was commissioned at Hay Point with minimal fixed beacons and no leads.

In order to achieve optimum utilisation and maximise deep draft access to the new channel, one of the world's first integrated e-Navigation systems was introduced to ensure the safe passage of deep draught departing ships.

The system developed at Hay Point combines and integrates two distinct components, namely:

- 1 A portable pilot unit (PPU) {onboard}.

2 Shore based monitoring capability (Hay Point Vessel Traffic Services (VTS) centre).

The Vessel Traffic Service at Hay Point monitors the ship's track through the ship's AIS which transmits data back to Hay Point VTS. The system creates an electronic corridor.

Standard Operating procedures ensure that should there be a system failure onboard the ship, the pilot can ask for navigation assistance from the VTSO. The shore based VTS replicates most information that is onboard the ship.

The Hay Point harbour master has instigated a simple grid system which depicts distance along the channel and offset from the channel centreline. Should the pilot lose onboard situational information they will be provided with an immediate position which allows them to take instantaneous corrective action to retain track.

This project has taken e-Navigation to the next level through the delivery of a highly sophisticated and integrated ship and shore system. This is the distinct and unique attribute that sets this project apart from others of its type around the world.

Since the system was commissioned in March 2007 there have been five occasions when the shore based assistance has been activated due to equipment failure onboard.

The key points of the presentation were:

Reduce physical aids to navigation leading to significant savings in set up costs (\$AUS 0.8M).

Use a tried and tested back-up method should the PPU fail.

High level of trust has been developed through well trained VTSOs and pilots, who have access to identical information. VTSO will contact the pilot if a major deviation from the centreline of the channel occurs.

VTSOs provide information service not navigational assistance; advising not directing.

4.6.4 Maritime Information Systems as a component of e-Navigation, Professor Lee Alexander, University of New Hampshire

Presented by Professor Lee Alexander

The scope of what constitutes 'Maritime Information Systems' (MIS) as a component of e-Navigation was described. There is a wide variety of navigation equipment, systems, services and processes that fall under the e-Navigation concept of operations. This includes shore-based services such as VTS, and shipborne equipment/systems including radar/ARPA, ECDIS, AIS, GNSS, and INS. A distinction was made between 'information' and 'data'. Whether shipborne or ashore, any data must eventually be converted into a presentation/display of 'information' that can be used for situational awareness or decision-support. At present, there are no specific standards related to the presentation/display of shore-based information (e.g. at a VTS Centre). Some 'guiding principles' and recommendations on the best way forward were provided.

The key points of the presentation were:

- 1 What are (or will be) e-Navigation related equipment, systems, services?
- 2 What do IMO's objectives actually mean? Some of these are unachievable.
- 3 What are the various information needs (shore-based and shipborne)? Just displaying more information isn't necessarily better. Therefore there is a need to temper the extent of systems.
- 4 What is the difference between 'information' and 'data'?
- 5 What are (or will be) some of the more important presentation/display issues related to e-Navigation? Need to be open to new display methods and opportunities.
- 6 There are some significant challenges/opportunities related to harmonizing shore-based and shipborne e-Navigation-related information.

- 7 A potential issue is that 95% of e-Navigation requirements are being developed by government and related agencies rather than user.
 - 8 Eliminating the bad ideas is difficult but essential. A sleeping giant is the number and types of AIS messages that will be possible. However the lack of a requirement to display binary messages will be a limiting factor.
 - 9 In future there will be 'nowcasts' which are continuously updated broadcasts.
 - 10 Pilots who are equipped with Portable Pilot units, will be the early innovators for e-Nav.
- 4.6.5 Maritime Safety Information Relay through Navigational databases - A Step towards e-Navigation, Mr Paulo Rafael da Silva, Instituto Hidrografico - Portugal

Presented by Lt Cdr Victor Conceição

There is some consensus regarding the need of efficient data channels enabling a timely exchange of maritime safety information. Another related issue is the ongoing discussion on web capabilities and web-based services that will be included as a part of e-Navigation.

The presentation focused on explaining the work done in Portugal by the Instituto Hidrográfico (IH) in developing web-based services, supported by robust navigational databases, which are already providing mariners with MSI in an organised friendly manner.

IH has been using the web to disseminate periodic Notices to Mariners for a long time. This has evolved in such a manner that a mariner may, for instance create a custom portfolio and be automatically warned whenever it changes.

Navigational databases and development of new services continue and IH expects to be able, in the short term, to provide a planning tool incorporating information from nautical charts, sailing directions, lists of lights and Maritime Safety Information (MSI).

The key points of the presentation were:

- 1 Dissemination of Notices to Mariners (NTM) and coastal Navigational Warnings (NW) has been progressively enhanced since 1998 (through web-based delivery (the ANAVnet application):
 - a Version 2 has implemented including correlating NTM, coastal and local NW with the charts and nautical publications. Version 2A of ANAVnet has enabled graphical data to be accessible for other applications including Geographic Information Systems;
 - b ANAVnet Version 3 is currently being implemented and will address quality control and geo-referencing and linking of ANAVnet with the List of Lights.
- 2 Future ANAVnet development will include improved compatibility and integration of NTM and NW with onboard systems (ECDIS), standards for geo-referencing MSI and the possibility for mariners to be sent hydrographic formatted reports, using ECDIS and binary AIS messages.
- 3 Consider that ANAVnet could be an e-Navigation component with some improvements including dedicated and secure communication channels; availability and standardization agreements?

Discussion – Technical Session 6 – Part 1 (papers 1 - 5)

No time was available for questions so the Chairman asked delegates with questions to put these in writing or follow up with speakers at the break.

Part 2 of e-Navigation

- 4.6.6 e-Navigation and future AtoN development planning, Jin Shengli, China Maritime Safety Administration

Presented by Wenhua Li (China MSA)

e-Navigation represents an effective means and inevitable trend in promotion of navigational safety and prevention of disastrous pollution in the days to come. The planning and construction of aids

to navigation, a vital part of shore-based e-Navigation system, is a pressing task for all coastal state governments. This presentation, based on the experience of AtoN construction in China and utilization of risk management tools, analyzes the requirements of e-Navigation for the shore-based AtoN system, and discusses the direction for navigational service along the coast in the next 5 to 10 years in China and puts forth the objective of a development program. It can also be used as a reference for other AtoN authorities in the planning and construction of their aids to navigation systems.

The key points of the presentation were:

- 1 Aids to Navigation, Hydrography and electronic navigation charts constitute an essential part of a future e-Navigation system. AtoN and hydrographic authorities play an important role in the construction, promotion and implementation of IMO's e-Navigation strategy.
 - 2 Making a systematic developing program, through needs identification, risk assessment, aimed to identify the gap between the present situation and the future e-Navigation requirements. Further to clarify the investment area, i.e. what we shall research and what we shall construct.
 - 3 China MSA 'target to implement the e-Navigation in 2020: to provide high accuracy positioning system based on GPS and Compass (Bei Dou) satellite, to build up an ENC-based integrated information platform collecting and broadcasting to users the meteorological, tidal, current information and information regarding AtoN condition; to construct a national AIS data centre providing dynamic monitoring of ships within 60nm from the coast.
 - 4 User need is important, and technology development is also crucial. Government co-operation in developing the core technology and is vital to promote the implementation of the e-Navigation strategy.
- 4.6.7 Radionavigation and Communications - The building blocks of e-Navigation, Mr Peter Douglas and Mr Alan Stewart, Northern Lighthouse Board, Mr Bill Kautz, United States Coast Guard

Presented by Mr Peter Douglas and Mr Bill Kautz

At a relatively early stage of the development of e-Navigation, the three key components of the concept were identified as:

- Electronic Navigation Chart (ENC) coverage of navigational areas;
- a robust electronic position, navigation and timing system (with redundancy); and
- an agreed infrastructure of communications to link ship and shore.

Of these components, the first is considered to be outwith the control of IALA members; however the latter two will be contributed to by IALA members, either during the specification phase, or by ongoing operation of the relevant technologies. Both were addressed in the presentation, which summarised the work of the Technology for e-Navigation (WG2) and the Communications (WG4) Working Groups of the e-Navigation Committee.

The key points of the presentation were:

- 1 Criticality of robust, redundant PNT information within e-Navigation.
- 2 Criticality of agreed and internationally available communications bands to support e-Navigation.

4.6.8 The Notion of the Universal Maritime Data Model and its Implications, Mr Jan-Hendrik Oltmann, German Federal Waterways and Shipping Administration

Presented by Mr Jan-Hendrik Oltmann

Before the advent of IMO's e-Navigation concept there were several attempts to harmonize and standardize some kinds of electronic and digital information exchange between ships and shore, such as ENC data exchange or radio communication systems like DSC, MF, DGNSS, and AIS.

However, the ship-side and the shore-side were mostly considered separate 'worlds' in terms of electronic data exchange and data handling until recently. This situation was fostered by the missing integration of different systems both onboard and ashore, and by the broad distribution of proprietary manufacturer solutions, which focused on a single system alone. The outcome was a variety of solutions which work fine as stand-alone but did not work together.

Global digital data exchange systems such as the GMDSS/DSC can be construed as an early vanguard of the need for a universal harmonization regarding both electronic and digital data exchange. But only the advent and implementation of the universal and now maturing concepts and systems like the INS, ECDIS and the AIS as well as the increased and still increasing demand for national, supra-national and even global shore-based data exchange constitute fresh and powerful driving forces for more harmonization regarding the data exchange by electronic means digitally: With the growing information exchange the need for harmonization has grown as well.

Therefore, harmonization of electronic, digital information exchange rightly features prominently within IMO's definition of e-Navigation. For the same reason, IMO identified a 'Common Maritime Information/Data Structure' as a 'high-level user need' within their e-Navigation strategy.

IMO invited IALA to participate in the development and implementation of their e-Navigation strategy. Hence, in fulfilment of IMO's above stated user requirement, IALA developed the notion of the Universal Maritime Data Model (UMDM) and the concept of the Universal Data Object Identifier (UDOI).

The UMDM will contain a universal and harmonized description of information/data relevant for the maritime community, i.e. a so-called "data model" in IT parlance. Each information/data object would be identifiable by a unique identifier, hence Universal Data Object Identifier. Using these universally harmonized data modelling on the abstract plane, the e-Navigation architecture and also the individual systems within the scope of e-Navigation both onboard and ashore could benefit.

The presentation outlined the state of development of the UMDM and its benefits.

The key points of the presentation were:

- 1 Proposed IALA e-Navigation stack.
- 2 IALA Universal Maritime Data Model (UMDM).
- 3 IALA Maritime Data Exchange Format (MDEF).
- 4 Universal Data Object Identifier (UDOI).
- 5 IALA Common Shore Based System Architecture (CSSA).

4.6.9 Putting the shore-based e-Navigation system architecture to work - a ten years experience report, Mr Dirk Eckhoff, German Federal Waterways and Shipping Administration

Presented by Mr Dirk Eckhoff

The German Waterways and Shipping Administration's mandate is to maintain and enhance safety and efficiency of vessel traffic and to protect the maritime environment. In order to fulfil this mandate, over the past decades large efforts have been made to provide shipping with Aids-to-Navigation (including VTS), and to provide the VTS operators with a real-time traffic image, mainly based on radar.

About a decade ago most of the systems had to be renewed soon and AIS had to be integrated. At the same time the operators' and stakeholders' needs for more and comprehensive information increased while budgets and personnel resources decreased.

It was recognized, that a completely new approach to the shore-based technical system design and for its technical operation was required (cf. presentations at IALA Conferences 2002 and 2006).

The design process was launched about eight years ago with an holistic approach. Based on information flow derived from user requirements one system was designed integrating all AtoN including VTS also covering maintenance and life-cycle management aspects.

There were amendments necessary to the organisational set-up of the administration, new system functions had to be described, and a new way of thinking was imposed, the object-oriented paradigm.

At the time, the term 'e-Navigation' was unknown and IMO's initiative was not foreseen. However, in hindsight, it turned out that the German administration pioneered a real life implementation of a system with e-Navigation along the lines of the shore-based system architecture.

Due to the application of the new holistic approach the German administration encountered both beneficial and challenging results, some of which with an unforeseen degree of success on one hand and necessary beforehand discussions on the other hand.

This presentation covered issues encountered and potential solutions found in the process. It gave a report on 'lessons learned' which may be helpful for the future implementation of e-Navigation internationally.

The key points of the presentation were:

- 1 There were various triggers for the development of a system structure: technical, operational, personnel.
- 2 Therefore the development of a shore-based e-Navigation like system architecture started 10 years ago with a holistic approach.
- 3 Not only changes in the system structure but also in respect to paradigm, methods, organisation, management were done.
- 4 Presented are the steps from the idea for one shore based system to the present phase of realisation.
- 5 The report includes the actions, reactions and lessons learned during the 10 years of implementation.

Discussion – Technical Session 6 – Part 2 (papers 6 – 9)

Asked if e-Loran is part of R-Mode and what is the situation regarding the receivers on board of R-Mode systems. Peter Douglas answered that e-Loran can indeed be introduced as an R-Mode system and can be used at least for timing of the other R-Mode systems. At this stage there is no active programme on research on those systems and there is no receiver on test to his best knowledge.

Jan-Hendrik Oltmann, responding to a question, said that the difference contained in the notions of UMDM and of VTM, which both addressed all the information needs, is that the first belongs to the engineering domain as the second belongs to the operational domain.

Lee Alexander was asked if IALA-NET is included in the list of systems he listed as part of e-Navigation and that are potentially available. He answered that no system should be excluded but his knowledge of that particular system is too little to be more precise at this stage. On IALA-NET, Omar Frits Eriksson added that IALA-NET, for the time being, is a system for the global exchange of AIS data between administrations, but it is not excluded that in the future the system is expanded to other exchange of data.

Jon-Leon Ervik indicated that during the last IMO COMSAR Sub-Committee, Ukraine submitted a paper which received a lot of support to provide updated information directly to ECDIS, which is an important IHO matter in the development of e-Navigation.

Responding to a question on the responsibility of the master when the pilot is on board in an e-Navigation environment, Neil Trainor said that obviously the Master has to stay in command but, indeed, communications between the pilot, using his pilot unit, and the master, remain to be (re)organised.

4.7 Technical Session 7 – Aids to Navigation – A Global Approach – focus on Africa

Chair: Mr James Collocott (South Africa)

Vice Chair Mr Steve Nell (South Africa)

Introduction by Chair

James Collocott stated that at a ministerial conference in Africa in 2002, concern was expressed for the safety of navigation and level of hydrography. He quoted statistics that demonstrated the poor compliance with SOLAS Regulations and IALA Recommendations by many African nations.

IMO MSC has agreed that safety of navigation should be on the priority action list of IMO's technical cooperation activities.

4.7.1 Global Warming: Challenges and Opportunities, Mr Simon Millyard, Trinity House

Presented by Cdre Jim Scorer

The onset of global warming will have an effect on the existing structures used for providing AtoN to mariners. Rising sea levels and climate change will impact on our current lighthouses in a way for which they were not designed.

Every day there are claims and counter claims about climate change and the impact it will have on the world we live in.

The presentation listed the various sources of data for climate information. Statistical information, including that on the rise in sea levels due to melting ice, was presented to support the case for global warming. Increasing sea levels and melting ice will lead to the opening of new shipping routes.

The presenter has studied a range of climate change data to bring to the audience a realistic estimation of what lies ahead based on the most respected data on the topic available. This will enable the AtoN provider to give due consideration to this issue.

This presentation reviewed the evidence behind climate change and what impact climate change will have on traditional AtoN platforms; it will not engage in the well-versed topic of what should be done to reduce man induced climate change.

The presentation explored what can be done to existing structures and to future designs to maintain secure and suitable platforms for AtoN into the future. Other impacts on the status quo were discussed, in order to prompt thinking on enforced changes to shipping and their future navigation requirements.

The key points of the presentation were:

- 1 The evidence behind global warming.
- 2 What impact it is believed global warming will have.
- 3 What can be done to protect navigation aids in this changing environment.

Closing message - IALA should consider monitoring the next IPCC report, due in 2013, and summarise the contents for IALA members to consider.

4.7.2 Traffic monitoring along the African Coasts, Reasons and Methods, RAdm Jean-Charles Leclair, IALA

Presented by RAdm Jean-Charles Leclair

AIS has changed the maritime world. Initially its main purpose was to be a tool to avoid collision, but rapidly, and also because of the very limited capabilities of its Minimum Keyboard Display (MKD), it appeared that its main function is rather for ship/shore exchange of information. As such it is a fantastic tool that shore authorities cannot ignore because it provides precise and reliable information on the commercial traffic along the coast of any country as never before. Therefore, it gives all its meaning to the SOLAS obligations expressed in the regulations 12 and 13 of Chapter V ‘...as the volume of traffic justifies and the degree of risk requires.’ Nowadays, Authorities in charge of safety of navigation cannot say anymore that they were not aware of such traffic. The tool exists and it is not necessarily expensive to implement.

AIS, LRIT and, tomorrow, AIS satellite offer much functionality that can be used to improve safety, security, protection of marine environment and, not less important, maritime traffic efficiency. Traffic monitoring will be still more efficient and beneficial for every coastal State and for the maritime industry if the data become global, for instance using IALA-NET.

Africa should not stay apart from this crucial evolution for maritime navigation.

The key points of the presentation were:

- 1 SOLAS Chapter V obligations.
- 2 Importance to know what the traffic is along the coast.
- 3 Use of AIS for traffic monitoring; easy and cheap.
- 4 Interest in monitoring coastal traffic.
- 5 Be part of IALA-NET.

4.7.3 Update on Western Indian Ocean-GEF-Marine Highway Development & Coastal & Marine Contamination Prevention Project Update, RAdm Neil Guy, Regional Project Co-ordinator WIO-MHD-CMPP Project

Presented by RAdm Neil Guy

The supporting and beneficiary countries are the Comoros, Kenya, Madagascar, Mauritius, Mozambique, Seychelles, South Africa and Tanzania.

Component A:

An overview of the geography of the Mozambique Channel was provided. He then listed the shipping activities, ports and the threats and risks in the region. A deep-water route will be surveyed in the Mozambique Channel (about 800 nautical miles). The data will be used to update existing ENC's or in new ones. The project will support the updating of ENC's of certain of the ports and approaches. Activities include:

- Generating and maintaining nautical charts and publications.
- Installing aids to navigation, automatic information systems and communication.
- Support for search and rescue operations.

Component B:

Sensitise issues related to marine and coastal protection. Create pollution prevention and contingency management plans for coastal and marine biodiversity hotspots with high-risk profiles. Develop a methodology to value ecosystem benefits. Develop a regional database and geographic information system on marine and coastal resources.

Component C:

Supporting efforts to ratify IMO conventions and translate them into national legislation. Assist the development of national oil spill contingency plans, a regional plan, and create sensitivity maps.

Oil spill response equipment.

Facilitate regional agreements and develop a regional contingency plan.

Component D:

Promote port state control. Support monitoring of fisheries activities. Co-operate with other regional projects

Participating governments should establish mechanisms to sustain the benefits achieved by the Project.

An update of the programme for 2010-2011 was provided.

The key points of the presentation were:

- 1 The Project is intended as a proactive solution to the problems relating to pollution in highly sensitive environmentally sensitive areas resulting from maritime disasters.
- 2 To improve the quality of electronic nautical chart data in the Project area.
- 3 To improve the aids to navigation, maritime safety information and pollution prevention and reaction planning in the Project area
- 4 To assist National Authorities to upgrade their charting and aids to navigation in their ports and approaches.
- 5 To provide training in as many related areas as possible.

4.7.4 Marine Aids to Navigation Management in Senegal and Prospects for Sub-regional Co-operation, Ing Mamadou Thioub, Port Autonome de Dakar / Service de Sécurité Maritime du Sénégal

Presented by Ing Mamadou Thioub

The presentation listed the various activities undertaken by the authority and the suite of aids to navigation deployed. The example of the management of Senegalese Maritime Safety Service, a convention entrusted between the State of Senegal and port Autonome de Dakar, could be a practice for many African countries often faced with difficulties of financing their maritime safety service activities. The presentation also discussed prospects for regional cooperation.

The multipurpose buoy tender 'Samba Laobé FALL' received in February 2008 has been designed to fulfil many missions, including clean up of minor pollution incidents and search and rescue and is intended to assist West African ports in the subarea to enhance maritime safety.

An overview of the hydrographic and GMDSS capabilities was also given.

Regional cooperation was vital. He listed of possibilities for regional cooperation was mentioned.

The key points of the presentation were:

- 1 Presentation of Senegalese Maritime Safety Service
 - 2 The multipurpose buoy tender 'Samba Laobé FALL'
 - 3 Sub-regional co-operation in West and Central Africa
 - 4 Co-operation in hydrography in Africa for renewed maritime electronics chartss (CHARMER)
- 4.7.5 Solutions for Africa, Mr Joel Tourbot, Institute for Maritime and Inland Waterways (CETMEF), France

Presented by Mr Joel Tourbot

Africa has some new ports, such as the Doraleh (in Djibouti) and Tangier Med (in Morocco). Many projects in Africa have seen substandard equipment supplied, which has created more problems.

Over the years, CETMEF has worked with many African nations to build capacity and improve safety. The example of the project in Djibouti was an excellent example of technical cooperation

The presentation was based on the mission outsourced to CETMEF for the engineering company BCEOM, which had signed a contract with the Port of Djibouti for a modernisation study of the marine marking and aids to navigation in the Port of Djibouti.

The missions given to BCEOM included:

- Reviewing the existing studies relating to the modernisation of aids to navigation stations in port approaches;
- Studying a buoy tender project with bathymetric capabilities;
- Writing calls for tenders for civil engineering and equipment, i.e. Buoyage equipment and buoy tender, including cost estimates for the work and supplies.

The work given to CETMEF by BCEOM were:

- On site missions;
- Review of buoyage studies, specifications for remote control systems and the buoy tender;
- Preparation of calls for tenders.

The presentation showed how the mission was carried out and the advantages of calling upon a commercial company, which brought solutions that are compatible with the local means and competencies and proposed industrial solutions, which does not allow the customer to be free in its technical choices. At the end of the study the customer specifications and requirements were developed and the customer was free to issue calls for tenders according to its preferences and financial means.

The key points of the presentation were:

- 1 Mission sample.
- 2 Global approach in terms of studies.
- 3 Co-operation with local authorities.
- 4 Partnership arrangements with local authorities.
- 5 Free selection of the supplier for the implementation.

In closing, Joel Turbot said that CETMEF will continue to work with Francophone countries, with the aim of focusing on technical co-operation, partnerships and transfer of skills.

4.7.6 Aids to Navigation Capacity Building in Africa, Mr Ómar Frits Eriksson, Danish Maritime Safety Administration

Presented by Mr Ómar Frits Eriksson

The presentation gives an overview of the capacity building support given recently by the Danish Maritime Safety Administration and some important components of capacity building and lessons learned are highlighted. A simple framework for how IALA might facilitate and co-ordinate the capacity building efforts of its members is described. In conclusion a number of recommendations are given on how IALA can play a more proactive role in supporting AtoN Authorities striving to fulfil their international obligations.

The key points of the presentation were:

- 1 IALA should take the lead in creating a global overview of those areas in the world where volume of traffic and degree of risk dictate a certain level of provision of AtoN services.
- 2 IALA should develop a plan for how IALA can be more proactive in supporting Aids to Navigation authorities that are striving to fulfil their international obligations.

- 3 IALA should focus on building the internal competences and knowledge of AtoN Authorities in developing countries, making them able to design their organisations properly and to develop strategies that ensure a sustainable development.

IALA should develop further the IALA Consultancy and the IALA World Wide Academy.

Discussion – Technical Session 7 (papers 1 - 6)

There were no questions at the end of this session.

Technical Session 7A – e-Navigation and Emerging Technologies

Chair: Mr Jorge Arroyo (USA)

Vice Chair Mr Christian Lagerwall (Sweden)

- 4.7.7 Virtual Aid to Navigation - What are we waiting for??, Mr Michael Skov, Danish Maritime Safety Administration

Presented by Mr Michael Skov

‘Denmark replaces all traditional Aids to Navigation with Virtual Aids to Navigation!’

This statement is a provocation, I know, and it is not likely to be true in the near future. We have a lot of unsolved challenges such as integrated bridge system ability to display virtual AIS as an AtoN symbol. Furthermore it is important to realise that shipping, as modern as it seems to be, is very conservative and changes are not implemented over night.

The presentation showed examples where virtual AtoN were used for submerged wrecks. Although safety messages were used, several vessels passed quite close to the wreck position. This showed that virtual AtoN were not as successful, in these cases, as was expected.

Virtual waypoints have also been used in an attempt to get ships to alter course at a particular waypoint in a new traffic separation scheme. However, this was discontinued after a few weeks as vessels were not altering and going aground.

Virtual AIS was used on a buoy in the Drogden Channel. However, one ship did hit the buoy in spite of this.

Virtual AIS as an AtoN is just another tool in our AtoN toolbox and it can be used by itself successfully in some cases and together with other aids in other cases such as marking of fairways in certain areas. It is important to take up the challenge with the gaps in display requirements, symbology and recognition by mariners and to use virtual AIS in combination with safety related messages for emergency response purposes. Virtual Aids will not yet replace the conventional ones although they are very useful in emergency response cases.

The key points of the presentation were:

- 1 Virtual AIS as emergency response.
- 2 Virtual AIS waypoints.
- 3 Virtual AIS as an Aid to Navigation.
- 4 Synthetic AIS on offshore structures.
- 5 Future use and challenges.

- 4.7.8 Navigating eLoran: challenges and the way forward, Dr Sally Basker and Mr Paul Williams, General Lighthouse Authorities of the United Kingdom and Ireland

Presented by Dr Nick Ward (GLA of UK and Ireland)

Global Navigation Satellite Systems (GNSS - e.g. GPS, GLONASS, Galileo) underpin much of our critical infrastructure, are already tightly integrated into ship-borne and shore-based systems, and will underpin the International Maritime Organization's e-Navigations system. However, GNSS are fragile and subject to intentional and unintentional interference.

The requirement is for resilient positioning, navigation and timing: it needs to be inherently reliable, secured against obvious external threats and capable of withstanding some degree of damage.

A single, cross-sector solution that augments GNSS with an independent, dissimilar and complementary system is best for users: they will benefit from economies of scale to keep equipment costs low; existing networks - user, technology, business and regulatory - can be exploited; and all this will lead to lower long-term average costs than any other approach.

eLoran is the only candidate that can be deployed in a timely fashion.

The presentation gave an overview of eLoran before discussing the drivers and requirements for eLoran. eLoran technology was then described. The GLAs' eLoran trials in the Orkneys were summarised and the presentation concluded by summarising future challenges.

The General Lighthouse Authorities have held two sets of GPS jamming trials in 2008 and 2009 to understand the impact of a loss of GPS on the safety of navigation. The following are some of the conclusions which were drawn from the trials;

- The precise impact of GPS jamming on a vessel depends on the bridge fit, configuration and level of system integration.
- DGPS – this alarmed when the GPS positioning input was lost and had a knock-on effect on the position reporting on the ECDIS and the AIS.
- AIS – this alarmed when the GPS positioning input was lost. AIS lost its ability to identify the bearing and distance of other ships and AIS AtoNs. Other ships and the vessel traffic services perceive the jammed ship to be in the wrong place.
- GPS receivers – one was affected to such an extent that it would not track GPS satellites automatically. The solution was to turn off the receiver for about an hour to force a cold start.

The key points of the presentation were:

- 1 Increasing reliance on GNSS.
- 2 Vulnerability of GNSS to interference.
- 3 Need for a back-up; eLoran is the best option.
- 4 eLoran performance demonstrated.

4.7.9 Portable Pilot Unit: A challenging e-Navigation application for Germany's most frequented port approach, the River Elbe, Captain Dietmar Seidel, German Federal Waterways and Shipping Administration

Presented by Mr Jan-Hendrik Oltmann

The River Elbe is Germany's most frequented fairway; approximately 80,000 vessels per annum, among them a significant number of container megacarriers and deep draught bulkers, use this fairway to reach ports like Hamburg, Brunsbüttel, Cuxhaven and Stade.

The continuous rise in number of vessels as well as the increase of size of vessels made the anticipation of additional e-Navigation tools necessary to grant safe and efficient traffic flow. Portable Pilot Units were considered to be an adequate tool.

The PPU for the River Elbe is designed to fit pilots and VTS requirements.

STEP 1: since the Elbe is an estuary with high morphological activity and sedimentation, continuously updated sounding plans are displayed within an ENC chart, converting the ENC to a bathymetric ENC (bENC).

STEP 2: up-to-date tidal information will be integrated to enable shipping to be continuously aware of available water level.

STEP 3: The Under keel clearance (UKC) management module combines the sounding and tidal information with vessels specific (squatting) characteristics.

STEP 4: the last module will integrate a logistic port planning tool. Passage of vessels shall be optimized not only in nautical but as well in commercial parameters.

The presentation discussed several attempts at providing the pilot with a picture, which was not cluttered with an overload of bathymetric data. Tidal windows were also introduced to assist the pilot during the waterway transit.

Portable Pilot Units and their design are no secret science. They only have to reflect state-of-the-art of science and technology and be embedded into proper seamanship. Proper seamanship is the basis, which will never be unnecessary. Insofar, Portable Pilot Units are just another tool. A fascinating one that opens up a multitude of additional chances. We should take them.

The key points of the presentation were:

- 1 Portable Pilot Unit (PPU) for the Elbe estuary and approaches to Hamburg.
- 2 Optimization of safety and easiness of traffic in limited fairway.
- 3 Implementation of current bathymetric data into an ENC.
- 4 Field trials and tasks.
- 5 Further steps in PPU development.

4.7.10 National Aids to Navigation Authorities Acting as a ‘Trusted Third-Party Marine Information Provider’, Mr Christian Forst, German Federal Waterways and Shipping Administration and Professor Jens Froese, Technische Universitaet Hamburg-Harburg (TUHH), Germany

Presented by Professor Jens Froese

Intelligent information and communication technologies show a great potential, in increasing the effectiveness of the infrastructure if they cover the entire logistics process, including: on board navigation, waterways and harbour management, terminal management as well as other logistic services provided in the maritime environment.

Value-added services should be defined and implemented globally. However, developing one global integrated system cannot be the aim, there needs to be freedom for individual solutions, but effective interoperability of existing and emerging systems allowing for a maximum of freedom concerning information format and content.

Main prerequisites to implement proper value-added services are the willingness of all stakeholders to comprehensively exchange all relevant information throughout the entire logistics process chain and to develop a coherent process “landscape” to allow easy and consistent allocation of all issues of relevance.

A major obstacle is the variety in combination of tasks, roles and responsibilities throughout the stakeholders. To overcome this heterogeneity a strict process-oriented approach has to be followed.

The use of Portnet in different parts of the world was discussed as a data connectivity backbone. The goals are safety and security of shipping, protection of the environment, improving knowledge and facilitate business networking. The pros and cons of data sharing were also discussed.

Traffic data is the main trigger. It is important to identify the functionality first and then specify the appropriate software. The CIMOSA process capturing scheme allows to mirror existing systems. In case of system design or reengineering structured modelling is required to define processes optimised to achieve specified goals. CIMOSA also provides a usable approach.

National Aids to Navigation Authorities are major stakeholders in the entire (maritime) logistic process.

Mostly being responsible for the safety and efficiency of maritime traffic they are authorised to collect and process all relevant data from shipping. Mandatory ship-reporting systems, VTS based on radar, AIS and VHF communication are established and operated, in general following relevant recommendations and guideline issued by IALA.

Considering the potential benefits of a world-wide harmonized information- and communication-system it is recommended that:

- IALA should prepare a guideline on how to carry out a process analysis, to make sure that identical or almost identical processes world-wide are identified and evaluated based on a common method and standards.
- IALA should develop a web-based tool providing generic processes as a basis for the individual analysis to be carried out under the lead of National AtoN Authorities.
- IALA may consider to act as a registrar for a domain map to represent coherent application areas on a world-wide basis.
- IALA set up a recommendation to encourage National Members to act as 'Trusted Third Party Marine Information Providers' and give guidance on how to develop and implement "Value-added" services to the maritime logistic industry

The key points of the presentation were:

- 1 Value-added services.
- 2 Logistics process chain.
- 3 Interoperability.
- 4 Process-oriented approaches for data exchange.
- 5 Recommendations for IALA.

4.7.11 Intelligent information systems in e-Navigation, Dr Nick Ward, General Lighthouse Authorities of the United Kingdom and Ireland

Presented by Dr Nick Ward

Providing the mariner with the right information at the right time will be a key element of e-Navigation. Overloading the user with unnecessary information is almost as bad as providing wrong information – it makes it difficult, if not impossible, to extract the right information. In many situations the navigator does not have time to go and look up the information they need in a book and downloading it from a database or a website could be a dangerous distraction. Can systems be designed so that they 'know' what information is needed in a particular situation and location, and can go and find it, presenting it in an easily identifiable and understandable format?

IALA's work on AtoN Information, simulation, GIS and the Universal Data Model aligns well with several of the identified future directions of e-Navigation, and will form a good foundation for the continuation of

IALA's work in support of e-Navigation.

The exchange of AtoN information between any parties in a digital environment will require internationally agreed standards so that information can be automatically compiled for sending and automatically understood by systems that receive it.

Once standards are in use, with suitable security measures, administrations will be able to coordinate management of AtoN information in a digital environment and this will in turn facilitate sharing of information with:

- mariners in real-time or near real-time;
- shore-based operators;
- hydrographic authorities (for inclusion in official navigational products);

- Original Equipment Manufacturers (OEMs) for inclusion in non-official chart systems such as Electronic Chart Systems (ECS), chart radars and “AIS radars” and other equipment databases.

This presentation showed ways in which intelligent information systems might be achieved and the benefits they could offer. In particular the use of software agents to locate and retrieve relevant information, linked to location will be reported. Methods of displaying the information in a comprehensible manner and exchanging data in standardised formats will be also be proposed. Finally ways of ensuring the integrity and authenticity of data will be considered and conclusions will be drawn as to how and when such developments might be achieved.

The key points of the presentation were:

- 1 Information management is fundamental to e-Navigation.
- 2 Providing the mariner with the right information at the right time.
- 3 Easily identifiable and understandable format.
- 4 Ensuring the integrity and authenticity of data.

Discussion – Technical Session 7a (papers 7 - 11)

The question was asked ‘Do you think the further development of e-loran will eventually become global?’, to which Nick Ward replied that he could not speak for the US, as discussions are still ongoing in north America. At the moment efforts are being made to try to influence the European nations which are not yet using it. There is now interest from the Far East but an agreement is required before actually pursuing this.

In response to the question ‘How many shipboard systems are there available for e-loran?’, Nick Ward said that there are very few at present, as the system is not yet widespread, only potential. Hopefully by 2013 e-loran will have better coverage and usage. There is the possibility of integrating e-loran into GNSS chips but this is at an early stage at the moment.

Next Nick Ward was asked if e-loran is at a national/regional or a global level, to which he replied that e-loran is certainly regional with some areas being larger than others. It is more practical to merge regional areas at present.

When asked whether the acronym bENC is a standard one, Jan-Hendrik Oltmann said that it is one used to describe the bathymetric data on the ENC.

This prompted the question as to whether the ENC picture provided on the PPU are the same one as the VTS? Jan-Hendrik Oltmann responded that yes it is the same bathymetric data and same picture.

