



IALA

REPORT ON A TRAINING SEMINAR ON THE IALA RISK MANAGEMENT TOOLBOX

18 NOVEMBER 2016



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This report includes details of the programme, a list of participants and final recommendations arising from the annual 5 day training seminar on the IALA Risk Management Toolbox held in Panama 2016.

1. Background and Objective

The fifth annual IALA Risk Management Toolbox Seminar delivered by the IALA World-Wide Academy was held in Panama from 14 till 18 November 2016. It was delivered in conjunction with Panama Maritime Authority (PMA) and was attended by 34 participants from 13 countries. In addition to the host nation, these were : Suriname, Antigua and Barbuda, Argentina, Korea, Norway, Bahrein, U.S.A., Russia, France, Brazil, Malaysia and Turkey. A full list of participants is at Annex B.

The seminar aimed firstly to familiarize participants with the PAWSA and Simulation components of the IALA Risk Management Toolbox before providing competency in the use of an IWRAP Mk2 model; a satisfactory understanding of simulation techniques and PAWSA and how the components of the toolbox complement each other.

Day 1 – Monday 14 November 2016

The seminar was opened formally at 0930 by Mr. Tomás Ávila, Secretary General of the Panama Maritime Authority. The Secretary-General of IALA, Francis Zachariae explained the purpose of the seminar and gave a short introduction on the work of IALA. He drew the attention to the related IALA publication on Risk management being : IALA recommendation 0-134 *on the IALA Risk Management Tool for Ports and Restricted Waterways*, *IALA Guideline 1018 on Risk Management* and the IALA World Wide Academy *Model Course for AtoN: Level 1 AtoN manager training*, *Use of the IALA Risk management tools*.

After that the Dean of the IALA World-Wide Academy, Omar Frits Eriksson invited participants and lecturers to introduce themselves.



Session 1: Introduction to IALA and the IALA World-Wide Academy (IALA WWA) Obligations under SOLAS Ch V 12; 13 (Programme Manager IALA WWA Gerardine Delanoye)

Mrs. Gerardine Delanoye, the Programme Manager of the IALA World-Wide Academy, delivered her first presentation on IALA which covered its aim and purposes, and its important motto : “successful voyages, sustainable planet”. She explained the work of IALA via the Technical Committees and its publications which is the backbone of IALA. She looked closer to the definition of Aids to Navigation. She then briefed on the function and work of the Academy, and its training activity. Ms. Delanoye then moved to the Academy’s capacity building activities. After that Mr. Zachariae explained the advantages of the planned move to an Intergovernmental Organization Status.

The next presentation, delivered by Mrs. Delanoye, was on the obligations of Coastal States under the SOLAS convention (Safety of Life at Sea). She highlighted SOLAS Chapter V Regulation 13 on the establishment and operation of Aids to Navigation (AtoN) before drawing attention to IMO SN.1/Circ 296 which endorsed the IALA Risk Management Toolbox. Mrs. Delanoye covered other important regulations in



SOLAS Chapter V before moving on to the importance of national legislation which should make clear who is responsible for the provision of AtoN.

Session 2: Introduction to the IALA Risk Management Toolbox (Omar Frits Eriksson)

Mr. Eriksson then introduced the three components in the IALA Risk Management Toolbox (the quantitative tool IWRAP Mk 2; the qualitative tool PAWSA and simulation) before explaining theoretical background to each. He explained the concept of Risk with some general examples. He highlighted that IWRAP Mk2 focused only on the probabilities of groundings and collisions, not the consequences. Unlike IWRAP Mk2, PAWSA considers both probability and consequence, using a methodical analytical approach to the management of risk. Simulation in risk management is a combination of traditional ship simulators and numerical navigators. Mr. Eriksson pointed out the importance of the development of AIS data as it is a very valuable tool to know the volume of traffic and to know the behavior of vessels.

