Regional Training Course on Basic Hydrography and Hydrographic Governance

Suva, Fiji
16th to 27th June 2014

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SUMMARY SHEET

Title of the seminar/course/workshop: Regional Training Course on Basic Hydrography and Hydrographic Governance

Host: Secretariat of the Pacific Community (SPC)

Venue and date: Suva, Fiji – 16th to 27th June 2014

Type: Regional

Organized by: SPC **Supported by:** IHO, LINZ and AHS

No. of participants and no. of countries: 14 Participants from 10 Countries

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Summary:

A regional training course to benefit countries in the area of influence of the South West Pacific Regional Hydrographic Commission (SWPHC) on basic hydrography and hydrographic governance was held in Suva, Fiji, between the 16th and 27th June, 2014.

The principle aim of the course was to provide an introduction to the:

- basic concepts, techniques, processes and equipment associated with hydrographic surveys and nautical cartography to IHO standards,
- fundamentals of hydrographic awareness, to raise awareness and understanding of the importance of hydrographic services, and
- how participating countries can assess and meet national hydrographic obligations as required by the IMO International Convention for the Safety of Life at Sea (SOLAS).

The course followed a structured syllabus comprised of three units; hydrography; basic cartography; and hydrographic governance. The course material and presentations provided links between each unit, highlighting the interconnectivity between each. A number of topics were supported by practical exercises, in particular the planning of hydrographic surveys; correcting charts for Notices to Mariners; and the assessment of maritime safety information.

Revision exercises and discussions were included to ensure the retention of key information relating to the specified learning objective, and the instructors assessed the level of engagement and contribution of individual students throughout the course.

Whilst the course was successful it is obvious that without sustained, targeted follow up action and investment, it will be difficult to build and maintain meaningful capacity in hydrography and it's governance within the region.

With so many Pacific Island Countries (PIC) attending, the opportunity was taken to review the status of each PIC in relation to the IMO, IHO and SWPHC. The session produced a valuable resource in understanding what each country needs to do to meet their international obligations. Each country agreed to a set of actions which will be monitored through the SWPHC meetings. To support the participants in discussions with their respective governments and raising awareness at the highest level as to the need to meet international obligations, a number of documents considered important to help them "tell their story" were collated into a Hydrographic Grab-and-Go data pack.

Key words:
Hydrography, Survey, Governance, Cartography, MSI (Maritime Safety Information), IMO International Convention for the Safety of Life at Sea (SOLAS)

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1 Introduction

A regional training course to benefit countries in the area of influence of the South West Pacific Regional Hydrographic Commission on basic hydrography and hydrographic governance was held in Suva, Fiji, between the 16th and 27th June, 2014. The course was hosted by the Secretariat of the Pacific Community (SPC). It was funded by the IMO under the Support to Small Islands Developing States (SIDS) and Least Developed Countries (LDCs) programme and organized in conjunction with the International Hydrographic Organization (IHO), the Secretariat of the Pacific Community (SPC), Land Information New Zealand (LINZ) and the Australian Hydrographic Service (AHS).

Much of the nautical chart coverage of the Pacific region is based upon old or incomplete survey data. Many of the SIDS in the region rely upon the larger Hydrographic Agencies around the world to conduct modern surveys and produce their charts. As the amount of commercial marine traffic increases, and more and more cruise liners visit remote areas of the region, the need to uphold the principles of the IMO International Convention for the Safety of Life at Sea (SOLAS) becomes ever more important.

The course aimed to provide professionals with an introduction to hydrography and knowledge on hydrographic governance as part of the first phase of the IMO initiative to strengthen safety of navigation services focusing on the electronic chart display information system and monitoring of maritime traffic.

It provided an overview of national obligations to comply with international obligations (IMO SOLAS) built on a general understanding of hydrographic surveying principles, cartographic depiction of maritime safety information and an understanding of maritime risk assessment methods as a tool to prioritise chart improvements.

This was achieved through lectures, practical exercises and interactive discussions of practical, real world problems. The participants were representatives from national maritime administrations. The training course was conducted in English and no interpretation was required.