When asked if the e-maritime concept will be open in connection and interface globally, Jens Froese said that he was not in a position to speak for the EU Commission but the core concept has been agreed. The ship itself is no longer the issue but the steel surrounding the cargo, in other words all commercial related activities.

4.8 Emerging Technologies

Part 1

Chair: Mr Ma Jianshe (China)

Vice Chair Mr Seamus Doyle (Ireland)

4.8.1 New Solid State frontier on radar technologies, Mr Sergio Gollone and Professor Michele Fiorini, SELEX Sistemi Integrati - Italy

Presented by Mr Sergio Gollone

Traditionally ‘solid state’ is associated with Air Traffic Control (ATC) radars while tube technologies are synonymous with Vessel Traffic Service (VTS) and Homeland Protection (HP) radars. This historical division was based on the fact that the transmitted spectrum and dynamic resolution of

solid state transmitters (TX) were not appropriate for VTS and HP applications. However, solid state technology is now mature to remove these limitations. The LYRA 50 series, thanks to a fully solid state architecture, gains coherent signal processing, low transmitting peak power, low voltage supply, high compactness, high reliability and capability of transmission on multiple frequencies.

In the LYRA radar family Wideband Frequency Modulation (WFM) is used to minimise the electromagnetic compatibility impact and is helpful in reducing interference from other radiating systems. The joint use of multi-frequency diversity and pulse compression (both digitally performed) allows low peak power long pulses, while a proprietary side lobe suppression algorithm reduces the pulse compression side lobe and its time stability at different environmental conditions is obtained by calibration algorithms.

The presentation showed results collected during the performance evaluation campaigns of the LYRA radar family and a demonstration of the achieved operational benefits on-live traffic recordings.

The key points of the presentation were:

- 1 Solid-state radar technology had now advanced sufficiently to make it suitable for VTS application. Performance in terms of lower power, cost effective than existing marine radar systems.
- 2 Drawbacks of Magnetron radar include small operational life, non coherent processor and phase coded waveforms and Doppler filtering is not allowed;
- 3 Benefits of fully solid-state final amplifier include a long, failure-free life, graceful degradation of system performance, coherent processing possible and high duty cycle. LYRA 50 doppler processing improves detection in presence of rain and sea clutter, scan to scan correlation tracking performances using proprietary scan to scan correlation algorithm is used for sea spikes suppression. Multi frequency transmission is especially effective in the case of rain clutter, where the number of scattering source is high.
- 4 LYRA 50 is operative in Yemen, (National Yemen VTS Project) where two radars sites monitor the Aden area. The radars detect the movement in the Gulf of large vessels and small wooden boats used by local fishermen

4.8.2 New Technology Radars and the Future of Racons, Dr Nick Ward and Mr Martin Bransby, General Lighthouse Authorities of UK and Ireland, and Captain Robert McCabe, Commissioners of Irish Lights

Presented by Dr Nick Ward

In 2004 the International Maritime Organisation approved a new radar performance standard (MSC Resolution 192(79)), which from 1 July 2008 removed the requirement for new S-Band (10 cm) radars to trigger racons (radar beacons). This was intended to facilitate the introduction of cost effective, coherent processing techniques that should enable future radars to have an improved performance in sea and rain clutter. Potentially, it also allows more stringent limits to be considered on spurious and out of band emissions of marine radars, increasing the efficiency of radar spectrum use.

The removal of the requirement to trigger racons does not necessarily mean that racons will be unusable with NT Radars. They may work at a reduced, but acceptable range; NT Radars could be designed to trigger racons, whilst retaining their other performance advantages; alternatively existing racons could be modified to work with NT Radars or new racons designed to do so. Calculations of performance with the first of the NT Radars (Kelvin Hughes Sharpeye) indicate that existing racons will perform, but with reduced range. The extent of that reduction in range and its significance has now been determined in trials carried out using the Irish Lights vessel GRANUAILE.

The results of these trials were reported, with recommendations on the strategy that might be adopted on the future use and development of racons.

The key points of the presentation were:

- 1 Results of trials to compare S-Band racons with new technology radar compared to X-band radar. Six racons installed in various different sites (lighthouses, pier, buoy, LANBY etc), and either modern solid state or old design units were tested.
 - 2 Results showed racon triggering ranges achieved by the NT were much less than X-Band radar except for a new technology racon with enhanced reception capability which achieved over double. The clarity of response was better for S-Band radar at short range in clutter than X-Band. Recommendations from the trials are:
 - a Modification of existing racons to improve their response to NT radars should be considered in consultation with racon manufacturers. Modifications could include: increasing the receive sensitivity, removing the scalable response, designing the racon to detect, and respond differently to NT radar.
 - b The differences in racon performance during these trials indicate that better standardisation of racons should be considered.
 - c IALA should be invited to consider the results of these trials when discussing its strategy for the future of racons.
- 4.8.3 A Next Generation Solid State, Fully Coherent, Frequency Diversity and Time Diversity Radar with Software Defined Functionality, Mr Jens C Pedersen, Terma AS - Denmark

Presented by Mr Jens C Pedersen

Coherent, Solid State Radar technology has been available for military applications for decades, but it did not penetrate into VTS for cost and technical reasons.

Technically, the main challenge has been that the dynamic requirement to VTS radar is much higher than to other radar applications. However, new radar technology, virtually unrestricted by dynamic constraints, has now been developed and is in operation for military applications.

To make this affordable for VTS and other applications for professional users, well-renowned advantages and new functions are implemented on a new technology platform. Methods are further refined and the outcome is software defined radar series, tailored to individual market segments and featuring:

- Even smaller target detection;
- Improved resolution;
- Improved frequency diversity;
- Even better all-weather processing capability;
- Sub-clutter visibility for targets moving radially and having speeds different from clutter;
- Easy system configuration and integration into systems of systems;
- Substantially reduced requirements to maintenance.

The new technology includes faster processing than ever, novel low voltage - low temperature (long life) solid state transmitters, enhanced receiver technology, very high speed coherent sampling on IF, floating point representation of data, low time-sidelobe pulse compression, loss-free signal processing and several other improvements.

The key points of the presentation were:

- 1 Until now, technology did not allow fully coherent solid state radar to meet the requirements for VTS and Coastal Surveillance.
- 2 Handling clutter in a high elevated radar, looking into the waves from shore to the sea, is ten fold more difficult than when being low on a ship.

- 3 Development of Terma's marine solid state radar unit commenced three years ago and first production units are being delivered in 2010.
- 4 One performance goal was to meet and exceed the IALA V-128 recommendation, and also to be able to configure to all three recommendation levels, basic, standard and advanced. System implemented in advanced form rather than basic will generate more immediate cost benefits.
- 5 Transmits low power 20% of time. A mixture of long and short transmissions ensure simultaneous short and long range coverage.
- 6 The power can be varied in sectors to further reduce illumination of built up areas. This will reduce the cost associated with spectrum pricing which is becoming an issue in some countries.
- 7 Coherence means that the amplitude and phase of signals during transmission and reception is known. This is the base for pulse compression and for extracting Doppler information from the signals. However, there are also new unwanted effects. Antenna side lobes are known in azimuth. By nature, side lobes will also occur in range in pulse compression radars. In this radar the side lobes are not suppressed. One of the big achievements made is that the side lobes are very low by design therefore able to see a small target near a large structure.

4.8.4 Four-Season Lighted Buoys, Captain Richard Moore, Canadian Coast Guard

Presented by Captain Richard Moore

In Canada, AtoN service delivery is complex and costly due to the size of the country and particularly harsh winter conditions. The situation on the Saint-Lawrence River, in Eastern Canada, presents additional challenges with its 900-kilometre commercial waterway open all year-round and severe environmental conditions. The Canadian Coast Guard has developed a buoy that can remain in position for two years without needing maintenance. This buoy provides lighted and radar service nine months of the year and can withstand winter ice pressure for the remaining three months.

The key points of the presentation were:

- 1 Current buoying system involving ice-free and ice-withstandable buoys. St Lawrence river presents considerable climactic conditions for vessels including ice, strong currents and tidal variations. Retrieval prior to winter can be hazardous if delayed at all.
- 2 Project presentation and performance requirements for 4-season buoy development. Desired buoy performance specifications include being maintenance free for minimum of two years on station.
- 3 Trials results meets all performance criteria in ≤ 5 kn current.
- 4 Challenges include better paint resistance to abrasion, adequate battery constraint within the buoy chamber.
- 5 The next step of this project is to further test the lantern performance. More testing will determine if water ingress was accidental or if the conditions in which the lantern must operate exceed its capacity.
- 6 Potential benefits of the new buoys include possible reductions in Floating Aids Program cost, replacement of two buoy systems, reduced stress on vessel's operations and potential use elsewhere in Canada.

4.8.5 Ultra Capacitors as Energy Storage in Self Contained Lights, Mr Jonas Lindberg, Sabik Oy, Finland

Presented by Mr Jonas Lindberg

Conventional battery technologies have a number of limitations and issues when used as an energy storage in a high quality self contained lantern. The main issues are limited lifetime, limited

number of charge cycles, reduced performance in high and low temperatures, environmental issues as well as problems related to long-time storage.

Ultra capacitors already outperform conventional batteries in all of the above areas but are larger in size and have a leakage current far beyond today's conventional batteries.

This presentation describes how ultra capacitors can be used in self-contained AtoN by using a combination of new generation LEDs and ultra low power electronics with high efficiency.

The key points of the presentation were:

- 1 Optimizing optical and electrical performance to match the ultra capacitor. Adding a filter in front of the step up converter can reduce performance? Power consumption between flashes is minimal (5mW).
- 2 Ultra Capacitor leakage current vs. state of charge is very easy to measure.
- 3 Energy calculations. 14 days' autonomy can be achieved.
- 4 Ultra capacitors are still expensive compared to lead-acid batteries. They have low energy density so are about 10 times larger than equivalent lead-acid batteries and have a high self discharge when fully charged. They are liable to permanent damage in extremely high temperatures (>85°C)
- 5 Ultra capacitors can be stored empty, have an extremely short charge time and a very long lifetime (they do not limit service life of the lantern). They also have a very high charging efficiency (>99%).

Discussion – Technical Session 8 Part 1 (papers 1 - 5)

Nick Ward was asked if the GLAs undertake any trials with S-Band radars SARTs. However, Jens Pedersen from Terma responded that it would be less expensive to modify racons than to increase the sensitivity of S-Band radars

Jens Pedersen was asked if the new solid state radars were in production yet, to which he replied that they are; production started in January 2010.

Part 2 of Emerging Technologies

- 4.8.6 The recapitalisation of the GLA's marine differential GPS network, Dr Nick Ward, Dr Alan Grant and Mr Seamus Doyle, General Lighthouse Authorities of the United Kingdom and Ireland, Mr Richard Tomkins, Northern Lighthouse Board

Presented by Mr Seamus Doyle

The mission of the General Lighthouse Authorities of the United Kingdom and Ireland (GLAs) is to deliver a reliable, efficient and cost-effective Aids to Navigation (AtoN) service for the benefit and safety of all mariners.

The GLAs provide a maritime differential GPS (DGPS) service, which was installed nearly a decade ago. While it was state of the art at the time, it is now nearing the end of its operational life and in need of replacement. The present system may not meet all the requirements set out in IMO Resolution A.915(22) for Future GNSS and may not meet the needs of emerging applications with the further development in the various GNSS constellations.

This presentation described this recapitalisation project, including information on the project cycle; a description of the user requirements; available options and the selected system design along with the progress to date on this important marine Aid-to-Navigation project.

The key points of the presentation were:

- 1 The need for DGPS.
- 2 Strategy for recapitalisation of DGPS.
- 3 The GLA DGPS network.

4 Progress on recapitalisation of GLA DGPS.

5 Future upgrades of DGPS.

4.8.7 The use of an Under Keel Clearance Management System as an AtoN in the Torres Strait, Mr Mahesh Alimchandani, Australian Maritime Safety Authority

Presented by Mr Mahesh Alimchandani

Under Keel Clearance Management (UKCM) systems are being increasingly adopted at ports, both as a means to enhance the safety of navigation and to increase the efficiency of shipping transportation.

Navigation in the Torres Strait is very demanding due to limiting depths, narrow shipping lanes and numerous reefs, coral cays and islands. Additionally, transiting ships can expect to encounter strong tidal streams and trade winds, complex tides and reduced visibility in the wet season, as well as occasional cyclones.

The Australian Maritime Safety Authority (AMSA) has recently embarked on the implementation of a UKCM system for the Torres Strait. The objectives for introducing UKCM are to validate the existing safety margin for deep draught vessels transiting the region and evaluate the appropriateness of the current maximum draught limitations.

It is expected that the UKCM system will enhance the safety and efficiency of navigation which will help protect the sensitive marine environment. This in turn will benefit the Australian community and shipping industry.

UKCM in the Torres Strait is perhaps among the first few being deployed in a coastal environment.

The presentation described the operational model for UKCM, as envisaged by AMSA. It also described the business services required of the system and the various utility services to support those business needs.

The key points of the presentation were:

- 1 UKCM systems are now sufficiently mature and there is high uptake of pilotage in the Torres Strait for AMSA to introduce a UKCM system.
 - 2 OMC International Pty Ltd, a Melbourne based company, has been selected as the preferred tenderer through an open tender process in 2009.
 - 3 AMSA is implementing a UKCM system firstly to validate the existing safety margin (minimum net UKC) and secondly to evaluate the appropriateness of the existing maximum (12.2m) draught regime.
 - 4 AMSA does not intend to consider any increase to the current maximum draught limit until it has verified the existing safety margin and then only if it is satisfied that it is safe to do so.
 - 5 The operational model envisages three operational stages – voyage planning, transit planning and UKCM-assisted transit stages.
- 4.8.8 Birds plague laser control and WiFi technologies applied to environmental control improvement in port areas, Captain Enrique Bernabeu and Mr José G Escudero, La Maquinista Valenciana, Spain

Presented by Captain Enrique Bernabeu

Environmental control is part of our future responsibility. LMV tries to make use of new technologies, available in the market, to solve problems existing in port areas.

It was indicated that a communications system, which will allow free of charge, real time communication with hundreds of devices inside a port area within a 50Km radius, over a private IP network using wifi / wimax / zigbee technologies, including transmission of pictures and video in real time, will be available very soon.

A sample practical application capable of being implemented thanks to this technology was illustrated; an environmental control buoy, used to establish a network of sensors for water quality control in port areas.

An alternative was a potential solution to a traditional problem in port areas related to storing grain; birds, from seagulls to cormorants have always been an unavoidable problem but LMV showed a new laser technology, already applied at airports to reduce the problem without harming the birds and respecting environmental policy.

The key points of the presentation were:

- 1 WiFi / wimax / zigbee systems.
 - 2 Networks of sensors for environmental control.
 - 3 Water quality network systems.
 - 4 Bird control in grain stores in port areas.
 - 5 New technologies applied to ports.
- 4.8.9 Assessment of Shoal Bank Movements via Earth Observation, Related to Re-positioning Needs for Aids to Navigation, Dr Sally Basker, Ms Michelle de Voy, Mr Martin Bransby, Dr Alan Grant, General Lighthouse Authorities of the United Kingdom and Ireland and Dr Ian Thomas and Dr Gordon Keyte, British National Space Centre

Presented by Mr Malcolm Nicholson (GLA of UK and Ireland)

The General Lighthouse Authorities of the United Kingdom and Ireland (GLAs) and the British National Space Centre are collaborating, through the UK Government Information From the Space Sector initiative, to determine if satellite Earth Observation (EO) techniques can be used to monitor dynamic shoal environments.

Initial work shows that Synthetic Aperture Radar imagery can be used to show the location and shape of shoals and can be obtained in all weather conditions and at night. The aims of the assessment are to identify if a change in a shoal has occurred, detect changes in shoal morphology and the effect of this change on the surrounding shoals near navigable channels. The outcome of the assessment will determine whether examining EO data could be a tool in cost-effective scheduling and reduction of in-situ monitoring by survey vessels.

This presentation outlined how growth in marine leisure activities, the proliferation of high-speed craft and changes in traffic patterns, place new demands on the GLAs. It then introduced results from a feasibility study of EO data gathered from around GLA waters and summarised the potential benefits for AtoN service providers.

The key points of the presentation were:

- 1 Shoal monitoring.
- 2 Navigable channels.
- 3 Surveying shoals.
- 4 Earth observation.
- 5 Synthetic aperture radar.

Discussion – Technical Session 8 Part 2 (papers 6 - 9)

Responding to three different aspects of the use of the UKCM system in the Torres Strait, Mahesh Alimchandani said that he could not communicate the cost of the system as it is a private commercial affair. Regarding the updating of the system with real tide conditions if they differ from the prediction, he explained that the information provided to the ship is a near real time update of the actual conditions, with alarm and recalculation of the passage plan if necessary. Regarding liability, it has still to be sorted out and formulated, but general principles apply: the service

provider is responsible for the calculations, AMSA is responsible for the sensors and the hydrographic service is responsible for the outcomes of the hydrographic survey.

Malcolm Nicholson confirmed that GLA used the SAR (Synthetic Aperture Radar) systems to detect changes of shoal bank from satellite, but other parameters can be used as bathymetry as proposed by Spain; furthermore, results would be better if the waters to survey are less turbid which can be the case around Spain compared with the waters around UK.

It was asked if, by allowing masters or ship owners to assess their passage plan one year in advance, is there not a risk that several large ships choose to cross the Straits at the same time, during the most favourable slot? Mahesh Alimchandani explained that it is possible to interrogate the system one year in advance but that one can expect that this will be in order to collect first rough information. However, this means that there is a need for traffic organisation.

Answering a question on squat, Mahesh Alimchandani said that the system calculates the squat effect and that is one of its main output. He added that the system does not input the information from the shipborne echo sounder, but one can expect that that information is checked independently by the bridge team.

Professor Ma asked why the GLA investigates different technology, such as RTK, during the preparation of the recapitalisation of the DGPS network as ships cannot use that technology. Seamus Doyle explained that at first they decided to look at all possible providers and users; but at the end the IALA DGNSS recommended system was chosen.

To conclude the session Professor Ma referred to the history of technical progress during the last century, in general and in safety of navigation matter in particular. e-Navigation has just appeared as a new step forward or as a new dream. However, all know that many dreams come true.

4.9 Technical Session 9 – Aids to navigation heritage - Discussion forum

Chair: Christian Lagerwall (Sweden)

Vice Chair: Carmen Martinez (Spain)

Introduction by Chair

Introducing the session, the chairman insisted on the importance of the heritage matter and he invited participants to send a representative to attend the EEP Committee and in particular its working group on heritage, conservation and civil engineering

The following papers were submitted for consideration by the forum:

- 4.9.1 Preservation of Historical Fresnel Lens by Bearing Rotation System and Seismic Isolation System, Mr Hajime Kanda and Mr Makao Yamamoto, AtoN Engineering Division, Maritime Traffic Department, Japan Coast Guard

Presented by Cdr Hideki Noguchi

Large Fresnel lenses have been in use for many years as marine aids to navigation and thus have high historical value. However, such large Fresnel lenses and their rotating system and mercury baths are very vulnerable to earthquake and nowadays it is almost impossible to reproduce them due to the cost. Therefore the Japan Coast Guard has developed two special systems in order to preserve these large lenses. One is a bearing rotating system that replaces the mercury bath with ball bearings and another is a seismic isolation system that mitigates the movement of earthquake. The presentation introduces these two systems.

The key points of the presentation were:

- 1 Preservation of historic Fresnel lenses.
- 2 Bearing rotating system.
- 3 Seismic isolation device.

4.9.2 Alternative use of lighthouses in Norway; obligations and positive effects of heritage emphasis, Arve Dimmen, Norwegian Coastal Administration

Presented by Arve Dimmen

The recent automation of lighthouses has led to a major shift in operation where the need for manned lighthouse stations is virtually non-existent. As a result of this, properties and buildings no longer needed for the operation are in risk of severe damage due to lower maintenance and infrequent watch. Many of the lighthouses and the surroundings are of considerable historic value; in Norway the Heritage Authority has listed 83 as heritage monuments according to The Act of Heritage.

In Norway, each governmental ministry is responsible for taking care of the heritage and cultural history within its areas of operation. This includes both the documentation of the heritage value of the objects, as well as the preservation and maintenance of them according to the standards required by the Heritage Authority. One solution to avoid the economical and practical challenge that face a Lighthouse Authority is to sell lighthouses and surrounding buildings in order to reduce the maintenance costs. This was also done in Norway, and in the period from 2004 to 2006, 18 lighthouses were sold.

However, Norway has also experienced that it is possible to reduce the maintenance costs without selling the lighthouses. Instead of selling, the lighthouses can be leased out to other bodies. By retaining ownership, we still have the opportunity to guide the development of the lighthouses, and they can be preserved as heritage objects under the control of the lighthouse authority.

When leasing lighthouses, other organisations can administer the site, and one important criterion is to allow public access to the lighthouses. People can enjoy the sites as well as understand the history and importance of lighthouses, as part of the local, national and international cultural history.

The presenter explained how NCA has established co-operation with other bodies, such as county or municipal authority, non-governmental organisations (NGO), voluntary organisations and private promoters or commercial companies. Furthermore he gave examples of lighthouses that are opened for the public and described the alternative use of them. In 2008 NCA has put approximately 70 Lighthouses on lease contracts

The key points of the presentation were:

- 1 Competence within own organisation:
 - a Heritage manager;
 - b Engineers, mariners, craftsmen.
- 2 Lighthouse museum:
 - a Focal point for practical and theoretical challenges concerning heritage or maritime cultural history;
- 3 Co-operation based on leasing contracts
 - a all alternative usage of the lighthouses should be in the public interest;
 - b prioritize 'tenants' in the following priority:
 - i. County- or municipal authority;
 - ii. Non-governmental organisations (NGO) or voluntary organisations;
 - iii. Private persons or commercial companies.
- 4 Networks, workshops, profiling
 - a take part in many different networks to promote and ensure the heritage values;
 - b important to keep the holistic view on the issue of heritage;

- c IALA's EEP Committee is an important international arena for exchanging ideas, methods and best practice.

4.9.3 Managing Alternative Use of Light Structures, Lyndon O'Grady, Australian Maritime Safety Authority

Presented by Mr Gerry Brine (AMSA)

The Australian Maritime Safety Authority (AMSA) has many years of experience in managing the alternative use of light structures.

In particular, this presentation will outlined how AMSA manages tourist access to its traditional lighthouses. Currently, there are thirteen towers open to the public and a further two in the process of being converted for public access. AMSA has to deal with state government lessors and private tourism licence holders in managing these arrangements.

The presenter discussed the licensing conditions that AMSA has in place with third party operators and the Building Code of Australia (BCA) recommendations for building alterations required to make towers safe for public access.

Case studies of Macquarie Lighthouse in Sydney (site of Australia's first lighthouse) and Table Cape lighthouse (built in 1888) located in Northern Tasmania, were used. Macquarie Lighthouse has undergone a significant internal refurbishment to preserve the fabric of the structure and enhance the visitor experience. Table Cape lighthouse is currently undergoing conversion to allow safe access to the public and is expected to be open in 2010. The case study detailed the processes involved in opening this particular tower which is fitted with an AIS base station and has also undergone a recent full low voltage electronics upgrade.

The presentation also discussed the AMSA Guide Training Course and the recent Self Accreditation Guide Training Course being implemented at a number of sites.

The key points of the presentation were:

- 1 How AMSA manages tourist access to its traditional lighthouses.
- 2 Alterations needed to buildings prior to opening to public.
- 3 Training of guides.
- 4 Use of specialist expertise in refurbishing historic lighthouses.

4.9.4 Challenges in the Preservation of Historical Lighthouses in Chile, James Crawford, Armada de Chile

Presented by James Crawford

With the aim of conserving historical lighthouses in Chile, the Maritime Aids to Navigation Service has developed three strategies: a renewal plan, the proposal of lighthouses as historical monuments and the loan for use of them. The first strategy is the renewal plan, which allocates funds to the maintenance of aids to navigation structures and facilities, especially those of historical value. The second one was the proposal to the Government to proclaim Serrano, Magdalena Island and Cabo Posesión lighthouses as historical monuments. The proclamation of these lighthouses was accompanied by legal protection by decree of cultural assets, which implies the guarding of facilities and avoiding their destruction. The third strategy corresponds to the execution of a commodatum contract [loan for use] for San Isidro and Magdalena Island lighthouses, which implies the allocation of funds for the rebuilding of their facilities.

The key points of the presentation were:

- 1 Problems faced by the Chilean Maritime Authority during the lighthouses conservation process.
- 2 The experience with lighthouses considered within the renewal plan.
- 3 The experience with lighthouses proclaimed Historical Monuments.

4 The experience with lighthouses under commodatum contract regime.

4.9.5 To maintain and preserve: The case of the Amedee island lighthouse (New Caledonia), Vincent Guigueno, Direction des Affaires Maritimes - France

Presented by Vincent Guigueno

Opened November 15, 1865, Amédée lighthouse has operated for over 140 years the access to Noumea, capital of New Caledonia. Symbol of the French colonial presence in the Pacific, the iron tower occupies a unique place in the architectural history of lighthouses. The island on which the lighthouse is built, located 12 miles from the mainland, became a place of leisure and tourism after the Second World War. Boats from Noumea and Australian ships came to enjoy the extraordinary environment of Amedee. In the 1950s, the lighthouse keepers had to monitor these recreational activities. Reception facilities were built in the early 1980s. The area around the island became a marine reserve under the responsibility of the South Province of New Caledonia. In 1994, the lighthouse was automated.

The presentation, after a brief history of visits to Amedee Lighthouse, showed how the lighthouse authority, local authorities and tour operators combine tourism and sustainable development of the island.

The key points of the presentation were:

- 1 New Caledonia.
- 2 Lighthouse heritage;
- 3 Sustainable development.

4.9.6 Venezuelan Modular Lighthouses Project, Carlos Guillermo Ortigoza Vecino, Venezuelan Navy

Presented by Carlos Guillermo Ortigoza Vecino

The Venezuelan Navy, operates around 100 lighthouses in its national waters, the first of them built in 1842. A modernisation plan started in 1999, which included the replacement of 16 working lighthouses and the construction of 12 new ones on the maritime and insular coasts of the country. To accomplish this plan, a technology to satisfy the following principles was developed: a geographic scope greater than 15 NM; the production and installation on site at a low cost; a long or even everlasting structure; eventually, this would constitute a resource which should enable exploitation as a tourist attraction.

The project 'Venezuelan Modularity Lighthouses' consists in main building of concrete and fibreglass structural reinforced, approach of 36 to 120 feet focal plane. Besides all the virtues so far mentioned, it will incorporate specific methodologies to avoid the degradation of the environment when installing the new devices. These lighthouses increase the security rate on shore and reduce aquatic accident risks, especially from oil and other petroleum products and improve the international perception of the country, which may influence positively the tourist in the Caribbean area.

The key points of the presentation were:

- 1 Brief historical review of Venezuelan AtoN; development and evolution systems.
- 2 Goals.
- 3 Environmental aspects considered and feasibility of implanting the project.
- 4 Views of Venezuelan Modular Lighthouses Models.

- 4.9.7 "An Ocean in Mind" Ancient holistic navigation methods - e-Navigation without electronics? Hendrik Eusterbarkey, German Federal Waterways and Shipping Administration

Presented by Hendrik Eusterbarkey

An holistic approach to the art of navigation in the framework of human culture shows the human ability of perception and cognition in interaction with nature. An example for this is the old art of navigation in Oceania. The old navigators were travelling with their canoes in an area of over 10 million square miles which forms the biggest cultural area on this earth.

They had a broad experience of how to draw conclusions from the 'speak of the sea' by observation of winds and clouds and birds and marine creatures. They were able to perceive the direction of the waves for defining their sailing directions. They used methods of observing the stars for navigation, bypassing instrumental measurement and mathematical formula and carried out without any instruments and technology on board.

The fascinating holistic approach of these ancient mariners with a unity of feeling, thinking and intuition should be kept in mind when creating and using modern navigation systems. Human cognitive ability and the ability of holistic perception of the environment for achieving situational awareness is a basic factor for navigation, may be nowadays more than in any time before.

The key points of the presentation were:

- 1 Human cognitive ability and the ability of holistic perception of the environment for achieving situational awareness is a basic factor for navigation.
- 2 Nowadays – may be more than in any time before – an holistic cognition and sentience of the ocean, the marine environment and the whole space is essential for a mariner as a framework and as the last back-up to technical means.
- 3 Human cognitive ability and holistic perception as a basis for achieving situational awareness should be design aspects for an e-Navigation environment on the ship and in the shore-based facilities.

Discussion – Technical Session 9 (papers 1 - 7)

In a comment on Gerry Brine's presentation, attention was drawn to the dehumidification of lighthouse which can lead to a decay process of the granite.

Responding to a question on the consequences of proclaiming a lighthouse as an historical monument, James Crawford explained that such proclamation in Chile does not imply that the installation of any antennas or other artefacts outside the tower is forbidden.

Cdr Noguchi was asked how removed mercury is treated? He replied that the removed mercury was transported to a mercury mine in Japan and recycled for other usage such as a fluorescent lamp.

Cdr Noguchi was then asked how to mitigate the z-axis movement of an earthquake? He replied that the seismic isolation system can mitigate the z-axis movement somewhat but at the top of tower, the x and y movement becomes larger and therefore the system was designed to mitigate mainly the x and y movement.

5 CONCLUSIONS AND RECOMMENDATIONS

This session was chaired by the Secretary-General designate, who explained the process by which the draft Conclusions and Recommendations, placed in each delegate's pigeon-hole that morning, had been arrived at. He also explained the necessity of seeking written comment, so that the potential problems of dealing with a 300 – 400 person drafting group could be avoided.

It was also explained that there does not have to be a matching recommendation for each conclusion and that a recommendation may focus on certain aspects of a conclusion.

Following a review of a revised document, which was conducted on the auditorium screen by Mahesh Alimchandani, the conference agreed to the following 18 conclusions and 18 recommendations.

| Conclusions | Recommendations |
|---|--|
| 1 IALA's risk assessment tool kit, comprising IALA Waterways Risk Assessment Programme (IWRAP) Mk2 and Ports and Waterways Safety Assessment (PAWSA), when properly applied, has proven to be effective. | 1 IALA should continue to refine and promote its risk assessment tool kit, comprising both IWRAP Mk2 and PAWSA and foster the training of facilitators in the use of these models. |
| 2 The current suite of IALA AtoN performance measures, including quality management systems, would benefit from a risk reduction approach. | 2 IALA should develop guidelines and methodologies to help members develop performance measures (metrics) that summarise the risk reduction benefits provided by collective national navigation safety measures. |
| 3 Business case analyses can help national authorities ensure that all relevant information is considered in a standardised process, thereby providing a common basis for decision-making. | 3 IALA should promote standardisation in developing business case analyses. |
| 4 The information contained in the revised booklet describing the IALA Maritime Buoyage (MBS) System remains of significant value to mariners. | 4 IALA should advise IMO and other relevant maritime organisations of the publication of the revised IALA MBS booklet. |
| 5 New technologies, such as synchronised and sequential lights and flickering Light Emitting Diode (LED) lights, offer opportunities for improved effectiveness and efficiency in the provision of visual aids to navigation. | 5 IALA should continue to lead in the research, development and deployment of new AtoN technologies. |
| 6 Existing racons may not provide adequate performance in the S-Band with new technology radars. | 6 IALA should review the standards for racons and provide advice to members. |

| Conclusions | Recommendations |
|---|--|
| 7 Vessel Traffic Management (VTM) is not yet universally understood and there is a need for its user requirements and scope to be defined and communicated. | 7 IALA should define the user requirements and scope of VTM and adopt a communications strategy to promote a universal understanding and acceptance of VTM amongst stakeholders. |
| 8 Vessel Traffic Services (VTS) authorities should ensure VTS personnel are provided with accredited VTS training. | 8 IALA should encourage its members with responsibility for the operation of VTS to ensure that VTS personnel are provided with accredited training in accordance with IALA Recommendation V-103 and the associated model courses. |
| 9 Improved information sharing amongst relevant stakeholders enhances VTS operations. | 9 IALA should develop guidance for information sharing amongst VTS and allied services. |
| 10 To realise the full potential of AIS, the AIS navigational data needs to be integrated into shipborne navigation equipment and graphically displayed. Application specific messages need to be displayed as appropriate. | 10 IALA should support development of a unified portrayal (i.e. display) of navigational information under the e-Navigation concept. |
| 11 IALA members can benefit from improved awareness of marine traffic. | 11 The IALA membership is encouraged to share maritime data through IALA NET and thus receive the benefits of participation. |
| 12 There is considerable knowledge and expertise within the IALA community that could be shared to assist authorities in meeting their obligations. | 12 IALA members are encouraged to support the development of the IALA World-Wide Academy (WWA) and IALA Consulting. 13 Information Technology should be used to gather and share knowledge and expertise held within the IALA membership. |
| 13 Some developing nations need long-term support to fulfil their SOLAS obligations for the provision of AtoN. | 13 IALA should develop a plan for proactively supporting aids to navigation authorities to fulfil their international obligations. |
| 14 Regional and sub-regional co-operation is necessary for the improvement of safety of navigation. | 14 IALA should proactively promote regional and sub-regional co-operation where necessary. |
| 15 Integration of traditional (visual) AtoN, radionavigation and other navigational information necessitates the development of an e-navigation data model. | 15 IALA should continue to develop the Universal Maritime Data Model (UMDM) for e-Navigation. |

| Conclusions | Recommendations |
|---|--|
| <p>16 Realisation of the full potential of e-Navigation requires robust communications with sufficient bandwidth, the integration of equipment and a common information structure.</p> | <p>16 To facilitate the future implementation of e-Navigation, IALA should:</p> <ul style="list-style-type: none"> • develop a common information structure and encourage members to adopt it for the exchange and presentation of AtoN related information; • develop guidance for the integration of equipment and information; • encourage its national members to participate in the international deliberations aimed at designating additional spectrum dedicated for e-Navigation. |
| <p>17 Global Navigation Satellite Systems (GNSS) are vulnerable to interference. A robust, resilient Position, Navigation & Time (PNT) system will be essential for e-Navigation.</p> | <p>17 IALA should encourage the development of a global redundant system, or combinations of systems, independent and dissimilar to GNSS, to facilitate the future implementation of e-Navigation.</p> |
| <p>18 Historic preservation issues such as preserving Fresnel lenses or removing mercury baths need to be addressed in co-operation with other interested parties.</p> | <p>18 IALA should continue to provide guidance on the preservation and maintenance of historic equipment and artefacts.</p> |

6 IALA GENERAL ASSEMBLY

During the Conference, IALA held two General Assemblies. The first General Assembly was to provide an update on the work of the IALA Council, including a Financial Report and a report from the IALA Strategy Group. The IALA Strategy for the coming Work Programme was presented, and a copy was provided to all delegates. The status of IALA's headquarters was reported and there was an invitation for nominations for the IALA Council for 2010 – 2014. The report from the first part of the General Assembly is at ANNEX F.

The goal of the second part of the General Assembly was the election of the new IALA Council for the period 2010 - 2014. A copy of the report from this part of the General Assembly, including a list of the elected Council members, is at ANNEX G.

Following the election of council members, presentations were provided for both VTS2012 and the 18th IALA Conference, 2014.