Session 4a: Regional Case Study of the use of IALA Risk Management Tools (Roger Barker);
Use of Simulation in Risk Management (Knud Benedict)

Mr. Eriksson introduced Mr. Roger Barker who delivered a presentation on case studies in the English Channel and North Sea between the United Kingdom and Continental Europe. The topics of his presentation covered PAWSA as a qualitative ports and waterways safety assessment tool, IWRAP as a quantitative tool and simulation. He showed how AIS plots, contour delimitations, AtoN overlays and IWRAP Mk2 can be used to present risk mitigation measures such as routing measures to governmental authorities when considering the geographical locations of offshore windfarms. He concluded by reminding participants of other considerations such as AIS carriage requirement by non-SOLAS vessels, different risks/causation factors applied for different classes of vessels and the value of local “qualitative” knowledge. This regional case study was very useful to understand the important relation between the different risk assessment tools and how the respective tools can be used to consider mitigation measures for specific issues.

Mr. Knud Benedict continued this session with a presentation on the Use of Simulation in Risk Management, definitions and samples. He started with some initial information about his former work field in the Maritime Simulation Centre Warnemünde and its projects. The definition of simulation was explained and Mr. Benedict listed the relevant IALA publications about simulation. He continued with the definition of simulation, areas of application, the importance and purpose of simulation. The role of simulation in Risk Management for Maritime Systems & Processes was explained in principle and specifically for the ship risk and the risk in waterways and ports. Samples for Application of Maritime Simulation, Methods & Results were given: The general elements of using simulation were shown for the sample EU Project FAROS on “Human Factors in Risk-Based Ship Design Methodology”. Finally specific samples for Waterway and Accident Investigations and samples for Risk Management in Ship Operation were explained in detail.

He ended by providing an overview of how simulation was used as a key component of the IALA risk management toolbox and its interaction with IWRAP Mk2 and PAWSA.

Session 4b: IWRAP Mk2 Development and Principles Practical Applications of IWRAP Mk2 (Omar Frits Eriksson)

Mr. Eriksson provided greater detail of the evolution, development and principles of IWRAP Mk2. He explained that it was based on defined traffic “legs” each of which used a probability curve to determine the lateral traffic distribution on each leg. A traffic separation scheme would show clear offsets between sets of distribution curves for traffic steaming in each lane. Traffic density plots are developed for small (e.g. 100m x 100m) squares using historical AIS data with higher densities shown in red, and few ships in lighter colors. The purpose is to predict the annual number of collisions and groundings on each leg. He explained that human “causation” factors (Pc) are used to weight the calculation of accident frequencies. He proceeded by explaining the rationale behind the analysis of powered and drifting groundings and categories of collisions. After a question Mr. Eriksson explained the possibilities to import VMS data or Lloyds data in the tool.

Day 2 – Tuesday 15 November 2016

Session 5a: PAWSA Development and Principles (Tuncay Cehreli)

Mr. Tuncay Cehreli started with the programme of the day. He provided an overview of the qualitative risk assessment tool PAWSA and its risk factors before moving on to its planning and implementation procedures. Basically, apart from assessing the current risk, PAWSA also covers evaluation of the effectiveness of existing mitigation measures and additional mitigations including their effectiveness. . PAWSA originally used 5 MS Excel® workbooks to generate risk mitigation measures. After implementing PAWSA in Izmit bay with 5 books, Turkey decided to reduce to 4. The book on risk factor rating scales was not used due to its minor effect that could be ignored. He advised that PAWSA is a two-day workshop together with all the participants which focus on 24 risk factors in its risk model (4 risk factors under each of 6 risk categories). The waterways risk model may be tailored keeping in mind the main focus and it is not possible to delete 1 box, only the content of the box as it is an Excel spreadsheet. The ideal proportion of participants is a split of 60/40 users/stakeholders and divided into teams with 2 or 3 in each.