2 Objective

As stipulated by IMO, the course aims to provide an introduction to;

1. Basic concepts, techniques processes and equipment associated with hydrographic surveys and nautical cartography to IHO standards;

2. Fundamentals of hydrographic awareness to raise awareness and understanding of the importance of hydrographic services; and

3. How participating countries can assess and meet national hydrographic obligations.

On completion of the course, students should be able to:

1. Explain how hydrography contributes to national economic development and environmental management;

2. Explain the principles of hydrographic equipment and systems to conduct hydrographic surveys to meet international standards (IHO S44);

3. Describe the information available through interpretation of nautical charts and electronic navigational charts and apply nautical cartographic techniques to depict maritime safety information in official nautical products in compliance with international standards (IHO S-4, S-57, S-53);

4. Appreciate the principles of maritime risk assessment (including the information input requirements), hydrographic planning and hydrographic specifications to prioritise chart improvements;

5. Outline the roles and functions of a national hydrographic authority and explain its interactions with other national and international maritime safety and hydrographic organisations;

6. Demonstrate awareness and understanding of international obligations relating to hydrography, identify the steps necessary for a nation to achieve this outcome

3 Venue, Dates, Roles and Participants

The two week course was held at SPC in Suva, Fiji, between the 16th and 27th June 2014.

Detailed below is a summary of the organisations involved and their respective roles and contributions:

IMO - Principle organiser and funding agency.

Secretariat of the Pacific Community (SPC) - IMO regional representatives and course administrators.

Land Information New Zealand (LINZ) - Provision of three trainers (Mr Adam Greenland, Mr Stuart Caie and Miss Jennifer Ryan).

Australian Hydrographic Service (AHS) - Provision of one trainer (Mrs Melanie Lovett).

Rod Nairn & Associates Pty Ltd – development of course material

The course was attended by fourteen participants from ten countries with Cook Islands, Fiji, Kiribati, Palau, Papua New Guinea, Samoa, Solomon Islands, Tonga, Tuvalu and Vanuatu represented. A full list of participants can be found at

Annex A. Overall the trainers were impressed by the enthusiasm and interest that the students showed for the subject matter.

4 Cost

To be supplied by SPC

5 Activities and Proceedings

5.1 Pre-course Assignment

None supplied

5.2 Opening Ceremony

The course was opened by Mrs. Fekita Utoikamanu, SPC Deputy Director General. Mrs Utoikamanu recognised the importance of this workshop for the SPC member Island Countries and Territories, given the ever-increasing importance of the oceans for transport, trade and livelihood, as well as the untapped economic potential. Mrs Utoikamanu acknowledged there is an enormous amount of work required in the Pacific region to meet member states' international obligations, noting that "the deficiencies in hydrographic surveys and charting in Pacific region, where many areas are unsurveyed or rely on old surveys and the coverage is incomplete, needs addressing and should be a national priority". In closing, Mrs Utoikamanu hoped that by the end of the training those present "will be familiar with all that is required to establish a national hydrography system and action plan which we hope will solicit the necessary national commitment" and encouraged them to make use of the expertise so they would be able to take it back home and contribute to the development of this important area.

Mr Adam Greenland, the National Hydrographer of New Zealand, set the scene for the training course that forms part of the UN capacity-building initiative "Delivery as one" which sees activities delivered jointly by the IMO and IHO. Mr Greenland outlined the course objectives and stated that "this course directly supports the aims and objectives of the capacity building strategy of the IHO and that of the SWPHC". Mr Greenland went on to stress the importance of hydrography in the region which has "never been more evident in light of the current state of many nautical charts with no new surveys for more than a hundred years". In conclusion, Mr Greenland re-iterated the critical importance of hydrography for coastal states and that without accurate and adequate nautical charts the risk of an incident increases where lives may be lost, property damaged, the environment suffers and the full economic potential of Pacific Island Countries will not be reached.

5.3 Course Proceedings

The course commenced with a session in which the students and instructors introduced themselves, and the structure of the following two weeks was discussed. The students were encouraged to indicate their background with regards to hydrography, and asked to state what they hoped to get out of the course.

