IALA WORLD-WIDE ACADEMY

Report on a Training Seminar on the IALA Risk Management Toolbox

In conjunction with The Director General of Coastal Safety and İstanbul Teknik Üniversitesi

Istanbul, Turkey

8 – 12 September 2014

Jean-Charles Leclair
Dean of the IALA World-Wide Academy

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 Istanbul in September 2014.

CONTENTS

The opinions expressed in this report are solely those of the authors and do not in any way reflect the opinions or policies of the International Association for Marine Aids to Navigation and Lighthouses Authorities

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Summary and Recommendations

The third annual IALA Risk Management Toolbox Seminar delivered by the IALA World-Wide Academy was held in the Marmara Pera Hotel, Istanbul, Turkey from 8th to 12th September 2014. It was delivered in conjunction with The Director General of Coastal Safety (DGCS) and İstanbul Teknik Üniversitesi (ITU) and was attended by 18 participants from 10 countries.

At the end of the Seminar, 8 recommendations were adopted by participants. These were:

- National maritime administrations should include the requirement for formal risk assessments of its main waterways in appropriate policies
- Participants in IALA risk workshops and users of IALA risk management tools are encouraged to become alumni of the IALA World-Wide Academy via LinkedIn
- To produce a specific IALA WWA model course on how to administer and run a PAWSA workshop
- Wherever a risk mitigation measure is being implemented, AIS data from both pre and post action should be forwarded to IALA for analysis
- National maritime administrations who use the IALA risk management tools should inform IALA with feedback so that the toolbox can be improved in accordance with IALA Recommendation O-134.4 (page 7)
- IWRAP Mk2 should be developed to include the consequences of collisions and groundings
- Encourage IALA National Members that use IALA risk management tools to join IALA-Net in order to improve the AIS database for IWRAP Mk2 purposes
- Inform sister international organisations (IAPH; PIANC etc.) of the use and value of the IALA risk management toolbox

Rear Admiral Jean-Charles Leclair
Dean
IALA World Wide Academy

1. Background and Objective

This report covers the development and delivery of the annual five day seminar on the IALA Risk Management Toolbox. It was attended by 18 participants from 10 countries. In addition to the host nation, these were Bahrain, Canada, Ecuador, Estonia, France, Iraq, Italy, Senegal and South Africa. A full list of participants is at Annex B.

The seminar aimed firstly to familiarise 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.

2. Preparation of the seminar

The superb organization provided by staff from The Directorate General of Coastal Safety and the İstanbul Teknik Üniversitesi ensured that this seminar was conducted faultlessly. Support services by the staff of the Marmara Pera Hotel matched this effectiveness. This paragraph provides an ideal opportunity to thank all of the above for the efforts to make the seminar the success that it was.

3. Progress of the Seminar

Day 1 – Monday 8 September 2014

Registration opened at 0900 for the 18 participants from 10 countries.

The seminar was opened formally at 1000 in the presence of Mr Cemalettin Şevli, The Director General, Maritime Affairs and Inland Waters Regulation, from the Competent Authority based in Ankara. It started with a presentation by Mr Bülend Temur, President of the Maritime Federation (DeniZCilIk Federasyonu – a major sponsor of the seminar). He welcomed both guests and participants on behalf of the board of the Maritime Federation and its members and stated that his Federation was established in March 2011 by participation of the leaders of Turkey's non-governmental maritime organisations. He advised that the Maritime Federation served the Turkish Marine Industry and Associations of Marine Professionals. It had a membership of 7,800 including Government Ministers; general managers in the Maritime Administration; ship owners, managers, Masters, Chief Engineers, Pilots, VTS controllers; ship owners, general and technical managers, marine superintendents; Shipyard Owners, port operators, suppliers, repairers, Agents, Forwarders, Brokers etc. The President listed the Associate members which were: İstanbul Technical University Maritime Faculty and its Alumni Association; Turkish Captains' Association; Turkish Maritime Pilot Association; Ferries' Master and Chief Engineers Association Established; Vessel Traffic Operators Association; Chamber of Marine Engineers and the Foundation of Istanbul Technical University Graduates. He explained that the Maritime Federation provided expertise to the Public; to Governments and local and national authorities in order to assist them. The subjects included safety, other matters interest and conflict of interest among partners within the maritime industry. The Federation also aimed to inform the general public through TV programs to introduce all sectors of the maritime world and avoid public misunderstanding of maritime incidents based on objective explanations. He concluded by hoping that participants had both successful training and an enjoyable stay in Istanbul. The Federation was honoured to sponsor the boat trip in the Istanbul Channel that evening.

Professor Dr. Nil Güler, Dean of the ITÜ Maritime Faculty, was unable to deliver a speech due to poor health. Her speech was delivered in her absence by Assistant Professor Dr Volkan Aydogdu. The text is shown below.