He showed a local example in Izmit bay PAWSA chart study where they asked the participants to identify and mark the risk areas for each risk category. Then this was combined with quantified results of PAWSA. Based on experience gained Mr. Cehreli informs that the outcomes



depend a lot on the motivation and continuity of the participants and it is strongly recommended to use the PAWSA implementation guide. It covers 7 modules for example the preparation and conduct of the PAWSA workshop. It is important to provide statistical information as input to the workshop. This can be about traffic volumes, cargoes and beside that hydro/meteo and waterway information should be available during the workshop.

Session 5b: PAWSA Use of workbooks (Tuncay Cehreli)

Mr. Cehreli started with giving the advice to only approach an organisation for participants instead of individuals. It should be the decision of the organisation who to send to a PAWSA workshop and not the choice of the facilitator. After this he gave a very clear presentation on the function and use of the 5 PAWSA workbooks. He explained the inputs into the Waterways Risk model, the 6 x 4 risk matrix model, and the considerations to be taken during the input process, including the immediate and subsequent consequences of maritime accidents. The content of each box was explained and Mr. Cehreli once again emphasised you may tailor the factors as appropriate based on the needs of your area.

Mr. Cehreli then explained that under the guidance of a facilitator (moderator) supported by dedicated note-takers, PAWSA teams input scores (1 – 4) into the relevant workbook input sheets. Once processed by the PAWSA software, the results convert in 1.0 – 9.0 scale on the baseline risk matrix. Book 2 then assessed the relative competency of each team in each of the 6 risk categories resulting in an output of team expertise distribution. The combination of Book 1 and 2 outputs were used to determine the effectiveness of risk mitigation measures which teams agree are balanced or whether additional measures are required. The Book 3 output displays the list of balanced / unbalanced mitigation measures and which require further investigation. Book 4 processes additional interventions and determines the results of such measures before displaying specific measures and cautions. He ended this session with showing the difference between the original PAWSA workbooks and the versions developed and used during the regional case.

Session 5c: Test Case – Izmit Bay, PAWSA Test Case (Tuncay Cehreli)

Mr. Cehreli started this presentation by saying he could imagine that the previous presentation about the use of the workbooks can be confusing. Therefore, Izmit Bay PAWSA implementation was shown as a test case to make all clearer. He showed the exact programme that was conducted during this PAWSA session. He outlined the maritime environment/domain and traffic pattern in the area before providing statistical details including marine accident figures. He explained that the 24 risk factors were some of tailored to apply to specific characteristics of Izmit Bay. Having completed the outline briefing, Mr. Cehreli invited participants to complete sections of PAWSA Book 1. He informed that participant even if they are not expert in the topic should answer them all, as the knowledge, thoughts and perception of all participants is important. The results can be compared with statistics.

Session 5d: PAWSA Test Case – continued (Tuncay Cehreli)

After a break Mr. Cehreli started with workbook 2 Risk Factor Rating Scales and continued with workbook 3 on team expertise. This team expertise input to the PAWSA system affects the outcomes as it is a weight factor that is applied. He continued with book 4 on existing mitigation measures effectiveness and finished with book 5 on additional mitigation measures and their effectiveness.

He ended with a summary stating that the combination of Book 1, 2, 3 and 4 outputs were used to determine the effectiveness of existing risk mitigation measures which teams agree are balanced or whether additional measures are required. The Book 4 output displays the list of balanced and unbalanced existing mitigation measures and which require further investigation. Book 5 processes additional interventions and determines the results of such measures before displaying specific measures and cautions.

Mr. Cehreli ended the whole PAWSA session by sharing the implemented solutions at Izmit bay. One of the most important additional measures proposed by the PAWSA workshop participants was the implementation of a VTS system.