6.1 Invitation to VTS2012



Captain Salih Oracki, Director General, Directorate General of Coastal Safety, Turkey provided a presentation on VTS2012 – 'Beyond the Limits', to be held in Istanbul, Turkey between 10 and 14 September 2012. He noted that Istanbul is a thriving, cosmopolitan city joining two continents and that it is looking forward to hosting the symposium. The focus for the Symposium will be the role of VTS in global traffic monitoring, legal aspects of providing VTS, recruitment, training and maintaining professional competencies for VTS personnel, the role of VTS in the emerging concept of e-Navigation, innovations and improvements in VTS operations and the unique aspects of providing VTS in arctic regions.

6.2 Invitation to the 18th IALA Conference, 2014

Mr Manuel Gómez, Deputy Director, Puertos del Estados, invited delegates to the 18th IALA Conference, to be held in Spain. His presentation noted that it is an honour for Puertos del Estado and Spain to host the next IALA conference in 2014.

All IALA members were invited to participate in the Conference, the IALA General Assembly and the Industrial Members' Exhibition in 2014.

7 INDUSTRIAL MEMBERS' EXHIBITION

The Industrial Members' Exhibition was opened at 1530 on Monday 22nd March by Torsten Kruuse, Secretary General of IALA at the invitation of Steve Nell, President of the Industrial Members' Committee (IMC). Mr Kruuse thanked delegates for their interest in the exhibition and praised IALA's industrial members for their support.



He went on to express his appreciation for the work of the IMC during the past four years in planning the event and to exhibitors for their response to the invitations to participate in what became a record-breaking take up of stand space.

Thirty six (36) Industrial Members exhibited their products and services. The South African Maritime Safety Authority (SAMSA) was represented and Puertos del Estados of Spain advertised the 18th IALA Conference to be held in 2014 on a date and at a venue to be agreed.

Names of the exhibitors and their products are given below:

| Booth Number | Name of exhibitor | Products |
|--------------|-----------------------------|--|
| 6&7 | Atlas Maritime Security | VTs and coastal surveillance systems; ship monitoring; traffic control; harbour security. |
| 21 | Australian Maritime Systems | Management and integration of maritime projects including VTs and the supply, installation and commissioning of aids to navigation. |
| 23 | Carmanah Technologies | Solar and LED technology; advanced optics; low maintenance marine lanterns. |
| 64 | CNS Systems | The complete range of AIS hardware and software including shipborne transponders, base stations, ENC's and tracking systems. |
| 61 | Elman | AIS for monitoring and identifying maritime traffic. Products include GMDSS, VHF and UHF radio; GPS receivers and NAVTEX. |
| 63 | Exact Earth Ltd | A subsidiary of COM DEV of Canada. Deals with capture of large amounts of AIS data of value to coastal surveillance and SAR authorities. |
| 57-60 | Floatex | Buoys for dredging, for surface and deepwater applications. Pioneers of the application of plastic rotomoulding technology for aids to navigation manufacture. |
| 65 | Gem Electronica | Supplier of equipment for VTs, coastal surveillance, integrated bridge systems, fibre optics and lasers. |



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| Booth Number | Name of exhibitor | Products |
|--------------|-----------------------------------|--|
| 49 | GISMAN | Design and manufacture of aids to navigation equipment; racons, mooring systems, project management, maintenance and training. |
| 22 | Japan Radio Company | Solid state radar, particularly VTS radar and customised VTS providing real time monitoring. |
| 47 | Jeppesen Marine | Digital navigation solutions based on worldwide vector chart data, meteorological information and transmission technologies. |
| 2 | Kannad | Design of positioning, measuring and data transmission systems for remote environments. |
| 24 | Kelvin Hughes | Marine navigation and surveillance systems including radar sensors; VDRs; ENC's and integrated bridge systems. |
| 3 | La Maquinista Valenciana | Design, manufacture and supply of aids to navigation, commissioning, maintenance and personnel training and AIS. |
| 37-40 | Marine Data Solutions / Kongsberg | Vessel traffic management and information systems and related resources in ports and offshore; marine domain awareness. |
| 51&52 | Mediterraneo Señales Maritimas | Provides a complete service for design, installation and commissioning of marine aids to navigation. Undertakes R & D and use of renewable energy. |
| 45&48 | Mobilis SAS | Mooring devices and buoys; dredging pipe floats; design of lights and electronic equipment. |



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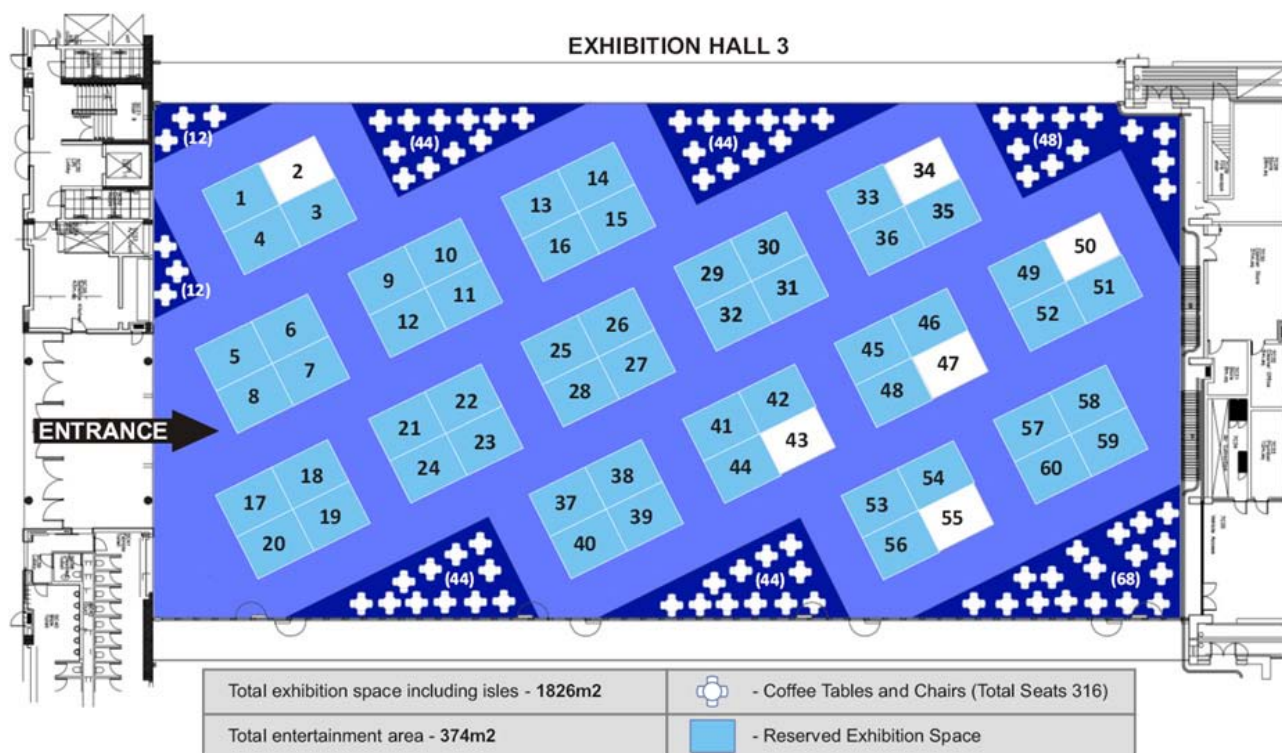
| Booth Number | Name of exhibitor | Products |
|--------------|---|---|
| 34 | OMC International | Under keel clearance (UKC) systems; channel design and mooring systems analysis; software programmes. |
| 10&11 | Pintsch-Bamag | LED Lanterns, sector lights, rotating beacons and remote monitoring systems. |
| 33,35&36 | Pharos Marine/Automatic Power | Full range of lanterns; LED lighting; ATONIS AIS; the Phalcon 2000 racon; iNAVproAIS analyzer software. |
| 50 | Puertos Del Estado | Puertos del Estado is the competent body in charge of AtoN services in Spain. Spain will host the 18th IALA Conference in 2014 |
| 62 | SAAB Transpondertech | Product portfolio includes AIS, VTS, VTMIS and coastal surveillance systems. Display includes the Trimble marine DGPS. |
| 29-32 | SABIK | Full range of LED lanterns, remote monitoring system and components for buoys operating in ice. |
| 25-28 | Sealite Pty. Ltd. | Latest advances in LED technology; a new 10nm LED lantern; a 2.2m buoy commissioned in 2009. |
| 19&20 | Selex Sistemi Integrati | Integrated Vessel Traffic Services. |
| 54 | Shanghai Navigation Aids Factory (SNAF) | Research, design and manufacture of LED lanterns and range lights, radar reflectors, light towers, buoys and solar panels. |
| 43 | Shanghai Rokem International | Remote sensing and control systems installed on buoys in the waters of the People's Republic of China; solar power; AIS integration. |
| 17&18 | SOFRELOG SAS | SYTAR: S Ystem for T racking A dministration and R outeing; design, installation and maintenance of VTS and coastal surveillance systems. |



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| Booth Number | Name of exhibitor | Products |
|--------------|---|---|
| 5&8 | South African Maritime Safety Authority (SAMSA) | The South African national safety agency with a primary role in maritime safety, marine environmental protection and SAR. |
| 41 | TERMA | Sea surveillance radar systems; radar for VTS Sensor technology for VTS and coastal surveillance radars. |
| 55 | Thales Air Systems | Civil and military ground, naval and coastal radars. A new range of radars designed for coastal surveillance has been launched. |
| 13-16 | Tideland Signal Corporation | Full range of marine aids to navigation; racons; LEDs; remote monitoring systems. |
| 44 | TRANSAS Marine | Vessel traffic management and monitoring systems; environmental protection; coastal security; protection of offshore installations. |
| 53&56 | United Star Navigation Technology | A full range of marine aids to navigation; provision of spares for VTS, DGPS and oil spills. |
| 9&12 | Vega Industries Ltd. | Lighted aids to navigation; optical, electronic and electro-mechanical instruments; photometric testing. |
| 42 | Wealth Marine Pte Ltd. | Marine aids to navigation products; barriers. Also operates a testing and research centre. Radar beacons. |
| 46 | Windside Production Ltd. | Vertical axis spiral wind turbines and accessories for a broad range of applications. |
| 1&4 | Zeni Lite Buoy Co. Ltd. | A wide range of fixed and floating aids; AIS products for providing navigation, meteorological and hydrological data; LED technology. |





Layout of Exhibition Hall

8 BUOY TENDER VISITS

There were no buoy tender visits during the conference.

9 SOCIAL EVENTS

9.1 Welcome Reception

On March 21st Transnet National Port Authority, the host for the Conference, welcomed delegates to a reception in the ballroom of the Westin Grand hotel.

9.2 Official Conference Dinner

On March 22nd an Official Conference Dinner was held at Moyo, part of the Spier Wine Estate. Amid entertainment and music, delegates were treated to traditional South African cuisine.

Jo-Ann Strauss was the MC. There were speeches of welcome by Captain Mike Brophy, Chief Harbour Master of Transnet National Ports Authority. He reflected on Cape Town's long recognized position as the 'Tavern of the Seas', for centuries a very welcome refuge and supply centre for the world's seafarers.

The text of Captain Brophy's address is at ANNEX H.

The next speaker was Alderman Ian Neilson, Executive Deputy Mayor of Cape Town.

The text of Alderman Neilson's address is at ANNEX I.

Mr Tsietsi Mokhele, Chief Executive Officer of the South African Maritime Safety Authority (SAMSA), and the conference's main sponsor, advised guests that South Africa has the largest economy in Africa. For a moment he praised African seamanship by mentioning by way of example the fact that Somali pirates can navigate 1000km offshore in a skiff to go about their awful deeds. He believed that IALA would certainly be of relevance in the Africa of the future and by 2020 or 2025 the African coast would be fully lit.

James Collocott spoke of the record-breaking attendance recorded for the conference with more than 400 delegates and a well-booked Industrial Members' Exhibition.

He drew guest's attention to the fact that there was at the dinner two generations of one family with a long history of service to IALA and he called for a round of applause for Mme Christiane Ville who was Administration Manager at HQ for many years, and for Marie-Helene Grillet, her daughter, who continues in that role today.

He then spoke in appreciation of Torsten Kruuse, retiring Secretary General, and referred to him as a true Friend of Africa.

In responses Torsten said that no international organization is better than its membership. At IALA all its members are willing to play a part in the promotion of maritime safety and the protection of the marine environment. James then presented him with a painting of the Victoria & Alfred Waterfront with Table Mountain as its background.

9.3 Industrial Members' Evening

'A Street Party at Ratanga Junction' was the setting for the Industrial Members' Dinner on March 24th. The location lent itself to presenting the wide cultural mix of South Africa in general and Cape Town in particular.

The décor, entertainment and food matched the theme. Delegates were entertained with South African music and dances. Judging by the level of noise, chatter and laughter, it was clear that the delegates had enjoyed themselves immensely; the event was a huge success.

9.4 Formal Closing Dinner

The Farewell Dinner was held in the Grand Ballroom of the Cape Town International Convention Centre on the night of 27th March.

Delegates and accompanying persons, staff of Transnet National Ports Authority, the IALA Secretariat and guests gathered for drinks at 1830 and sat down to dinner at 1930 whereupon the Programme Director, Nico Panagio, was introduced. He in turn presented the musicians who provided splendid accompaniment to the excellent food and fine wines on offer.

The Secretary General of IALA (designate), Gary Prosser, announced the newly-elected IALA Council and its President, David Gordon (South Africa), and Vice-President, Manuel Gomez (Spain).

Captain Mike Brophy, Chief Harbour Master of Transnet National Ports Authority, delivered a farewell address in which he said he was proud that IALA had brought its conference to South Africa (see ANNEX L).

Mr Jon Cayzer, Head of Ministry, Department of Transport, Office of the MEC for Transport: Western Cape, spoke (see ANNEX M).

The outgoing President, Captain Liu Gongchen of the Maritime Safety Administration of the People's Republic of China, said, "Good evening, new President Mr. David Gordon, new Secretary-General, Gary Prosser, Ladies and Gentlemen.

I am very pleased to attend the ceremony. First of all, I would like to extend my sincere thanks to our host for the excellent organization and nice arrangements for the conference.

I have been IALA President since the 2006 IALA conference in Shanghai. During four years, I have got the support from all Council members, the IALA Secretariat as well as IALA members. On this occasion, I would like to extend my sincere thanks to all of you for everything you have done for me. I really enjoyed the time working with you in IALA.

Although I am leaving the presidency of IALA, I am still in charge of maritime safety in the Ministry of Transport in China. The experience I gained from IALA is very useful to my work.

I hope and I am sure, under the leadership of the new President and Secretary-General, IALA will develop fast and grow strong.

I would like to propose a toast to the successful conference, to friendship, to good health and the future of IALA.”

A speech followed from the newly-elected IALA President, David Gordon.

At this point, the floating trophy was handed by David Gordon to Manuel Gomez of Spain whose authority, Puerto del Estado, will host the next IALA Conference, the 18th, to be at a venue and on dates to be agreed there in 2014.



Cdr Tsietsi Mokhele, CEO of SAMSA (South African Maritime Safety Authority) proposed a Vote of Thanks and congratulated the President and Gary Prosser for their efforts. He also applauded the IALA Council and the Membership of the Association.

To close this elegant affair at which was served the best of South African cuisine with world - class entertainment Programme Director Nico Panagio wished all present God Speed. Farewells were made and the many departed looking forward to Spain.

10 ACKNOWLEDGMENTS

The Conference expressed its appreciation to Transnet National Ports Authority and their sponsors for their invaluable support for the 17th IALA Conference. It wished particularly to acknowledge:

- South Africa Maritime Safety Authority
- Thales Coast Watcher Radars;
- Marine Data Solutions;
- CHL Radar Antenna Systems;
- Australian Maritime Safety Authority (AMSA).

Appreciation was also expressed to the International Maritime Organisation and the IALA Industrial Members' Committee, which each sponsored 5 delegate places for a member of staff of African maritime authorities.

IALA acknowledges the following organisations without which the Conference would not have been possible:

Cape Town International Convention Centre; Global Conferences Africa; Scan Display; AV Alliance; Creative Presentation; Megacoach; Absolutely Write; Next Level Design; P R Workshop; Mahisha Business Centre; Amanzi Blue and Exhibition Freighting GSM.

The reporting of the technical sessions and the compilation of the report was undertaken by:

Mahesh Alimchandani

Gerry Brine

Dr Mike Hadley

Captain Terry Hughes

Rear-Admiral Jean-Charles Leclair

Paul Ridgway

Thanks is also extended to those who contributed to the drafting of the Conclusions and Recommendations.

Photographs of the Conference were taken by Exhibition Photos Durban, Kevin and Greg Joseph.

ANNEX A **LIST OF DELEGATES**

| |
|---------|
| ALGERIA |
|---------|

BOULERBAH, Monsieur Ali

Directeur

Office National De Sinalisation Maritime (O.N.S.M)

6 Boulevard Colonel Amirouche Alger

16000

ALGERIE

Telephone: +213 21 6356 70

Fax: +213 21 6356 79

e-mail: aliboulerbah@yahoo.fr

| |
|--------|
| ANGOLA |
|--------|

FERREIRA, Mr Salustiano Pinto

National Co-ordinator

Hidrography and Maritime Sinalisation Institute; Ministry of Transport

Rainha Ginga no 74

Luanda

ANGOLA

Telephone: 0024 492 38970 032

e-mail: orfeu_salu@yahoo.com.br

NARCISO, Mr Manuel

Co-ordinator of Subcomission of Sinalisation

Hidrography and Maritime Sinalisation

R.Ginga/74

ANGOLA

e-mail: manuelnarciso2000@yahoo.com

| |
|-----------|
| ARGENTINA |
|-----------|

ESCALANTE, Mr Raul

Hidrovia Sa

O'Higgins 1357

Piso 14

Buenos Aires 1426

ARGENTINA

Telephone: +54 11 4320 6900

Fax: +54 11 4320 6931

e-mail: raul.s.escalante@gmail.com

ZORZONI, LCapt Armando
Asesor Nautico
Servicio De Hidrografia Naval
AV Montes De Oca
2 Piso
1270
ARGENTINA

Telephone: +54 11 430 12249

Fax: +5411 4301 2249

e-mail: tdf@hidro.gov.ar

| |
|-----------|
| AUSTRALIA |
|-----------|

ALIMCHANDANI, Mr Mahesh
Network Planning Manager & Nautical Adviser
Australian Maritime Safety Authority
G P O Box 2181
Canberra City 2601
AUSTRALIA

Telephone: +61 2 6279 5927

Fax: +61 2 6279 5002

e-mail: mx@amsa.gov.au

BRINE, Mr Gerry
Manager Navigation Safety
Australian Maritime Safety Authority
GPO Box 2181
Canberra 2601
AUSTRALIA

Telephone: +61 2 6279 5049

Fax: +61 2 6279 5002

e-mail: gerry.brine@amsa.gov.au

DAVIDSON, Mr Clive
Australian Maritime Systems
655 MacArthur Avenue Central
Pinkenba
AUSTRALIA

Telephone: +61 7 3633 4100

Fax: +61 7 3633 4198

e-mail: jason.button@marsys.com.au

GALBRAITH, Mr Dana
Sealite Pty Ltd
11 Industrial Drive
Somerville 3912
AUSTRALIA

Telephone: +61359776128

e-mail: d.galbraith@sealite.com.au

GROVES, Mr Bradley
Australian Maritime Safety Authority
GPO Box 2181
Canberra 2601
AUSTRALIA

Telephone: +61 2 6279 5050
Fax: +61 2 6279 5966
e-mail: brad.groves@amsa.gov.au

ISHIHARA, Hiroyuki
Australian Maritime Systems / Japan Radio Company
655 MacArthur Avenue Central
Pinkenba
AUSTRALIA
Telephone: +61 7 3633 4100
Fax: +61 7 3633 4198
e-mail: jason.button@marsys.com.au

IZUORAH, Mr Emeka
Sealite Pty Ltd
HSE 5, NO 10 Udi Street; Osborne Estate Phase 1
Ikoyi
Lagos 103081
NIGERIA
Telephone: +234 1 435 3413
e-mail: emekaizuorah@infrastructuresupportservices.com

JOPPICH, Mr Errol
Australian Maritime Systems
655 MacArthur Avenue Central
Pinkenba
AUSTRALIA
Telephone: +61 7 3633 4100
Fax: +61 7 3633 4198
e-mail: jason.button@marsys.com.au

MCGILVRAY, Mr David
Australian Maritime Systems
PO Box 1430 Eagle Farm Mc
Eagle Farm
Queensland 4009
AUSTRALIA
Telephone: +61 7 36334100
Fax: +61 7 36334199
e-mail: jason.button@marsys.com.au

O'BRIEN, Mr Peter
OMC-International
6 Paterson Street
Abbotsford 3067
AUSTRALIA
e-mail: peter@omc-international.com.au

O'BRIEN, Dr Terry

OMC International
6 Paterson Street
Abbotsford 3067
AUSTRALIA

Telephone: +61 3 9412 6500

e-mail: admin@omc-international.com.au

PEACHEY, Mr Graham

CEO
Australian Maritime Safety Authority
GPO Box 2181
Canberra
2601
AUSTRALIA

Telephone: +61 262 79 5039

Fax: +6262 79 5813

e-mail: ceo@amsa.gov.au

PROCTER, Mr Chris

Director
Sealite Pty Ltd
11 Industrial Drive
Somerville 391
AUSTRALIA

Telephone: +61359776128

Fax: +61359776124

e-mail: chris.procter@sealite.com.au

SUGARMAN, Mr John

Managing Director
Australian Maritime Systems
PO Box 1430 Eagle Farm Mc
Eagle Farm
BRISBANE 4009
AUSTRALIA

Telephone: +61 7 36334101

Fax: +61 7 36334198

e-mail: jason.button@marsys.com.au

TRAINOR, Mr Neil

Australian Maritime Safety Authority
C/- Maritime Safety Queensland GPO Box 2595
BRISBANE 4001
AUSTRALIA

Telephone: +61 7 3120 7422

Fax: +61 7 3120 7440

e-mail: neil.trainor@amsa.gov.au

WALKER, Mr Michael
Business Development Manager
Sealite Pty Ltd
11 Industrial Drive
Somerville 3912
AUSTRALIA

Telephone: +61 3 59776128
e-mail: m.walker@sealite.com.au

| |
|---------|
| AUSTRIA |
|---------|

CIEPELINSKI, Mr. Michel
Area Sales Manager
Frequentis AG
Innovationsstraße 1
Vienna 1100
AUSTRIA

Telephone: 43 1 811 50 3830
Fax: 43 1 81150 77 3830
e-mail: michel.ciepelinski@frequentis.com

| |
|---------|
| BAHRAIN |
|---------|

ABDULLA, Mr Jaffer
Navigation Service Manager
Middle East Navigation Aids Services
P.O.Box 66 Kingdom Of Bahrain
MANAMA 66
BAHRAIN

Telephone: +973 17828555
Fax: +973 17727765
e-mail: jaffer@menas.com.bh

MIRZA, Mr Shaheen
Senior Project Engineer
Middle East Navigation Aids Services
P.O.Box 66 Kingdom Of Bahrain
Manama 66
BAHRAIN

Telephone: +973 17828549
Fax: +973 17727765
e-mail: mirza@menas.com.bh

| |
|---------|
| BELGIUM |
|---------|

DESCAMPS, Mr Antoine
Head of Department
Flemish Government - Shipping Assistance Division
Maritiem Plein 3
Oostende
8400
BELGIUM

Telephone: +32 1 59 255 440
Fax: +32 59 255 440
e-mail: antoine.descamps@mow.vlaanderen.be

| |
|-------|
| BENIN |
|-------|

RIGOBERT, Aballo
Port Autonome de Cotonou
BENIN

Telephone: +229 21312613
Fax: +229 2131 28 91
e-mail: aballo@yahoo.fr

| |
|--------|
| BRAZIL |
|--------|

DOS SANTOS DUARTE JÚNIOR, Captain Walter
Director
Brazilian Navy - Centro De Sinalização Náutica Almirante Moraes
Centro De Sinalização Náutica Almirante Moraes Rego
Rua Barão De Jaceguai, S/n
PONTA DA ARMAÇÃO - NITERÓI, RJ 24.048-900
BRAZIL

Telephone: +55 21 2189 3132
Fax: +55 21 2189 3132
e-mail: diretorcamr@hotmail.com

PIOVESANA JÚNIOR, Captain Alberto
Advisor
Brazilian Navy - Centro De Sinalização Náutica Almirante Moraes
Centro De Sinalização Náutica Almirante Moraes Rego
Rua Barão De Jaceguai, S/n
PONTA DA ARMAÇÃO - NITERÓI, RJ 24.048-900
BRAZIL

Telephone: +55 21 2189 3523
Fax: +55 21 2189 3132
e-mail: piovesana@camr.mar.mil.br

| |
|--------|
| CANADA |
|--------|

ALLAN, Mr John
VP Global Sales & Marketing
ExactEarth Ltd
60 Struck Court
CAMBRIDGE, ON N1R 8L2
CANADA

Telephone: +1 519 622 4445 X 4814
e-mail: john.allan@exactearth.com

BEST, Mr. George
Director of Sales
ExactEarth Ltd.
60 Struck Court
Cambridge, Ontario N1R 8L2
CANADA

Telephone: +1 519-622-2300
Fax: +1 519-623-8575
e-mail: george.best@exactEarth.com

CHÂTEAUVERT, Mr. André
Canadian Coast Guard
200 Kent Street, Station 5N177
OTTAWA, ONTARIO K1A 0E6
CANADA

Telephone: +1 613-998-1408
Fax: +1 613-996-8902
e-mail: andre.chateauvert@dfo-mpo.gc.ca

CHAULK, Mr. Neil
Vice President, Marketing and Sales Director
CNS Systems
Suite 201, 1118 Topsail Road
Mount Pearl A1N5E7
CANADA

Telephone: +1 709 754 0400
Fax: +1 709 754 0419
e-mail: nchaulk@icanmarine.com

EDGAR, Mr. Bruce
Sales Channel Manager - Africa & Middle East
Carmanah Technologies
203 Harbour Road
Building 4
Victoria, BC V9A 3S2
CANADA

Telephone: +1 877 722 8877
Fax: +1 250 380 0062
e-mail: bedgar@carmanah.com

MABSON, Mr. Peter
ExactEarth Ltd.
60 Struck Court
Cambridge, Ontario N1R 8L2
CANADA

Telephone: +1 519-622-2300
Fax: +1 519 623 8575
e-mail: peter.mabson@exactearth.com

MOJICA, Mr. Fernando
Canadian Coast Guard
200 Kent Street
OTTAWA K1A 0E6
CANADA

Telephone: +1 613 998 1403
e-mail: jose-fernando.mojica@dfo-mpo.gc.ca

MOORE, Mr Richard
Class Manager – Aids to Navigation
Canadian Coast Guard
200 Kent St. Station 7S036
OTTAWA/ON J9J 2N2
CANADA

Telephone: +1 613 949 9137
Fax: +1 613 998 9258
e-mail: moorer@dfo-mpo.gc.ca

O'FLYNN, Mr Brian
Military Market Development Manager
Carmanah Technologies
203 Harbour Road, Bdg 4
Victoria, BC V9A 3S2
CANADA

Telephone: +1 877 722 8877
Fax: +1 250 380 0062
e-mail: boflynn@carmanah.com

TREMLETT, Mr. Robert
Head of Maritime Affairs
ExactEarth Ltd.
60 Struck Court
Cambridge, Ontario N1R 8L2
CANADA

Telephone: +1 519-622-2300
e-mail: robert.tremlett@me.com

| |
|-------|
| CHILE |
|-------|

CRAWFORD, Lt. Cdr. James
Head, Marine Aids to Navigation Department
Dirección General Del Territorio Marítimo Y De M.M.
Errazuriz #537
Valparaíso 2362283
CHILE

Telephone: +56 32 2208201
Fax: +56 32 2208085
e-mail: jcrawford@directemar.cl

HEUSSER, RAdm Juan Pablo
Dirección General Del Territorio Marítimo Y De M.M.
Errazuriz #537
Valparaíso 2362283
CHILE

Telephone: +56 32 2208201
Fax: +56 32 2208085
e-mail: director@directemar.cl

SALGADO, Commander Carlos
Head, International Affairs Department
Dirección General Del Territorio Marítimo Y De M.M.
Errazuriz #537
Valparaíso 2362283
CHILE

Telephone: + 56 32 2208201
Fax: +56 32 2208085
e-mail: csalgado@directemar.cl

| |
|-------|
| CHINA |
|-------|

CHEN, Mr Jinde
Director
China Maritime Safety Administration
Jianguomennei Ave 11
Beijing 100736
CHINA

Telephone: +86 10 6529 2220
Fax: +86 10 6529 2893
e-mail: liwenhua@msa.gov.cn

GONG, Mr Hua
Shanghai Navigation Aids Factory Co., Ltd.
985 Pu Dong Bei Road, Shanghai, P.R. China
Shanghai 201208
CHINA

Telephone: +86-21-68467283
Fax: +86 21 50692584
e-mail: gonghua36@yahoo.com.cn

GUOJUN, Mr Peng
Honorary Director
Navigation Institute of Jimei University
No 165 Dongdu Road;Huli District;Xiamen City
Fujian Province 361012
CHINA

Telephone: +86 592 6011087
Fax: +86 592 6011080
e-mail: xianglu@msa.gov.cn

HAN, Mr Wei
Director
China Maritime Safety Administration
Jianguomennei Ave.11
Beijing 100736
CHINA

Telephone: +86 10 6529 2220
Fax: +86 10 6529 2893
e-mail: hanwei@msa.gov.cn

HE, Mr Zimu
United Star Navigation Technology Co., Ltd
Rm.801,Tower B,Huazun Plaza, Jia 29, Beisanhuan Middle Road
Xicheng District
Beijing 100029
CHINA

Telephone: +86 6236 9699
Fax: +86 6236 9689
e-mail: hezimu@usnt.com.cn

HOU, Mr Xiao Ming
Shangai Navigation Aids Factory Co. Ltd.
985 Pu Dong Bei Road
Shanghai 201208
CHINA

Telephone: +86 21 68467283
Fax: +86 21 50692584
e-mail: gonghua36@yahoo.com.cn

JIA, Mr Bin
Vice President
United Star Navigation Technology Co. Ltd.
Rm.801, Tower B,Huazun Plaza, Jia 29, Beisanhuan Middle Road
Xicheng District
Beijing 100029
CHINA

Telephone: +86 10 6236 9699
Fax: +86 10 6236 9689
e-mail: hezimu@usnt.com.cn

JIANG, Mrs Xuemei

Director
China Maritime Safety Administration
Jianguomennei Ave.11
Beijing 100736
CHINA

Telephone: +86 10 6529 2220

Fax: +86 10 6529 2893

e-mail: jiangxuemei@msa.gov.cn

LEE, Mr. Shek

Senior Electronics Engineer
Marine Department, Hong Kong
Vessel Traffic Centre
Deck 4, Outer Pier, Macau Ferry Terminal
Sheung Wan
Hong Kong SAR
CHINA

Telephone: +852 22337833

Fax: +852 28576860

e-mail: derek_lee@mardep.gov.hk ; sunny_pang@mardep.gov.hk

LI, Mr Wei Yun

Shangai Navigation Aids Factory Co. Ltd.
985 Pu Dong Bei Road
Shangai 201208
CHINA

Telephone: +86 21 68467283

Fax: +86 21 50692584

e-mail: gonghua36@yahoo.com.cn

LIN, Mr Hua

President
United Star Navigation Technology Co., Ltd.
Rm.801, Tower B, Huazun Plaza, Jia 29, Beisanhuan Middle Road
Xicheng District
Beijing 100029
CHINA

Telephone: +86 10 6236 9699

Fax: +86 10 6236 9689

e-mail: hezimu@usnt.com.cn

LIU, Mr. Chunhai

Rokem
9D Double Dove Great Tower
438 Pudian Road
Shanghai 200122
CHINA

Telephone: +86 21 50810062

Fax: + 86 21 58818728

e-mail: robertliu@rokem.com

LIU, Capt Gongchen
Chief Safety Supervisor
Ministry of Transport China
Jianguomennei Ave.11
Beijing 100736
CHINA

Telephone: +86 10 6529 2595
Fax: 86 10 6529 2039
e-mail: ialachina@msa.gov.cn

LIU, Mr. Robert
Rokem
9D Double Dove Great Tower
438 Pudian Road
Shanghai 200122
CHINA

Telephone: +86 21 50810062
Fax: + 86 21 58818728
e-mail: robertliu@rokem.com

LU, Mr Yongqiang
China Maritime Safety Administration
Jianguomennei Ave.11
Beijing 100736
CHINA

Telephone: +86 10 6529 2220
Fax: +86 10 6529 2893
e-mail: lyq0404@126.com

MA, Mr Jianshe
Director
China Maritime Safety Administration
Jianguomennei Ave.11
Beijing 100736
CHINA

Telephone: +86 10 6529 2220
Fax: +86 10 6529 2893
e-mail: majianshe@msa.gov.cn

PANG, Mr Kwok Keung
Electronics Engineer
Marine Department, Hong Kong
Vessel Traffic Center
Deck 4, Outer Pier, Macau Ferry Terminal
Hong Kong SAR
CHINA

Telephone: +852 22337832
Fax: +852 28576860
e-mail: sunny_pang@mardep.gov.hk

PENG, Mr Hai
Vice President
United Star Navigation Technology Co.
Rm.801, Tower B, Huazun Plaza, Jia 29, Beisanhuan Middle Road
Xicheng District
Beijing 100029
CHINA

Telephone: +86 10 6236 9699
Fax: +86 10 6236 9689
e-mail: penghai@usnt.com.cn

WANG, Mr Qiang
Shanghai Navigation Aids Factory Co. Ltd.
985 Pu Dong Bei Road, Shanghai, P.R.China
Shanghai 201208
CHINA

Telephone: +86-21-68467283
Fax: +86-21-50692584
e-mail: gonghua36@yahoo.com.cn

WENHUA, Mr Li
China Maritime Safety Administration
Jianguomennei Ave.11
Beijing 100736
CHINA

Telephone: +86 10 6529 2220
Fax: +86 10 6529 2893
e-mail: liwenhua@msa.gov.cn

WONG, Mr. Chan-Kwong
Marine Officer/vessel Traffic Centre
Marine Department, Hong Kong
21st Floor, Harbour Building, 38 Pier Road
Central
Hong Kong SAR
CHINA

Telephone: +852 2233 7811
Fax: +852 2857 9042
e-mail: ck_wong@mardep.gov.hk

XINGGU, Mrs Zhang
Navigation Institute of Jimei University
No 165 Dongdu Road;Huli District;Xiamen City
Fujian Province 361012
CHINA
Telephone: +86 592 6011087
Fax: +86 592 6011080
e-mail: zhangxg_jmu@126.com

YANG, Mrs Jian Yung
Shangai Navigation Aids Factory Co. Ltd.
985 Pu Dong Bei Road
Shangai 201208
CHINA
Telephone: +86 21 68467283
Fax: +86 21 50692584
e-mail: gonghua36@yahoo.com.cn

YUEN, Mr. Lobee
Electronics Engineer
Hong Kong SAR Government - EMSD
6/f Emsdhq
3 Kai Shing Street
Kowloon
Hong Kong SAR
CHINA
Telephone: + 852 2808 3521
Fax: 852 2873 2154
e-mail: wyyuen@emsd.gov.hk