"Distinguished General Directorates, Dean, Istanbul Harbour Master, IALA experts, participants - good morning to all. Yaşar Duran Aytaş, Jean-Charles Leclair: welcome to the IALA WWA Risk Management Seminar which is being hosted by Istanbul Technical University Maritime Faculty in conjunction with the Directorate General of Coastal Safety and Maritime Federation in Turkey. It is a great pleasure to see you together with us on this occasion. I would like to give a short introduction of our faculty, which is composed of an undergraduate school (BSc-4 Years) and Graduate Program (Master and PHD program in maritime transportation engineering). We are proud of being the oldest and best maritime institute in the Turkey. Our faculty was established in 1884 and merged with ITU (one of the oldest and technical universities in Turkey) in 1992. Within our undergraduate school, we have three academic departments. Currently, one of those departments is only offering service courses to the two main departments namely; Maritime Transportation and Management Engineering Department, and Marine Engineering Department. Within ITU-Institute of Science and Technology, we are offering MSc programmes (started in 1992) and research oriented PhD programmes (started in 2003). Within ITU's international joint academic degree programs framework, our faculty has a joint undergraduate degree program with the State University of New York's (SUNY) Maritime Faculty. Within this programme the students follow courses in New York for one and a half years and the remaining education is concluded in Istanbul. Furthermore, our Faculty has international academic collaborations in its teaching and research activities. We are proud of being one of the founding universities of the International Association of Maritime Universities (IAMU) and Black Sea Association of Maritime Universities (BSAMI). We are also active in academic research activities. We have many completed and on-going various scale national and international research projects. And we are glad take part in such important seminar. On behalf of our Dean, I would like to thank Mr. Jean-Charles Leclair, Dean of IALA WWA for organizing this seminar in Istanbul and to Mr. Yaşar Duran Aytaş, General Director of Coastal Safety; Mr. Bülend Temur, President of Maritime Federation, Turkey for being its sponsor. Many thanks to everyone for participating in this seminar."

Assistant Professor Dr Volkan Aydogdu then provided an outline of the seminar and social programme and other administrative details.

The Dean of the IALA World-Wide Academy (The Academy) Rear-Admiral Jean-Charles Leclair started by thanking the Government of Turkey; the Directorate General of Maritime Affairs in particular and the İstanbul Teknik Üniversitesi (ITU) for accepting the heavy load of organising the Istanbul seminar. Having outlined the programme, he informed the distinguished delegates that this was the sixth risk management seminar delivered by IALA and thanked the expert lecturers and their parent organisations for their attendance. He highlighted the impressive work conducted by Captain Tuncay Çehreli and Dr. Serdar Kum on the independent delivery of a practical PAWSA workshop in Turkey. The Dean welcomed the fact that the seminar was being held in Istanbul due to the combination of its unique hydrological conditions and complex maritime traffic mix transiting two International Straits monitored by a world-class VTS centre which delegates would have the chance to visit that evening. He wished them all a fruitful week.

The final welcome was delivered by Yaşar Duran Aytaş, Director General, Directorate General Coastal Safety. The text of his address was as follows:

"Mr. Dean, distinguished IALA experts, participants, ladies and gentlemen, good morning to all. Welcome to the IALA WWA Risk Management Seminar which is being hosted by Istanbul Technical University Maritime Faculty and Directorate General of Coastal Safety. It is a great pleasure for us to see you in Istanbul which is one of the most beautiful cities in the world on this occasion. The Directorate General of Coastal Safety (DGCS) has been a national member of IALA since 1958 and closely follows all works carried out by both IALA and IMO. Besides, DGCS always supports IALA and contributes its works and related events. As you may know, previous IALA events held in Turkey were 35th IALA VTS Committee meeting and 12th IALA VTS Symposium which had been hosted by DGCS back to back in Istanbul two years ago, in September 2012.

DGCS is a state owned organization and belongs to Ministry of Transport, Maritime Affairs and Communications. DGCS provides Search and Rescue, Salvage, VTS, Pilotage, Aids to Navigation and Marine Communications in Turkish waters and especially in Turkish Straits. Due to being only waterway between Black Sea and Mediterranean Sea, the Turkish Straits has great geopolitical and strategic importance and very dense maritime traffic. In other words, the Turkish Straits is the only waterway connecting Black Sea countries to the rest of the world. So, it is very important waterway for not only Turkey but also for the other countries particularly Black Sea countries.