The course structure was designed to be heavily weighted in favour of practical exercises. Necessary theory was taught in the form of formal lectures, and structured

in a logical way to ensure each lecture built upon the previous one. Field trips to visit harbour facilities, such as a tide gauge and navigation aids and an opportunity to meet with the Fiji national MSI coordinator were also utilised.

A brief outline of the course structure is detailed below (A full course outline can be found at Annex B):

N.B. Lecturers are indicated by their initials – Adam Greenland (AG), Stuart Caie (SC), Jennifer Ryan (JR) and Melanie Lovett (ML)

Day 1 - Theory
Location: Classroom

Session 1	Introduction to Hydrography and Hydrographic Governance	AG
Session 2	What is Hydrography?	AG
	Economic Benefits of Hydrography	AG
	International Obligations to Provide Hydrographic Services	AG
	The International Hydrographic Organization (IHO)	AG
Session 3	The International Maritime Organization (IMO)	AG
	Other Related Authorities, Agencies and Bodies	AG
Session 4	Understanding the Nautical Chart	JR/ML
	Exercise - practical tasks using the nautical chart	JR/ML

Day 2 - Theory
Location: Classroom

Session 1	Basic Elements of Hydrographic Surveys	SC
	International Hydrographic Survey Standards	SC
	Acoustic Theory for Hydrography	AG
Session 2	Introduction to Hydrographic Systems and Equipment	SC
Session 3	Introduction to Laser Airborne Depth Measurement -LIDAR	SC
	SBES Principles and Errors	SC
	SBES Calibration	AG
Session 4	MBES Principles and Calibration	AG
	SSS Principles and Operation	AG
	Exercise - revision and discussions	SC

Day 3 – Theory
Location: Classroom

Session 1	Geodesy - The Shape of the Earth	AG
	Projections and Grids	JR
	Horizontal Control	AG
	Horizontal Positioning - GNSS	AG
	Theory of Tides	SC
Session 2	Water Levels and Vertical Datum	SC

Day 3 – Field Trip
Location: King's Wharf, Suva

Session 3	Off site visit to Suva Port - tide gauge	All
Session 4	Off site visit to Suva Port – reading a chart	All

Day 4 – Theory
Location: Classroom

Session 1	Theory of Errors in Measurement	AG
	Sources of Errors in Hydrographic Surveys	SC
	Hydrographic Survey Specifications	SC
Session 2	Gridded Bathymetry	SC
	Hydrographic Metadata and Transfer Formats	SC
	Survey Planning	SC
Session 3	Exercise - planning a hydrographic survey	SC
Session 4	Exercise - contour and critique of practical survey data	SC

Day 5 – Theory
Location: Classroom

Session 1	Cartographic Fundamentals	JR
	The Nautical Chart	JR
	Regional Hydrographic Survey Capabilities and Future Strategic Directions for the Pacific	SPC
Session 2	Scales and Objectives	JR

	IHO Charting Standards	JR
Session 3	Cartographic Planning	JR
Session 4	Revision and discussion - cartographic fundamentals	JR

Day 6 – Theory
Location: Classroom

Session 1	Nautical Chart Production	ML
	Chart Compilation Process	ML
Session 2	Chart compilation Process (continued)	ML
	Transition from Paper Chart to Digital chart	ML
Session 3	Principles of ENC Production	ML
	Nautical Chart Maintenance	ML
Session 4	Nautical Chart Distribution	ML
	Revision and discussion – chart production and maintenance	ML

Day 8 – Theory
Location: Classroom

Session 1	Global Maritime Distress Safety System (GMDSS)	AG
	SafetyNET	AG
	NAVTEX	AG
	World-Wide Navigational Warning Service (WWNWS)	AG
Session 2	Maritime Safety Information (MSI)	SC
	WWNWS Guidance Documents	SC
	National Coordinator duties	SC
	SafetyNET & NAVTEX Coverage	SC
	Joint IMO/IHO/WMO Manual on Maritime Safety Information	SC
	S-53 Message Format- Examples	SC
Session 3	Practical Exercises - Information Assessment for Promulgation	SC
	Review of Practical Exercise	SC
Session 4	Chart Updating and Liaison with Charting Authority (HO)	SC