ZHANG, Mrs Shufang
Dalian Maritime University
Lingshui Qiao, Linghai Road, No.1
Collegy Of Information Science And Technology
Dalian 116026
CHINA
Telephone: +86 411 847231180
Fax: +86 411 84723118 801
e-mail: sfzhang@mail.dlptt.ln.cn

| |
|------|
| CUBA |
|------|

ALMAGUER, Sr Julio Fidel Sierra
Grupo Empresarial GEOCUBA
Calle 6 /e 3ra Y 3ra-A, N° 301, Miramar, Playa La Habana
11300
CUBA
Telephone: +537 2094493
Fax: +537 2093895
e-mail: anav@geocuba.cu

| |
|---------------|
| CÔTE D'IVOIRE |
|---------------|

DAGOU, Mr Ossey Albert
Directeur Des Marchés
Port Autonome Abidjan
1, Boulevard Du Port
Abidjan 01 BP 3254
CÔTE D'IVOIRE
Telephone: +22 521238310
Fax: +22 21341810
e-mail: oadag@hotmail.com

GNAGNE ADOU, Marie J

Port Autonome Abidjan
1, Boulevard Du Port
Abidjan 01 BP 3254
CÔTE D'IVOIRE

Telephone: +22 52123 8410

Fax: +22 21243982

e-mail: gnagne_josiane@hotmail.com

| |
|---------|
| DENMARK |
|---------|

BANG, Mr Claus Jakob

Superintendent
Danish Maritime Safety Administration (DaMSA)
Overgaden O Vandek 62B
Copenhagen 1023
DENMARK

Telephone: +45 326 895 83

e-mail: cjb@frv.dk ; vfa@frv.dk

BRANDT, Captain Jorgen

Admiral Danish Fleet / Great Belt VTS
Sylowsvej 8
KORSOR DK-4220
DENMARK

Telephone: +45 58 37 68 68

e-mail: boss@mil.dk

ENGBERG, Mr Per Christian

Product Manager
Gatehouse A/S
Lindholm Brygge 31 5
Nr.Sundby DK 9400
DENMARK

Telephone: +45 7020 1909

Fax: +45 7020 1910

e-mail: pch@gatehouse.dk

ERIKSSON, Mr Omar Frits

Head of Innovation and Project Division
Danish Maritime Safety Administration (DaMSA)
Overgaden Oven Vandet 62B
Postboks 1919
Copenhagen DK1023
DENMARK

Telephone: +45 326 89598

e-mail: ofe@frv.dk ; vfa@frv.dk

ESKILDSSEN, Mr Svend

Director General
Danish Maritime Safety Administration (DaMSA)
Overgaden Oven Vandet 62B
Copenhagen 1415
DENMARK

Telephone: +45 3268 9565
e-mail: ses@frv.dk ; vfa@frv.dk

LOLCK, Dr Jens-Erik

Terma AS
Hovmarken 4
Luystруп DK8520
DENMARK

Telephone: +45 8743 6452
Fax: +45 8743 6001
e-mail: jel@terma.com

PANNERUP, Mr Ole

Sales Manager
Terma A/S
Hovmarken 4
Lystrup 8520
DENMARK

Telephone: +4587436000
Fax: +4587436001
e-mail: bnn@terma.com

PEDERSEN, Mr Jens Christian

Director, Product Portfolio & Innovation Radar Systems
Terma AS
Hovmarken 4
Luystруп DK8520
DENMARK

Telephone: +45 8743 6242
Fax: +45 8743 6001
e-mail: jcp@terma.com

SKOV, Mr Michael

Head of Aids to Navigation Management & Policy Division
Danish Maritime Safety Administration (DaMSA)
P.O. Box 1919
Overgaden Oven Vandet 62B
Copenhagen 1023
DENMARK

Telephone: +45 32689578
Fax: +45 32574341
e-mail: msk@frv.dk ; vfa@frv.dk

SØRENSEN, Mr Peter K
Head of Department
Force Technology, Division for Maritime Industry
Hjortekærsvej 99
Lyngby
2800 KGS
DENMARK

Telephone: +45 72157700
Fax: 45 72157701
e-mail: pk@force.dk

THORN, Mr Jan
Head of Division
Danish Maritime Safety Administration (DaMSA)
Ovengaden Oven Vandet 62B
Copenhagen 1023
DENMARK

Telephone: +45 32689588
e-mail: jth@frv.dk ; vfa@frv.dk

VEJLIN, Mrs Anna
Terma A/S
Hovmarken 4
Lystrup 8520
DENMARK

Telephone: +45 87436000
Fax: +4587436001
e-mail: bnn@terma.com

| |
|----------|
| DJIBOUTI |
|----------|

DABALE, Mr Dabale Ali
Chief De Service Senior Des Phares & Balises
Port De Djibouti
DJIBOUTI

Telephone: +253 356451
Fax: +253 354963
e-mail: Dabaleh.Ali@dpworld.com

| |
|---------|
| ESTONIA |
|---------|

KÄÄRMANN, Mr Leo
Estonian Maritime Administration
Valge 4
Tallinn 11413
ESTONIA

Telephone: +372 6205 604
e-mail: leo.kaarmann@vta.ee

KRAAV, Dr Vaido
Adviser
Estonian Maritime Administration
Valge 4
Tallinn 11413
ESTONIA

Telephone: +372 6205534
Fax: +372 6205606
e-mail: Vaido.Kraav@vta.ee

PRELA, Mr Toivo
Deputy Director General
Estonian Maritime Administration
Valge 4
Tallinn 11413
ESTONIA

Telephone: +372 6205600
Fax: +372 6205606
e-mail: toivo.prela@vta.ee ; Vaido.Kraav@vta.ee

| |
|---------|
| FINLAND |
|---------|

ASP, Ms Sara-Maaria
Export Manager
Oy Windside Production Ltd.
Keskitie 4
Viitasaari 44500
FINLAND

Telephone: +35 82083 50700
Fax: +358208350701
e-mail: leila@windside.com

BERG, Mr Jens
SABIK
PI 19
PORVOO 06151
FINLAND

Telephone: +358 195601100
Fax: +35 8 19560112
e-mail: jens.berg@sabik.com

BOUCHET, Mr Simon
Sales
SABIK
P.O.Box 19
Porvoo 06151
FINLAND

Telephone: +358 195601100
Fax: +358 195601120
e-mail: sales@sabik.com

ERLUND, Mr Thomas
Finnish Transport Agency
PoB 171
Deputy Director
Helsinki 00181
FINLAND

Telephone: +35 408299877
e-mail: thomas.erlund@fta.fi

JOUTSINIEMI, Mr. Risto
Oy Windside Production Ltd.
Keskitie 4
Viitasaari 44500
FINLAND

Telephone: +358 2083 50700
Fax: +35 +358 208350701
e-mail: finland@windside.com

KOSTIAINEN, Mr Keijo
Director
Finnish Transport Agency
P.O. Box 185
Helsinki FI-00101
FINLAND

Telephone: +358 206 37 3340
Fax: +358 204 48 4555
e-mail: Kirsi-Marja.Hinkkanen@liikennevirasto.fi

LINDBERG, Mr Jonas
SABIK
PI 19
Porvoo 06151
FINLAND

Telephone: +358 206 37 3340
Fax: +358 204 48 4555
e-mail: keijo.kostiainen@fta.fi

MANSNER, Mr. Lars
Marketing Director
SABIK
P.O.Box 19
Porvoo FI06151
FINLAND

Telephone: +358 195601100
Fax: +358 195601120
e-mail: lars.mansner@sabik.com

PORTHIN, Mr Markus
VTT Technical Research Centre of Finland
P.O.Box 1000
Espoo FI-02044 VTT
FINLAND

Telephone: +358 20 722 6883
Fax: +358 20 722 7000
e-mail: markus.porthin@vtt.fi

SARVIKIVI, Mr. Kalevi
SABIK
PI 19
Porvoo 06151
FINLAND

Telephone: +358196501100
Fax: +358195601120
e-mail: kalevi.sarvikivi@sabik.com

| |
|--------|
| FRANCE |
|--------|

AMIEL, Mr Laurent
Sofrelog
9, rue Louis Rameau
Bp 70101
Bezons Cedex
95873
FRANCE

Telephone: +33 1 39 96 44 44
Fax: +33 1 39 96 44 40
e-mail: ykw@sofrelog.com

AUBERT, Mr Xavier
Gisman
7 Rue Blériot
ZA Toul Garros
AURAY 56400
FRANCE

Telephone: +33 297294121
Fax: +33 297294130
e-mail: contact@gisman.fr

COLIN, Mrs Nathalie
Thales Air Systems
Hameau De Roussigny
Limours
FRANCE

Telephone: +33 164919947
Fax: +33 164916712
e-mail: nathalie.colin@thalesgroup.com

DERROUAZI, Mr Karim

Mobilis
ZI Les Milles -370 Rue Jean De Guiramand
Aix En Provence BP49000
FRANCE

Telephone: +33 442 37 1500
Fax: +33 442 27 15 01
e-mail: mobilis@mobilis-sa.com

DESNOES, Mr Yves

President
Instut Francais De Navigation
8 Rue Leon Vaudoyer
FRANCE

Telephone: +33 143485398
Fax: +33 143485398
e-mail desnoes@noos.fr

DUMOULIN, Mr Julien

Mobilis
ZI Les Milles -370 Rue Jean De Guiramand
Aix En Provence
FRANCE

Telephone: +33 442371500
Fax: +33 44227150
e-mail: mobilis@mobilis-sa.com

GUICHOUX, Mr Yann

CETMEF Techonopole Brest - Iroise
BP 5155, rue Pierre Bouguer
Plouzane 29280
FRANCE

Telephone: +33 298056751
Fax: +33 298056767
e-mail: yann.guichoux@developpement-durable.gouv.fr

GUIGUENO, Dr Vincent

Head of the Lighthouse Heritage Program
French Administration (Direction des Affaires Maritimes)
La Grande Arche
Arche Paroi Sud
92055 La Défense Cedex
FRANCE

Telephone: +33 (0) 1 40 81 84 43
Telephone (Mobile): +33 (0) 6 86 77 07 44
e-mail: vincent.guigueno@m4x.org

GUITTON, Mr Sébastien

Kannad
Zone Industrielle Des 5 Chemins
Guidel 56530
FRANCE

Telephone: +33 02 97 02 49 49

Fax: +330297650298

e-mail: isabelle.saget@kannad.com

JANOT, Mr Philippe

Thales Air Systems
3 Avenue Charles Lindbergh
Rungis 94628
FRANCE

Telephone: +33 6 89 27 97 67

e-mail: philippe.janot@thalesgroup.com

JUNIET, Mr Francois

CEO
Mobilis
ZI Les Milles -370 Rue Jean De Guiramand
Aix En Provence BP49000
FRANCE

Telephone: +33 442 37 1500

Fax: +33 442 27 15 01

e-mail: mobilis@mobilis-sa.com

LARUE, Mr Johan

Sofrelog
9, rue Louis Rameau
Bp 70101
Bezons Cedex
95873
FRANCE

Telephone: +33 (0)1 39 96 44 44

Fax: +33 (0)1 39 96 44 40

e-mail: ykw@sofrelog.com

LE FLOCH, Mr Noel

International Business Development
Sofrelog
9, rue Louis Rameau
Bp 70101
Bezons Cedex
95873
FRANCE

Telephone: +33 1 39 96 44 44

Fax: +33 1 39 96 44 40

e-mail: ykw@sofrelog.com ; yuk-kit.wiederkehr@sofrelog.com

MACKEY, Mr David

Sofrelog
9, rue Louis Rameau
Bp 70101
Bezons Cedex
95873
FRANCE

Telephone: +33 139964445

Fax: +33 139964440

e-mail: david.mackey@sofrelog.com ; yuk-kit.wiederke@sofrelog.com

MANCHARD, Mr Jacques

Direction des Affaires Maritimes
La Grande Arche
1, Parvis de la Défense
Secteur Défense 7

92055 Paris La Défense Cedex

Telephone: +33 1 40 81 61 09

Fax: +33 1 40 81 80 72

e-mail: jacques.manchard@developpement-durable.gouv.fr

ORVATTI, Mr Guy

Mobilis
ZI Les Milles -370 Rue Jean De Guiramand
Aix en Provence BP49000
FRANCE

Telephone: +33 442 37 1500

Fax: +33 442 27 15 01

e-mail: gorvatti@mobilis-sa.com

QUINQUIS, Mr Jean Jacques

CETMEF Techonopole Brest - Iroise
BP 5155, rue Pierre Bouguer
Plouzane 29280
FRANCE

Telephone: +33 2 98 05 67 51

Fax: +33298056767

e-mail: jean-jacques.quinquis@developpement-durable.gouv.fr

ROGET, Mr Vincent

Gisman
7 rue Blériot
ZA Toul Garros
AURAY 56400
FRANCE

Telephone: +33297294121

Fax: +33 297294130

e-mail: vincent.roget@gisman.fr

SAGET, Mrs Isabelle
Kannad
Zone Industrielle Des 5 Chemins
GUIDEL 56530
FRANCE

Telephone: 33 2 97 02 49 49

Fax: 33 297650298

e-mail: isabelle.saget@kannad.com

TOURBOT, Mr Joël
Technical Engineer
CETMEF Techonopole Brest - Iroise
2, Bd Du Président Kennedy
CS 90385
Aix en Provence 13 097
FRANCE

Telephone: +33 442527425

Fax: +33 442527401

e-mail: joel.tourbot@developpement-durable.gouv.fr

| |
|---------|
| GERMANY |
|---------|

BENEDICT, Dr Knud
Wismar University of Applied Sciences; Maritime Simulation Centre
Richard-Wagner-Str.31
Rostock-Warnemuende
D-18119
GERMANY

Telephone: +49 381 498 5891

Fax: +49 381 498 5892

e-mail: knud.benedict@hs-wismar.de

BOBER, Mr Stefan
German Waterways and Shipping Administration
Weinbergstrasse 11
Koblenz 56377
GERMANY

Telephone: +49 261 9819 2231

e-mail: stefan.bober@wsv.bund.de

CHRISTIANS, Mr. Olaf
ATLAS Maritime Security GmbH
Sebaldsbruecker Heerstrasse 235
Bremen 28309
GERMANY

Telephone: +49 421 457 4984

e-mail: olaf.christians@atlas-elektronik.com

ECKHOFF, Mr Dirk
System Engineer
Waterways And Shipping Administration, Germany
Wasser- Und Schifffahrtsdirektion Nord
Hindenburgufer 247
Kiel 24106
GERMANY

Telephone: +49 431 3394 5702
Fax: +49 431 3394 6399
e-mail: dirk.eckhoff@wsv.bund.de

EUSTERBARKEY, Mr Hendrik
System Engineer
Waterways and Shipping Administration, Germany
Waterways and Shipping Directorate North
Hindenburgufer 247
Kiel 24106
GERMANY

Telephone: +49 431 3394 5703
Fax: +49 431 3394 6399
e-mail: Hendrik.Eusterbarkey@wsv.bund.de

FORST, Mr Christian
Head Traffic-Technology
WSD-Nord
Hindenburgufer 247
24103
GERMANY

Telephone: +49 4 3133945700
Fax: +49 4 3133 946399
e-mail: Christian.Forst@wsv.bund.de

FROESE, Prof. Jens
Jacobs University
P.O. Box 750 561
28725 Bremen
GERMANY

Telephone: +49 421 200 3137
Fax: +49 421 200 3103
e-mail: jens.froese@t-online.de

FURNESS, Mr Stephen
Senior Manager Sales & Business Development
ATLAS Maritime Security GmbH
Sebaldsbruecker Heerstrasse 235
Bremen 28309
GERMANY

Telephone: +49 421 457 5117
e-mail: stephen.furness@atlas-elektronik.com

HAGMEYER, Dipl.-Ing. Joerg
Antriebs Und Verkehrstechnik GmbH Deputy Head of Division
Pintsch Bamag GmbH
Huenxer Strasse 149
Dinslaken 46537
GERMANY

Telephone: +49 2064 602 378
Fax: +49 2064 602 283
e-mail: joerg.hagmeyer@pintschbamag.de

JABER, Mr Khaled
Head of AtoN Dept.
Pintsch Bamag GmbH
Hünxer Str. 149
Dinslaken 46537
GERMANY

Telephone: +49 2064 602252
Fax: +49 2064 602283
e-mail: khaled.jaber@pintschbamag.de

JUNG, Mrs. Sandra
ATLAS Maritime Security GmbH
Landshuter Str. 26
Unterschleißheim 85716
GERMANY
Telephone: +49 (0) 89 3179 3030
e-mail: sandra.jung@atlas-elektronik

KLINDT, Mr. Holger
ATLAS Maritime Security GmbH
Sebaldsbruecker Heerstrasse 235
Bremen 28309
GERMANY

Telephone: +49 421 457 1752
e-mail: holger.klindt@atlas-elektronik.com

KLISCH, Mrs Anja
German Aerospace Center (DLR)
Kalkhorstweg 53
Neustrelitz 17235
GERMANY

Telephone: +49 3981 480 189
Fax: +49 3981 480 123
e-mail: anja.klisch@dlr.de

KRAECHTER, Mr. Rolf-Dieter
Managing Director
Pintsch Bamag GmbH
Huenxerstrasse 149
Dinslaken 46537
GERMANY

Telephone: +49 2064602200
Fax: +49 2064602330
e-mail: rolf-dieter.kraechter@pintschbamag.de

LENHART, Mr Aleksandar

Head of Traffic Division
Pintsch Bamag GmbH
Hünxer Str. 149
Dinslaken 46537
GERMANY

Telephone: +49 2064 602320

Fax: +49 2064 602283

e-mail: aleksandar.lenhart@pintschbamag.de

OLTMANN, Mr Jan-Hendrik

Gerrman Federal Waterways & Shipping Administration
Hindenbufer 247
24106
GERMANY

Telephone: 49 431 3394 5701

Fax: 49 431 3394 6399

e-mail: Jan-Hendrik.Oltmann@wsv.bund.de

STRENGE, Mr Rainer

Head of Traffic Technologies Centre
Federal Waterways Administration, Traffic Technologies Centre
PO Box 100 420
Koblenz 56034
GERMANY

Telephone: +49 261 9819 2000

Fax: +49 261 9819 2015

e-mail: rainer.strenge@wsv.bund.de

WECKER, Mr Bernd

PLATH GmbH
Hauptstrasse 39
Basau
GERMANY

Telephone: +49 4527 973760

e-mail: bernd-wecker@t-online.de

| |
|-------|
| GHANA |
|-------|

ADJABEN, Mr Frederick

Harbour Master; Takoradi
Ghana Ports and Harbour Authority
PO Box 488
Takoradi 233
GHANA

Telephone: +233 31 240 73

Fax: +233 31 22814

e-mail: fadjabeni@yahoo.com ; amensah@ghanaports.net

OWUSU-KORANTENG, Mr James

Harbour Master; Tema
Ghana Ports and Harbour Authority
PO Box 488
Tema 233
GHANA

Telephone: 233 22 202638

Fax: 233 22 202812

e-mail: jowusu-koranteng@ghanaports.net

| |
|--------|
| GUINEA |
|--------|

SOULEYNANE, Bah

Port Authority de Conakry
GUINEA

| |
|-------|
| INDIA |
|-------|

SUMAN, Mr Manmohan Singh

Director General
Directorate General of Lighthouses & Lightships
Deep Bhawan, A-13, Sector 24, Noida
Gautam Budh Nagar 201 301
INDIA

Telephone: 91 120 2411168

Fax: 91 120 2411345

e-mail: dgll@ndb.vsnl.net.in

SUREJ, Capt. A M

Deputy Director General
Directorate General of Lighthouses & Lightships
Deep Bhawan, A-13, Sector 24, Noida
Uttar Pradesh
Gautam Budh Nagar 201 301
INDIA

Telephone: +91 120 2412509

Fax: +91 120 2412509

e-mail: Captainsurej@yahoo.co.in

| |
|---------|
| IRELAND |
|---------|

DOYLE, Mr Seamus

Commissioners of Irish Lights
Harbour Road
Dun Laoghaire
Co. Dublin
IRELAND

Telephone: +353 1 271 5450

Fax: +353 1 271 5565

e-mail: s.doyle@cil.ie

O'HIGGINS, Capt. Kieran
Commisioners of Irish Lights
Harbour Road
Dun Laoghaire
Co. Dublin
IRELAND

Telephone: 353 1 271 5540
Fax: 353 1 271 5565
e-mail: k.ohiggins@cil.ie

RUTTLE, Dr Stuart
Chief Executive
Commisioners of Irish Lights
Harbour Road
Dun Laoghaire
Co. Dublin
IRELAND

Telephone: +353 1 271 5410
Fax: +353 1 271 5565
e-mail: s.ruttle@cil.ie

| |
|-------|
| ITALY |
|-------|

BONARDI, Mrs Anna
Floatex
Via Cave 12
Provaglio d'Iseo 25050
ITALY

Telephone: +39 0309823255
Fax: +39 0309823599
e-mail: sale@floatex.it

BORGHESE, Mr Francesco
Elman Srl
Via Di Valle Caia 37
Pomezia 00040
ITALY

Telephone: +39 069194405
Fax: +39 069194306
e-mail: f.borghese@elmansrl.it

FANESCHO, Fabio
Selex Sistemi Integrati
Via Tiburtina Km12.400
Rome 00121
ITALY

Telephone: +39 0641502201
Fax: +39 0641503728
e-mail: aercolino@selex-si.com

FIORI, Mr Pierluigi
Elman Srl
Via Di Valle Caia 37
Pomezia 00040
ITALY

Telephone: +39 069194405
Fax: +39 069194306
e-mail: p.fiori@elmansrl.it

FIORINI, Mr Michele
System Engineer
Selex Sistemi Integrati
Via Tiburtina Km12.400
Rome 00121
ITALY

Telephone: +39 0641504505
Fax: +39 0641504769
e-mail: mfiorini@selex-si.com

FRAU, Mr Francesco
Selex Sistemi Integrati
Via Tiburtina Km12.400
Rome 00121
ITALY

Telephone: 390641502201
Fax: 390641503728
e-mail: ffrau@selex-si.com

GALLONE, Mr Sergio
Selex Sistemi Integrati
Via Tiburtina Km12.400
Rome 00121
ITALY

Telephone: +39 0641502201
Fax: +39 0641503728
e-mail: sgallone@selex-si.com

GIULIANI, Mr Cesare
GEM Elettronica
Via Amerigo Vespucci 9
SanBenedetto del tronto 63039
ITALY

Telephone: +39 073559051
Fax: +39 0735590540
e-mail: silvia@gemrad.com

GOLINO, Mr Giovanni
Selex Sistemi Integrati
Via Tiburtina Km12.400
Rome 00121
ITALY

Telephone: +390641502201
Fax: +390641503728
e-mail: aercolino@selex-si.com

HENDRIKSE, Mr Andrew
Floatex
Via Cave 12
Provaglio d'Iseo 25050
ITALY

Telephone: +39 030 9823255
Fax: +39 030 9823599
e-mail: sale@floatex.it

HENDRIKSE, Mrs Theresa
Floatex
Via Cave 12
Provaglio d'Iseo 25050
ITALY

Telephone: +39 0309823255
Fax: +39 0309823599
e-mail: sale@floatex.it

LICO, Andrea
Selex Sistemi Integrati
Via Tiburtina Km12.400
Rome 00121
ITALY

Telephone: +39 0641502201
Fax: +39 0641503728
e-mail: aercolino@selex-si.com

MARRONE, Margerita
Selex Sistemi Integrati
Via Tiburtina Km12.400
Rome 00121
ITALY

Telephone: +390641502201
Fax: +390641503728
e-mail: aercolino@selex-si.com

MERLINI, Ms Nicola
GEM Elettronica
Via Amerigo Vespucci 9
San Benedetto del Tronto 63039
ITALY

Telephone: +39073559051
Fax: +390735590540
e-mail: silvia.merlini@gemrad.com

PARIS, Mr Piercarlo

Floatex
Via Cave 12
Provaglio d'Iseo 25050
ITALY

Telephone: +39 0309823255

Fax: +39 0309823599

e-mail: sale@floatex.it

PELLIZZARI, Captain Piero

Italian Coast Guard
Viale Dell'Arte N.16
ROMA 00144
ITALY

Telephone: +39 3204365527

Fax: +39 0659084440

e-mail: piero.pellizzari@mit.gov.it

SCANCARELLO, Mr Mario

Selex Sistemi Integrati
Via Tiburtina Km12.400
Rome 00121
ITALY

Telephone: +39 0641503421

Fax: +39 0641504769

e-mail: scancarello@selex-si.com

ZUURBIER, Mr Rudy

Managing Director
Floatex
Via Cave 12
Provaglio d'Iseo 25050
ITALY

Telephone: +39 0309823255

Fax: +39 0309823599

e-mail: sale@floatex.it

| |
|-------|
| JAPAN |
|-------|

ANTOKU, Mr Hiroyuki

Section Chief
Japan Coast Guard
2-1-3 Kasumigaseki Chiyoda-Ku
Tokyo 100-8918
JAPAN

Telephone: +81 335915650

Fax: +81 335913590

e-mail: antoku-y3pu7@kaiho.mlit.go.jp

CARD, Mr. Michael
Zeni Lite Buoy Co. Ltd.
2-176-1 Toyoshima Minami Ikeda-Shi
Osaka 5630035
JAPAN

Telephone: +81 727611231
e-mail: overseas@zenilite.co.jp ; k-furukawa@zenilite.co.jp

IKEDA, Mr Tamotsu
Advisor
Tokyo Keiki INC
2 16 46 Minami-Kamata
Ohta-Ku
Tokyo 144 8551
JAPAN

Telephone: +81 337378630
Fax: +81 337378669
e-mail: t-ikeda@tokyo-keiki.co.jp

IRIGUCHI, Mr Takuo
Zeni Lite Buoy Co. Ltd.
2-176-1 Toyoshima Minami Ikeda-Shi
Osaka 5630035
JAPAN

Telephone: +81 72 761 1231
e-mail: overseas@zenilite.co.jp ; k-furukawa@zenilite.co.jp

KOIVISTO, Mr. Asser
Zeni Lite Buoy Co. Ltd.
Hallimestarinkatu 11
Kaarina 20780
FINLAND

Telephone: +358 22437711
Fax: +358 22437733
e-mail: asser.koivisto@navielektro.fi

LANGLOIS, Mr Jonathan
Zeni Lite Buoy Co. Ltd.
7500A Beach Road, #09-323 The Plaza
199591
SINGAPORE

Telephone: +65 6392 5795
Fax: +65 6392 5796
e-mail: k-furukawa@zenilite.co.jp ; y-tabata@zenilite.co

MÄKIPAAKKANEN, Ms Heidi
Zeni Lite Buoy Co., Ltd.
Hallimestarinkatu 11
Kaarina 20780
FINLAND

Telephone: +358 22437711
Fax: +358 22437733
e-mail: heidi.makipaakkanen@navielektro.fi

MARUOKA, Mr Noboru
Zeni Lite Buoy Co. Ltd.
7500A Beach Road, #09-323 The Plaza
19959
SINGAPORE
Telephone: +65 6392 5795
Fax: +65 6392 5796
E-mail: k-furukawa@zenilite.co.jp ; y-tabata@zenilite.co

MIKI, Mr. Kaoru
Zeni Lite Buoy Co. Ltd.
Hulic Kyobashi Building 3F, 2-7-12, Yaesu, Chuo-Ku
Tokyo 1040028
JAPAN
Telephone: +81 3510 7231
e-mail: overseas@zenilite.co.jp ; y-tabata@zenilite.co.jp

MORI, Mr. Katsumi
President
Sena and Vans Co. Ltd.
1-6-6 Haneda-Kukou Ohta-Ku
Tokyo
Daiichi-Sogo Bldg 144-0041
JAPAN
Telephone: +81 3 5708 7300
Fax: +81 3 5708 0151
e-mail: morik@s-vans.com ; satot@s-vans.com

NODA, Mr Masami
Japan Aids to Navigation Association
Kaiji Center Bldg., Kojimachi 4-5
Chiyoda-Ku
Tokyo 102-0083
JAPAN
Telephone: +81 3 3230 1470
Fax: +81 3 3230 1050
e-mail: noda@jana.or.jp

NOGUCHI, Cdr Hideki
Senior Engineering Officer
Japan Coast Guard
2.1.3 Kasumigaseki;Chiyodaku
Tokyo 1008918
JAPAN
Telephone: +81 3 3591 5650
Fax: +81 3 3591 3590
e-mail: noguchi-i8twy@kaiho.mlit.go.jp

OSANAI, Vice Admiral Satoru
Director General
Japan Coast Guard
2-1-3, Kasumigaseki Chiyodaku
Tokyo 1008918
JAPAN

Telephone: +81 3 3591 6361
Fax: +81 3 3591 3590
e-mail: kotsukikaku-17gv@kaiho.mlit.go.jp

SATO, Mr. Tatsuo
Director
Sena and Vans Co. Ltd.
1-6-6 Haneda-Kukou Ohtaku Tokyo
Daiichi-SogoBldg 144-0041
JAPAN

Telephone: +81 3 5708 7300
Fax: +81 3 5708 0151
e-mail: satot@s-vans.com

TABATA, Mr Yoshihisa
Zeni Lite Buoy Co. Ltd.
HULIC Kyobashi Building 3F, 2-7-12, Yaesu, Chuo-Ku
Tokyo 1040028
JAPAN

Telephone: +81 3 3510 7231
e-mail: overseas@zenilite.co.jp ; y-tabata@zenilite.co.jp

TAKAHASHI, Capt Toshio
Director
Japan Coast Guard
2-1-3;Kasumigaseki;Chiyodaku
Tokyo 1008918
JAPAN

Telephone: +81 3 3591 5650
Fax: +81 3 3591 3590
e-mail: kotsukikaku-17gv@kaoho.mlit.go.jp

TANAKA, Mr Hiroshi
Tokokai (Japan Lighthouse Association)
Saisui Bild 3-6 Toranomom 1Chome Minato-Ku
Tokyo 105-0001
JAPAN

Telephone: +81 3 3501 1054
Fax: +81 3 3507 0727
e-mail: soumu4@tokokai.org

UEHARA, Mr Nobuyuki
Australian Maritime Systems/Japan Radio Company
JAPAN

UENO, Mr Hiroshi
Director and Adviser
Nippon Koki Kogyo Co. Ltd.
2-7-18 Fukuura Kanazawa-Ku
Yokohama
Kanagawa Pref. 236-0004
JAPAN

Telephone: +81 45 350 7231
Fax: +81 45 783 5047
e-mail: hiroshi_ueno@nipponkoki.co.jp

| |
|-------|
| KENYA |
|-------|

KAGIMBI, Mr Wilfred
Chief Surveyor & Receiver of Wrecks
Kenya Maritime Authority
P O Box 95076
Mombasa
KENYA

Telephone: +25 4412318398/9
Fax: +25 4412318397
e-mail: wilfredkagimbi@yahoo.com ; wkagimbi@maritimeauthority.co.ke

NGUYO, Mr John Ndiritu
Principal Marine Officer
Kenya Ports Authority
PO Box 95009-80104
Mombasa 80104
KENYA

Telephone: +25 441 2312211/3481
e-mail: jnguyo@kpa.co.ke ; nguyojohn@yahoo.com

| |
|-------|
| KOREA |
|-------|

BANG, Mr. Chong
Marketing Director
Daekee Marine Corp.
#58-5, Sungui-Dong, Cheil Bldg. 3Fl.
Nam-Gu
Incheon 401-812
REPUBLIC OF KOREA

Telephone: +82 32 886 7777
Fax: +82 32 886 7500
e-mail: daekee@daekee.co.kr

GUG, Professor Seung Gi
Korea Maritime University
#1 Dongsam, Young Do
Busan 606-791
REPUBLIC OF KOREA

Telephone: +82 51 410 4227
Fax: +82 51 410 4227
e-mail: cooksg@mail.hhu.ac.kr

GWUN, Mr Taek Gu
Changsan IT Co. Ltd
#858-5, Yeonsan-Dong, YeonJae-Gu
Busan 611-840
REPUBLIC OF KOREA

Telephone: +82 51 63 78 932
Fax: +82 51 63 78 938
e-mail: tggwun@changsanit.com

JEON, Mr Minsu
Korea Association of Aids to Navigation
#12F, IT Castle2, Gasan
Seoul 153-768
REPUBLIC OF KOREA

Telephone: +82 2 2627 8308
Fax: +82 2 2627 8315
e-mail: minsuids@hanmail.net

KANG, Mr Sungbok
Korea Association of Aids to Navigation
#12F, IT Castle2, Gasan
Seoul 153-768
REPUBLIC OF KOREA

Telephone: +82 2 2627 8308
Fax: +82 2 2627 8315
e-mail: kangsb7968@hanmail.net

KIM, Mr Kang On
Assistant Director
Ministry of Land, Transport and Maritime Affairs (MLTM)
Government Complex 4, 88 Gwunmun-Ro
Gwacheon-City
Gyeonggi-do, Korea 427-712
REPUBLIC OF KOREA

Telephone: +82 2 2110 6388
e-mail: ohmiri@korea.kr

KWON, Mr. Nueng-Joong
President
Daekee Marine Corp.
#58-5, Sungui-Dong, Cheil Bldg., 3Fl.
Nam-Gu
Incheon 402-812
REPUBLIC OF KOREA

Telephone: +82 886 7777
Fax: +82 886 7500
e-mail: daekee@daekee.co.kr

LEE, Miss Jinju
Overseas Sales Manager
Woorimarine Co. Ltd.
C-1104 Woorim Lions Vally, 425
Cheongcheon-Dong, Bupyeong-Gu
Incheon 403911
REPUBLIC OF KOREA

Telephone: +82 10 6301 6690
Fax: +82 32 623 6698
e-mail: asiria21@hotmail.com

LEE, Mr Seung Jae
Senior Deputy Director
Ministry of Land, Transport and Maritime Affairs (MLTM)
Government Complex 4, 88 Gwunmun-Ro
Gwacheon-City
Gyeonggi-do, Korea 427-712
REPUBLIC OF KOREA

Telephone: +82 2 2110 6388
Fax: +82 2 504 4076
e-mail: ohmiri@korea.kr

LEE, Mr Yong Jae
CEO
Woorimarine Co. Ltd
C-1104 Woorim Lions Vally, 425
Cheongcheon-Dong Bupyeong-Gu
Incheon 403911
REPUBLIC OF KOREA

Telephone: +82 10 3669 7294
e-mail: yilee@woorimarine.com

NG, Ms Lily
Director
Wealth Marine Pty. Ltd.
12 New Industrial Road, Morning Star Centre
536202
SINGAPORE

Telephone: +65 648 76232
Fax: +65 648 76230
e-mail: sales@wealthmarine.com.sg

PARK, Mr Hwang Hun
Deputy Director
Ministry of Land, Transport and Maritime Affairs (MLTM)
Government Complex 4, 88 Gwunmun-Ro, Gwacheon-City
Gwacheon-City
Gyeonggi-do, Korea 427-712
REPUBLIC OF KOREA

Telephone: +82 2 2110 6388
Fax: +82 2 504 4076
e-mail: ohmiri@korea.kr

PARK, Prof Jinsoo
Korea Maritime University
1, Dongsam-Dong, Yeongdo-Gu
Busan 606-791
REPUBLIC OF KOREA

Telephone: +82 51 410 4240
Fax: +82 51 405 2818
e-mail: jspark@hhu.ac.kr

SUNG, Ms. Mi Ra
Deputy General Manager
GMT Cybernetics Co. Ltd.
3rd Fl. COSKA BLD., 455-7 Seongnae-Dong, Gangdong-Gu
Seoul 134-030
REPUBLIC OF KOREA