Although, we (as a coastal state) take all necessary measures and utilize the technological developments to improve safety and efficiency of navigation and protection of marine environment in the Turkish Straits, some accidents still happen. You know there is no any system in the world to make risks zero in such narrow waterways. When we analyze the accidents that have happened in the Turkish Straits, we can primarily see four items which endanger the safety of navigation:

- ✓ Substandard vessels
- ✓ Inadequate Flag and Port State Controls
- ✓ Inefficient and Inexperienced Crew
- ✓ Lack of data sharing between port states and coastal states

In addition to these items, the most important factor causing the accidents is human error and as you may agree with me that human error always exists where human factor exists. Yes, risk cannot be reduced to zero but we can minimize risks to an acceptable level by using an appropriate tool like IALA's risk management tools. IMO, IALA and all other related parties such as Flag State, Port State, Coastal State, Ship-owner/charterer, Operator, Cargo owner, Vessel crew and Classification Societies play important roles in minimizing the risks including protecting marine environment. And we are of the opinion that IALA is doing a great job in terms of risk management through its technical Committees and the World Wide Academy.

Last March we executed a very successful risk assessment study of a very important port area in Turkey named Izmit Bay by using PAWSA. And during the two-day PAWSA workshop, we realized once again the importance of risk assessment and the excellent job that IALA is conducting in this field. We will share with you all our experience with the Izmit PAWSA workshop including lessons learned within the PAWSA section of this seminar. So I don't want to highlight the details because you have almost a week here to review and discuss all details with risk management and the role of parties concerned in risk mitigation.

Before concluding my speech I would like to thank Mr. Jean-Charles Leclair, Dean of IALA WWA for organizing this seminar in Istanbul and Prof. Dr. Nil Güler, Dean of ITU Maritime Faculty for hosting it. I also thank Mr. Bülend Temur, President of the Maritime Federation Turkey for being its main

sponsor. And many thanks to everyone for participating in this seminar. I wish you all a good and successful seminar. Enjoy your time in Istanbul."

The opening ceremony closed at 1030 with a group photograph before the coffee break.

Dignitaries, Presenters and Participants at the Opening Ceremony

4. **Content of the Seminar**

Session 1: 1100 – 1150 Introduction to IALA and the World-Wide Academy

The session was opened by Jean-Charles Leclair who explained the purpose of the seminar before introducing the programme and the feedback and recommendations process. He then introduced himself and his fellow lecturers (Mr Omar Frits Eriksson; Dr Serdar Kum; Captain Tuncay Çehreli; Mr Stephen Bennett; Professor Knud Benedict; Mr Erik Sonne Ravn and Mr Per Christian Engberg) before inviting participants to introduce themselves.

The Dean delivered his first presentation on IALA which covered its aim and purposes, the planned move to Intergovernmental Organization Status, its publications and its standing Committees. He then briefed on the function and work of the Academy, its funding through principal sponsors and its training activity. He advised that IALA, through the VTS Committee, hoped to work with the IMO to make VTS training a mandatory requirement in due course. Jean-Charles Leclair then moved to the Academy's capacity building (CB) activities including joint activities with the IMO and IHO under the United Nations "Delivering as One" CB strategy.

Session 2: 1150 – 1210 Obligations under SOLAS Chapter 5 (Chair Sessions 2-5 - Mr Omar Frits Eriksson)

The Dean delivered a presentation on the obligations on Coastal States under the United Nations Convention on the Law of the Sea (UNCLOS); the Safety of Life at Sea (SOLAS) and other IMO Conventions. He 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. He advised that SOLAS Chapter 5 Regulation 12 covered the provision of Vessel Traffic Services and that IMO Resolution A.857 covered VTS activity and training. The Dean covered other important regulations in SLAS Chapter V before moving on to the requirement for national legislation which could, if appropriate, include rules on the use of IALA risk management tools.

Session 2

The Dean and Chair **Captain Tuncay Çehreli**

Session 3: 1210 – 1310 IALA Training and Accreditation Process; Regional Overview and the use of AIS

Mr Stephen Bennett gave a presentation on the IALA Training and Accreditation process which focussed on IALA Recommendations V-103 and E-141. He explained the obligations placed on Competent Authorities by these Recommendations before detailing the range of both VTS and AtoN courses delivered by Approved Training Organizations or The Academy. He explained that the Risk Management Course being conducted in Istanbul was an integral part of the Level 1 AtoN manager syllabus.

The second presentation by Captain Tuncay Çehreli covered the VTS systems covering the 8,500 Km Turkish coastline. These included the chain of AIS Base Stations and AS AtoN (SOTAS); the five VTS and the VTM centre in Ankara. A “single window” Vessel Traffic Management System Architecture accessible by all national maritime authorities was under development. It was planned to be operational by 2016. He then displayed the information available from the DGCS SOTAS system which provided AIS information from both Class A and B receivers. In answer to a question he indicated that the AIS data may be shared via the IALA-Net system in due course.