	Maritime safety review	SC

Day 9 – Field Trip
Location: MSAF and SOPAC, Suva

Session 1	Off site visit - MSI assessment from MSAF perspective	All
Session 2	Off site visit – project update from SOPAC	All

Day 9 – Theory
Location: Classroom

Session 3	MSI Practical Exercises, Information Assessment for Promulgation	SC
	Maritime Risk Assessment - Principles	AG
Session 4	Maritime Risk Assessment -Vanuatu example	AG

Day 10 – Theory
Location: Classroom

Session 1	Regional Hydrographic Coordination and Cooperation	AG
	Global Distribution of ENC - RENCs	JR
Session 2	IMO Integrated Technical Cooperation Programme (ITCP)	AG
Session 3	IALA – and the World-Wide Academy	SC
	Donor Agencies and Funding	AG
	Introduction to e-Navigation	SC
	Standards of Competence for Hydrographic Surveyors	AG
Session 4	Introduction to Marine Spatial Data Infrastructures (MSDI)	SC
	The Universal Hydrographic Data Model - S100	JR

Day 11 – Theory
Location: Classroom

Session 1	International Obligations to Provide Hydrographic Services	AG
	Voluntary IMO Member State Audit Scheme	AG
Session 2	Meeting National Hydrographic Obligations	AG
	Contracting Hydrographic Surveys	SC

Session 3	Satellite Bathymetry	SC
	Bilateral Agreements and Contracts for Charting Support	AG
Session 4	Review of National Hydrographic Regulations	AG
	Exercises – 1) Review hydrographic arrangements for represented States 2) Develop national action plan for meeting hydrographic obligations	AG

Day 12 – Theory
Location: Classroom

Session 1	Considerations with ECDIS and ENC	ML
	The Need for Hydrography	AG
	Course Summary Discussion - Review of SOLAS Obligations and Economic Benefits of Hydrography	AG
Session 2	Group Discussion - Experience of working in a Hydrographic Office (resource priorities, recruitment and training, retention, workflows, ICT support systems, NtM maintenance)	JR/ML
	Evaluation Forms, Closing Ceremony, Participant Certificates	AG
	Closure of the Course	AG

5.4 Closing Ceremony

The course was formally closed on Friday 27th June 2014 by the Director of the Applied Geoscience and Technology Division (SOPAC), Mr. Mike Patterson. Mr. Patterson reiterated the sentiments of the opening ceremony and expressed his thanks to the trainers, SPC and IMO for delivering the course.

Certificates were presented to students by Mr. Mike Patterson. Parting speeches were made by Captain Johns Rounds (SPC) and Adam Greenland. Both urged the students to use the skills that they had learned to look after their respective country's economic and environmental futures.

Finally Patricia Logha, of the Papua New Guinea National Maritime Safety Authority (NMSA), spoke on behalf of the student body and expressed her thanks to all involved in organising the course. Ms. Logha said that all of the students recognised the value of such a course and they each now have a responsibility to raise the awareness of hydrography and it's governance within their countries to ensure their governments understand importance of meeting international obligations.

6 Revision Exercises and Anticipated Outcome

The assessment of the students against the learning objectives was done on an informal, rolling basis. The high practical content of the course meant that formal

progress testing would have been impractical. In addition a group summary and assessment session was held on Day 12. The IMO standard feedback questionnaire was distributed by SPC representatives with completed forms collected at the end of the course. A summary of the feedback is provided in Annex C.

6.1 Revision Exercises

Revision exercises and discussions were designed to ensure the retention of key information relating to the specified learning objective. Instructors assessed the level of engagement and contribution of individual students throughout the course.

The course was designed in such a way as to allow time for a subject to be taught before the students were given time to put into practice what they had learnt. This 'learning by doing' technique was a very effective means of both transferring knowledge and assessing the understanding of the subject matter.

The trainers assessed the level of engagement and contribution of individual students throughout the course. In summary, it was judged that all students reached an acceptable level of competence through the practical exercises.

On completion of the training, all but one participant was provided with a certificate of attendance. The participant that missed out only attended half the course. Although a good record of achievement, the certificate should not be considered for qualification purposes.

6.2 IMO Course Feedback Questionnaire Results

The full collated results table can be found at Annex C.