Telephone: +82 2 488 6501
Fax: +82 2 488 6505
e-mail: mirasung@gmtc.kr

WEISHI, Mr Wang
Wealth Marine Pty. Ltd.
12 Marine Road, Morning Star Centre
536202
SINGAPORE

Telephone: +65 648 76232
Fax: +65 648 762 30
e-mail: sales@wealthmarine.com.sg

YOON, Dr. Daegwun
Mokpo National Maritime University, Korea
Jukgyo-Dong 571
Mokpo 530-729
REPUBLIC OF KOREA

Telephone: +82 10 6753 6353
e-mail: dyoon@mmu.ac.kr

| |
|--------|
| LATVIA |
|--------|

FREIVALDS, Mr Nils
Chairman of the Board
Maritime Administration of Latvia
Trijadibas Str5
Riga LV-1048
LATVIA

Telephone: +37 167062101
Fax: +37 167062139
e-mail: nils.freivalds@lja.lv

KRASTINS, Mr Janis
Head of Hydrographic Service
Maritime Administration of Latvia
Trijadibas Str 5
Riga LV-1048
LATVIA

Telephone: +37 167062140
Fax: +37 167062139
e-mail: janis.krastins@lhd.lv

| |
|-------|
| MAIIF |
|-------|

SQUIRE, Cdre David
General-Secretary
Marine Accident Investigators International Forum (MAIIF)
202 Lambeth Road
London
UNITED KINGDOM

Telephone: +44 1282 814998
e-mail: sec@maiif.org

| |
|----------|
| MALAYSIA |
|----------|

ABDUL HADI, Mr Abdul Nasar
Secretary
Lightdues Board Malaysia
Marine Department Headquarters Malaysia
PO Box 12, Jalan Limbongan
Port Klang
Selangor 42007
MALAYSIA

Telephone: +603 31695222
Fax: 603 31685020
e-mail: nasarhadi@marine.gov.my

HASSAN, Adm Zaaïm
Director General
National Hydrographic Centre
Marine Department Headquarters
P.O Box 12, Jalan Limbongan
Port Klang
Selangor 42007
MALAYSIA

Telephone: +60 331694582
Fax: +603 31685020
e-mail: hasan@yahoo.com

LAY HUA, Mrs Yap
Principal Assistant Secretary
Ministry of Finance
Marine Department Headquarters
P.O Box 12, Jalan Limbongan
Port Klang
Selangor 42007
MALAYSIA

Telephone: +60 888823446
Fax: +60 331685020
e-mail: layhua.yap@treasury.gov.my

LEAN HIN, Mr Ooi
President
Shipowners Association Malaysia
Marine Department Headquarters
P.O Box 12, Jalan Limbongan
Port Klang
Selangor 42007
MALAYSIA

Telephone: +60 378832600
Fax: +603 31685030
e-mail: ooih@evergreen-marine.com.my

MANZOOR HUSSEIN, Capt. Intiaz Hussein
Executive Secretary
Malaysia Shipowners Association
Marine Department Headquarters
P.O Box 12, Jalan Limbongan
Port Klang
Selangor 42007
MALAYSIA

Telephone: +603 22752129
Fax: +603 31685020
e-mail: masa_kl@tm.net.my

OTHMAN, Dato' Capt. Ahmad
Director General
Marine Department Malaysia
Marine Department Headquarters
P.O Box 12, Jalan Limbongan
Port Klang
Selangor 42007
MALAYSIA

Telephone: 60 3 33467788
Fax: 60 3 31685289
e-mail: ahmad@marine.gov.my

WAN SALLEH, Mr. Wan Endok
Regional Director
Marine Department Sarawak
Marine Department Sarawak Complex
Lot 683, Section 66, Jalan Utama Tanah Puteh
Kuching Sarawak 93619
MALAYSIA

Telephone: +60 82 484 159

Fax: +60 82 331 778

e-mail: wes@jls.gov.my

| |
|------------|
| MOZAMBIQUE |
|------------|

PELEMBE, Mr Felix
Inahina
Av Karl Max No 153
Maputo 2089
MOZAMBIQUE

Telephone: +258 27430186/8

Fax: +258 21430185

e-mail: pelembefelix@yahoo.com.br

| |
|---------|
| NAMIBIA |
|---------|

MANDIA, Captain Mussa
Port Captain
Namibian Ports Authority
361 Rikumbi Kandanga & 17 Rd
Walvis Bay N/A
NAMIBIA

Telephone: +264 208 2258

Fax: +264 208 2236

e-mail: mussa@namport.com.na

NANGOLO, Mr Matthy Mattheus
Director
Ministry of Works and Transport and Maritime Affairs
P/Bag 2005
Ausspannplate
Windhoek
NAMIBIA

Telephone: +26 461 2088025 / 6

Fax: +26 461 2400 24

e-mail: mmnangolo@mwtc.gov.na

| |
|-----------------|
| THE NETHERLANDS |
|-----------------|

BOSCH, Mr. Martien
Sr. VTSO/Training Advisor
Port Of Amsterdam
Box 19406
Amsterdam 1000 GK
THE NETHERLANDS

Telephone: +31 20 523 4731
Fax: +31 20 523 4231
e-mail: martien.bosch@portofamsterdam.nl

DITZEL, Mr. Auke
PM - Simulation and Software Group
MARIN
Haagsteeg 2
Wageningen 6700AA
THE NETHERLANDS

Telephone: +31 317 493496
Fax: +31 317 493245
e-mail: a.ditzel@marin.nl

GERRITSEN, Mr. Herman
Dutch Pilots Association
Markweg 200
Europoort-Rotterdam 3198 NB
THE NETHERLANDS

Telephone: +31 88 900 3010
Fax: +31 88 900 3344
e-mail: p.rollins@loodswezen.nl

GLANSDORP, Mr Cornelis
CETLE
Beelstraat 52
Rotterdam 3066TL
THE NETHERLANDS

Telephone: +31 102201330
e-mail: cees.glansdorp@cetle.org

GOUD, Mr Ko
Chairman
RACON
Noordelijke Achterweg 70
Wemeldinge 4424 EG
THE NETHERLANDS

Telephone: +31 1136262324
e-mail: chairman@vts-racon.nl

HOGENDOORN, Mr Rene

HITT Traffic
PO Box 717
Apeldoorn 7300 AS
THE NETHERLANDS

Telephone: +31 55 543 2559

Fax: +31 55 543 2553

e-mail: rene.hogendoorn@hitt.nl

HOOIJMANS, Mr Peter

Ministry Of Transport, Public Works and Water Management
P.O. Box 9070
Arnhem 6800 ED
NETHERLANDS

Telephone: +31 263688563

e-mail: peter.hooijmans@rws.nl

KORF, Mr Jacob

Managing Director
HITT (HK) Ltd.
Unit 101,105
Bonham Strand Trade Centre
135 Bonham Strand Trade Centre Shueng Wan
Hong Kong SAR
CHINA

Telephone: +852 29051633

Fax: +852 2801704

e-mail: korf@hitt.nl; maria@hitt.hk

LANGEN, Mr Robert

Rijkswaterstaat
Lange Kleiweg 43
Rijswijk 2275XT
THE NETHERLANDS

Telephone: +31 703366672

e-mail: rob.langen@rws.nl

PAAP, Mr Pieter

Senior Policy Advisor VTM/NAV
Netherlands Ministry of Transport, Public Works and Water Management
P.O.Box 20904
The Hague 2500 EX
THE NETHERLANDS

Telephone: +31 70 351 1502

Fax: +31 70 351 1548

e-mail: pieter.paap@minvenw.nl

POLDERMAN, Mr Kees

Assistant Director, International Maritime Affairs
Ministry of Transport, Public Works and Water Management
PO Box 20904
The Hague 2500 EX
THE NETHERLANDS

Telephone: +31 70 3511568

Fax: +31 70 3511568

e-mail: kees.polderman@minvenw.nl

POWELL, Mr Daniel

Orga BV
Postbus 3046
Schiedam 3101 EA
THE NETHERLANDS

Telephone: +31 10 208 5555

Fax: +31 10 437 8445

e-mail: d.powell@orga.nl

RÖHNER, Mr Ben

Port of Rotterdam
Wilhelminakade 909
Rotterdam 3072 AP
THE NETHERLANDS

Telephone: +31 10 252 1184

e-mail: b.rohner@portofrotterdam.com;

SCHMITZ, Mr Wiebe

Manging Director
CHL Netherlands B.V.
PO Box 3072
Katwyle ZH
THE NETHERLAND

Telephone: +31 714025514

Fax: +31 71402 5078

e-mail: wschmitz@chl.nl

SEIGNETTE, Mr. Raymond

Port Of Rotterdam
World Port Center
P.O.Box 6622
Rotterdam 3002 AP
NETHERLANDS

Telephone: +31 10 252 2017

Fax: +31 10 252 1925

e-mail: RWP.Seignette@portofrotterdam.com

SIPKE, Hoekstra

Advisor
RWS Noordzee
PO Box 5807
Rswyk
THE NETHERLANDS

Telephone: +31 70 3366884
Fax: +31 70 4152246
e-mail: sipke.hoekstra@rws.nl

VAN 'T PADJE, Mr W.H.M.

STC B.V.
Wilhelminakade 701
Rotterdam 3072 AP
THE NETHERLANDS

Telephone: +31 10 48 66 654
e-mail: padje@stc-r.nl

VAN BUUREN, Capt. Wim
Dutch Pilots Association
Markweg 200
Europoort-Rotterdam 3198 NB
THE NETHERLANDS

Telephone: 31 88 900 3010
Fax: 31 88 900 3344
e-mail: p.rollins@loodswezen.nl

VAN DE WEEM, Mr Claus

Sales Manager
CHL Netherlands
PO Box 3072
Katwyle ZH
222OCB
THE NETHERLANDS

Telephone: +31 71 4025514
Fax: +31 71 4025078
e-mail: cvandeweem@chl.nl

VAN DER HEIJDEN, Mr Wim

SMC
Struisgras 17
Gouda 2804 NM
THE NETHERLANDS

Telephone: +31 182 532 586
e-mail: wimvanderheijden.SMC@gmail.com

VAN GILS, Mr Jeffrey Ralph
Ministry Of Transport, Public Works and Water Management
P.O. Box 556
Rotterdam 3000AN
THE NETHERLANDS

Telephone: +31 10 402 6653
Fax: +31 10 402 7095
e-mail: jeffrey.van.gils@rws.nl

| |
|-------------|
| NEW ZEALAND |
|-------------|

BROOK, Mr. John
Engineering Manager
Vega Industries Ltd
PO Box 50443
Porirua 5240 5240
NEW ZEALAND

Telephone: +64 4 238 0200
Fax: +64 4 237 4392
e-mail: John.Brook@vega.co.nz

GUILD, Mr. Ian
Technical Sales Engineer
Vega Industries Ltd
P.O Box 50443
Porirua 5240 5240
NEW ZEALAND

Telephone: +64 4 238 0200
Fax: +64 4 237 4392
e-mail: Ian.Guild@vega.co.nz

MONTAGU, Mr Gary
Vega Industries Ltd
21 Heriot Drive
Porirua
Wellington 5022
NEW ZEALAND

Telephone: +64 42380200
e-mail: beaver.dn@xtra.co.nz

TAYLOR, Mr. Alistair
CEO
Vega Industries Ltd
PO Box 50443
Porirua 5240 5240
NEW ZEALAND

Telephone: +64 4 238 0200
Fax: +64 4 237 4392
e-mail: Alistair.Taylor@vega.co.nz

| |
|---------|
| NIGERIA |
|---------|

EBUBEUGU, Captain Iheanacho
General Manager Marine
Nigerian Ports Authority
PMB 12588
26-28 Marina
Lagos
NIGERIA

Telephone: +23 48033301002
e-mail: achoebube@yahoo.co.uk

| |
|--------|
| NORWAY |
|--------|

CHRISTIANSEN, Mr Stig Erik
Kongsberg IT AS
Pirsenteret
Trondheim N-7462
NORWAY

Telephone: +47 950 22 819
Fax: +47 73515020
e-mail: stig.erik.christiansen@kongsberg.com

DIMMEN, Mr Arve
The Norwegian Coastal Administration
Servicebox 2
Aalesund 6025
NORWAY

Telephone: +47 70231050
Fax: +47 70231008
e-mail: arve.dimmen@kystverket.no

DRABLOS, Mr Bjorn
Norwegian Coastal Administration
Serviceboks 2
Alesund 6016
NORWAY

Telephone: +47 70 160160
Fax: +47 70 160101
e-mail: bjorn.drablos@kystverket.no

ELGAR, Mr Paul
Jeppesen Norway
PO Box 212, N-4379
Egersund
NORWAY

Telephone: +47 51 46 47 00
Fax: +47 51464701
e-mail: paul.elgar@jeppesen.com

ERVIK, Capt. Jon Leon
Head of Department
Norwegian Coastal Administration
Grevlingstien 26
HAUGESUND 5517
NORWAY

Telephone: +47 91681538
e-mail: jon.leon.ervik@kystverket.no

FLATEN, Mr. Inge
President
Kongsberg Norcontrol IT AS
P.O. Box 1024
Horten N-3194
NORWAY

Telephone: +47 33084800
Fax: +47 33045735
e-mail: inge.flaten@kongsberg.com

GONZALEZ, Mr. Roberto
Business Development Manager
Kongsberg Norcontrol IT AS
P.O. Box 1024
Horten N-3194
NORWAY

Telephone: +47 33084800
Fax: +47 33045735
e-mail: roberto.gonzalez@kongsberg.com

HAGEN, Mr John Erik
Norwegian Coastal Administration
Box 466
Haugesund 5542
NORWAY

Telephone: +47 9 0947 630
e-mail: john.erik.hagen@kystverket.no

KROSNESS, Mr Bjoern Erik
Principal Engineer (Nautical)
Norwegian Coastal Administration
Serviceboks 2
Aalesund 6016
NORWAY

Telephone: +47 71489036
e-mail: bekrosness@kystverket.no

LIU, Mr. Andre
Kongsberg Norcontrol IT A
PSA Vista
20 Harbour Drive, #06-01A
11761
SINGAPORE

Telephone: +65 65457375
Fax: +65 6545 7379
e-mail: andrew.liu@kongsberg.com

SLOTSVIK, Mrs Kirsti
Director General
Norwegian Coastal Administration
PO Box 25
Alesund 6025
NORWAY

Telephone: +47 70231010
Fax: +47 70231008
e-mail: kirsti.slotsvik@kystverket.no

SOLBERG, Mr. Eivind
After Sales Manager
Kongsberg Norcontrol IT AS
P.O. Box 1024
Horten N-3194
NORWAY

Telephone: + 47 33084800
Fax: +47 33045735
e-mail: eivind.solberg@kongsberg.com

ZEILER, Mr Willy
Marketing & Communication Manager
Jeppesen Norway
PO Box 21, N-4379
Egersund
NORWAY

Telephone: +47 51 46 47 00
Fax: +47 51464701
e-mail: willy.zeiler@jeppesen.com

| |
|------|
| OMAN |
|------|

AL-KALBANI, Mr Ali Rashid
Operations and Development Manager
Arabian Maritime and Navigation Aids Services L.L.C
PO Box 1677
CPO SEEB PC 111
OMAN

Telephone: 968 24 510 283
Fax: 968 24 510 432
e-mail: stephen@amnas-oman.com

BENNETT, Mr Stephen
General Manager
Arabian Maritime & Navigation Aids Services
PO Box 1677
CPO SEEB PC 111
OMAN

Telephone: +968 24519283
Fax: +968 24510432
e-mail: stephen@amnas-oman.com

| |
|------------------|
| PAPUA NEW GUINEA |
|------------------|

HAY, Mr Adam
Project Manager
Nawae Construction Ltd.
PO Box 261
Alotau 211
PAPUA NEW GUINEA

Telephone: +675 6411233
Fax: +675 6411183
e-mail: ahay@nawae.com
PETRUS, Mr. Eric Daniel
Manager - Nav aids & Investigation
National Maritime Safety Authority
PO Box 668, Port Moresby
National Capital District
Port Moresby 121
PAPUA NEW GUINEA

Telephone: +675 3213033
Fax: +675 3210484
e-mail: epetrus@nmsa.gov.pg

RUPEN, Mr Chris
National Maritime Safety Authority
PO Box 668, PORT MORESBY, National Capital District, Papua N
Port Moresby 121
PAPUA NEW GUINEA

Telephone: +675 321 1244
Fax: +675 321 0873
e-mail: crupen@nmsa.gov.pg

| |
|--------|
| POLAND |
|--------|

BARANOWSKI, Mr Artur
R&D Department Director
Sprint Sp. Z O.O.
64E Budowlanych Str.
Gdansk 80-298
POLAND

Telephone: +48 58 340 77 00
Fax: +48 58 340 77 01
e-mail: artur.baranowski@sprint.pl

BURKA, Mr Michal
Software Engineering Department Director
Sprint Sp. Z O.O.
64E Budowlanych Str.
Gdansk 80-298
POLAND

Telephone: +48 58 340 77 00
Fax: +48 58 340 77 01
e-mail: michal.burka@sprint.pl

LEDOCHOWSKI, Mr Marek
Navigation Manager
Maritime Office in Gdynia
Urząd Morski w Gdyni; Chrzanowskiego 10
GDYNIA 81-338
POLAND

Telephone: +48 58 6206356
Fax: +48 58 6201936
e-mail: marek.ledochowski@umgdy.gov.pl

MLOTKOWSKI, Mr Jan
Deputy Director
Maritime Office in Gdynia
Urząd Morski w Gdyni; Chrzanowskiego 10
Gdynia 81-338
POLAND

Telephone: +48 58 6206356
Fax: +48 58 6201936
e-mail: jan.mlotkowski@umgdy.gov.pl

| |
|----------|
| PORTUGAL |
|----------|

CAMILO, Lt Cdr Antonio Manuel Mauricio
Head of Navigation Division
Instituto Hidrografico
Rua Da Trinas 49
Lisboa 1249-093
PORTUGAL

Telephone: +351 210 943 084
Fax: +351 210 943 299
e-mail: mauricio.camilo@hidrografico.pt

PLACIDO DA CONCEICAO, Lt Cdr Victor Fernando
Head of Maritime Safety Section
Instituto Hidrografico
Rua Da Trinas 49
Lisboa 1249-093
PORTUGAL

Telephone: +351 210 943 084
Fax: +351 210 943 299
e-mail: placido.conceicao@hidrografico.pt

SOUSA, Captain Jacinto
Operations Manager Coastal VTS
IPTM, IP
Edifício VTS, Av. Eng. Bonneville Franco S/n
Paço de Arcos 2770-058
PORTUGAL

Telephone: +351 214464831
Fax: +351 214464839
e-mail: jacinto.sousa@imarpor.pt

| |
|--------|
| RUSSIA |
|--------|

CHEREPANOV, Mr Sergey
Deputy Director, Shore-Based Systems
Transas Technologies
54-4 Maly Pr V.O.
St Petersburg 199178
RUSSIA

Telephone: +7 8123253131
Fax: +7 8123253132
e-mail: Sergey.Cherepanov@transas.com

WYNG, Mr Chaz
Sales Manager, Shore-Based Systems
Transas Marine (UK) Ltd.
Seahawk, Bilton Way, Hampshire
Portsmouth PO3 5JN
UNITED KINGDOM

Telephone: +44 2392 674000
Fax: +44 2392 674048
e-mail: charles.wyng@transas.com

| |
|----------|
| SCOTLAND |
|----------|

DAY, Capt. Phillip
Director of Marine Operation
Northern Lighthouse Board
84 George Street
Edinburgh EH16 6NL
SCOTLAND

Telephone: +44 1314733100
Fax: +44 1312202093
e-mail: Phild@nlb.org.uk

DOUGLAS, Mr Peter
Navigation Manager
Northern Lighthouse Board
84 George Street
EDINBURGH EH2 3DA
SCOTLAND

Telephone: +441314733100
Fax: +44 1312202093
e-mail: PeterD@nlb.org.uk

LOCKWOOD, RAdm Roger
Northern Lighthouse Board
84 George Street
EDINBURGH EH16 6NL
SCOTLAND

Telephone: +441314733100
Fax: +441312202093
e-mail: RogerL@nlb.org.uk

SPAIN, Mr Mike
Northern Lighthouse Board
84 George Street
Edinburgh EH16 6NL
SCOTLAND SCOTLAND

Telephone: +44
Fax: +44 1312202093
e-mail: mikesp@nlb.org.uk

WADDELL, Mr Moray
Northern Lighthouse Board
84 George Street
Edinburgh EH16 6NL
SCOTLAND

Telephone: +44 1314733100
Fax: +44 1312202093
e-mail: MorayW@nlb.org.uk

| |
|---------|
| SENEGAL |
|---------|

MAMADOU, Mr Thioub
Directeur Des Phares Et Balises
Service De Securite Maritime Du Senegal (Port Autonome de Dakar)
BD Liberation
Dakar BP 3198
SENEGAL

Telephone: +221 338 220556
Fax: +221 338 235263
e-mail: mbaidythioub@yahoo.fr

THIOYE, Mr Pathe Yero
Ingenieur Charge D'Etude et suivi des Projects
Port Autonome De Dakar/Phares Et Balises
Phares Et Balises; Avenue Felix Eboue
Dakar 3195
SENEGAL

Telephone: +221 33 849 7957
e-mail: pthioye2@yahoo.fr

| |
|--------------|
| SOUTH AFRICA |
|--------------|

ABDOOL, Mr Mohammed
Chief Financial Officer
Transnet National Ports Authority
30 Wellington Road
Parktown
Johannesburg 2001
SOUTH AFRICA
Telephone: +27 113519041
Fax: +27 113519045
e-mail: mohammed.abdool@transnet.net

APPEL, Miss Eustacia
Technician
Transnet National Ports Authority
100 Beach Road, Mouille Point 8005
Cape Town 7945
SOUTH AFRICA
Telephone: +27 214495171
Fax: +27 214493663
e-mail: eustacia.appel@transnet.net

BROPHY, Captain Mike
Chief Harbour Master
Transnet National Ports Authority
PO Box 1027
Durban 4000
SOUTH AFRICA
Telephone: +27 31 361 8917
Fax: +27 86 644 0043
e-mail: mike.brophy@transnet.net

BURCHELL, Capt Keith
Managing Director
Burport Marine Consultancy Africa (Pty) Ltd.
Bruma
Johannesburg 2026
SOUTH AFRICA
Telephone: +27 11 616 7248
Fax: +27 11 616 6033
e-mail: burchell.marine.consult@yebo.co.za

CHETTY, Captain Neil
Harbour Master Regional Project Co-ordinator
Transnet National Ports Authority
PO Box 162
Port Elizabeth 6000
SOUTH AFRICA
Telephone: +27 41 507 1710
Fax: +27 41 507 1956
e-mail: neil.chetty@transnet.net

COLLOCOTT, Mr James

Technical Support Manager: Lighthouse Services
Transnet National Ports Authority
PO Box 50491
Waterfront
Cape Town 8002
SOUTH AFRICA

Telephone: +27 21 449 5174

Fax: +27 21 449 8230

e-mail: james.collocott@transnet.net

COX, Mr Kieron

Manager
Maretek
2 Wedeloond Road
Constantia
Cape Town 7806
SOUTH AFRICA

Telephone: +27 21 794 3497

e-mail: maretek@iafrica.com

DEYSEL, Mr Chris

Operational Supervisor
Transnet National Ports Authority
P.O Box 1094
Port Elizabeth 6000
SOUTH AFRICA

Telephone: +27 041 5072133

Fax: +27 041 5834709

e-mail: chris.deysel2@transnet.net

GOQWANA, Chumi

SAMSA
161 Lynwood Road
Brooklyn
Telephone: +27 12 366 2600

GORDON, Mr David

Senior Manager - Lighthouse Services
Transnet National Ports Authority
100 Beach Road
Mouille Point
Cape Town 8001
SOUTH AFRICA

Telephone: +27 21 449 5171

Fax: +27 21 449 3663

e-mail: david.gordon2@transnet.net

GOVENDER, Mr Vishvanadhan
Marine Training & Development Manager
Transnet National Ports Authority
Box 3141
Westbrook
Durban 4399
SOUTH AFRICA

Telephone: +27 31 361 6327
e-mail: Vish.Govender@transnet.net

GUY, Rear Adm. Neil
Western Indian Ocean Project Marine Highway Development
10 Farmside, 25 Homestead Ave
Bergvliet
Cape Town 7945
SOUTH AFRICA

Telephone: +27 21 715 7008
Fax: +27 21 715 7008
e-mail: nguy@zsd.co.za

KEARNS, Mr Eugene
Port Manager Saldanha
Transnet National Ports Authority
PO Box X1
Saldanha 7395
SOUTH AFRICA

Telephone: +27 22 7035472
Fax: +27 22 7035472
e-mail: Eugene.kearns@transnet.net

KOHLER, Capt Brian
Compass Adjuster
PO Box 841
Linkhills 3652
SOUTH AFRICA

Telephone: +27 31 762 1367
Fax: +27 83 475 3629
e-mail: kohlerbct@telkomsa.net

LEKALA, Mr Rufus
Harbour Master, Port of Durban
Transnet National Ports Authority
P.O Box 1027
Durban 4000
SOUTH AFRICA

Telephone: +27 31 361 8799
Fax: +27 31 361 8920
e-mail: rufus.lekala@transnet.net

LENTLE, Mmutle
Chief Information Officer
Transnet National Ports Authority
PO Box 32696
Braamfontein
Johannesburg 2017
SOUTH AFRICA

Telephone: +27 113519063
Fax: +27 11 351 9084
e-mail: mmutle.lentle@transnet.net

LEWIS, Mr David Hector
Operations Manager
Marine Data Solutions
P O Box 51680
Waterfront
Cape Town 8002
SOUTH AFRICA

Telephone: +27 213868517
Fax: +27 213868519
e-mail: davidl@marinedata.co.za

MADIBO, Tebogo
SAMSA
161 Lynwood Road
Brooklyn
Telephone: +27 12 366 2600

MAJOZI, Ms Gugu
Transnet National Ports Authority
PO Box 32696
Braamfontein
Johannesburg 2017
SOUTH AFRICA

Telephone: +27 113519021
Fax: +27 11 351 9023
e-mail: gugulethu.majozi@transnet.co.za

MASETI, Mr Brendan
Transnet National Ports Authority
PO Box 32696
Braamfontein
Johannesburg 2017
SOUTH AFRICA

Telephone: +27 113519126
Fax: +27 11 351 9200
e-mail: brendan.maseti@transnet.net

MATSHELE, Gentie

SAMSA

161 Lynwood Road

Brooklyn

Telephone: +27 12 366 2600

MDLALOSE, Sabelo

Transnet National Ports Authority

Port of Cape Town

Cape Town 8001

SOUTH AFRICA

Telephone: +27 21 449 5286

Fax: +27 21 449 6437

MNGADI, Ayanda

SAMSA

161 Lynwood Road

Brooklyn

Telephone: +27 12 366 2600

MODIPANE, Ms Lauriette

Executive Commercial

Transnet National Ports Authority

PO Box 2695 Montana Park

Pretoria 2193

SOUTH AFRICA

Telephone: +27 11 351 9001

Fax: +27 11 351 9011

e-mail: lauritte.modipane2@transnet.net

MOKHELE, Cdr Tsietsi

Chief Executive Office

South African Maritime Safety Authority

P O Box 13186

Hatfield

Pretoria 0028

SOUTH AFRICA

Telephone: +27 12 366 2628

Fax: +27 12 366 2604

e-mail: PA-TO-CEO@samsa.org.za

MQADI, Capt Dennis

Harbour Master (Marine Services)

Transnet National Ports Authority

PO Box 181

Richards Bay

SOUTH AFRICA

Telephone: +27 35 905 3131

Fax: +27 35 905 3061

e-mail: dennis.mqadi@transnet.net ; Suenette.Erasmu@transnet.net

NAICKER, Mr Ben
Transnet National Ports Authority
P.O Box 1027
Durban 4000
SOUTH AFRICA

Telephone: +27 31 361 8799
Fax: +27 31 361 8920
e-mail: Ben.Naicker@transnet.net

NELL, Mr Steve
Managing Director
Marine Data Solutions
P O Box 51680
Waterfront
Cape Town 8002
SOUTH AFRICA

Telephone: +27 21 386 8517
Fax: +27 21 386 8519
e-mail: steven@marinedata.co.za

NGCUKANA, Miss Nandipha
Regional Manager
Transnet National Ports Authority
4 Bayhead Road
Maydon Wharf
Durban 4000
SOUTH AFRICA

Telephone: +27 31 361 6067
Fax: +27 31 361 5507
e-mail: nandipha.ngcukana@transnet.net

NKAYI, Ms Beatrice
Executive – Ports and Corporate Affairs
Transnet National Ports Authority
PO Box 32696
Braamfontein
Johannesburg 2017
SOUTH AFRICA

Telephone: +27 11 3519102
Fax: +27 11 351 9200
e-mail: beatrice.nkayi@transnet.net

NKOSI, Mr Redge
Executive Head
South African Maritime Safety Authority
P O Box 13186
Gauteng
Pretoria 0028
SOUTH AFRICA

Telephone: +27 12 366 2662
Fax: +27 12 366 2601
e-mail: RNkosi@samsa.org.za

OLIVIER, Mrs Erlene

Engineering And Commercial Manager
Transnet National Ports Authority
C120 20 Langeberg Road Kingsrest
Bayhead
Durban 4001
SOUTH AFRICA

Telephone: +27 31 361 6612

Fax: +27 31 361 6779

e-mail: erlene.olivier@transnet.net ; suzette.visser2@transnet.net

OTTO, Capt. Karl

Executive Head: Centre for Sea Watch and Response
South African Maritime Authority
P O Box 532
Parow 7499
SOUTH AFRICA

Telephone: +27 21 938 3310

Fax: +27 866 544 742

e-mail: kotto@samsa.org.za ; rskosana@samsa.org.za

PHIHLELA, Mr Khomotso

Chief Executive
Transnet National Ports Authority
30 Wellington Street
Parktown
Johannesburg 2001
SOUTH AFRICA

Tel: +27 11 351 9092

Fax: +27 11 351 9007

e-mail: khomotso.phihlela2@transnet.net

PILLAY, Mr Devendran

Operational Supervisor
Transnet National Ports Authority
P O Box 4324
Cape town 8001
SOUTH AFRICA

Telephone: +27 21 449 4729

Fax: +27 214496437

e-mail: Devan.Pillay@transnet.net

PLAATJES, Capt Mogamat

Deputy Harbour Master, Port of Durban
Transnet National Ports Authority
P O Box 1027
Durban 4000
SOUTH AFRICA

Telephone: +27 31 361 8488

Fax: +27 31 361 8851

e-mail: Mogamat.plaatjies@transnet.net

POGGENPOEL, Mr Robin Ralph
Regional Manager Lighthouse Services
Transnet National Ports Authority
P O Box 4324
Cape Town 8001
SOUTH AFRICA

Telephone: +27 21 449 5286
Fax: +27 21 449 6437
e-mail: robin.poggenpoel@transnet.net

PWENDA, Lizzy
SAMSA
161 Lynwood Road
Brooklyn
Telephone: +27 12 366 2600

RAPPETTI, Mr Eugene
Marine Operations Manager
Transnet National Ports Authority
P O Box 1027
Durban 4001
SOUTH AFRICA

Telephone: +27 31 361 8688
Fax: +27 31 361 8514
e-mail: eugene.rappetti@transnet.net ; Zuki.Gobeni@transnet.net

SAAYMAN, Mr Johan
Technical Manager (Civil)Lighthouse Services
Transnet National Ports Authority
PO Box 50491
Waterfront
Cape Town 8002
SOUTH AFRICA

Telephone: +27 21 449 5176
Fax: +27 21 449 3663
e-mail: johan.saayman@transnet.net

SEWNATH, Mr Naresh
Harbour Master, East London
Transnet National Ports Authority
East London 8000
SOUTH AFRICA

Telephone: +27 43 700 1176
e-mail: naresh.sewnath@transnet.net

STEPHEN, Ms Zola
Executive Legal, Risk & Compliance
Transnet National Ports Authority
30 Wellington Road
Parktown
Johannesburg 2193
SOUTH AFRICA

Telephone: +27 11 351 9186

Fax: +27 11 351 9190

e-mail: zola.stephen2@transnet.net

STOWE, Capt Peter
Harbour Master, Saldanha
Transnet National Ports Authority
PO Box X1
Saldanha 7395
SOUTH AFRICA

Telephone: +27 22 7035472

Fax: +27 22 7035472

e-mail: Peter.stowe@transnet.net

TEFFO, Mr Conrad
Transnet National Ports Authority
30 Wellington Road
Parktown 2193
Johannesburg 2001
SOUTH AFRICA

Telephone: +27 11 3519084

e-mail: conrad.teffo@transnet.net

TSHAZI, Miss Nontsindiso
Operations Manager Search and Rescue
South African Maritime Safety Authority
P.O.Box 532
Paro
Cape Town 7499
SOUTH AFRICA

Telephone: +27 21 938 3316

Fax: +27 86 656 9346

e-mail: ntshazi@samsa.org.za

WARREN, Mr Leslie Donald
Transnet National Ports Authority
P O Box 12518
Jacobs
Durban 4001
SOUTH AFRICA

Telephone: +27 27 31 361 5512

Fax: +27 31 361 5507

e-mail: leslie.warren@transnet.net

WINTER, Mr Mervyn
Technical/Projects Manager
Marine Data Solutions
PO Box 51680
Waterfront
Cape Town 8001
SOUTH AFRICA

Telephone: +27 213868517
Fax: +27 213868519
e-mail: mervynw@marinedata.co.za

| |
|-------|
| SPAIN |
|-------|

BERNABEU, Mr. Enrique
La Maquinista Valenciana
C/ Solidaritat
P.I. Barrio Del Cristo, Aldaia
Valencia 46960
SPAIN

Telephone: +34 96 159 60 71
e-mail: enrique.bernabeu@lmvsa.com

GÓMEZ, Mr Manuel
Deputy Director of International Relations and Cooperation
Puertos del Estado
Avda. del Partenón, 10
Madrid 28042
SPAIN

Telephone: +34 91 5245512
Fax: +34 91 5245505
e-mail: mgomez@puertos.es

HARO, Mrs Pilar
Managing Director
Mediterraneo Señales Maritimas S.L.L.
Pol. Ind. Mas de Tous, Calle Belgrado
Nave 6, La Pobla de Vallbona
Valencia 46185
SPAIN

Telephone: +34 962761022
Fax: +34 962761598
e-mail: pharo@mesemar.com

LINDLEY, Mr. Patrick
Almarin
Costa Brava 25
Barcelona 08030
SPAIN

Telephone: +34 933601101
e-mail: patrick@almarin.es

MARTINEZ, Ms Carmen
Head of AtoN Department
Puertos Del Estado
Avda. Partenón, nº 10
Madrid 28042
SPAIN

Telephone: +34 915245526
Fax: +34 915245506
e-mail: cmartinez@puertos.es

MARTINEZ, Mr Antonio +34962761022
Project Manager
Mediterraneo Señales Maritimas S.L.L.
Pol. Ind. Mas de Tous, Calle Belgrado
Nave 6, La Pobla de Vallbona
Valencia 46185
SPAIN

Telephone:
Fax: +34 962761598
e-mail: amartinez@mesemar.com

REBOLLO, Mr. Juan Francisco
Head of the Spanish AtoN Service
Puertos del Estado
Avda. del Partenón 10
Madrid 28042
SPAIN