The final presentation on a regional overview and the use of AIS was delivered by Mr Omar Frits Eriksson. He started by briefing on the global sharing of AIS data via the IALA-Net system. He explained the use of the geostationary polar AIS satellite deployed by the Danish Maritime Authority before briefing participants on the Sea of Marmara region to be considered by this risk management

seminar. He displayed the AIS data set that would be used for the IWRAP Mk2 sessions and drew attention to the 3,500 annual crossing situations and the mix of vessels to be considered.

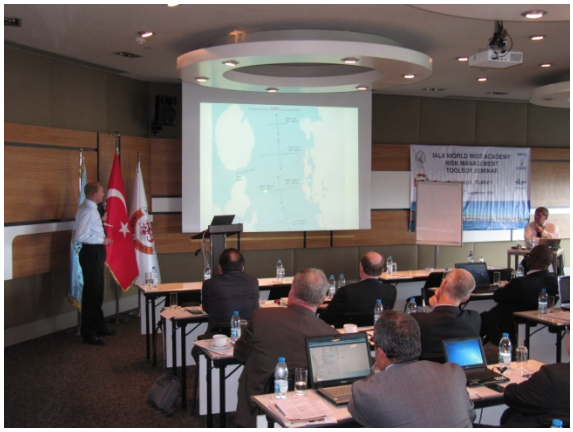
Session 4: 1400 - 1515 - Introduction to the IALA Risk Management Toolbox

Stephen Bennett gave a presentation on the theoretical background to risk; its definitions and the IALA Recommendation (O-134) and Guidelines (1018; 1092) covering that issue. Key learning points were consolidated through the use of a theoretical risk matrix MS Excel® Workbook.

Omar Frits 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 the historical and theoretical background to each. 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. He concluded that IALA was investigating a simplified risk management qualitative tool (SQUART) and the incorporation of other tools such as SAMSON being developed by the Netherlands.

Session 5: 1545 – 1700 - IWRAP Mk2

Mr Erik Sonne Raven provided greater detail of the development and principles of IWRAP Mk2. He explained that it was based on defined traffic "legs" each of which used a probability (Gaussian) 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 colours. The purpose is to predict the annual number of collisions and groundings on each leg. Human "causation" factors (P_c) are used to weight the calculation of accident frequencies. In response to questions about the value of causation factors, Erik Raven advised that in the absence of known causation factors, IWRAP have developed average factors which the operator can adjust based on regional experience. Models can be generated both temporally (day/night) seasonally if required.



Session 5

Mr Omar Frits Eriksson **Mr Erik Sonne Ravn**

Mr Ravn proceeded by explaining the rationale behind the analysis of powered and drifting groundings and categories of collisions before participants uploaded the IWRAP Mk2 program and

data. He explained that there were two versions of IWRAP Mk2. The free version from IALA required all data to be input manually. The commercial version from GateHouse (€3,500 original cost; €2,800 in subsequent years) allowed all data to be input automatically. Omar Frits Eriksson intervened with a video of crossing traffic in the Denmark Strait. Participants were then invited to follow an initial demonstration of the IALA (manual) version of IWRAP Mk2 which showed the use of its tools, displays and data entries. The session concluded at 1700 with a reminder that IWRAP Mk2 used purely geometrical figures to calculate the number of vessels considered on each leg. The angle that vessels crossed the legs must be taken into careful consideration.

Participants then prepared themselves for the evening visit to the Istanbul VTS centre and cruise on the Istanbul Strait which was sponsored generously by the Maritime Federation.

Monday 8 September Evening Cruise

Delegates in front of the Istanbul VTS Centre **Mr Bülend Temur, President of the Maritime Federation and Jean-Charles Leclair**

Day 2 – Tuesday 9 September 2014

Session 6 and 7: 0900 - 1230 – Creation of an IWRAP Mk2 model and Practical Applications of IWRAP Mk2 (Chair Day 2 Mr Omar Frits Eriksson)

After an introduction by The Chair which drew participants' attention to the IWRAP Mk2 Wiki Site on the IALA website, Mr Erik Sonne Ravn guided participants through the process of creating an IWRAP Mk2 model based on the Sea of Marmara. AIS data and chart data were then uploaded before traffic route "legs" and topographic areas were defined.

Session 8: 1400 -1545 Advanced IWRAP Mk2 Modelling (1)

After the lunch break 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. An interesting exchange on causation factors ensued. The first modelling task was considered to have been achieved successfully. A question was raised about the use of vector charts in IWRAP Mk2 to avoid the requirement to generate polygons. Erik Ravn advised that it was theoretically possible, but the time taken to do that by GateHouse would not be cost effective.

Session 9: 1615 – 1730 Advanced IWRAP Mk2 Modelling (2)

Mr Omar Frits Eriksson opened the session by outlining Bayesian Network techniques for the potential development of causation factors before describing his ongoing investigations into that potential. This generated some further discussion on the possible manipulation of causation factors. That discussion could be informed through the establishment of an alumnus of IWRAP users.