6.2.1 Arrangements Prior to the Activity

In general the administrative arrangements prior to the course start seem to have been well received; however, one participant indicated they had not received their invitation in good time; and two participants stated they had not received information about the objective, scope, subject areas and programme before the course.

6.2.2 During the Activity

The majority of the students felt the length of the course was 'just right, three indicated it was 'too short'. One student felt the course could be spread over a month as there was a "lot of information to be taken in" in a short time.

The venue, facilities and equipment supplied for the course were generally regarded as being excellent or good.

The quality of course material, resources, presentations and activities were well received and generally judged to be either excellent or good. A couple of students would have liked to have more 'hands-on' or practical experience with survey equipment.

6.2.3 At the end of the Activity

The students were asked to grade both the lecturers on the content of their lectures, presentation, ability to transfer knowledge and effectiveness in answering questions

and suggesting solutions to issues. The vast majority of students graded each lecturer as excellent or good for all aspects of their tuition.

Although no one topic stands out in the feedback, it was evident during the course that the practical exercises of applying chart corrections and assessing Maritime Safety Information were very well received, with all students participating and working together. Other topics that were of interest and relevant were the risk assessment for hydrography and understanding international obligations.

All students indicated that the course objective was met; that they were likely to use the information gained when they returned to work; and they would have the opportunity to transfer the knowledge gained to colleagues.

6.2.4 Further Comments

Students were given the opportunity to make further comments and a representative sample of the themes that arose is given below:

- A lot of content, consider extending the course.
- The training was informative and productive.
- Well executed.
- Need practical exercises on a boat.
- Future training to build on the skills gained.
- Consider similar training for "qualification" rather than "attendance".
- An excellent effort in organising and coordinating hydrographic training

7 Achievements and Conclusions

The instructors would like to recognise the quality of the on-site organisation provided by the representatives of SPC and to express their gratitude for the hospitality shown by SPC. The venue proved to be a success, with excellent facilities and space to accommodate all aspects of the training.

The commitment the students showed to such a challenging course is also noteworthy, and the resulting success is in no small way due to their enthusiasm for the subject matter.

As an introduction to basic hydrography and hydrographic governance the course was a great success and the student feedback was excellent. It can be considered that the course has gone a long way to raise the awareness of each Pacific Island Country (PIC) represented as to the importance of establishing hydrographic governance and understanding their international obligations under the SOLAS Convention.

The gathering of so many PICs at different stages of development, in terms of the IHO Capacity Building Strategy, provided an opportunity to build relationships with other nations and learn from each others experiences. The session reviewing the current and future state of each PIC in relation to the IMO, IHO and SWPHC, was very well received; generated good discussion; and an understanding of what each country needs to do meet their international obligations. Each country agreed to a set of actions which will be monitored through the SWPHC meetings. The table produced from this session is included in Annex E.

At the end of the course each student received a Hydrographic Grab-and-Go (HGG) data pack which contained a number of documents considered important to help them "tell the story" to their respective governments, with the intention of raising awareness at the highest level as to what they need to do to meet international obligations. A content list of the HGG is provided in Annex F.

Whilst the subject matter was clearly of use to the students, it was evident from discussions with them that without sustained, targeted follow up action and investment, it will be difficult to build meaningful capacity in hydrography and establish hydrographic governance. Many asked when the next course would be and expressed a desire for it to be run on a regular basis.

7.1 Recommendations

IMO should seek to ensure all participants receive their invitations and necessary pre-event information in good time to enable adequate preparation.

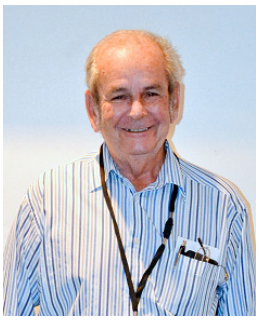
Consider reducing or modifying the content of the course, particularly the technical components i.e. acoustic theory for hydrography, SBES principles and errors, SBES calibration, MBES principles and calibrations and SSS principles and operations.

It should be noted that whilst courses such as this are useful, without follow up action very little long term capacity will be built. IMO and IHO should consider how a course such as this, and appropriate further development, could be run in the SWPHC region on a semi-regular basis.