Day 3 – Wednesday 16 November 2016

Session 6: SQUART development and principles (Gerardine Delanoye)

Mrs. Delanoye started this session with informing on the status of SQUART as this has not yet been approved by the IALA Council. The draft guideline and Excel workbooks are still under development of the IALA Requirements and Management Committee as this tool need further refinement. Also the name of this simple qualitative risk assessment tool is not yet agreed. Then Mrs. Delanoye explained the principles of SQUART and Mr. Eriksson looked in some more detail to the 3 workbooks.



Session 7: Overview of Maritime Simulators, Simulation Techniques in risk management (Knud Benedict)

Mr. Benedict started this second session on maritime simulators with an overview of all different simulator types and new developments, from VTS and bridge simulation to decision support simulators. He also took a closer look at all the pro's and con's about advanced simulations systems. Mr. Benedict's presentation dealt with samples of the application of maritime simulation based on a description of objective and tasks including human factors in risk-based ship design methodology. This was expanded to highlight specific factors to be considered in accurate simulation. Exercises with desk top and fast time simulation were shared. He informed about several European projects for example a maritime simulator network and sea traffic management project. He continued with modelling of ships motion, forces and sources and modelling environmental effects. He ended with explaining how simulation can be used to consider the effects of resolution in physical AtoN.

Session8: Creation of an IWRAP Mk 2 model using Panama AIS data (Omar Frits Eriksson)

Before starting this session Mr Eriksson finished his presentation of session 4b. After that , assisted by Mr Per Christian Engberg, he guided participants through the process of creating an IWRAP Mk2 model based on the Panama traffic approaches. AIS data and chart data were then uploaded before traffic route "legs" and topographic areas were defined. All participants then started with the first exercise on collision and a second exercise on groundings.

Session 9a: Advanced IWRAP Mk2 modelling (1)

After the lunch break Mr. Eriksson showed some AIS density plots from Panama. He discovered a touristic island called Pearl Island by analyzing the density of traffic. Then participants practiced generating the necessary polygons of land masses and depth contours required for grounding predictions. Models were then run to calculate the number of annual groundings and collisions (or years between such incidents). Individual results were then compared and reasons for differences were discussed.

Session 9b: Advanced IWRAP Mk2 modelling (2)

After that session Mr Muhammad Juned Akhtar from Norway gave a presentation on the Fjord Crossing Project. He explained how they used IWRAP for a bridge building project. He explained they used the tool to decide on the height of the bridge, it's strength and what height of ships could pass under the bridge.

Day 3 – Thursday 17 November 2016

Session 9c: Advanced IWRAP Mk2 modelling (3)

Mr. Eriksson started his session with an overview lecture on IWRAP Mk2 modelling. He then, assisted by Mr. Engberg, continued the IWRAP Mk2 practical session by answering all the questions of the participants. While loading data a movie was shown about future possibilities on the use of IWRAP. It was impressive for the participants to see a movie of traffic based on IWRAP that also showed the ship domain presented as an ellipse. That brought some participants to asking how long the IWRAP version that was installed on their laptop will be available. Mr. Engberg explained how the participants could use the programme until January.

Session 10: Complementary use of IALA Risk Management Tools-Regional Case Study-Izmit Bay (Tuncay Cehreli, Omar Frits Eriksson, Knud Benedict)

Mr. Cehreli started this session with informing about the importance of draft IALA *Guideline on Marine casualty/incident reporting and recording, including near miss situations as it relates to VTS*. In this session on Complementary use of IALA Risk Management Tools in Izmit bay, PAWSA and IWRAP implementations are used as a case study. First, Mr. Cehreli briefly introduced and interpreted the chart study of PAWSA which shows 5 relatively high risky areas in Izmit bay and provided information with their approach to these areas by using IWRAP and Simulation techniques to take the most appropriate risk mitigation measures. He also introduced the Izmit bay IWRAP study which has been done by Istanbul Technical University Maritime Faculty to emphasize the importance and benefit of complementary use of the IALA toolbox. An example was given on a situation in Izmit bay. In different IWRAP scenario's it was tested what was the best way for ships to approach a bridge that was in a bend. The results showed that it was the best when ships did not had to alter course near to the bridge but the ship was in a straight line to that bridge before making its approach. He then opened the discussion and asked the participants, considering their own area , what tool they would use first PAWSA or IWRAP. Mr. Benedict underlined the benefits of use of simulation particularly on identifying the risks and evaluation of the effectiveness of the new / planned mitigation measures. Then Mr. Eriksson focused on mutual positive effects of the tools when used sequentially or in parallel. Mr. Barker finished this session with a case study on Singapore Strait and Dover Strait that clearly showed an increase or decrease in risk by using IWRAP.