The last part of the session considered three actual cases in which IWRAP Mk2 had been used. These were the Lepsøy Reek in Norway; the removal of a safe water mark in the Kattegat, Denmark and Jomard Entrance in Papua New Guinea. This was followed by an active question and answer session which included the use of IWRAP Mk2 to inform other risk management tools, including PAWSA.

Day 3 – Wednesday 10 September

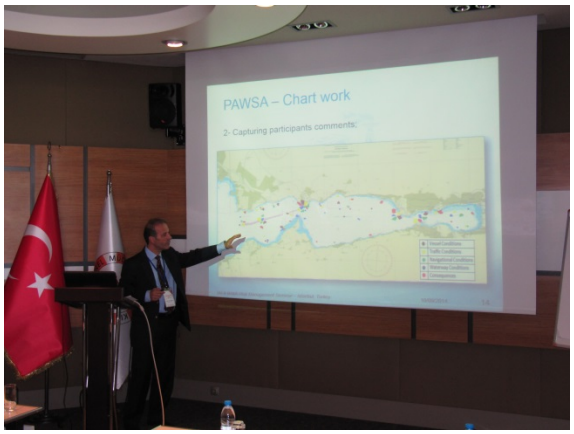
Session 10 and 11: 0900 – 1230 Maritime Simulation (Chair Mr Omar Frits Eriksson)

Professor Knud Benedict started with an overview on maritime simulators using a Beatles song to illustrate the nature of simulation. He identified the IALA Recommendations and Guidelines (O-138; 1058; 1097; 1069) relating to simulation before defining the term “simulation” and its various types. He considered that IWRAP Mk2 was an example of “traffic flow” process simulation and PAWSA was a “trend” process. He then explained the general structure of modelling a simulation process before discussing its importance and purpose. He detailed the different types of maritime simulators (ship handling; engine room; VTS and safety and security).

The second part of this session covered examples of ship simulation and decision support for manoeuvring prediction. Video clips were used to demonstrate the capabilities of the latter. Questions were taken on the quality of maritime simulators and the generation of modelling.

Session 11 started by covering elements of maritime simulation and modelling. This started with an explanation of how ships’ motions were modelled based on Newton’s law, inertia and coefficients of resistance using the “superimposition” principle. Professor Benedict detailed the physical parameters affecting different classes of vessel before explaining modelling and simulating the maritime environment including both navigation aids (inboard) and aids to navigation (external to a vessel) using databases. He moved on to explain how visual effects were modelled and simulated and the developments in that field. He referred again to IALA Guidelines 1058 and 1097 before describing the next-generation beamers (projectors) and databases which should be available within the next two years.

The final section of Professor 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. 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.



Sessions 10 and 12

Captain Tuncay Çehreli on PAWSA **Professor Knud Benedict on Simulation**

Session 12: 1400 - 1530 PAWSA – Development and Principles (Chair Session 12 and 13 - Jean-Charles Leclair)

Captain Tuncay Çehreli provided an overview of PAWSA and its risk factors before moving on to its administrative implementation and planning procedures. He advised that PAWSA was a highly structured two-day workshop which considered 24 factors in its risk model (6 risk categories; 4 definitions per category). PAWSA originally used 5 MS Excel® workbooks to generate risk mitigation measures. In the Turkish case, these were reduced to 4. The option to use 4 or 5 can be decided by the workshop organiser. One of PAWSA's objectives was to identify candidate waterways for VTS installations. Solutions must meet stakeholders' expectations in a cost-effective manner. He illustrated the process by highlighting the PAWSA workshop run by DGCS in March 2014 for İzmit Bay which involved over 30 waterway users and stakeholders' ideally split 60/40 users/stakeholders and divided into teams with 2 or 3 in each. Preparation for such a workshop should be commenced 6 months ahead of the event. A question raised the issue of who might be invited as observers to a PAWSA workshop. Captain Çehreli cautioned that observers from the media should be handled with caution. In response to another question he reinforced the fact that the national Competent Authority could not delegate its responsibility for AtoN provision, so that any AWSA recommendations must be approved formally by the CA before implementation. He reminded participants that IMO SN.1/Circ.296 dated 7 December 2010 based on NAV 52/1/7/2 endorsed the use of IALA's risk management tools and that SOLAS Chapter V set down obligations on Governments. Final discussions focused on the value of PAWSA in coastal waters rather than in choke points and ports. The Chair advised that that point would be taken up during Session 16 on the complementary use of the IALA risk management toolbox.

Session 13: 1600 – 1730 PAWSA Workbooks

Associate Professor Dr. Serdar Kum gave a very clear presentation on the function and use of the 4 PAWSA workbooks used in the Turkish test case. He explained the inputs into 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. 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, these resulted in scores of 0.0 – 9.9 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 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.