To maintain relationships between PICs and Primary Charting Authorities (PCAs), the AHS and LINZ should consider regular contact and possible visits to follow up on the actions agreed during Day 12. Progress on the action points could also be monitored through the regular SWPHC meetings held in region.

8 Annexure

Annex A List of participants and their contacting addresses

Trainees by Country			
SPC/SOPAC 	Name: BEGG, Zulfikar Title: Geoscience Technician, SPC Geotechnical	Address: SPC, Private Mail Bag City: Suva	Tel: (+679) 338 1377 Fax: Email: zulfikar@sopac.org
Cook Islands 	Name: SIMPSON, Stephen Lee Title: Director of Maritime, Ministry of Transport	Address: PO Box 61 City: Rarotonga	Tel: +682 28810 Fax: +682 28816 Email: maritime1@transport.gov.ck
Fiji 	Name: TAVAI, Jeke Kelo Title: Senior Transport Planning Officer, Ministry of Works, Transport & Public Utilities	Address: Nasilivata House Samabula City: Suva	Tel: +679 338 4111 Fax: +679 337 3617 Email: jeke.tavai@govnet.gov.fj
	Name: MATALOLOKULA, Osea Title: Hydrographic Assistant, Fiji Navy	Address: Hydrographic Office, Fiji Navy, PO Box 12387 City: Suva	Tel: 3361053/3361099 Fax: 3381515 Email: abel.lagivola@gmail.com

	Name: MORRELL, James Jason Title: Hydrographic Assistant, Fiji Navy	Address: Hydrographic Office, Fiji Navy, PO Box 12387 City: Suva	Tel: 336 1099 (ext. 13) Fax: 333 0251 Email: mtavo@fijitimes.com.fj
	Name: KUMAR, Sunil Title: Navigation Safety Officer, Maritime Safety Authority of Fiji (MSAF)	Address: Level 4, Kadavu House, Victoria Parade City: Suva	Tel: 3478238 Fax: Email: skumar@msaf.com.fj
Kiribati 	Name: ATANIMAKIN, Ioteba Title: Marine Officer, Marine Division, Ministry of Communications, Transport & Tourism Development	Address: PO Box 511 Betio City: Tarawa	Tel: Fax: +686 26561 Email:
Palau 	Name: UEKI, Mekeruul Title: GIS AIDE – Office of Palau Automated Lands & Resource Information System (PALARIS)	Address: PO Box 100 City: Koror, Palau	Tel: (680) 488 6654 Fax: (680) 488 6460 Email: eliteruirfunction09.@gmail.com
Papua New Guinea 	Name: LOGHA, Patricia Doyle Title: Charting Officer, National Maritime Safety Authority (NMSA)	Address: National Maritime Safety Authority, PO Box 668 City: Port Moresby 121	Tel: +675 321 3033 Fax: +675 321 3051 Email: plogha@nmsa.gov.pg

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Solomon Islands 	Name: HANUAGI, Tony Title: SI Maritime Safety Administration (SIMSA)	Address: Solomon Islands Maritime Safety Administration, PO Box G8 City: Honiara	Tel: +677 21535 Fax: Email: colisukulu@gmail.com
Tonga 	Name: FIFITA, Sioeli Title: Marine Officer, Marine & Ports Division, Ministry of Infrastructure.	Address: Marine & Ports O.G. Sanfft Building Taufaahau Road City: Nuku'alofa	Tel: +676 22555 Fax: Email: sioelif@infrastructure.gov.to
Tuvalu 	Name: TAPUAIGA, Siila Title: Master MV Manufolau. Ministry of Transport, Office of the Prime Minister	Address: Ministry of Transport, Office of the Prime Minister, Vaiaku City: Funafuti	Tel: +688 20055 Fax: +688 20722 Email: tapuaigas@gmail.com
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Annex B Full Course Outline and Structure

IMO/IHO REGIONAL TRAINING COURSE ON BASIC HYDROGRAPHY AND HYDROGRAPHIC GOVERNANCE (FIJI, 16 TO 27 JUNE 2014)