Session 11: IWRAP Case Study of Singapore – (Omar Frits Eriksson)



Mr. Eriksson started with sharing the geographical details of the area and an overview of the model. He explained how to copy data of legs and the volume of the traffic. By copying a leg, automatically a master leg is created. When later on the volume of traffic in that leg is changed, only the master needs to be amended. The participants had plenty of time to exercise with the tool and some of the results were discussed.

Session 12: Presentation and visit to Panama Canal visitors centre

Panama Maritime Authority organized a sponsored visit on Sunday 13 November to Agua Clara Visitors Centre where the expanded Panama canal locks are located. The center offered a breathtaking panoramic view that contrasts two particular scenarios. On one side we saw the famous Gatun Lake, where cargo ships or other vessels transit every day, while on the other side, but from a different perspective, we saw the the expanded lock of the Panama Canal.

After the impressive viewpoint, we were directed to the projection room where the group learn about the history and efforts of thousands of men and women that have marked the Canal's first century.

Panama Maritime Authority sponsored a second visit to Miraflores Visitor Center located on the east side of the Miraflores Locks. After that visit the seminar dinner took place at the same location with an open view on the locks operating. It was a great evening!



Day 5 – Friday 18 November 2016

Session13: Discussion on the IALA Risk Management Toolbox, Summary of the interaction between IALA’s Risk Management Tools, Review of Current and Future Risk Management (All)

Mr. Eriksson started this session by thanking the Panama Maritime Authority for the great visit and dinner at Miraflores Locks triggering his audience with some questions. He started with looking in deeper detail to the Singapore Strait Case and how he identified the hotspots in several ways. He showed the case of Malacca Strait that has a traffic separation scheme with a deep water route and explained how to copy traffic from one part of the leg to another part. The results of running an IWRAP exercise showed that the grounding frequency was noticeably higher than the historical data.

Mr Eriksson then “wrap-up” by asking the participants if they have remarks or wishes for the further development the IWRAP and PAWSA tool. He explained future solutions how to deal with the challenge on how to get hold on good AIS data. He informed that one can be to use of IALA-NET. It is a global data exchange scheme that is available for IALA Members. He introduced the IALA group on the LinkedIn social media website for information exchange and discussions. He briefed that an IALA sub-group had been created for IALA Academy Alumni.

Closing Ceremony

The Secretary-General of IALA, Francis Zachariae then thanked the host Panama Maritime Authority, presenters and administrators and their parent organisations for the most professional conduct of the workshop.

We had the honor of Mr. Jorge Barakat, Minister of Maritime Affairs of Panama handing over the certificates to all participants personally.