Dr. Kum went on to explain the difference between the original PAWSA workbooks and the versions developed by the İstanbul Teknik Üniversitesi before describing the 8 sections of the PAWSA Workshop Report and its appendices and the specific action format generated by the PAWSA process. The final discussion period raised a number of points which Captain Çehreli explained would be clarified during the PAWSA test case sessions on Day 4. The essential role of the Facilitator (Moderator) was stressed by Dr. Kum and the Chair who congratulated Turkey on running such a successful PAWSA workshop.

Day 3 ended with all delegates and guests attended the spectacular seminar dinner in the famous Maiden Tower built on an islet in the Istanbul Strait.


Seminar Dinner in the historic Maiden Tower

Day 4 – 11 September 2014

Session 14: 0900 – 1030 PAWSA Test Case Izmit Bay (1) (Chair Session 14 and 15 Omar Frits Eriksson)
Day 4 started with a farewell from Professor Knud Benedict who had to depart for another engagement. He thanked all participants for their contributions before singing them three of his trademark songs. The seminar then welcomed Captain Roger Barker from Trinity House Lighthouse Services, UK, who joined as an expert presenter.

Session 14 was opened by Captain Tuncay Çehreli with an introduction to the Izmit Bay PAWSA workshop held on 11 and 12 March 2014. He outlined the maritime environment and traffic mix in the area before providing statistical details including marine accident figures. He explained that the 24 risk factors were tailored to apply to specific characteristics of Izmit Bay. Having completed the outline briefing, Captain Çehreli invited participants to complete sections of PAWSA Book 1. They worked in pairs to select the most appropriate of the four choices listed under each category.

Session 15: 1100 – 1230 PAWSA Test Case Izmit Bay (2).
After the coffee break, participant pairs were invited to complete sections of Workbooks 2 and 3 on risk factor rating scales and team expertise with helpful interventions from Captain Çehreli and Associate Professor Dr. Serdar Kum. These exercises consolidated the theoretical knowledge gained

on Day 2 Sessions 12 and 13. Following a presentation on the chartwork process, the exercise was continued with Books 4 (mitigation effectiveness) and 5 (additional mitigations). The PAWSA sessions concluded with Captain Çehreli outlining the recommendations arising from the Izmit Bay workshop before he described the Izmit VTS centre which included a 3D display of the area. A number of questions were taken on the facilitation process at the end of the session.

Session 16: 1400 – 1530 - Regional Case Study of the use of IALA Risk Management Tools (Chair Sessions 16 and 17 Omar Frits Eriksson).

The Chair introduced Captain Roger Barker who delivered a presentation on case studies in the English Channel and North Sea between the United Kingdom and Continental Europe. He showed how AIS plots, contour delimitations, AtoN overlays and IWRAP Mk2 can be used to present risk mitigation measures such as routeing measures to governmental authorities when considering the geographical locations of offshore windfarms. He explained a similar case study in the offshore approaches to north east England before focussing on a wind farm project in the approaches to the Thames Estuary and how the IMO-endorsed IWRAP Mk2 (including "what-if" analyses) can be used to considerable effect. 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. Questions covered the use and adjustment of causation factors.

Sessions 15 and 16

Team PAWSA exercises **Captain Roger Barker presents his case study**

Before the coffee break, Mr Stephen Bennett displayed the initial list of draft seminar recommendations and invited participants to add or amend the list before formal endorsement on the final day.

Session 17: 1600 – 1730 – Complementary Use of the IALA Risk Management Toolbox

Participant Mr James Collocott opened the session by displaying a chart of the South African coastline and asked the seminar how a risk assessment of their waters should be approached and which risk management tools should be used in which areas. The generated a number of positive responses from both presenters and participants. These included prioritising areas, hazards and existing routes; the use of coastal and satellite data, coastal radars and stakeholder feedback; examination of marine accident data and liaison with neighbouring States. The Chair summarised by identifying that all three tools (IRAP Mk2, PAWSA and simulation) had value in specific areas, either individually or in parallel. The Dean of the Academy drew the discussion to a close by highlighting

the value of IWRAP Mk2 as demonstrated by Captain Barker and the superb example of the use of PAWSA by Turkey. This generated further discussion about the total cost of ownership of AtoN services and the requirement for careful management of PAWSA workshops.

The initial intervention by Mr Collocott was followed by a review of the complementary use of the risk management toolbox by the Session Chair. Mr Eriksson then displayed the AIS data set held by the Danish Maritime Authority and informed participants that the USA had conducted over 40 PAWSA workshops covering its major ports. Participant Mr Brian Tuomi advised that the Singapore Port Authority had contracted a private company to conduct a PAWSA analysis of one of its new terminals. The Chair then delivered short presentations on an IWRAP Mk2 analysis of the Malacca Strait; IWRAP Mk2 assumptions, data requirements, AIS data quality, periodic changes in a waterway, elements of causation probability factors, default causation factors, collision scenarios and other mathematical methodologies.