Telephone: +34 915245526
Fax: +34 915245506
e-mail: jfrebollo@puertos.es

RODRIGUEZ, Mrs. Laura
La Maquinista Valenciana
C/ Solidaritat, 12. P.I. Barrio Del Cristo
Aldaia
Valencia 46960
SPAIN

Telephone: +34 961596071
e-mail: laura.rodriquez@lmvsa.com

RODRIGUEZ, Mr Ignacio
Technical Manager
Mediterraneo Maritimas S L L
Pol. Ind. Mas de Tous, Calle Belgrado
Valencia 46185
SPAIN

Telephone: +34 962761022
Fax: +34 962761598
e-mail: irodriguez@mesemar.com

ROMERO, Mr Fernando
Quality Manager
Mediterraneo Señales Maritimas S.L.L.
Pol. Ind. Mas de Tous, Calle Belgrado
Nave 6, La Pobra de Vallbona
Valencia 46185
SPAIN

Telephone: +34 962761022
Fax: +34 962761598
e-mail: fromero@mesemar.com

| |
|--------|
| SWEDEN |
|--------|

ABRAHAMSSON, Mr Anders
Sales Director
C.N.S.Systems AB
St.Larsgatan 32 B
Linköping SE-58224
SWEDEN

Telephone: +46 13352290
Fax: +46 13352299
e-mail: anders.abrahamsson@cns.se

BERGSTEDT, Capt. Pernilla
Head Of Ship Operational Unit
Swedish Transport Agency
P O Box 653
Norrköping 601 15
SWEDEN

Telephone: +46 11191414
Fax: +46 11191230
e-mail: pernilla.bergstedt@transportstyrelsen.se

ERICSSON, Mr Holger
Business Development Director
C.N.S. Systems AB
St. Larsgatan 32 B
Linköping 58224
SWEDEN

Telephone: +46 13352290
Fax: +46 13352299
e-mail: holger.ericsson@cns.se

ERIKSSON, Captain Ove
Swedish Maritime Administration
Ostra Promenaden 7
Norrköping 60178
SWEDEN

Telephone: +46 11191233
e-mail: ove.eriksson@sjoefartsverket.se

LAGERWALL, Mr Christian
Swedish Maritime Administration
Östra Promenaden 7
Norrköping 601 78
SWEDEN

Telephone: +4611 191193
e-mail: christian.lagerwall@sjofartsverket.se

MANGS, Mr Gunnar
VP Sales & Marketing
Saab TransponderTech AB
Låsblecksgatan 3
Linköping 589 41
SWEDEN

Telephone: +46 13 18 94 28
Fax: +46 13 18 23 77
e-mail: Gunnar.Mangs@transpondertech.se

NYBERG, Mr Magnus
TrueHeading AB
Vendevagen 90
Danderyd 18232
SWEDEN

Telephone: +46 86222663
Fax: +46 854593910
e-mail: magnus.nyberg@trueheading.se

RICHTER, Mr Mark
Saab TransponderTech AB
Am Prime Parc 11
Frankfurt 65470
GERMANY

Telephone: 49 717917652
e-mail: mark_richter@trimble.com

ZETTERBERG, Mr Rolf
Swedish Maritime Administration
Östra Promenaden 7
Norrköping 601 78
SWEDEN

Telephone: +46 11 19 1512
Fax: +46 11 191055
e-mail: rolf.zetterberg@sjofartsverket.se

| |
|--------|
| TAIWAN |
|--------|

LIN, Mr I-Fu
VTS Supervisor
Kaohsiung Harbor Bureau
No.13, Ln.45, Qingshan St., Xiaogang Dist.
Kaohsiung City 81268
TAIWAN

Telephone: +886 921 246 969
Fax: +886 7 571 7427
e-mail: p49875@mail.khb.gov.tw

| |
|----------|
| TANZANIA |
|----------|

NHNYETE, Mr Ignatious Kigili
Hydrography Manager
Tanzania Ports Authority
PO Box 9184
Dar es Salaam
TANZANIA

Telephone: +255 222 129 342
Fax: +255 222 113 432
e-mail: nhnyete@tanzaniaports.com ; nhnyete@yahoo.com

| |
|----------|
| THAILAND |
|----------|

TANUWONG, Vice Admiral Nakorn
Hydrographic Department, Royal Thai Navy
222 Rimtangrodfaikhao Rd, Bangna
Bangkok 10260
THAILAND

Telephone: +66 2 475 2251
Fax: +66 2 475 2249
e-mail: matukornl@yahoo.com

| |
|--------|
| TURKEY |
|--------|

CEHRELI, Captain Tuncay
Co-ordinator
Directorate General of Coastal Safety
Kiyi Emniyeti Genel Mudurlugu, Meclisi Mebusan Cad.
No 18 Salipazari - Beyoglu
Istanbul 34433
TURKEY

Telephone: +90 212 2925243
Fax: +90 212 2493691
e-mail: tcehrel@kegm.gov.tr

ORAKCI, Mrs Beril
Manager, Foreign Affairs
Directorate General of Coastal Safety
Kiyi Emniyeti Genel Mudurlugu, Meclisi Mebusan Cad.
No 18 Salipazari - Beyoglu
Istanbul 34433
TURKEY

Telephone: 90 212 2925243
Fax: 90 212 2493691
e-mail: berilgullu@hotmail.com

ORAKCI, Captain Salih
Director General
Directorate General of Coastal Safety
Kiyi Emniyeti Genel Mudurlugu, Meclisi Mebusan Cad.
No 18 Salipazari - Beyoglu
Istanbul 34433
TURKEY

Telephone: +90 212 2925243
Fax: +90 212 2493691
e-mail: salihorakci@kegm.gov.tr

OZGURCE, Mr Bedri Olcay
Head of VTS Department
Directorate General of Coastal Safety
Kiyi Emniyeti Genel Mudurlugu, Meclisi Mebusan Cd.
No 18 Salipazari - Beyoglu
Istanbul 34433
TURKEY

Telephone: +90 21 229 25243
Fax: +90 21 224 93691
e-mail: olcayozgurce@hotmail.com

UYSAL, Mr Celalettin
Head of AtoN Department
Directorate General of Coastal Safety
Kiyi Emniyeti Genel Mudurlugu, Meclisi Mebusan Cad.
No 18 Salipazari – Beyoglu
Istanbul 34433
TURKEY

Telephone: +90 212 2925243
Fax: +90 212 2493691
e-mail: celalettin.uysal@kegm.gov.tr

YALCIN, Captain Tayfun
Supervisor
Directorate General of Coastal Safety
Kiyi Emniyeti Genel Mudurlugu, Meclisi Mebusan Cad.
No 18 Salipazari - Beyoglu
ISTANBUL 34433
TURKEY

Telephone: +90 212 2925243
Fax: +90 212 2493691
e-mail: tayfunender@gmail.com

| |
|---------|
| UKRAINE |
|---------|

ROMANOV, Mr Roman
State Hydrographic Service of Ukraine
23, Gagarina Avenue
Kyiv 2660
UKRAINE

Telephone: +38 050 344 01 08
Fax: +38 044 2932 98
e-mail: miagkova.a@hydro.gov.ua

| |
|----------------|
| UNITED KINGDOM |
|----------------|

BARKER, Captain Roger
Director of Navigational Requirements
Trinity House
Tower Hill
London EC3N 4DH
UNITED KINGDOM

Telephone: +44 207 481 6902
Fax: +44 207 481 1466
e-mail: roger.barker@thls.org ; Julia.King@thls.org

DE BIES, Mr Bruce
Regional Sales Manager
Kelvin Hughes Ltd.
Klompemakerstraat 64
3194 DE Hoogvliet
Rotterdam 3194
THE NETHERLANDS

Telephone: +31 10 4724966
e-mail: bruce.debies@kelvinhughes.nl

DE HALPERT, RAdm Sir Jeremy
Executive Chairman
Trinity House
Tower Hill
London EC3N 4DH
UNITED KINGDOM

Telephone: +44 207 481 6902
Fax: +44 207 481 1466
e-mail: julia.king@thls.org

GLASS, Captain Duncan Colin
Retiring Chair of the IALA Aids to Navigation Committee
Tutor's Cottage, Sarum St Michael
129 The Close
Salisbury SP1 2EY
UNITED KINGDOM

Telephone: +44 1722 321076
e-mail: duncan.glass@thls.org

GREY, Mr Ralph Michael
Former Editor
Lloyd's List
9 Gander Green, Haywards Heath, West Sussex
RH161RB
UNITED KINGDOM

Telephone: +44 1444 415 761
e-mail: rjmgrey@dircon.co.uk

HOR, Mr Mk
Managing Director
Pharos Marine Ltd.
35, Tannery Road, #05-05
Tannery Block
347740
SINGAPORE

Telephone: +65 67479325
Fax: +65 67470478
e-mail: mkhor@pharos-api.com

HUGHES, Captain Terry
Consultant to Trinity House
1 Claudius Way
Roman Park, Highfield Hill
Lydney, Gloucester GL15 5NN
UNITED KINGDOM

Telephone: 44 1594 845258
e-mail: terryhughes@maritime-vtm.co.uk

JAMES, Mr Owen
Pharos Marine Ltd.
Steyning Way
Hounslow
Middlesex TW4 6DL
UNITED KINGDOM

Telephone: +44 208 538 1100
e-mail: ojames@pharosmarine.com

KELLY, Mr Peter
Engineering & Project Delivery Manager
Trinity House
The Quay
Harwich CO12 3JW
UNITED KINGDOM

Telephone: +441255-24505
e-mail: peter.kelly@thls.org

KING, Mr Peter
Naval Sales Manager
Kelvin Hughes Ltd.
New North Road, Hainault
Ilford, Essex IG6 2UR
UNITED KINGDOM

Telephone: +44 208 498 1736
e-mail: peter.king@kelvinhughes.co.uk

MILLS, Mr Bruce
General Manager
Transas Marine (UK) Ltd.
Seahawk, Bilton Way, Hampshire
Portsmouth PO3 5JN
UNITED KINGDOM

Telephone: +44 2392 674000
Fax: +44 2392 674048
e-mail: bruce.mills@transas.com

NICHOLSON, Mr Malcolm
Principal Development Engineer
Trinity House
The Quay
Harwich CO12 3JW
UNITED KINGDOM

Telephone: +44 01255245143
Fax: +44 1255245009
e-mail: malcolm.nicholson@thls.org

SCORER, Cdre Jim
Director of Operations
Trinity House
The Quay
Harwich CO12 3JW
UNITED KINGDOM

Telephone: +44 1255 245000
Fax: +44 1255 245009
e-mail: jim.scorer@thls.org ; Julia.King@thls.org

TASSELL, Mr Alan
Pharos Marine Ltd.
Steyning Way
Hounslow
Middx. TW4 6DL
UNITED KINGDOM

Telephone: +44 208 538 1100
e-mail: atassell@pharosmarine.com

WARD, Dr Nick
General Lighthouse Authorities
12 Mariners Drive
Swanage BH19 2SJ
UNITED KINGDOM

Telephone: +44 1929 426021
e-mail: nick.ward@gla-rnav.org

| |
|--------------------------|
| UNITED STATES OF AMERICA |
|--------------------------|

ALEXANDER, Dr Lee
Research Professor
University of New Hampshire
Center for Coastal and Ocean Mapping
Chase Ocean Engineering Lab;24 Colovos Road
Durham NH 03824
UNITED STATES OF AMERICA

Telephone: +1 603 862 1745
e-mail: leealex@ccom.unh.edu

ARROYO, Mr. Jorge
United States Coast Guard
2100 2nd Street SW
Washington DC 20593-7581
UNITED STATES OF AMERICA

Telephone: +1 202 372 1563
e-mail: jorge.arroyo@uscg.mil

ATKINSON, Mr Ian
Tideland Signal
PO Box 52430
Houston
Texas 77052
UNITED STATES OF AMERICA

Telephone: +1 713 425 1503
Fax: +1 713 682 4635
e-mail: vicky.carter@tidelandsignal.com

BRAVO, Ms Jessey
Sales Manager
Tideland Signal
PO Box 52430
Houston
Texas 77052
UNITED STATES OF AMERICA

Telephone: +1 716 681 6101
Fax: +1 713 682 4635
e-mail: vicky.carter@tidelandsignal.com

BURFORD, Mr Paul
Tideland Signal
PO Box 52430
Houston
Texas 77052
UNITED STATES OF AMERICA

Telephone: +1 713 425 1503
Fax: +1 713 682 4635
e-mail: vicky.carter@tidelandsignal.com

BURNS, Cdr William
Commandant (CG-7413)
United States Coast Guard
2100 2nd St, SW, MAILSTOP 7684
Washington, DC 22307
UNITED STATES OF AMERICA

Telephone: +1 202 372 1536
e-mail: william.j.burns@uscg.mil

CAIRNS, Mr William
Principal Navigation Engineer & Chair IALA e-NAV Committee
United States Coast Guard
2100 Second Street S.W
Washington 20593
UNITED STATES OF AMERICA

Telephone: +1 202 372 1557
Fax: +1 202 372 1930
e-mail: william.r.cairns@uscg.mil

CARTER, Miss Vicky
Assistant To Vice President
Tideland Signal
PO Box 52430
Houston
Texas 77052
UNITED STATES OF AMERICA

Telephone: +1 713 425 1503
Fax: +1 713 682 4635
e-mail: Vicky.Carter@tidelandsignal.com

CLARK-MAUDSLEY, Ms Christine

Tideland Signal

PO Box 52430

Houston

Texas 77052

UNITED STATES OF AMERICA

Telephone: +1 713 425 1503

Fax: +1 713 682 4635

e-mail: vicky.carter@tidelandsignal.com

DOLAN, Captain Pete

Pharos Marine/Automatic Power, Inc.

26 Pizarro Ave

Novato 94949

UNITED STATES OF AMERICA

Telephone: +1 415 382 6296

e-mail: dolantp@aol.com ; atassell@pharosmarine.com

FERGUSON, Mr. Kendall

SC-104 Chair

RTCM

231 Crown Manor Drive

Stafford, Virginia 22556

UNITED STATES OF AMERICA

Telephone: +1 540 219 9332

e-mail: Kendall_Ferguson@Trimble.com

KAUTZ, Mr. William

United States Coast Guard

2100 Second St SW

e-mail: william.d.kautz@uscg.mil

Washington DC 20593

UNITED STATES OF AMERICA

Telephone: +1 202 4753553

KINNEY, Captain Gabe

Business Development

Lockheed Martin MS2

P.O. Box 4840 EP7-201, MD 31

Syracuse, New York 13221-4840

UNITED STATES OF AMERICA

Telephone: +1 315 456 3911

Fax: +1 315 456 0530

e-mail: gabriel.o.kinney@LMCO.com

LORETTA, Mr. Andrew

Director, AIS Business Development

Orbcomm

22265 Pacific Blvd, Ste. 200

Dulles 20166

UNITED STATES OF AMERICA

Telephone: +1 310 948 4044

e-mail: loretta.andrew@orbcomm.com

MITCHENER, Mr Allen

President
Tideland Signal
PO Box 52430
Houston
Texas 77052
UNITED STATES OF AMERICA

Telephone: +1 713 681 6101
Fax: +1 713 682 4635
e-mail: vicky.carter@tidelandsignal.com

MUILENBURG, Capt Wayne

IALA Councillor, Chief Waterways Management
United States Coast Guard
2460 Wildflower Lane
Huntingtown, MD 20639
UNITED STATES OF AMERICA

Telephone: +1 202-372-1505
Fax: +1 202-372-1929
e-mail: wayne.a.muilenburg@uscg.mil

QUICKENDEN, Mr Clive

Vice President
Tideland Signal
PO Box 52430
Houston
Texas 77052
UNITED STATES OF AMERICA

Telephone: +1 713 681 6101
Fax: +1 713 682 4635
e-mail: vicky.carter@tidelandsignal.com

SOLLOSI, Mr Mike

Retiring Chair of IALA VTS Committee
United States Coast Guard
2100 2nd Street SW
Washington, DC 20593
UNITED STATES OF AMERICA

Telephone: +1 202 372 1545
Fax: +1 202 372 1931
e-mail: Mike.M.Sollosi@uscg.mil

THIBAULT, Dr. Marc

United States Coast Guard
Navigation Systems Branch (CG-5413)
21000 Second Street S.W. Stop 7581
Washington DC 20593-7581
UNITED STATES OF AMERICA

Telephone: +1 202 372 1529
Fax: +1 202 372 1530
e-mail: marc.a.thibault@uscg.mil

TLAPA, Mr. Greg
Visual Aids to Navigation Program Manager
United States Coast Guard
2100 2nd St Southwest
CG-54131
Washington DC 20593
UNITED STATES OF AMERICA
Telephone: +1 202 372 1546
e-mail: gregory.b.tlapa@uscg.mil

TRENCHARD, Mr Steve
Pharos Marine / Automatic Power Inc.
213 Hutcheson Street
Houston, Texas 77003
UNITED STATES OF AMERICA
Telephone: +1 713 228 5208
Fax: +1 713 228 3717
e-mail: STrenchard@automaticpower.com

TUNG, Mr Jonathan
Vice President
Tideland Signal
PO Box 52430
Houston
Texas 77052
UNITED STATES OF AMERICA
Telephone: +1 713 681 6101
Fax: +1 713 682 4635
e-mail: vicky.carter@tidelandsignal.com

VARGAS, Mr. Ivan
Electronic Engineer
Pharos Marine/ Automatic Power, Inc.
213 Hutcheson Street
Houston, Texas 77003
UNITED STATES OF AMERICA
Telephone: +1 713 228 5208
Fax: +1 713 228 3717
e-mail: ivargas@automaticpower.com

WILLIAMS, Ms Nicci
Lockheed Martin MS2
300 M Street SE, Suite 600
Washington 20003
UNITED STATES OF AMERICA
Telephone: +1 202 863 3473
Fax: +1 202 863 3402
e-mail: keisha.woods@lmco.com

| |
|---------|
| URUGUAY |
|---------|

RUISDAEL, Capt. Ramallo

Chief, Uruguayan Navy

Sarandi 75

Montevideo 11000

URUGUAY

Telephone: +598 2 9161210

Fax: +598 2 9155852

e-mail: serba@armada.gub.uy

| |
|-----------|
| VENEZUELA |
|-----------|

CARRASQUEL, Mr Cesar

Oficina Coordinadora De Hidrogrfia Y Navegacion(OCHINA)

VENEZUELA

Telephone: +58 2125 3038883

Fax: +58 212 3038885

CONTRERAS, Mr Mr Pablo

Sales Venezuela

Tideland Signal

PO Box 52430

Houston

Texas 77052

UNITED STATES OF AMERICA

Telephone: +1 713 425 1503

Fax: +1 713 682 4635

e-mail: vicky.carter@tidelandsignal.com

LEON, Mr Reinaldo

Oficina Co-ordinadora De Hidrogrfia Y Navegacion(OCHINA)

VENEZUELA

Telephone: +58 2125 3038883

Fax: 58 212 3038885

E-mail: titonavster@gmail.com

ORTIGOZA VENCINO, Carlos Guillermo

Hydrographic and Navigation National Service, Venuezala Navy

VENEZUELA

e-mail: seretova@hotmail.com

PIETROBON, Cn Mauricio

Oficina Co-ordinadora De Hidrogrfia Y Navegacion(OCHINA)

VENEZUELA

Telephone: +58 212 3038731

Fax: +58 212 3038731

e-mail: manegive1@hotmail.com

RODRIGUEZ, Mr Pablo
Oficina Co-ordinadora De Hidrografia Y Navegacion(OCHINA)
VENEZUELA

Telephone: +58 2125 3038883

Fax: +58 212 3038885

e-mail: pablofrp@gmail.com

| |
|---------|
| VIETNAM |
|---------|

BANG, Mr Le Minh
Vietnam Maritime Safety Company No 1
No 31 Da Nang Rd
Thaipong City
VIETNAM

Telephone: +84 31 3551817

Fax: +84 31 3855124

e-mail: msc1@vnn.vn ; vms_office@hn.vnn.vn

DINH LAM, Mr Vuong
Vietnam Maritime Safety Company No 1
No 31 Da Nang Rd
Thaipong City
VIETNAM

Telephone: +84 31 3551817

Fax: +84 31 3855124

e-mail: msc1@vnn.vn

DINH VAN, Mr Pham
Vietnam Maritime Safety Company No 1
No 31 Da Nang Rd
Thaipong City
VIETNAM

Telephone: +84 31 3551817

Fax: +84 31 3855124

e-mail: msc1@vnn.vn

LONG, Mr Tran Tieu
Vietnam Maritime Safety Company No 1
No 31 Da Nang Rd
Thaipong City
VIETNAM

Telephone: +84 31 3551817

Fax: +84 31 3855124

e-mail: msc1@vnn.vn

TUAN ANH, Mr Le

Vice Manager of International Relation Dept.
Vietnam Maritime Safety Company No 1
No 31 Da Nang Rd
Thaipong City
VIETNAM

Telephone: 84 31 3551817

Fax: 84 31 3855124

e-mail: msc1@vnn.vn

VAN QUANG, Mr Luu

Director General
Vietnam Maritime Safety Company No 1
No 31 Da Nang Rd
Thaipong City
VIETNAM

Telephone: +84 31 3551817

Fax: +84 31 3855124

e-mail: msc1@vnn.vn

| |
|-------|
| YEMEN |
|-------|

SALEM, Mr Faisal Mohammed Mareai

Maritime Affairs Authority Yemen
P.O Box 1443
Tawahi
Aden
YEMEN

Telephone: +967 2 222 043

Fax: +967 2 222 041

e-mail: maa.aden@y.net.ye

| |
|-----|
| ICS |
|-----|

MURRAY, Mr John

Senior Marine Advisor
International Chamber of Shipping
12 Carthusian Street
London EC1M 6EZ
UNITED KINGDOM

Telephone: +44 20 7417 2898

e-mail: john.murray@marisec.org ; kathryn.hall@maris.org

| |
|------|
| IMPA |
|------|

FRAGOSO, Captain Otavio
Senior Vice President
International Maritime Pilots' Association
HQS Wellington
Temple Stairs, Victoria Embankment
London WC2R 2PN
UNITED KINGDOM

Telephone: +44 20 7240 3973
Fax: +44 20 7240 3518
e-mail: otaviof@globo.com

KIRCHNER, Mr Paul
Representative
International Maritime Pilots' Association
APA, 499 South Capitol Street SW
Suite 409
Washington DC 20003
UNITED STATES OF AMERICA

Telephone: +1 202 484 0700
Fax: +1 202 484 9320
e-mail: apaxdir@aol.com

WATSON, Capt. Michael
President
International Maritime Pilots' Association
HQS Wellington
Temple Stairs, Victoria Embankment
London WC2R 2PN
UNITED KINGDOM

Telephone: +44 20 7240 3973
Fax: +44 20 7240 3518
e-mail: office@impahq.org ; cjames@impahq.org

| |
|--------------------|
| NAUTICAL INSTITUTE |
|--------------------|

PATRAIKO, Mr David
Director of Projects
The Nautical Institute
202 Lambeth Road
London, SE1 7LQ
UNITED KINGDOM

Telephone: +44 2079281351
e-mail: djp@nautinst.org

| |
|------|
| IALA |
|------|

GRILLET, Ms Marie-Helene

Administration Manager

IALA

20ter Rue Schnapper

St Germain en Laye 78100

FRANCE

Telephone: +33 134517001

Fax: +33 134518205

e-mail: iala-aism@wanadoo.fr

HADLEY, Dr Michael

Technical Co-ordination Manager

IALA

20ter Rue Schnapper

St Germain En Laye 78100

FRANCE

Telephone: +33 134517001

Fax: +33 134518205

e-mail: m.hadley@orange.fr

KRUUSE, Mr Torsten

Secretary General

IALA

20ter Rue Schnapper

Saint Germain en Laye 7810

FRANCE

Telephone: +33 1 3451 70 01

Fax: +33 1 3451 82 05

e-mail: secgen.iala@wanadoo.fr virginia.butler@wana

LECLAIR, Rear Admiral Jean-Charles

Dean IALA WWA

104 Alle Des Bruyeres -Port D'Alen

St Cyr-Sur-Mer

83270

FRANCE

e-mail: jean.leclair@wanadoo.fr

NGO MBONG, Mrs Jeanne Lorraine

IALA

20 ter, Rue Schnapper

Saint Germain en Laye 78100

FRANCE

Telephone: +33 1 34 51 70 01

Fax: +33 134518205

e-mail: lorraine.mbong@wanadoo.fr ; iala-aism@wanadoo.fr

PROSSER, Mr Gary
Secretary-General (Designate)
20ter, Rue Schnapper
Saint Germain en Laye 78100
FRANCE

Telephone: +33 1 34 51 70 01
Fax: +33 1 3451 82 05
e-mail: secgen.iala@wanadoo.fr

RIDGWAY, Mr Paul
Editor IALA Bulletin
IALA
No 3 The Green
Ketton
Stamford
PE9 3RA
UK

Telephone: +44 1780 721 628
Fax: +44 1780 721 980
e-mail: pridgway@globalnet.co.uk

**ANNEX B ADDRESS BY MR KHOMOTSO PHIHLELA, CHIEF EXECUTIVE OF
TRANSNET NATIONAL PORTS AUTHORITY**

The Honourable Minister of the Department of Public Enterprises Ms Barbara Hogan

President of IALA Capt. Liu Gongchen

Mr. Steve Nell: President of IALA Industrial Members' Council

Mr. Torsten Kruuse, the outgoing Secretary General of IALA

Mr. Gary Prosser Secretary General of IALA, designate

conference participants and delegates from various parts of the world, distinguished panel of speakers, invited guests, members of the media, ladies and gentlemen good morning.

On behalf of the National Ports Authority of South Africa, a division of Transnet Ltd, we welcome you to the 17th IALA Conference, hosted by the National Ports Authority and organized by the Local Organising Committee of AILA. I welcome our esteemed guests from the African Region and beyond. It is the first time in the 53 years existence of IALA that this conference is hosted on the African continent and Transnet National Ports Authority has been a member of IALA since the Association's inception in 1957.

We have this week an impressive array of foreign and local experts speaking during the conference, on the total spectrum of Aids to Navigation. Gatherings such as this provide continuous valuable feedback for policy makers as well as experts from around the globe in the field of maritime transportation, shipping, logistics and maritime safety. I am also gratified to see that all of us here share common concerns and look forward to working together to promote safety and security in our waters. The theme of this 17th Conference of the International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA – AISM) is: "Aids to Navigation: A global approach: All waters, all risks; all solutions."

Issues of safety and security are a global concern and affect all of us. What can be more apt than to address these issues at a global platform like this? And South Africa, and the TNPA in particular, commends your organization for the very important role you are playing to foster the safe, economic and efficient movement of vessels for the benefit of the maritime community and the protection of the marine environment, which together with your guidance and leadership have positioned IALA as an international centre of excellence in marine aids to navigation and related matters.

I cannot over-emphasize the role IALA plays in supporting safety and security of those who work, travel and entertain at sea, as well as ensuring the protection of international trade and our shores from the impact of marine accidents.

As is the case with other coastal nations, South Africa faces a major challenge of improving the safety and environment protection standards, while ensuring that the ships transporting cargo are able to do so at internationally competitive freight rates. It is a particular challenge for South Africa as a nation that is largely dependent on sea-borne trade and with an extensive and a dangerous coastline, encompassing environmentally sensitive areas along it.

Our government, through Transnet recognizes the catalytic role the National Ports Authority of South Africa plays in our region. The National Port Authority is not alone in its investments throughout the coastline, other state organs and private technology suppliers have also been investing in their operations and facilities. The commitment shown by these businesses is appreciated. South Africa is a country of great terrain and diversity, which brings to fore the exceptional strength and vibrancy of its people. We place great emphasis on finding innovative and cost-effective ways that can assist in the safe navigation of ships. And with maritime transport being so vital to our economy, it is important that we continue to improve the necessary aids to navigation. In this regard, we have developed an extensive network of maritime aids to navigation (AtoN), incorporating many of the latest technologies which would not have been possible if we were not a member of IALA.

In addition to the growing economic benefits associated with safe and secure navigation, there has been a corresponding growth in public recognition for the importance of trade routes. Business leaders, community leaders understand that the maritime industry does more than facilitate the success of South Africa's import and export industries, and the country's international trade. They understand that we are economic engines in our own right -- creating employment opportunities, business opportunities and wealth throughout our operating communities

To reach our goals at the National Port Authority, we are committed to providing facilities and services to move cargo. One of the challenges we face in the years ahead is keeping pace with growing movements along our coastline. In the world of shipping, there are many routes to choose from. And for us standing still is not an option. TNPA, through its Lighthouse Services Business Unit, is the only competent and legal maritime aids to navigation authority in South Africa that provides, operates and maintains 45 lighthouses and other marine aids to navigation along the country's coastline. It also maintains the AtoN in all the ports, fisheries harbours as well as most private harbours and marinas under contract, thus ensuring all the AtoN on the South African coast comply with international standards, such that of IALA. Therefore, over the following sessions of this conference we will listen to informative dispositions about risk, quality and environment, impacts of Automatic Identification systems (AIS), e-Navigation, visual aids to navigation, coastal zone development and emerging technologies. You will agree with me that when fully harnessed, digital technology will allow logistics services suppliers and providers in the region to enjoy improved access to markets, distribution channels and information networks through fewer, more efficient and cost-effective exchanges.

The programme that has been set out for the next few days gives us an opportunity to explore options for addressing challenges and emerging developments in Aids to navigation, it is equally important that both the public and the private sector work in unison in successfully maintaining access to seamless, efficient and competitive shipping and aids to navigation infrastructure and services to help reduce transport costs. This conference will provide us a rare opportunity to share our views and experiences and get an overview of the latest trends in the industry, while concurrently identifying avenues for efficiently addressing the market demands.

Allow me at this juncture to applaud everyone for their contribution to this forum. We clearly need to work hard and sustain the continuity of this important gathering, foster public-private sector deliberation and discussion of issues lined up in the programme. In this respect, we need to work hard and cooperate in our individual, bilateral, and multilateral commitments. I have no doubt that this type of collaborative forum should be sustained and even strengthened in the future. This Conference should enable us to openly share views and promote the recognition that all stakeholders benefit from efforts to eliminate maritime accidents and incidents in our waters.

Ladies and Gentleman....

To our first-time visitors, as well as those returning to enjoy our beautiful country and continent, our conference organising committee has worked hard at putting together a conference that will offer an exciting, topical and dynamic business programme, along with a pleasant and memorable experience of our wonderful country.

With that Ladies and Gentleman, let me say that it is an honour and a pleasure having all of you here. Have a good conference and a wonderful stay here in South Africa and particularly Cape Town. If anyway, we can make your stay more comfortable, then please do let us know.

On behalf of the National Ports Authority, I welcome you once more to our beautiful country and wish you a productive conference ahead. I will end my welcome address by thanking all our valued guests. I am especially grateful to our Minister of Public Enterprise, Minister Barbara Hogan for accepting our invitation to this occasion.

To all of you, thank you for being here, welcome, and enjoy the conference!

Siyanamukela!

ANNEX C **LETTER FROM IHO**

**INTERNATIONAL HYDROGRAPHIC
BUREAU**

4, quai Antoine 1er
B.P. 445
MC 98011 MONACO CEDEX
PRINCIPAUTE DE MONACO



**BUREAU HYDROGRAPHIQUE
INTERNATIONAL**

Tel : +377.93.10.81.00
Fax : +377.93.10.81.40
e-mail : info@ihb.mc
web : www.ihb.int

GREETINGS FROM THE INTERNATIONAL HYDROGRAPHIC ORGANIZATION

Dear President and Secretary-General Designate,

Greetings from the Directing Committee of the International Hydrographic Bureau. We send you best wishes on behalf of all the IHO Member States for a successful and fruitful conference.

The association and continuing high levels of contact and cooperation between our two organizations has never been stronger than it is today. There are many exciting developments intended to improve safety of navigation and protection of the marine environment that involve both IALA and IHO. These include the ongoing development of an IMO e-Navigation strategy, where both our organizations are contributing cooperatively and constructively. Another is the implementation of Virtual Aids to Navigation – which has both an operational component, which is the province of IALA, and potential charting requirements that the IHO will address. Most recently, the IHO has been very pleased to contribute to IALA's initiative in bringing together the States who will be responsible for navigation aids in the high Arctic if viable trade routes established there. This initiative will most likely be matched by a parallel Arctic Regional Hydrographic Commission – resulting in further close cooperation between our two organizations.

The Directing Committee would also like to pay particular tribute to your outgoing Secretary-General Mr Torsten Kruuse. It has been his strong sense of direction, his initiative, and often his perseverance, that has led to the achievement of so many significant milestones under his stewardship. They will provide a lasting benefit to all mariners. It must also be said that his personal commitment and drive is in no small part the reason that the IHO and IALA have such a successful relationship today. We send Torsten our best wishes for the future.

On behalf of the Directing Committee
Yours sincerely

Captain Robert WARD
Director

ANNEX D **KEY NOTE ADDRESS BY MR MICHAEL GREY, LLOYDS LIST**

Minister, Mr President, Distinguished Guests, Ladies and Gentlemen. It is a very great pleasure to be here in this beautiful city, after an absence of nearly 50 years. Things have probably changed a bit since I was last here aboard a Port Line ship en route to Australia in the late 50s!

You may be a little surprised and even dismayed to discover that you are not meeting the Secretary-General of the International Maritime Organisation today, who has been unavoidably detained in London, but a rather old and battered journalist. I hope you are not too disappointed. Your reaction may well be similar to that of the Deputy Director of the UK Chamber of Shipping, which had been my first employer when I came ashore, when I announced to him that I wished to leave his Technical and Marine Safety Branch and become a journalist.

“Journalism”, he said in the tone of somebody who had discovered something extraordinarily nasty adhering to the sole of his beautifully polished shoe – “Journalism, Grey – is all lies and hyperbole!”

I often think of this conversation, from all those years ago, and then relate it to some of the quite unbelievable things that go on in the shipping industry pretty well all the time, and reflect that journalists, at least in my branch of the trade, don’t actually have to lie that much. Indeed we probably spend quite a lot of time and thought trying to tone down, rather than exaggerate, the realities of what they see around them in our amazing international industry, because they genuinely think that nobody would believe them.

This is not the 16th century, but the 21st, and we have gangs of pirates ranging around the Gulf of Aden and Western Indian Ocean, in small open boats, armed with RPGs, Kalashnikovs and incongruously, tall aluminium ladders, capturing large merchant ships and holding them and their crews for substantial ransoms. They have even been operating a large captured car carrier as a sort of super-mothership for their operations, which have extended to the Seychelles and beyond. I suppose you could describe piracy, as the recession bites, as one of the maritime sectors where there has been genuine growth!

But perhaps because this is the 21st century, and not the 16th, we seem to be curiously less capable of dealing with these pirates, being tied up with our own adherence to complex international laws, issues of sovereignty and human rights, jurisdiction and responsibility, of which the delighted pirates take full advantage, when in another age there might have been a more robust response. As a journalist reporting this stuff, I sometimes have to pinch myself to make sure I am awake and not dreaming.