Gerardine DELANOYE
Programme Manager



Day 1 – Monday 14 November			
Time	Event	Content	Chair/Presenter
08:30 – 09:30	Registration		
09:30 – 11:00	Session 1	Opening and Review Opening Ceremony Introduction to IALA and the IALA World-Wide Academy (IALA WWA)	Secretary General PMA IALA Secretary-General Gerardine Delanoye
11:00 – 11:30	Break	Group photograph & Coffee break	All participants
11:30 – 12:00	Session 2	Obligations under SOLAS Ch V 12; 13	Gerardine Delanoye
12:00 – 13:00	Session 3	Introduction to the IALA Risk Management Toolbox Introduction to navigation risk IALA Risk Management Toolbox Overview	Omar Frits Eriksson
13:00 – 14:00	Lunch		
14:00 – 14:45	Session 4a	Regional Case Study of the use of IALA Risk Management Tools	Roger Barker
14:45 – 15:30		Use of Simulation in Risk Management	Knud Benedict
15:30 – 16:00	Coffee break		
16:00 – 17:30	Session 4b	IWRAP Mk2 Development and Principles Practical Applications of IWRAP Mk2	Omar Frits Eriksson
18:30 – 21:00	Reception	Hotel	
Day 2 – Tuesday 15 November			
09:00 – 10:30	Session 5a	PAWSA Development and Principles	Tuncay Cehreli
10:30 – 11:00	Coffee break		
11:00 – 13:00	Session 5b	PAWSA - Use of workbooks	Tuncay Cehreli
13:00 – 14:00	Lunch		
14:00 – 15:30	Session 5c	Test Case – Izmit Bay PAWSA Test Case - continued	Tuncay Cehreli
15:30 – 16:00	Coffee break		
16:00 – 17:30	Session 5d	PAWSA Test Case - continued	Tuncay Cehreli
Free evening			



Day 3 – Wednesday 16 November			
Time	Event	Content	Chair/Presenter
09:00 – 09:30	Session 6	SQUART development and principles	Gerardine Delanoye
09:30 – 10:30	Session 7	Overview of Maritime Simulators Simulation Techniques in risk management	Knud Benedict
10:30 – 11:00	Coffee Break		
11:00 – 13:00	Session 8	Creation of an IWRAP Mk 2 model using Panama AIS data	Omar Frits Eriksson Per Engberg
13:00 – 14:00	Lunch		
14:00 – 15:30	Session 9a	Advanced IWRAP Mk2 modelling (1)	Omar Frits Eriksson
15:30 – 16:00	Coffee Break		
16:30 – 17:30	Session 9b	Advanced IWRAP Mk2 modelling (2)	Omar Frits Eriksson
19:15 – 23:30	Dinner	To be confirmed	
Day 4 – Thursday 17 November			
09:00 – 10:30	Session 9c	Final IWRAP Mk2 modelling	Omar Frits Eriksson
10:30 – 11:00	Coffee Break		
11:00 – 13:00	Session 10	Complementary use of IALA Risk Management Tools-Regional Case Study-Izmit Bay	Tuncay Cehreli Omar Frits Eriksson
13:00 – 14:00	Lunch		
14:00 – 15:30	Session 11	IWRAP Case Study Malacca Strait – comparison between models	Omar Frits Eriksson
15:30 – 16:00	Coffee Break		
16:00 – 18:30	Session 12	Presentation and visit to Panama Canal	
Free evening			
Day 5 – Friday 18 November			
09:00 – 10:30	Session 13	Discussion on the IALA Risk Management Toolbox Summary of the interaction between IALA’s Risk Management Tools Review of Current and Future Risk Management	Omar Frits Eriksson Gerardine Delanoye Roger Barker Knud Benedict
10:30 – 11:00	Coffee Break		
11:00 – 12:30	Session 14	Recommendations and Closing Seminar recommendations and feedback Closing remarks and issue of Certificates	IALA Secretary-General
12:30 – 14:00	Lunch	Participants disperse on completion	