The session ended with the presentation of his certificate to Participant Associate Professor Dr. Selcuk Nas who was unable to attend the final day of the seminar.

Day 5 – Friday 12 September 2014

Session 18: 0900 – 1030 – Discussion on the IALA Risk Management Toolbox (Chair Omar Frits Eriksson)

The Chair opened the session by inviting Mr Bennett to run through the draft recommendations for consideration during Session 19. He then asked Mr Per Christian Engberg from GateHouse to brief participants on software developments in the IWRAP Mk2 program. These included the removal of the possibility of regular ferry traffic "colliding" with itself; refinement of traffic types; interaction between parallel legs; library of geographic geotif and shape files; AtoN coverage and incorporation of google earth images with a snapshot tool. In response to a question, the Chair clarified the difference between the free and commercial versions of IWRAP Mk2. Updates to the program could be found on the IWRAP Mk2 help menu.

The Session continued with a presentation by Assistant Professor Dr. Volkan Aydogdu on human stress ranking related to the maritime environment (environmental stress - ES) including ship operations. He explained how simulators were used to determine theoretical stress levels within the Istanbul Strait before proposing mitigation measures to avoid critical situations.

The Chair then introduced the concept of "safety" or "comfort" zones surrounding vessels to determine near miss collision and grounding scenarios in risk assessments. Danish Maritime Authority analysis determined that there were 10 near miss situations for every recorded accident. AIS data was being used to develop algorithms to detect abnormal manoeuvres within specific waterways. Following a question from the Dean of the Academy, Captain Çehreli informed the workshop that the IALA VTS Committee was developing an IALA Guideline on reporting near miss situations. Mr Omar Frits Eriksson (Chair of the IALA ENAV Committee) concluded the Session by a short brief on developments in the e-Navigation "maritime cloud" concept applied to the free flow of maritime traffic which he illustrated by a video clip from Ramboll Consultants.

Session 19: 1100 – 1230 – Feedback and Closing Ceremony (Chair Jean-Charles Leclair)

Mr Omar Frits Eriksson reminded participants of the availability of the IWRAP Wiki and the IALA Dictionary via the "Technical" tab on the IALA website (www.iala-aism.org). He moved on to remind

participants on IALA-NET before concluding with the use of the IALA Wiki as a collaboration tool for IALA technical Committees. He then introduced the idea of using the IALA group on the LinkedIn social media website for information exchange. He briefed that an IALA sub-group had been created for IALA Academy alumni.

Mr Omar Frits Erikson handed over to the Dean of the IALA Academy, Jean-Charles Leclair for the final part of the workshop. The Dean ran through the 8 draft recommendations formulated during the workshop. Following some minor modifications, all 8 were endorsed unanimously by participants.

Recommendations

- National maritime administrations should include the requirement for formal risk assessments of its main waterways in appropriate policies
- Participants in IALA risk workshops and users of IALA risk management tools are encouraged to become alumni of the IALA World-Wide Academy via LinkedIn
- To produce a specific IALA WWA model course on how to administer and run a PAWSA workshop
- Wherever a risk mitigation measure is being implemented, AIS data from both pre and post action should be forwarded to IALA for analysis
- National maritime administrations who use the IALA risk management tools should inform IALA with feedback so that the toolbox can be improved in accordance with IALA Recommendation O-134.4 (page 7)
- IWRAP Mk2 should be developed to include the consequences of collisions and groundings
- Encourage IALA National Members that use IALA risk management tools to join IALA-Net in order to improve the AIS database for IWRAP Mk2 purposes
- Inform sister international organisations (IAPH; PIANC etc.) of the use and value of the IALA risk management toolbox

Summary and Closing Ceremony

The Chair summarised the successes of the workshop and invited specific feedback. The consensus from an analysis of feedback forms and verbal interventions was that the workshop had achieved its aim and participants felt that they had gained satisfactory competency in the value and use of the IALA risk management toolbox. It was proposed that a “SWAT” analysis might be conducted of each risk management tool. Mr Omar Frits Eriksson undertook to investigate the proposal within the risk management steering group and AtoN Requirements and Management Committee (ARM).

The Chair then thanked the organisers, presenters and administrators and their parent organisations individually for the most professional conduct of the workshop. Captain Çehreli on behalf of the DGCS thanked all the delegates and participants in particular for their contributions.

Certificates were then presented before The Dean wished all delegates safe journeys home.