There has, of course, been traditionally a great deal of lawlessness in that sea area. Even in my days at sea I remember when making a landfall on Cape Guardafui, running up into the Gulf of Aden from Australia, we used to make jokes about not being able to see the light because the lighthouse keepers had been carried away by the locals, the same Puntland clans who are energetically pirating today. Of course it may well have been that the light was obscured by sandstorms during the Southwest Monsoon, but we had it on good authority that if the locals were not lavishly bribed, they would indeed capture the keepers and smash up the light. I suppose it was an early form of light dues.

There is a sort of delightful timelessness about the shipping industry that makes me feel like Rip Van Winkle, in that our crises are ever repeated, our problems perennial, and come around like the seasons. You don’t have to be that old to remember the last terrible recession in shipping, but not enough people evidently did, if you look at the mess we are in with the amount of over-ordering there has been, in a repetition of the 1970s. I have to say I wondered whether shipowners ever read the newspapers, as we watched them still ordering enormous containerships by the dozen, even after all the lights had gone out in Lehman Brothers in the autumn of 2008.

There were shipowners desperately waving their chequebooks as they competed to buy capesizes in shipyards that were still being used as paddy fields by bemused rice farmers, who didn’t really know a lot about ship construction. Then, just a few months later these same owners were paying enormous premiums to cancel those same orders for ships which would not now be constructed in

those same non-existent shipyards which still hadn't yet been built. Journalists, even with the most creative imagination, couldn't make this up!

You probably don't want to hear anything more about climate change, or global warming, but here again no journalist, no matter how hyperbolic, could have invented the sudden and extraordinary conversion of half the shipowning world from utter scepticism to the greenest activism, once somebody came up with the idea of slow steaming to save fuel.

Just a couple of years ago, if a charterer had been told that his cargo was taking twice as long as he had expected, he would have been onto his lawyers in a flash, claiming the owner had lied about the speed of his ship. Today, all the owner, who has throttled back his 25 knot ocean greyhound to the service speed of a WW II Liberty ship, has to do is to look very serious, cite what he is doing for the planet, and give the cargo owner a severe lecture on sustainability. "Being green is being good", he will smirk, thinking of all that fuel he is going to save.

And that's probably sufficient global warming for today, although just a couple of weeks ago I attended a Lloyd's Register lecture about the exciting possibilities for nuclear powered merchant ships. Honestly, I'm not making this up either, but the sudden attraction of this form of propulsion is because nukes don't produce CO₂, which is now seen as a greater danger by a larger number of people, than is radioactivity. Ships so propelled, I am told, will only need refuelling every five years or so! That's a big bonus, if you can persuade the authorities to let them into port!

2010, as I'm sure you know by now, is designated by the International Maritime Organisation as the Year of the Seafarer. I would suggest that this is not before time as we within the industry (as much of those of the general public), need to be reminded that ships are driven around by sentient human beings, just like us, and are not operated by robots, or by remote control.

A few years ago I was in a bar in with a group of ship managers who were attending a manning conference. They were typical of their profession, hard-pressed, worried folk who spend half their lives in aircraft, characterised by premature ageing, multi-tasking and mobile telephones (nowadays, of course these have been replaced by Blackberries, which makes them even more exhausted).

The conversation, which was all about the various nationalities and their respective price per month, began to resemble that of a group of housewives talking earnestly about the virtues of different brands of detergents, or car enthusiasts boasting about the attributes of their souped up motors.

It is the Year of the Seafarer, but there is still an attitude in our shipping industry, which sees the very same seafarers we are supposed to celebrate as a commodity, for which there is a market, like that for steel wire, anti-fouling or spare cylinder-head liners. It is a market not dictated by expertise with ships or a reputation for smart seamanship, or marine engineering skill, but price, and it is still the monthly rate that calls the shots in the great global seafaring manpower bazaar.

And there are still expeditions being mounted to far flung parts of the globe, looking for hidden sources of seafarers in remote islands or hidden valleys, or perhaps, even, joy of joys, undiscovered peoples famous for their abilities in the operation of enormous marine diesels. But I suspect their searches will all be in vain, and we will just have to make do with whom we already have. But we might, however, try and make their lives aboard ship rather more tolerable.

It often seems to me that there is insufficient connection made between the way we regard the seafaring workforce, even in this YOTS, and the extraordinary difficulty we have in persuading bright young people to go to sea. It is a universal problem, which has been recognised and even quantified by reliable agencies like BIMCO and the International Shipping Federation, but it is one that is getting worse, as the world fleet increases and the demographics work their irreversible way around the world fleet.

And we fail to make the connections with the aspirations of our seafarers, essential workers in an industry which feeds and fuels the world, and which are just the same as ours. We fail to treat them with any generosity, with so many of them maintained as casual labour. We whittle down crew levels well below that which is either safe or socially sustainable, in our fixation with the

cheapest, offering strong hints that if those we employ are too demanding, there is a crew from a cheaper source that will do their job at half the price. We tolerate shore authorities treating them badly over shore leave, and fail to defend them sufficiently robustly against the social enthusiasm for criminalisation of anyone who might make a mistake, or be accused, on however flimsy the evidence, of pollution.

We build ships in which the accommodation and amenities are arguably worse than those which were being delivered forty years ago, and we still don't seem to understand that loyalty is a two way business, especially in our relations with cadets and junior officers, who need opportunities to progress their careers.

I hope that the YOTS will be a time when the whole industry can reflect on these matters, and it jolly well needs to change its ways, for the recession will not last for ever and the seafarer shortage will return with a vengeance that may see ships tied up for want of a competent crew.

The emphasis must be on the word “competent”, because mere bodies will not be enough, in an age of intolerance of any form of marine accident, with liabilities and indeed criminal prosecution being more lavishly spread beyond those who merely “drive” ships. And the best sectors in this industry understand this perfectly and are doing what they can to invest in people, in training and education. Others blunder on as usual, hoping that something will turn up.

Members of this organisation, particularly those operating lighthouse tenders and overseeing maritime safety, attach enormous importance to the maintenance and furtherance of seafaring skills, and understand this word “competence” better than most. I would suggest that here, among your members Mr President, is to be found one of the last refuges of real, old-fashioned seamanship, co-existing alongside great abilities with really advanced navigational technology. But I'm sure you also are very aware of the deficiencies to which you are witness in the wider world, evidenced by marine accidents, which have your vessels rushing out of port with wreck marking buoys, and enormous bow shaped dents which suddenly appear in your navigational marks, and others which unaccountably vanish!

This of course reflects upon competence, and I suppose it is a very relevant question to ask whether the technology found aboard the average merchant ship might be getting ahead of the ability of seafaring mankind to use it. This might appear unfair, and I have to confess it reflects what I have been told, as one who has to take IT advice from small grandchildren, rather than part of my own experience.

“The technology is outstripping the capabilities of ship's staff”. This is a worrying quotation from a technical seminar I attended last month in which great concern was expressed about the difficulties of system design and integration which was evidenced with some of the outfits of machinery and equipment aboard the latest generation of tonnage now coming into service.

The intentions to provide integrated solutions are admirable, but the inability to put this into practice, because of the fragmented links between the various stakeholders actually produce system weaknesses. “We don't take sufficient account of the skill set of the operator” said one of the presenters of this Lloyd's Register paper, which seems to suggest that it is deficiencies in the human element component which is one of the major problems. I believe that the intervention of bodies like IALA, particularly at the time when new equipment is being developed, can be very helpful at injecting practical reality into the eventual solutions.

The problem is often misunderstood by those who specify and purchase ships, who are sold systems that appear superficially attractive, and promise savings in manpower, or improvements in efficiency, that turn out to be conditional on the expertise, and training, of the operator, which extra dimension is sadly ignored. Just putting the equipment aboard ship, the owner is told, is sufficient.

In navigational terms, we had, some years ago, the illusion of the One Man Bridge Operation, which I still maintain was both dangerous and anti-social. But the cost-cutters don't give up, and you can see the same sort of attitudes reflected in a worrying rise in the level of protests by shipowners, at least in my part of the world, that visual aids to navigation such as lighthouses and buoys are now redundant, and they shouldn't have to pay for them.

I have to say, as diplomatically as I can, that there is a degree of hubris in such an attitude - I think it is nonsense on stilts – and there is plenty of evidence of the same, in the shape of not infrequent casualties involving lavishly equipped ships. You might remember the picture of the big containership “embedded” in the white cliffs of a Mediterranean island, or the computer controlled post-Panamax monster sitting forlornly on the Varne bank in the English Channel, after the technology got rather out of hand. I would suggest that the very fashionable “e-navigation” is fine, but it should not entirely replace “I-navigation” – “I” for looking out of the window from time to time.

We live in technologically advanced times, but we should not forget first principles, and I note that IALA places great value on the assessment and management of risk which you infer should be central to any technical advances. We shouldn’t just blunder into the adoption of sophisticated equipment, because it is there, without considering the consequences. The interval between the first “radar assisted collision” to the first “computer aided grounding” was very many years but you might have thought we would have learned something!

In your excellent conclusions from your Shanghai conference, you also strongly endorsed the importance of training in aids to navigation, which you describe as an “ongoing challenge”. I suspect that two years on, you would probably agree that this challenge is still ongoing! In fact, I would venture to suggest that the need for navaid training is even greater, as we move further into the digital age.

GPS is clearly the favourite fix of the present, and has come a long way since the first outfit I ever saw, which was a huge device twice the size of a double wardrobe installed aboard the QE2 in about 1975. But it does sometimes fail. Just last month, so I was told, and curiously coincidental to the US decision to turn off Loran-C, GPS all around San Diego went absolutely berserk. San Diego is a sizeable American city, and the headquarters of at least one US Pacific Fleet, but I understand the chaos, both afloat and ashore, was considerable.

Alternatives, which might involve a bit more seamanship, or navigation aids which might not be quite so vulnerable, like e-Loran, could be a very worthwhile element of insurance in a world in which we could see lunatics with electronic jamming devices causing mayhem. Your organisation, Mr President, can have a very important role in setting out these practical problems in the appropriate international fora.

Indeed, it is in its international scope and practical background, that IALA brings so much practical good sense to these important debates about a number of navigational dilemmas facing the industry. The long and distinguished record of IALA in promoting harmonisation becomes very relevant as we move into the age of virtual aids to navigation, a core element of e-navigation and one that badly needs the best possible practical input. In recent years there has been something of a concern at the lack of harmony, with non-standard equipment making it harder and harder for officers to be safely switched between ships without extensive retraining. This is a practical problem that could get worse, before it gets better.

There has sometimes been a sense that it has been the manufacturers who have been often calling the shots, with the bewildered users forced to put up with what they are told they need. IALA and its practical expertise, conferred by its working members, is doing a great deal to restore order to this confusing situation, providing real leadership and guidance. The sense that the IALA membership is going in the same direction, towards common aims, will prove to be so important in the near future, as vital decisions have to be made about the shipping industry’s employment of exciting new technology.

We badly need more harmonisation, in a global industry which is always threatened by unilateralism and regionalism, and an industry moreover, where, in extremis, we inevitably panic in our own language! Which might be a perfect cue to mention the useful and important work being done in the harmonisation of Vessel Traffic Services, with the development of model courses, and the practical enhancement of communications between ship and VTS ashore.

How obvious and useful it is, when you think of the harmonisation of buoyage that will lead the mariner into port, to be able to pick up your VHF handset with the confidence that the VTS, or

indeed Vessel Traffic Management ashore, will be to the same universal high standard, no matter where you are. That really is something worth aiming for.

The fact that IALA is largely composed of a network of like minded members, who pursue a technical, practical and non-political agenda, must be considered the glue that binds the organisation together, and makes it work so well. If you are looking for a demonstration of how this can work, you need not look beyond the recent IALA meeting on the marking of polar routes, and the resolution it produced. There was no grandstanding about global warming, or the fate of the polar bears, no political interventions about whether Baffin Island is owned by the Canadians or Americans, or sovereignty over sub-polar oilfields.

It was experts from five Arctic nations getting together because they recognised that between them, they can make Arctic navigation safer. It was an important initiative that has borne much fruit. It sort of makes you wonder whether IALA could have its remit expanded to take over the governance of other knotty problems, outside that of our maritime industry, like economics or world banking.....? But perhaps its success lies in the fact that it sticks to the things it knows about, and to which it can bring real expertise and practical knowledge.

Mr President, ladies and gentlemen, I have spoken for long enough. There is a huge amount to look forward to this week, in an exciting agenda, that has been designed with a great deal of thought, my only slight sorrow being that if our excellent South African hosts had extended the programme with a few more sessions, we might have been able to take in a World Cup game or two.

If I have any conclusions to leave you with it is not to put all your trust in technology, value your seafarers and not just during this celebratory year. And continue to exercise real leadership at places like IMO and elsewhere, where your practical expertise is so very valuable. And please Mr President, forgive my hyperbole, but remember that I work as a journalist. Thank you for listening.

ANNEX E **TRIBUTE TO TORSTEN KRUUSE**

After a 20 year career as a gunnery officer in the Royal Danish Navy, and a period with Danish Railways, Torsten Kruuse was appointed Director General of the Royal Danish Navigation and Hydrography Administration in 1987 – and so he took the Danish seat on the IALA Council. I wonder if IALA knew what was to happen! Seven years later, in 1994, he was appointed Secretary General. Since then he has been at the cutting edge of navigation safety in an era which has seen the massive increase in shipping worldwide and the need to keep it safe at sea. Developing the risk control measures to meet this expansion has been at the heart of IALA work, with Torsten in command. That work has included the embrace of GPS, the advance in light and buoy technology, the rationalisation of the standards needed of VTSS worldwide, the development of AIS before it hit an unsuspecting maritime community, the development of e-Navigation from concept to IMO acceptance, and organising maritime support to repair navigation aids across South Asia after the 2004 tsunami. Down the years Torsten has overseen the issue of a vast selection of documents, recommendations and guidelines. He has organised and delivered a broad range of workshops and seminars ranging from e-Navigation to VTS, from polar navigation to quality management. And of course every four years he has presented the IALA conference – this is his fifth.

Torsten has led on many navigation projects that have needed to be developed, tested and standardised worldwide – no mean task for a non-government organisation in a small HQ in west Paris. That today IALA stands alongside the IMO and IHO in international recognition reflects that the maritime community owes you, Torsten, a huge debt of gratitude and appreciation for your outstanding work over the last 16 years at the helm of IALA, and 23 years – that's nearly half of its life – with the organisation.

Already honoured with a Danish knighthood, last October you were made a Knight, or Chevalier, of the Ordre de Mérite Maritime in France. Last month you were elected a Younger Brother of Trinity House and at yesterday's Council meeting elected an Honorary Member of IALA. All these are lasting testaments to the high regard with which you, and IALA, are held in the international maritime community.

Torsten, you have set IALA's course for the challenges of the 21st century, and the pilot boat now awaits. The crew of the good ship IALA are lining the decks to cheer you off, and you can return to harbour, to Kirsten and your family, knowing that you have done well for us all.

You have one further act to perform, which is to open the industrial members' exhibition shortly, but in recognition of your time and success at IALA, we present you with this special crest – from all in IALA.

ANNEX F REPORT OF THE 11TH IALA GENERAL ASSEMBLY (PART 1)

Session 1 of the 11th IALA General Assembly was held on 22nd March, 2010, at the Cape Town International Convention Centre in Cape Town, South Africa.

1 OPENING

The General Assembly was opened at 15:30 by Torsten Kruuse, Secretary General of IALA.

Mr. Kruuse reminded the members present that IALA General Assemblies are held in two sessions. The first session is devoted to the presentation of the financial status of the Association, of specific developments other than technical and to the vote on amendments to the Constitution. He explained that no changes had been planned to the Constitution; therefore there would be no vote during this session of the Assembly. The second session is devoted to the election of the Council, which will lead the Association during the period 2010-2014.

2 PRESENTATION OF THE IALA ACCOUNTS 2006-2009

The accounts were presented by Admiral Sir Jeremy de Halpert, IALA Treasurer and Chairman of the Financial Advisory Committee.

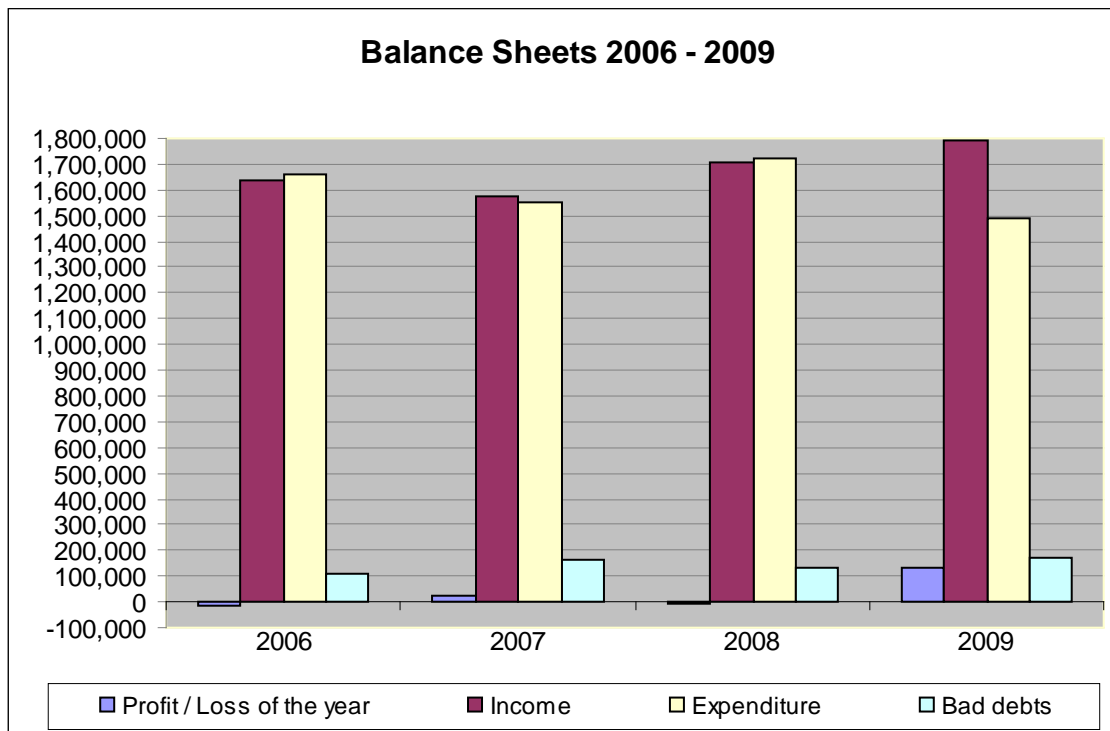
The Treasurer began his presentation by explaining that the Association was working with a very tight budget, which requires paying attention to details. He reported a good co-operation with the IALA Secretariat and thanked Marie-Helene Grillet for her support in the production of the finance reports to the Council and the General Assembly.

He then explained that this finance report to the General Assembly was important information to the IALA Members' finance departments or Government Accountant.

The Treasurer reflected on the Finance Advisory Panel (FAC): consisting of 5 members elected from among the Council for a renewable 4 year period, the FAC is a monitoring and advising committee to the Council. The FAC is led by a Treasurer elected from among its members. The Treasurer maintains close liaison with the IALA Secretariat, audits the accounts before the FAC meets, is made aware of any tax or legal potential issues through regular meetings with the Chartered Accountant, and may authorize expenses not provided for in the budget, within certain limits. The Council however is the sole body responsible for approving the budget for the next year and the forecast for the next 4 years, approving the balance sheet and deciding on increases in subscriptions.

The Treasurer then presented the accounts for the period 2006-2009. The annual turnover was 1,43 M Euros (equivalent to 1,30 M Pounds or 1,96 M US Dollars). IALA maintains a 1,7 M Euro reserve, according to its requirement of being able to operate without any funding for 12 months. The amount of reserve was better than when the General Assembly met last, when the reserve allowed for an 8 month operation only.

IALA however is not a big company and cannot afford to make big losses. The following graphs showing the results of accounts for the years 2006 to 2009 make clear that IALA finances are sound but put some limitations to expanding the service to members.



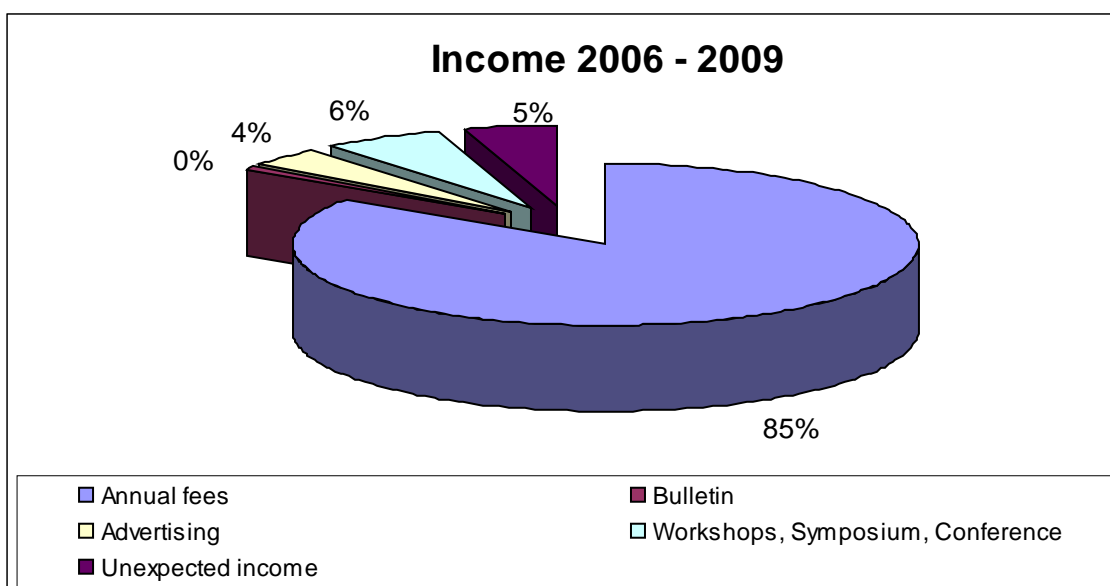
The income (in red) generates IALA activities and a better service to the members. It varies from one year to another.

The expenditure (in yellow) is limited by the available income not to use the reserve.

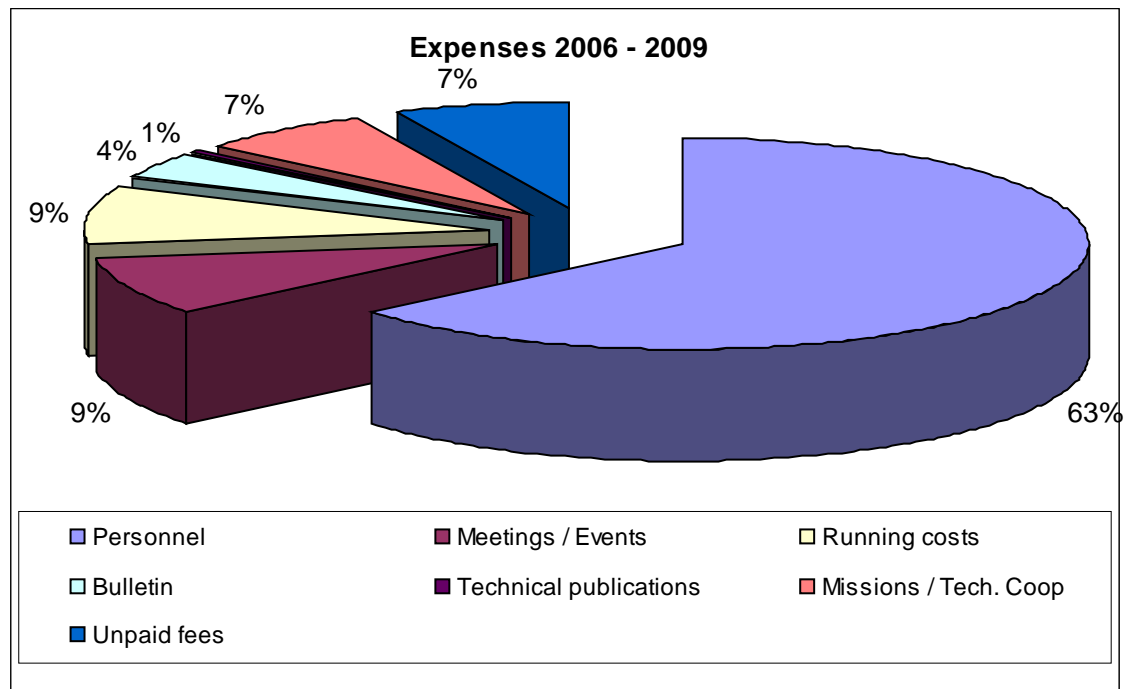
The profit/loss is kept as little as possible. The exceptionally high profit in 2009 is due to the massive arrival of new Industrial Members and other exceptional income, which will not reproduce in the next years. It is also due to a tight management by the Secretariat.

The bad debts are the members who are not paying their membership fees and thus reduce the amount of service IALA can provide.

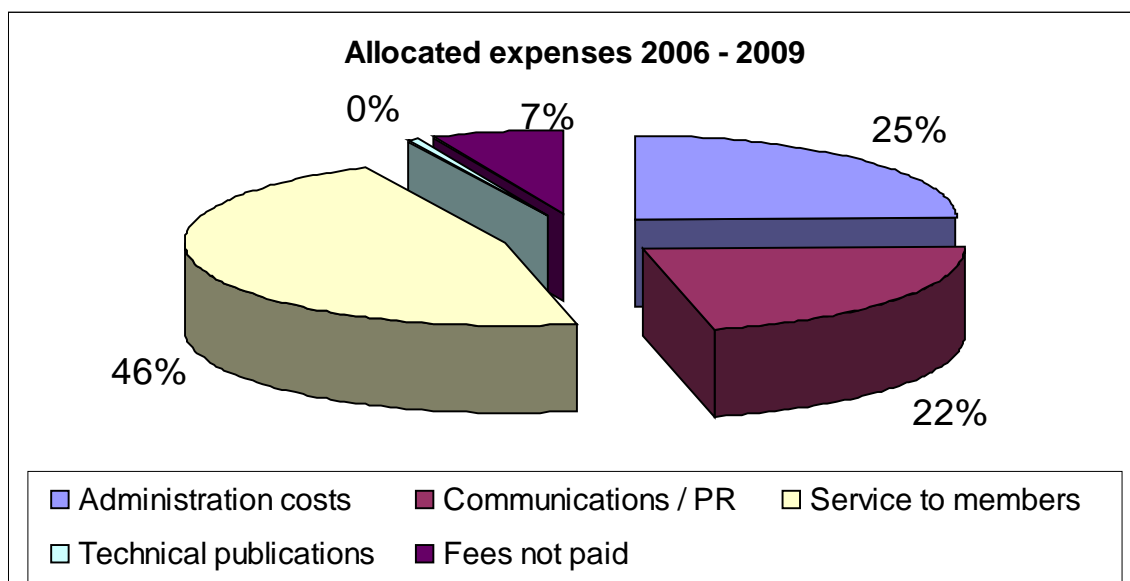
The next graph shows the sources of IALA income. It is clear that the membership fees are vital for IALA: they represent 85% of its income.



The next graph gives an idea of where the income is spent. The IALA personnel must be seen as the engine room for all activities.

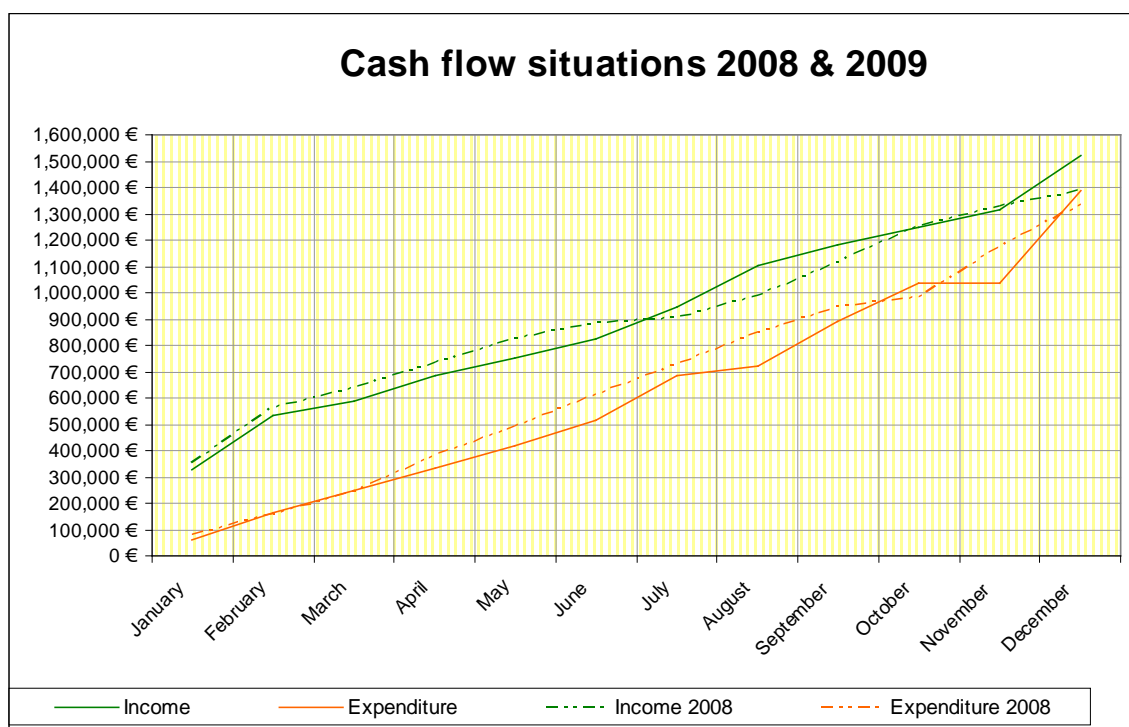


It plays a big role in Committees, Conferences and Workshops, and in the production of all IALA documents. The staff in themselves (8 staff members) is a major source of output.



The graph above is a real picture of where the money goes. It shows a slim but efficient organization, focused on output.

Because of small reserves cash flow is vital. The Secretariat produces cash flow situations every month. They are valuable tools to foresee the result of the year, monitor the income and expenditure, ensure that the budget is not exceeded, give the Council real time information on the IALA accounts and adjust the budget according to actual figures.



The solid lines are the figures for 2009 and the dotted lines are those for 2008.

All activities are planned 1 to 3 years in advance. Members are requested to pay by 31 January of each year, with the aim of starting the year with more than 300,000 Euros. Should that not be the case, the activities have to be curtailed during the year. The income and expenditure lines come close in July-August, reducing the cash flow.

Essential activity in the last quarter led to a minor loss in 2008.

The Treasurer concluded in saying that IALA is a small but very effective organization on which the Secretary General exercises good financial control. The membership fees are vital to ensure that the annual programme is carried out. It is essential that members pay early.

3 PRESENTATION OF THE IALA STRATEGY

The Chairman of the IALA Council Group on Strategy, Christian Forst, gave an overview of the work of the Group, which resulted in the Strategy document delivered at the General Assembly.

He recalled that the current IALA Council Strategy Group was formed in 2007 after the Shanghai Conference. The Group met regularly at each Council meeting, together with all Councillors. It also held meetings between the Council sessions and met once a year with the IALA Policy Advisory Panel, which consists of all Committee Chairs and Vice Chairs.

The working procedure adopted by the Strategy Group was as follows:

- Identify relevant strategic items for consideration by Council task groups;
- Make cost/benefit analysis for each item;
- Prioritise the strategic items;
- Consider their impact on the work of IALA;
- Allocate responsibility to one or more IALA « tools » (Committees, Workshops/Seminars, Secretariat, etc.);
- Check that the IALA structure is adequate and establish Work Programmes according to priorities.

After the Group had gone through the procedure a master Strategy document was prepared in 2009. The document consists of three parts:

- A vision statement: An outlook regarding the expected developments in shipping, maritime safety and related matters over the next 20 years.
- A high level strategy: An overall, long-term strategy covering the focus of IALA's activities
- An implementation plan: A summary of strategic items as prioritized by the Council to be dealt with in a 4 year period between General Assemblies.

The **Vision statement** foresees that the maritime traffic will continue to expand with the contribution of emerging economies. The passage to e-Navigation will be slow but most of the necessary tools exist and are operational (e.g. AIS) or nearly achieved, such as ECDIS that has significantly improved. Virtual aids to navigation are also about to come on the scene and have to be taken in to account. At the same time more reliance will be given to GPS while its vulnerability will need to be tested.

The **High level strategy** states that some of the most important goals for the next 4 years should be to:

- Promote the role and image of IALA on international scene;
- Strengthen IALA relationship with IMO and IHO and other international and regional bodies;
- Identify user requirements for the best possible service;
- Lead developments in digital Aid to Navigation;
- Maintain standards for traditional and enhanced Aid to Navigation services;
- Promote environmentally sound delivery of Aid to Navigation services.

The **Implementation plan** describes how to achieve the goals listed in the high level strategy. It summarizes the strategy implementation as follows:

- Enhance the position of IALA as the competent international marine aids to navigation association by:
 - Being at the forefront in the harmonised and standardised development of aids to navigation (AtoN), both traditional AtoN and e-Navigation and evaluate new technologies.
 - Promoting the free movement of maritime information and data across national borders to increase international cooperation. This calls for standards for data format and exchange.
 - Developing methods and criteria to gather and analyze user requirements, and thus understand the very essence of safety of navigation and the marine risk.
- Develop and publish guidelines and recommendations on specific items, for example:
 - Development of e-Navigation, including: maritime information systems, position, navigation & timing systems, communications and architecture.
 - Implementation of systems such as e-ANSI, and AIS as an AtoN, integrating traditional aids and new technologies as elements of the same system.
 - Relationships between AtoN, VTS, traffic monitoring, pilotage services, routeing, channel features and its application to the ships using these services.
 - Risk management as part of the planning for and provision of AtoNs, including, but not limited to further development of the IALA Risk Management Toolbox and promote its use by members, whilst ensuring that the methods used are standardised.
- Promote the development of multi-purpose systems

- Leading the development of future electronic systems that will alter the mix of AtoN and maritime information systems.
- Determining the relevance of traditional AtoN alongside future digital electronic navigation systems.
- • Assist other services or organizations
 - Increasing the cooperation with and participation in IMO, ITU and IHO.
 - Further developing the effective compatibility between IALA and IMO, ITU and IHO, so that the recommendations and guidelines of IALA are adhered to by national authorities.
- Implement the IALA World Wide Academy

4 STATUS OF IALA HEADQUARTERS

The Secretary General Elect, Gary Prosser, reported on the work made recently on a possible relocation of IALA Headquarters.

The past 4 year period has seen changes in its working pattern: the Committees have increased in number of participants (up to 100 in the e-Navigation Committee) and more meetings were held outside the Committees.

The changes made to the Constitution in 2006 allow for the Council to decide upon the location of the Headquarters and registered office of IALA.

In 2008 an offer was received from The Netherlands to host IALA. The Secretary General Elect went to Rotterdam in 2009 on an inspection visit. Also in 2009 France offered its assistance to IALA to keep its Headquarters in the country.

Both offers were submitted to the Council at its 47th session and the outcome was the following: although the Council greatly appreciated the generous offer of The Netherlands, it agreed to pursue as “a preferred option” the French proposal. The Council decided to setup a facilitation group made of the Secretary General and a small number of members of the Strategy group to pursue the best option for IALA and report back to the 49th session with a progress update.

IALA is currently investigating a number of options in Saint-Germain-en-Laye, which is the town where IALA hold its present Headquarters.

5 INVITATION TO NOMINATIONS FOR THE IALA COUNCIL 2010-2014

The IALA Administration Manager, Marie-Helene Grillet, took the floor to explain how and when the new Council was to be elected.