NAME	COUNTRY	ORGANISATION	EMAIL
Agustin Padovani	Argentina	Hidrovia	agpadovani@hidrovia-gba.com.ar
Mohamed Khurshid	Bahrain	Menas	M.Khurshid@menas.com.bh
Bernice Mahabier	Suriname	Maritime Authority Suriname	bmahabier@mas.sr
Bryan Ristie	Suriname	Maritime Authority Suriname	bristie@mas.sr
Darion Lake	Antigua and Barbuda	Department of Marine Services and Merchant Shipping	dlake@abregistry.ag
Colleen Black	U.S.A.	MITAGS	cblack@mitags.org
Andrey Oleynikov	Russia	Departement of Navigation and Oceanography of Ministry of Defence of the Russia	oas-73@mail.ru
Muhammad Juned Akhtar	Norway	Public Roads Administration	muhammad.juned.akhtar@vegvesen.no
Rafael Montilla	Panama	Panama Maritime Authority	rmontilla@amp.gob.pa
Rogelio Valencia	Panama	Panama Maritime Authority	rvalencia@amp.gob.pa
Nitzeira Watzon	Panama	Panama Maritime Authority	nwatzon@amp.gob.pa
Flor Pitty	Panama	Panama Maritime Authority	fpitty@amp.gob.pa
Abdel Diaz	Panama	Panama Maritime Authority	abdel.diaz@amp.gob.pa
Jaime Rodriguez	Panama	Panama Canal Authority	Jrodriguez@pancanal.com
Fernando Bolivar	Panama	Panama Canal Authority	Fbolivar@pancanal.com
Domiluis Villarreal	Panama	Panama Canal Authority	Dvillarreal@pancanal.com
Jorge Luis Vásquez	Panama	Panama Canal Authority	JLVasquez@pancanal.com
Yesenia Cerrud	Panama	Panama Canal Authority	Ycerrud@pancanal.com
Ricardo Gálvez	Panama	Panama Canal Authority	Rgalvez@pancanal.com
Raul Perea	Panama	Panama Canal Authority	Rperea@pancanal.com
Fermin Caballero	Panama	Panama Canal Authority	Fcaballero@pancanal.com
Claudina Boyd	Panama	Panama Canal Authority	Cboyd@pancanal.com
Alexis Vallarino	Panama	Panama Canal Authority	Avallarino@pancanal.com
Pete Dolan	U.S.A.	Pharos Marine	pdolan@automaticpower.com
Gaëlle Nassif	France	Cerema	gaelle.nassif@cerema.fr
Michel Cousquer	France	Cerema	Michel.Cousquer@cerema.fr
Mariana De Castro Michimoto	Brazil	Admiral Moraes Rego Aids to Navigation Center	marimichimoto@yahoo.com.br
Hye-jin KIM	South-Korea	KRISO	hjk@kriso.re.kr
Abdul Majid Rais	Malaysia	Marine Department of Malaysia	majid@marine.gov.my
Jorge Puente	Panama	International Marconsult Inc.	jpunte@int-marconsult.com
Hector Polo	Panama	International Marconsult Inc.	hector.polo@int-marconsult.com
Jose David Reyna	Panama	International Marconsult Inc.	josedavid.reyna@int-marconsult.com
Gabriel Alemán	Panama	Panama Pilots	gaap27@yahoo.com
Ulas Emiroglu	Turkey	Directorate General of Coastal Safety	ulasemg@yahoo.com
IALA TEAM			
ZACHARIAE Francis	France	IALA	francis.zachariae@iala-aism.org
ERIKSSON Omar Frits	France	IALA WWA	omar.eriksson@iala-aism.org
DELANOYE Gerardine	France	IALA WWA	gerardine.delanoye@iala-aism.org
CEHRELI Tuncay	Turkey	Directorate General of Coastal Safety	TCehreli@kegm.gov.tr
BARKER Roger	U.K.	Trinity House	Roger.Barker@trinityhouse.co.uk
BENEDICT Knud	Germany	Hochschule Wismar	knud.benedict@hs-wismar.de
ENGBERG Per Christian	Denmark	Gatehouse	pch@gatehouse.dk







10, rue des Gaudines - 78100 Saint Germain en Laye, France
Tél. +33 (0)1 34 51 70 01- Fax +33 (0)1 34 51 82 05 - contact@iala-aism.org
www.iala-aism.org

International Association of Marine Aids to Navigation and Lighthouse Authorities
Association Internationale de Signalisation Maritime