Annex A

IALA World-Wide Academy Risk Management Training Seminar
Istanbul, Turkey
8th to 12th September 2014
In conjunction with The Director General of Coastal Safety and İstanbul Teknik Üniversitesi

PROGRAMME

Time	Event	Content	Chair/Presenter
Day 1 – Monday 8 September 2014			
09:00 – 10:00	Registration		
10:00 – 11:00	**Session 1**	**Opening and Review** Opening Ceremony Introduction to IALA and the IALA World-Wide Academy (IALA WWA)	1. Bülend Temur – President, Maritime Federation 2. Prof. Dr. Nil Güler - Dean of ITÜ Maritime Faculty 3. Jean-Charles Leclair – Dean, IALA WWA 4. Yaşar Duran Aytaş - Director General, DGCS Jean-Charles Leclair
11:00 – 11:30	Break	Group photograph & Coffee break	All participants
11:30 – 12:00	**Session 2**	Obligations under SOLAS Ch V 12; 13	Jean-Charles Leclair
12:00 – 13:00	**Session 3**	IALA Training and Accreditation process Regional overview and use of AIS	Stephen Bennett Tuncay Çehreli Ómar Frits Eriksson
13:00 – 14:00	Lunch		
14:00 – 15:00	**Session 4**	**Introduction to the IALA Risk Management Toolbox** Navigation Risk IALA Risk Management Toolbox	 Stephen Bennett Ómar Frits Eriksson
15:00 – 15:15	Coffee break		
15:15 – 16:30	**Session 5**	**IWRAP Mk2** Development and Principles IWRAP Mk 2 Incident Scenarios	 Ómar Frits Eriksson Erik Sonne Ravn
17:30 – 21:00	Reception	Afloat on the Istanbul Strait	Courtesy of Maritime Federation
Day 2 – Tuesday 9 September			
09:00 – 10:30	**Session 6**	Creation of an IWRAP Mk 2 model	Erik Sonne Ravn
10:30 – 11:00	Coffee break		
11:00 – 12:30	**Session 7**	Practical Applications of IWRAP Mk2	Erik Sonne Ravn
12:30 – 14:00	Lunch		
14:00 – 15:30	**Session 8**	Advanced IWRAP Mk2 Modelling (1)	Ómar Frits Eriksson Erik Sonne Ravn
15:30 – 16:00	Coffee break		

16:00 – 17:30	**Session 9**	Advanced IWRAP Mk2 Modelling (1)	Ómar Frits Eriksson Erik Sonne Ravn
Free evening			
Day 3 – Wednesday 10 September			
09:00 – 10:30	**Session 10**	**Maritime Simulation** Overview of Maritime Simulators Simulation Techniques & Application Area	Prof. Knud Benedict
10:30 – 11:00	Coffee Break		
11:00 - 1230	**Session 11**	Elements of Maritime Simulation and Modelling Samples for Application of Maritime Simulation	Prof. Knud Benedict
Time	**Event**	**Content**	**Chair/Presenter**
12:30 – 14:00	Lunch		
14:00 – 15:30	**Session 12**	**PAWSA (1)** Development and Principles	Tuncay Çehreli
15:30 – 16:00	Coffee Break		
16:00 – 17:30	**Session 13**	PAWSA Workbooks	Assoc. Prof. Dr. Serdar Kum
19:15 – 23:30	Dinner	Maiden Tower	
Day 4 – Thursday 11 September			
09:00 – 10:30	**Session 14**	**PAWSA (II)** PAWSA Test Case – Izmit Bay	Tuncay Çehreli Assoc. Prof. Dr. Serdar Kum
10:30 – 11:00	Coffee Break		
11:00 – 12:30	**Session 15**	PAWSA Test Case – continued	Tuncay Çehreli Assoc. Prof. Dr. Serdar Kum
12:30 – 14: 00	Lunch		
14:00 – 15:30	**Session 16**	Regional Case Study of the use of IALA Risk Management Tools	Roger Barker
15:30 – 16:00	Coffee Break		
16:00 – 17:30	**Session 17**	**Complementary Use of the IALA Risk Management Toolbox** Review of Current and Future Risk Management	Jean-Charles Leclair Ómar Frits Eriksson
Free evening			
Day 5 – Friday 12 September			
09:00 – 10:30	**Session 18**	**Discussion on the IALA Risk Management Toolbox** Update on IWRAP Mk2 development Summary of the interaction between IALA's Risk Management Tools	Per Christian Engberg Jean-Charles Leclair Ómar Frits Eriksson Roger Barker Tuncay Çehreli Assoc. Prof. Dr. Serdar Kum Stephen Bennett
10:30 – 11:00	Coffee Break		
11:00 – 12:30	**Session 19**	**Feedback and Closing** Seminar feedback Closing remarks and issue of Certificates	Stephen Bennett Tuncay Çehreli Jean-Charles Leclair
12:30 – 14:00	Lunch	Participants disperse on completion	

Annex B

IALA World-Wide Academy Risk Management Training Seminar
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