DAY 1: Monday, 16 June 2014	
(08:30 – 08:40)	Registration & General Remarks by SPC, EDD
(08:40 – 08:50)	Opening Remarks by SPC Deputy Director General, Mrs. Fekita Utoikamanu.
(08:50 – 09:00)	Remarks by National Hydrographer, New Zealand Hydrographic Authority, Mr. Adam Greenland.
(09:00 – 09:05)	Official Photograph
09.05 – 09:30	Coffee break
Session 1 (09.00 – 10.30)	1-1-1 Introduction to Hydrography and Hydrographic Governance
Session 2 (11.00 – 12.30)	1-2-1 What is Hydrography?
	1-2-2 Economic Benefits of Hydrography
	1-2-3 International Obligations to Provide Hydrographic Services
12.30 – 13.30	Lunch break
Session 3 (13.30 – 15.00)	1-2-4 The International Hydrographic Organization (IHO)
	1-3-1 The International Maritime Organization (IMO)
	1-3-2 Other Related Authorities, Agencies and Bodies
15.00 – 15.30	Coffee break
Session 4 (15.30 – 7.00)	1-4-1 Understanding the Nautical Chart
	Practical exercise on the nautical chart -
DAY 2: Tuesday, 17 June 2014	
Session 1 (09.00 – 10.30)	2-1-1 Basic Elements of Hydrographic Surveys
	2-1-2 International Hydrographic Survey Standards
	2-1-3 Acoustic Theory for Hydrography
10.30 – 11.00	Coffee break
Session 2 (11.00 – 12.30)	2-2-1 Introduction to Hydrographic Systems and Equipment
12.30 – 13.30	Lunch break
Session 3	2-3-1 Introduction to Laser Airborne Depth Measurement -LIDAR

(13.30 – 15.00)	2-3-2 SBES Principles and Errors
	2-3-3 SBES Calibration
15.00 – 15.30	Coffee break
Session 4 (15.30 – 17.00)	2-4-1 MBES Principles and Calibration
	2-4-2 SSS Principles and Operation
	Revision exercises and discussions
DAY 3: Wednesday, 18 June 2014	
Session 1 (09.00 – 10.30)	3-1-1 Geodesy - The Shape of the Earth
	3-1-2 Projections and Grids
	3-1-3 Horizontal Control
	3-2-1 Horizontal Positioning - GNSS
10.30 – 11.00	Coffee break
Session 2 (11.00 – 12.30)	3-2-2 Theory of Tides
	3-2-3 Water Levels and Vertical Datum
12.30 – 13.30	Lunch break
Session 3 (13.30 – 15.00)	*Off site visit to Suva Port – tide gauge*
15.00 – 15.30	Coffee break
Session 4 (15.30 – 17.00)	*Off site visit to Suva Port – reading a chart*
DAY 4: Thursday, 19 June 2014	
Session 1 (09.00 – 10.30)	4-1-1 Theory of Errors in Measurement
	4-1-2 Sources of Errors in Hydrographic Surveys
	4-1-3 Hydrographic Survey Specifications
10.30 – 11.00	Coffee break
Session 2 (11.00 – 12.30)	4-2-1 Gridded Bathymetry
	4-2-2 Hydrographic Metadata and Transfer Formats
	4-2-3 Survey Planning
12.30 – 13.30	Lunch break