She reminded the members that the IALA Council consists of 24 Councillors drawn from among the National Members, seating on the IALA governing body for a renewable four year period. Among the 24 two are nominated and twenty-two are elected the National Members present at the General Assembly.

Application forms for the IALA Council were to be made available from the IALA Secretariat, room 1.72.

The forms have to be filled in by the Head of the National Member wishing to apply and returned to the IALA Secretariat by 17h00 on Friday 27th March.

On the basis of the applications received a voting sheet will be developed. National Members present at the second session of the General Assembly will be requested to tick up to 22 of the administration names appearing on the nominations' list. Any voting sheet on which more than 22 names have been ticked will be invalid and taken out. In the case of a country having more than one candidate the voting sheet will show its different candidates under the country name. In this specific case the members will tick one only of the administration names given for that country. At

the auditorium entrance voting members will be provided with voting cards, on the basis of one per delegation. The voting cards will be handed over together with the voting sheets.

Immediately after the voting procedure the IALA President, Vice President, Secretary General and staff members will leave the auditorium to count the votes. The count will be made by the IALA staff members, witnessed by the President and Vice President.

It was reminded that only National Members present at the General Assembly are able to vote and to be elected.

6 ADOPTION OF REVISED IALA MARITIME BUOYAGE SYSTEM

IALA National Members present were reminded of the presentation made during the Conference plenary session on 22nd March 2010 of the revised IALA Maritime Buoyage System. The new edition of the system was to be considered as an amendment to the Buoyage Agreement signed on 15th April 1982 and as such required to be formally approved by two thirds of the IALA National Members present at the General Assembly. Members were requested to let the Assembly know if there was any objection to adopt the new system.

No one of the members present did object to this General Assembly decision and the revised IALA Maritime Buoyage System was formally adopted. The Secretary General was tasked to inform all parties to the Agreement of this new edition.

7 ANY OTHER BUSINESS

The US Coast Guard representative asked for the floor in order to express his organization's appreciation to the outgoing Secretary General. He presented him, on behalf of the Commandant of the United States Coast Guard, the Distinguished Public Service Award in recognition of the support Torsten Kruuse had given to both IALA and the US Coast Guard.



ANNEX G **REPORT OF THE 11TH IALA GENERAL ASSEMBLY (PART 2)**

REPORT OF SESSION 2

Session 2 of the 11th IALA General Assembly was held on 27th March, 2010, at the Cape Town International Convention Centre in Cape Town, South Africa.

1 OPENING

Captain LIU announced that this was the second and final session of the 11th IALA General Assembly. He reminded the participants that the first session was held on Tuesday 22nd March and a report in English was given to all delegates through the pigeon holes. A report in French was available in the foyer next to the auditorium entrance.

He said that the purpose of this second session was to elect the new IALA Council, which will lead the Association for the next 4 years, until the 18th IALA Conference in 2014 in Spain, where the next General Assembly will be held.

It would also be the occasion to get the formal invitations to the next VTS Symposium in 2012 and the next IALA Conference.

He then announced that the vote was about to start and the floor to Marie-Helene GRILLET, IALA Administration Manager, to explain the voting procedure.

2 ELECTION OF THE IALA COUNCIL 2010-2014

Marie-Hélène Grillet reminded the participants that the IALA Council consisted of 24 National Members leading the Association for a four year period. Among the 24, 22 are elected and 2 are nominated - the current and next Conferences' hosts.

The outgoing Council was drawn from all continents, achieving a good representation of the number of members on each continent. During the last four year period the Council met in several different places (China, France, Japan, South Africa, Chile...). The Council sessions were always well attended, showing that being a Council member is considered by the Councillors as it should: a real commitment.

She then explained how to use the voting sheets and voting cards and called the National Members present to go to the ballot box with their voting sheet and card in order to elect the new IALA Council for the period 2010-2014.

The following National Members took part in the vote:

- | | |
|--------------------|---|
| - Algeria: | Office National de Signalisation Maritime |
| - Australia: | Maritime Safety Authority |
| - Argentina: | Seguridad Nautica Armada Argentina, Servicio de Hidrografia Naval |
| - Benin: | Port Autonome de Cotonou |
| - Canada: | Canadian Coast Guard, Marine Services |
| - Cuba: | Oficina Nacional Hidrografia y Geodesia |
| - Chile: | Armada de Chile, Direccion General del Territorio Maritimo y de Marina Mercante |
| - Brazil: | Centro de Sinalizaçao Nautica e Reparos "Alte Moraes Rego" |
| - Côte d'Ivoire: | Port Autonome d'Abidjan |
| - China (P.R. of): | Maritime Safety Administration, Ministry of Communications |
| - Denmark: | Danish Maritime Safety Administration |

| | |
|--------------------|---|
| - England & Wales: | Trinity House Lighthouse Service |
| - Estonia: | Aids to Navigation and Hydrographic division |
| - Finland: | Finnish Maritime Administration |
| - France: | Direction des Affaires Maritimes |
| - Germany : | Wasser-und Schifffahrstdirektionen Nord/nordwest |
| - India: | Department of Lighthouses and Lightships |
| - Ireland: | Commissioners of Irish Lights |
| - Italy: | Italian Coast Guard |
| - Japan: | Japan Coast Guard, Maritime Traffic Department |
| - Korea (Rep. of): | Ministry of Land, Transport and Maritime Affairs |
| - Malaysia: | Light Dues Board, Peninsular Malaysia |
| - Netherlands: | Ministry of Transport, Public Works & Water Management |
| - Norway: | Harbour, Lighthouse & Pilotage Services, Kystdirektoratet |
| - Oman (Sultanat): | Arabian Maritime and Navigation Aids Services |
| - Papua N. Guinea: | National Maritime Safety Authority |
| - Poland: | Urząd Morski w Gdyni |
| - Portugal: | Direcção de Faróis |
| - Russia: | Principal Department of Navigation and Oceanography |
| - Scotland: | Northern Lighthouse Board |
| - Senegal: | Port Autonome de Dakar, Service de Sécurité Maritime |
| - South Africa: | Transnet National Ports Authority |
| - Spain: | Puertos del Estado, Area de Ayudas a la Navegacion |
| - Sweden: | Swedish Maritime administration |
| - Sweden: | Swedish Transport Agency |
| - Thailand: | Royal Thai Navy, Hydrographic Department |
| - Turkey: | Directorate General of Coastal Safety |
| - Ukraine: | State Hydrographic Institute of Ukraine |
| - U.S.A. | The U.S. Coast Guard |
| - Uruguay: | Servicio de Iluminacion y Balizamiento |
| - Venezuela: | Dirección de Hidrografía y Navegación |
| - Vietnam: | MSC-1 |

To elect 22 candidates among the following:

| | |
|--------------------|---|
| - Australia: | Maritime Safety Authority |
| - Brazil: | Centro de Sinalização Náutica e Reparos “Alte Moraes Rego” |
| - Canada: | Canadian Coast Guard, Marine Services |
| - Chile: | Armada de Chile, Dirección General del Territorio Marítimo y de Marina Mercante |
| - China (P.R. of): | Maritime Safety Administration, Ministry of Communications |

- Denmark: Danish Maritime Safety Administration
- Finland: Finnish Maritime Administration
- France: Direction des Affaires Maritimes
- Germany : Wasser-und Schifffahrstdirektionen Nord/Nordwest
- India: Department of Lighthouses and Lightships
- Ireland: Commissioners of Irish Lights
- Italy: Italian Coast Guard
- Japan: Japan Coast Guard, Maritime Traffic Department
- Korea (Rep. of): Ministry of Land, Transport and Maritime Affairs
- Malaysia: Light Dues Board, Peninsular Malaysia
- Netherlands: Ministry of Transport, Public Works & Water Management
- Norway: Harbour, Lighthouse & Pilotage Services, Kystdirektoratet
- Russia: Principal Department of Navigation and Oceanography
- Senegal: Port Autonome de Dakar, Service de Sécurité Maritime
- Sweden: Swedish Maritime administration
- Turkey: Directorate General of Coastal Safety
- England & Wales: Trinity House Lighthouse Service
- Uruguay: Servicio de Iluminacion y Balizamiento
- U.S.A: The U.S. Coast Guard

The Secretariat, consisting of Marie-Hélène GRILLET, Jean-Charles LECLAIR and Paul RIDGWAY, assisted by Lorraine MBONG and James COLLOCOTT, IALA Vice President acting as a witness, left the room to count the votes.

When they returned, Gary PROSSER announced that the IALA Council 2010-2014 would consist of:

Designated members:

- South Africa: Transnet National Port Authority
- Spain: Puertos del Estado

Elected Members:

- Australia: Maritime Safety Authority
- Brazil: Centro de Sinalizaçao Nautica e Reparos “Alte Moraes Rego”
- Canada: Canadian Coast Guard, Marine Services
- Chile: Armada de Chile, Direccion General del Territorio Maritimo y de Marina Mercante
- China (P.R. of): Maritime Safety Administration, Ministry of Communications
- Denmark: Danish Maritime Safety Administration
- Finland: Finnish Maritime Administration
- France: Direction des Affaires Maritimes
- Germany: Wasser-und Schifffahrstdirektionen Nord/Nordwest
- India: Department of Lighthouses and Lightships

- Ireland: Commissioners of Irish Lights
- Japan: Japan Coast Guard, Maritime Traffic Department
- Korea (Rep. of): Ministry of Land, Transport and Maritime Affairs
- Malaysia: Light Dues Board, Peninsular Malaysia
- Netherlands: Ministry of Transport, Public Works & Water Management
- Norway: Harbour, Lighthouse & Pilotage Services, Kystdirektoratet
- Russia: Principal Department of Navigation and Oceanography
- Senegal: Port Autonome de Dakar, Service de Sécurité Maritime
- Sweden: Swedish Maritime administration
- Turkey: Directorate General of Coastal Safety
- England & Wales: Trinity House Lighthouse Service
- Uruguay: Servicio de Iluminación y Balizamiento
- U.S.A: The U.S. Coast Guard

All Councillors were requested to go on the stage for an official photograph. The first Council meeting, gathered to elect the IALA President, Vice-President and Finance Advisory Committee, was to take place the same day at 15h30.

3 INVITATION TO THE 2012 VTS SYMPOSIUM, TURKEY, SEPTEMBER 2012



Captain Salih Oracki, Director General, Directorate General for Coastal Safety, Turkey, introduced Istanbul as the venue for the next VTS Symposium - VTS2012, between 10 – 14 September. He concluded his presentation by inviting all IALA members to take part in the Symposium.

The text of Captain Oracki's address is at ANNEX J

4 INVITATION TO THE 2014 IALA CONFERENCE, SPAIN, 2014

Mr Manuel Gómez, Deputy Director, Puertos del Estado, Spain, invited delegates to the 18th IALA Conference, to be held in Spain. All IALA members were invited to Spain to participate in the conference and the IALA General Assembly.

The text of Mr Gomez' address is at ANNEX K

Captain LIU Gongchen, IALA President, closed the General Assembly at 12h30 on 27th March 2010.

**ANNEX H ADDRESS BY CAPTAIN BROPHY, CHIEF HARBOUR MASTER,
TRANSNET PORTS AUTHORITY**

Good Evening all, Chairman , Secretary General Delegates , ladies and gentlemen it is my pleasure to welcome you to Africa , South Africa , Cape Town and to this wonderful venue of Moyo for our official conference dinner

Some of you will already have experienced the individual and unique ambience of Moyo. Last year the IALA council holds their official dinner here.

Moyo is situated in the heart of the wine lands of the Western Cape Province. Noble and great wines are produced from the wine yards of this famous area.

Grape cultivation and wine production in the Western Cape largely owes its origin to the arrival and of the settlement French Huguenots fleeing the turbulence of religious strife in France.

Tonight I urge you to take the opportunity to imbibe the outlay of the time wines on offer.

It is with expectations that I am, as I am sure you all are, looking forward to the next 5 days of the conference and the import of the papers that are being presented, particularly in all matters affecting the seafarer in this designated year of the seafarer.

Again welcome to you all and I invite you to drink from the well of Africa.

Algoa Bay and Natal. Mossel Bay was the first recorded post office in South Africa. It is here that is navigators left message for each other in a shoe place under all now over 500 years old Millwood tree.

The different name given to this Cape of Southern Africa reflects the varying mood of its surrounding seas and land with such name as The Cape Storms, The Fairest Cape and The Cape of Good Hope. Place yourself on the ships of the 15th century Portuguese Navigators Vasco da Game and Da Nova to name but two. Imagine their terror when it is the Cape of storms, their joy when it's the Jurist Cape and their geatilade when it was the Cape of Good Hope.

You will have arrived here by jet plane large and very large. To have arrived here by ship would have been a wonderful and memorable experience. But sadly to travel South Africa by ships belongs to the past.

You would have felt the warm, embracing and welcoming light from the lighthouses of Cape Columbine, Dassen Island, Robben Island and Green Point as your ship neared and steamed into Table Bay.

During my seafaring days and as a navigator on board ship some of the passengers were able to stand with me on the early morning watch in order to witness coming out of the dawn horizon the slow majestic appearance of Table Mountain.

A never to be forgotten lifetime vision.

During your stay here I invite you all to take in the sights and services offered in what I like to as the Navigators Coast. We still have rich Navigators in place such as Saldanha Bay, Mossel Bay (Translated from the Portuguese name) Algoa and Natal.

**ANNEX I ADDRESS BY ALDERMAN IAN NEILSON, EXECUTIVE DEPUTY
MAYOR OF CAPE TOWN**

Good Evening Ladies and Gentlemen. I am very pleased to be a part of this Conference, and thank the organisers for inviting me to address you this evening.

I welcome you all to Cape Town and hope that you will not only have a very constructive conference, but that you will also have the opportunity of seeing around our City and its hinterland. It is wonderful to again welcome visitors to our shores. I trust that you will enjoy with us the great bounty of sea, land and mountain that God has given us in this part of the world.

This year, 2010, is of course a very important year for us, as we are hosting the FIFA 2010 World Cup. We have completed a grand new stadium where we will be hosting 8 matches of the Cup. We hope to have 300 000 visitors here during the World Cup, and our hope is, as we have for you, that all will go home with wonderful memories that tug at you to come back again. It will be the best World Cup ever.

Cape Town's history is intimately linked to that of the sea and maritime history. We have many appellations, but one that we are fond of is that Cape Town is known as The Tavern of the Seas. I hope you will enjoy all the conviviality and hospitality that is encompassed in those few words.

Cape Town has over the past 10 years established itself as one of the top international conference destinations and various awards the past few years have placed us in the top two or three world destinations. Cape Town is also positioned as a City of Great Events and we have a strengthening and growing events program, especially sport and cultural events, throughout the year.

We are a city with the greatest diversity of races, cultures and religions. A city of openness where there is a great tolerance for others. A unique and iconic city where Africa meets the East and the West. We are a First World city in a developing country and experience all the advantages and contradictions that that brings.

People have lived here for thousands of years. The indigenous inhabitants were the Khoi and San who were pastoralists and fishermen. Cape Town's origin in its modern form is as a halfway refreshment station for ships sailing between Europe and the East. It was a modest beginning as a City at the foot of Table Mountain 350 years ago and its founders had no plans for what subsequently occurred.

A small group of European settlers started a colony of the Dutch East Indies Company. They were augmented by a group of French Huguenots fleeing religious oppression and who went on to develop the Cape into a great wine producing area. Slaves were brought here from Madagascar, the Dutch East Indies, India, Mozambique and many other places. Bantu-speaking people moved here from the interior of the country. The British conquered the Cape in 1806 and many British and Irish settlers followed. We, the descendants of this wide mix of people, are today the 3.5 million inhabitants of Cape Town, one of the most diverse societies on earth.

And it is our position as a port, a maritime city, that made us what we are.

From those early origins of supplying water and fresh food to ships, our economy has of course expanded over the last 3½ centuries. Wine, fruit and wheat production are key mainstays of our agricultural economy, much of which is exported via the Port of Cape Town. But we also have a diverse services economy, four universities and three teaching hospitals.

The Government of the City of Cape Town has looked closely at how we need to proceed in the further growth of our City.

When we consider the development of cities, we have to first examine their current development status. Just as individuals have a hierarchy of needs, as spelt out by Maslow in 1943, so do cities. The value of any intervention or promotion of any sector can succeed or fail based on correctly identifying how it is positioned in such a hierarchy and what it needs to unlock opportunity.

Richard Florida, a US academic who studies the growth of cities and city regions, describes five key factors that are at stake which make a city or region attractive in which to live. These are economic and physical security; aesthetics; openness; basic services; and civic leadership.

Broadly, worldwide, the manufacturing sector is in decline and the growing sectors that provide promise for the future are the services sector and the creative sector. The post world war economy ran on coal and fuel. The fuel of the 21st century economy will be knowledge and innovation. The services and creative sectors have different needs and require different approaches if promotion is to succeed.

In the City of Cape Town, we have recognised that both the service sectors and the creative sectors provide us with enormous opportunity for growth.

In the service sector, we have the basis for growth built on education and health. The tourism industry is already producing many jobs including those in the conference and exhibition industry. Business processing and the call industry are proving to be solid opportunities for further growth.

The City of Cape Town recognises that people are its single most important asset. Therefore, we have developed a key strategy of developing, attracting and retaining talent in Cape Town. One of the initiatives we have started with is to form better relationships with our institutions of higher learning to harness this talent. The City of Cape Town believes the availability of a globally competitive human resources or talent will be a significant enabler for economic growth. This will lead to further job creation and economic growth.

But our real opportunity is in the creative sector, an area where we already have a promising start. We have to now facilitate business incubators and creative eco-systems to build on our solid education base, keep our graduates in town and “grow our own timber” for the vast creative industry of the future. Entrepreneurship has been earmarked as a key area of intervention.

The current Cape Town city government has driven a clear strategy to build on a Maslow type hierarchy. Our first priority was to get the basics right: a platform for economic growth based on three legs of infrastructure provision; effective and clean government institutions; and efficient regulation that enables rather than controls.

We have driven a very strong infrastructure program to advance basic service provision – water, sanitation, cleansing, electricity and housing. We have more recently moved the focus to connectivity, including a major public transport program.

Currently we are making great strides in broadband connectivity to the rest of the world, something we have until now lagged behind. Major international cables are being installed along both our east and west coasts to link us better the rest of the world. And within the city, hundreds of kilometres of both private sector and government broad-band cables are being laid. By the end of 2011, we expect to have connectivity on a par with many 1st World countries.

The Cape region is also the Silicon Valley of Africa. Together with a strong promotion of entrepreneurship, these elements combine to provide the platform for the ICT sector being a key growth area in our economy over the next few decades. The City is strongly committed to supporting this sectoral growth. Our sights are now also turning more strongly to physical security and law enforcement.

Cape Town is thus close to addressing the Richard Florida's five key factors. Nature has provided us with the aesthetics and our history has provided openness. We have strong civic leadership and basic service provision is in hand. As we turn our attention to physical security we will also close the circle on providing the conditions for economic security.

But, whatever our eventual economic success, Cape Town remains The Tavern of the Seas. And we will continue to welcome the world to our shores.

I hope that will be your experience too.

Thank you very much.

**ANNEX J ADDRESS BY CAPTAIN SALIH ORAKCI, DIRECTOR GENERAL OF
COASTAL SAFETY, TURKEY**

Dear President, Secretary General, Ladies and Gentlemen.

Good morning to all,

First of all, I would like to thank to Transnet, National Ports Authority of South Africa and Organization Committee for their hospitality and their best efforts to organize such a distinguish conference successfully in a wonderful city as Cape Town.

I have worked at sea more than 15 years as a master mariner, but this is my first time been in Cape Town so I have been very impressed by the natural beauty, harmonization of people from all around the world, mixture of traditional and modern life altogether. I think we all will back our countries with wonderful memories.

Although he is not among us right now, I would also like to thank to Mr. Torsten Kruuse who retired as IALA Secretary-General, on behalf of my Administration for his successful works, by taking the opportunity of this Conference.

On the other hand Mr. Gary Prosser, I also congratulate you for your new position and I wish you best success.

In this Conference, a lot of distinguish speakers shared their experiences and knowledge with us on the very important topics such as;

- Maritime accident and near misses;
- Risk and quality management;
- The future of visual Aids to Navigation;
- Developments on the virtual Aids to Navigation;
- Vessel Traffic Management;
- Maximizing the potential of AIS;
- e-Navigation;
- and emerging technologies for the Aids to Navigation.

And I believe that this Conference has achieved its main goal, thanks to all speakers and participants. Besides, I also would like to state that the exhibition organized within the Conference is quite useful and successful in terms of products exhibited and organization.

In one hand, fast growing technology and correspondingly increasing means and capabilities, on the other hand increasing maritime trade and demands, bear the necessity of continuous development of Aids to Navigation. At this point, quite important missions fall to IALA as it is the only entitled international authority related with Aids to Navigation.

Now, let me talk about my Administration briefly.

We work within the frame of Ministry of Transport and Communication and it is not only VTS Authority in The Turkish Straits and Aids to Navigation Authority in all Turkish Coasts, but it also performs salvage, search and rescue and marine communication services.

As you may recall that, Capt. Tayfun YALCIN has already presented emergency situation management in The Turkish Straits with some statistical information within this Conference, so I don't want to mention once again the importance of maritime safety in The Turkish Straits. On the other hand you will have a chance to see that by the technical tour to Istanbul VTS Centre during VTS Symposium.

I cordially would like to express that it is a great privilege and honour for us to host you in Istanbul for VTS Committee meeting will be arranged between 3 – 7 September and also for the 12th IALA VTS Symposium to be held between 10 – 14 September 2012.

Should I need to emphasize the theme of Symposium shortly, it is an inevitable necessity to think and apply of VTS's beyond the available limits within the framework of new concepts such as e-navigation and Vessel Traffic Management, developing technology and growing demands Territorial, technological, legal, operational and personnel limits can be shown as examples to these limits stated at the theme of "beyond the limits" of VTS Symposium to be held in Istanbul in 2012.

There may be some of you visited Istanbul at least for once but I think 12th VTS Symposium is a great chance for whom never been Istanbul chosen as the European Capital of Culture for 2010 and as you know it is the only one founded at two continents in the world. This beautiful city in which unique Istanbul Strait pass through in it has hosted many civilizations throughout history, so there will be former capital of 3 successive empires-Roman, Byzantine, Ottoman- with a fascinating mixture of past and present, old and new waiting for you.

This city does not have only affluence history but also one of the finest, captivating and alive cities in the world. Old palaces, gorgeous mosques, antique museums, bazaars, Istanbul Strait and others are worth-seeing places.

Besides, Istanbul was declared by UNESCO as one of the world heritage cities.

The 12th VTS Symposium is to be held in an area that is almost in the centre of Istanbul. You may find some information about Istanbul and venue that the Symposium to be arranged at the brochures which have been distributed during this Conference.

Ladies and Gentleman,

I know that it is very difficult to be the last speaker but now I will bring you somewhere that may help you to forget your exhaustion even for a few minutes.

Let's go to Istanbul

(At this stage there was a movie show to introduce Istanbul)

I hope to see you all in Istanbul

Thank you.

ANNEX K ADDRESS BY MR MANUEL GOMEZ, DEPUTY DIRECTOR, PUERTOS DEL ESTADO, SPAIN

Mister Chairman, ladies and gentlemen, distinguished delegates, dear colleagues from all member countries, industrial members and associated members of the International Association of Marine Aids to Navigation and Lighthouse Authorities, it is my greatest pleasure and honour to take over from James Collocott, the responsibility of organizing the next IALA conference. Thus, on behalf of the Government of the Kingdom of Spain, through Puertos del Estado, I hereby invite you to the 18th IALA Conference in 2014 in Spain.

This is a most important challenge, furthermore taking into consideration the excellent organisation and success of the conference we are closing today. A challenge that we are facing as from our return to Spain next week, with our formal commitment to offer you the perfect meeting point to present the state of the art technology in aids to navigation and this association. And this next conference will be in the same year that Trinity House celebrates its 500 anniversary.

My presence here today is only the very final step of a long and extremely well prepared programme carried out by a group of people, either at national level or inside this association. A project launched back in the year 2003, when Spain hosted the first Aids to Navigation Day.

I would like at this point to make a special mention to my colleague and friend Juan Francisco Rebollo, Head of Aids to Navigation Service in Puertos del Estado, for his enthusiasm working for this candidature. I also wish to express my gratitude to the delegation of the Republic of Korea, for their positive support and attitude that has greatly contributed to the success of our proposal, a success that I sincerely wish them in return, in the near future.

Spain's Constitution grants exclusive competence for coastal illumination and marine marking to the Central Administration, a tradition since the middle of nineteenth century. This responsibility is executed through Puertos del Estado, under the supervision of the Ministry of Public Works and Transport.

Thus, Puertos del Estado is responsible for the planning, co-ordination and control of the Spanish system of aids to navigation, a task carried out through the Lighthouse Commission. We are also responsible of the surveillance, inspection and control of the Spanish maritime marking system, the promotion of training, investigation and, technological development in this field.

The Lighthouse Commission is more than sesquicentennial, as it was founded in 1842, similarly to the Commission previously established in France, and still existing in our neighbour country.

Puertos del Estado also holds the representation of the Central Administration in front of international institutions and commissions in respect of Aids to Navigation.

In connection with aids to navigation, our mission is framed into Regulation 13, points 1 and 2 of SOLAS Convention, defining the policy and strategy for the national aids to navigation system, guaranteeing a service able to respond to users' needs, in accordance with international standards and available technology. It is also our mission to promote training, research, technological development and innovation, and enhance the preservation of our heritage, the harmonization among service providers and with neighbouring countries.

Our objectives and our vision are linked to becoming a Centre of Excellence in the area of aids to navigation.

Spain has been a member of IALA since 1977, and is honoured to be a member of the Council, a position it has held since 1994; it has actively participated in the ANM and EEP Committees. The Radionavigation Committee held a session in Madrid back in 1985, and in 2001, the Spanish Maritime Administration celebrated a workshop in Gijón in relation with VTS training. More recently, a project was initiated in Madrid on Service Quality Management, including a seminar on the subject. Last year, we hosted a seminar in Santander in connection with new technologies and preservation of lighthouses heritage.

By coincidence, during this seminar, UNESCO declared the lighthouse of Torre de Hércules in A Coruña as a World Heritage Site, being the first lighthouse ever obtaining this recognition. We are sincerely grateful to all of you who in different ways supported the candidature of Torre de Hércules, especially to the IALA Secretariat and the Council, among others.

This path will reach its high point with the celebration in Spain of the 18th Conference of IALA. Meanwhile, we are proposing that IALA declares 2012 the year of Gustaf Dalen, on the first centennial of the Nobel Prize award to this Swedish scientist. This award was a major contribution to the development of aids to navigation.

I am not going to make now a long speech about Spain. You all know that Spain is reputed to be a hospitable and welcoming country, with mild weather, excellent gastronomy and incredible culture, traditions and landscape. We have a coastline of about 8000 kilometres, and we are one of the largest countries in the European Union. We are proud of our bunch of popular ambassadors, amongst them Ferrán Adrià, one of the best chefs in the world, or Pedrosa and Lorenzo, World Motorcycle champions, or Fernando Alonso in Formula 1. Do not forget about Real Madrid or Barcelona soccer clubs. Feel the Spanish experience, do not wait till 2014, any time is a good time to visit us. Enjoy this short video about what Spain is ready to offer you.

Thank you very much. See you in Spain in 2014.

**ANNEX L ADDRESS BY CAPTAIN BROPHY, CHIEF HARBOUR MASTER,
TRANSNET PORTS AUTHORITY**

Good evening honoured guests, delegates, ladies and gentlemen

Farewells are never easy; there is always an element of sadness to it. Parting from old friends and new friendships made during the past week makes it even more difficult.

The conference had a sizable content to it dealing with communication in the modern age. VTS has a whole new meaning. Gone are the days when communication was achieved by means of a VHF radio of dubious reliability, Morse code, signal lamp, semaphore flags and flag hoists.

During the 1960/70's it was the rage in the seafaring community to make up broaches of flag signals for sweethearts.

Consisting of meanings such as – Beware, you are standing into danger:

Stop your engines immediately

Do not drop anchor here

Go full ahead on your engines

Go full astern on your engines

At a Royal Navy dinner an attractive young lass sitting next to a commander, he turns to her and compliments her on her broach of a hoist of signal flags. He asks her “do you know what it means?” she replies, that she got it from her boyfriend who is away at sea at the moment, she says that it means that “I love you”. The commander considers for a moment and replies, it is not quite that – it means permission is granted to lie alongside.

During the past week the content of the presentations were relevant and covered many burning issues on the discussions surrounding the future value of visual aids to navigation. In the modern era of e-navigation the signal coming through give strong arguments and motivation when it comes to requesting capital from chief executives or boards for the replacement of existing lighthouses or for the construction of the new infrastructure.

The advent of the age of modern aids to navigation and e-navigation must not solely be there for the protection of the environment and maximising the profits of the fleet owners, cargo owners and vessel operators. It must remain paramount in this the year of the seafarer that our primary objective is still geared towards ensuring the well-being, security and safety of our seafarers who man the shipping fleets.

Recognising that the environment needs to be protected from the havoc caused by marine accidents we must not, as occurred a number of years past when a large bulk carrier sank off the coast of Cape Town, relegate the regard for death of seafarers to the bottom of the scale. The first indications of the disaster were when heavy fuel oil began washing onto the adjacent shoreline. It took 2 weeks and with the assistance of an ROV before the identity of the owner and the name of the vessel could be established. The concern in the media was the loss of the vessel, cargo, pollution and affected sea birds. When it was finally established that the crew of 32 perished it was of little concern and incidentally reported in the media.

It is laudable, encouraging and reassuring that coming out of this IALA conference that there is still a high regard and care for the safety of the seafarer.

The subject of e-navigation was widely covered in papers presented during the conference. If I may be so brave as to ask what is the future of astro-navigation? The sextant is stored in a box on board ship with a sign advising, break the glass in case of emergency. The South African Master Mariners Society recently surveyed its membership, asking, should astro-navigation still be a subject on the curriculum for deck officers. The result of the survey is still awaited. If I may be as bold as to ask the question, should the sextant be consigned to Davey Jones' locker?

I do not need to stress the importance of lighthouses as essential AtoNs for bridge navigating officers, but what is the meaning and significance of a lighthouse to all the other seafarers on board? In many instances it is an emotional one. Having said farewell to wives, sweethearts and family: with the ship steaming off the coast on a voyage that can last for many months: the same seafarers now staring sternwards catching a final glimpse of the flash of light from the lighthouse that is their last contact with home.

It will be many months before those same seafarers eagerly staring forwards to see that first flash of welcoming light from the lighthouse, grateful that they have arrived safely back and soon to be reunited with wife, sweetheart and family. I sincerely hope that you all enjoyed the hospitality of South Africa and Cape Town. But like the seafarer also eagerly looking forward to seeing your own welcoming lighthouse.

Now it is my sad task to bid you all farewell from the fierce Cape of Storms, the tranquillity of the Fairest Cape, the promise of the Cape of Good Hope, and the adventure of Navigators coast.

When I welcomed you here on Monday evening I invited you all to drink from the Wells of Africa, it is gratifying to note that the Wells of wine of the Western Cape's noble wines have copiously been imbibed with great relish and gusto.

On inviting you to drink from the Well of Africa I must now apologise to all for not relating the full significance of this. The complete and true saying is "when you drink from the Wells of Africa you will return to Africa to drink again.

So in reality we now bid you farewell and into the future bid you welcome again to Africa.

ANNEX M **SPEECH BY MR JON CAYZER, HEAD OF MINISTRY, DEPARTMENT
OF TRANSPORT, WESTERN CAPE, SOUTH AFRICA**

IALA President

IMC President

Vice-Presidents

Distinguished guests

Ladies and gentlemen

It is a great pleasure for me to address you tonight at this farewell dinner of the 17th IALA Conference which I believe was held for the first time in the 54 year history of IALA on African soil.

I must apologise on behalf of my political principal, Minister Robin Carlisle that he could not do so himself. He is away at the moment, but he asked me to convey his best wishes and hopes that you have enjoyed your conference in the most beautiful coastal city in the world. May I extend to you a traditional warm welcome to Cape Town and I do hope some of you will be staying for a few days leisure time. San Francisco, Hong Kong, Rio, Sydney and Vancouver have their charms, for sure, but - allowing for a little bias and boasting - which city can rival the 'fairest Cape' in the world?

The first time I saw Table Mountain was from the sea in 1995 on a voyage from Hong Kong on the P&O liner Canberra and I felt a twinge of envy at the lucky people who saw Cape Town for the first time when P&O's Queen Mary 11 sailed into port this week. What a glorious sight: an elegant blue and red sea-city, if you will, of blazing lights.

The liner is so big one could clearly see her floodlit name in letters from the top of Adderley Street. I believe we will see many more liners and commercial shipping in Cape Town in the years ahead as our economy grows, and we increase our share of global trade. This is where you, of course, are presented with multiple challenges and opportunities.

The Department of Transport, and Transnet in particular, commend your organisation for the very important role you are playing to foster the safe, economic and efficient movement of vessels for the benefit of the maritime community and the protection of the marine environment, which together with your guidance and leadership have positioned IALA as an international centre of excellence in marine aids to navigation and related matters.

One cannot over-emphasise the role IALA plays in supporting safety and security of those who work, travel and entertain at sea, as well as ensuring the protection of international trade and our shores from the impact of marine accidents.

As is the case with other coastal nations, South Africa faces a major challenge of improving the safety and environment protection standards, while ensuring that the ships transporting cargo are able to do so at internationally competitive freight rates. It is a particular challenge for South Africa as a nation that is largely dependent on sea-borne trade and with an extensive and a dangerous coastline, encompassing environmentally sensitive areas along it. You may know that the Western Cape boasts one of the most diverse marine kingdoms in the world.

We place great emphasis on finding innovative and cost-effective ways that can assist in the safe navigation of ships. And with maritime transport being so vital to our economy, it is important that we continue to improve the necessary aids to navigation. In this regard, we have developed an extensive network of maritime aids to navigation (AtoN), incorporating many of the latest technologies which would not have been possible if we were not a member of IALA.

Ports play a pivotal role in the South African and sub-Saharan economies. The eight South African seaports see on an annual basis 13 927 vessels; 173.9 million tons of cargo and 3 million TEUs, annually constituting some 98 percent of all imports and exports to and from the country, making them the backbone of international trade.

It is therefore self-evident that the simple fact that this conference was hosted by South Africa has great benefit not only for South Africa but for the African continent as a whole.

If I may for a moment bat for South Africa: the continent's economic powerhouse is well-placed to benefit from the economic opportunities in the Butterfly Zone - the sea routes between Brazil, South African and India. The ports of Cape Town, Durban and Richards Bay are equidistant from the fast growing emerging markets of Brazil and India. I know that the Butterfly Zone is championed at the highest level by the political leaders of these three countries, and was raised frequently by Ministers during a visit to India I undertook in 2008 in my previous career. You have a major role to play in this exciting development. We see your presence here as a vote of confidence in our great national voyage.

Mr Chairperson, we are cognisant of the fact that organising a conference of this nature is a daunting task, but with the support and work of the IALA Secretariat, it proved to be a very successful and well-organised conference. I congratulate you warmly.

Ladies and Gentlemen, I do hope you will enjoy the rest of your evening. Do try some of our excellent Cape wines. As Oscar Wilde said...

I thank you.