Session 3 (13.30 – 15.00)	*Exercise - Planning a hydrographic survey.* *Exercise - Contour and critique of practical survey data*
15.00 – 15.30	Coffee break
Session 4 (15.30 – 17.00)	*Exercise - Planning a hydrographic survey.* *Exercise - Contour and critique of practical survey data*
DAY 5: Friday, 20 June 2014	
Session 1 (09.00 – 10.30)	5-1-1 Cartographic Fundamentals
	5-1-2 The Nautical Chart
	5-1-3 Scales and Objectives
10.30 – 11.00	Coffee break
Session 2 (11.00 – 12.30)	5-2-1 IHO Charting Standards
12.30 – 13.30	Lunch break
Session 3 (13.30 – 15.00)	5-3-1 Cartographic Planning
15.00 – 15.30	Coffee break
Session 4 (15.30 – 17.00)	*5-4-1 Cartographic Revision Exercise - Cartographic Fundamentals* *The Nautical Chart* *Scales and Objectives* *IHO Charting Standards* *Cartographic Planning & Developing a Chart scheme* *Review of Practical exercise*
DAY 6: Saturday, 21 June 2014	
Session 1 (09.00 – 10.30)	6-1-1 Nautical Chart Production
	6-1-2 Chart Compilation Process
10.30 – 11.00	Coffee break
Session 2 (11.00 – 12.30)	6-2-1 Chart compilation Process (continued)
	6-2-2 Transition from Paper Chart to Digital chart
12.30 – 13.30	Lunch break
Session 3 (13.30 – 15.00)	6-3-1 Principles of ENC Production
	6-3-2 Nautical Chart Maintenance
15.00 – 15.30	Coffee break
Session 4 (15.30 – 17.00)	6-4-1 Nautical Chart Distribution
	6-4-2 Revision Exercise – Chart Production and Maintenance

DAY 7: Sunday, 22 June 2014 – Rest day	
DAY 8: Monday, 23 June 2014	
Session 1 (09.00 – 10.30)	8-1-1 Global Maritime Distress Safety System (GMDSS)
	8-1-2 SafetyNET
	8-1-3 NAVTEX
	8-1-4 World-wide Navigational Warning Services
10.30 – 11.00	Coffee break
Session 2 (11.00 – 12.30)	8-2-1 Maritime Safety Information (MSI)
	8-2-2 WWNWS Guidance Documents
	8-2-3 National Coordinator Duties & Responsibilities
	8-2-4 SafetyNET & NAVTEX Coverage
	8-2-5 Joint IMO/IHO/WMO Manual on Maritime Safety Information
	8-2-6 S-53 Message Format- Examples
12.30 – 13.30	Lunch break
Session 3 (13.30 – 15.00)	8-3-1 MSI Practical Exercises Information Assessment for Promulgation
	MSI - Practical Exercise – Information assessment for promulgation *MSI – Review of Practical Exercise*
15.00 – 15.30	Coffee break
Session 4 (15.30 – 17.00)	8-4-1 Chart Updating and Liaison with Charting Authority (HO)
	8-4-2 Maritime safety review
DAY 9 : Tuesday, 24 June 2014	
Session 1 (09.00 – 10.30)	*Practical MSI Experience*
10.30 – 11.00	Coffee break
Session 2 (11.00 – 12.30)	*Practical MSI Experience*
12.30 – 13.30	Lunch break
Session 3 (13.30 – 15.00)	8-3-1 MSI Practical Exercises Information Assessment for Promulgation
	9-3-1 Maritime Risk Assessment – Principles
15.00 – 15.30	Coffee break

Session 4 (15.30 – 17.00)	9-4-1 Maritime Risk Assessment -Vanuatu example
DAY 10 : Wednesday, 25 June 2014	
Session 1 (09.00 – 10.30)	10-1-1 Regional Hydrographic Coordination and Cooperation
	10-1-2 Global Distribution of ENC - RENCs
10.30 – 11.00	Coffee break
Session 2 (11.00 – 12.30)	10-2-1 IMO Integrated Technical Cooperation Programme (ITCP)
12.30 – 13.30	Lunch break
Session 3 (13.30 – 15.00)	10-2-2 IALA – and the World-Wide Academy
	10-3-2 Donor Agencies and Funding
	10-3-3 Introduction to e-Navigation
	10-3-4 Standards of Competence for Hydrographic Surveyors
15.00 – 15.30	Coffee break
Session 4 (15.30 – 17.00)	10-4-1 Introduction to Marine Spatial Data Infrastructures (MSDI)
	10-4-2-1 The Universal Hydrographic Data Model - S100
	10-4-2-2 IHO S-100
DAY 11 : Thursday, 26 June 2014	
Session 1 (09.00 – 10.30)	11-1-1 International Obligations to Provide Hydrographic Services
	11-1-2 Voluntary IMO Member State Audit Scheme
10.30 – 11.00	Coffee break
Session 2 (11.00 – 12.30)	11-2-1 Meeting National Hydrographic Obligations
	11-2-2 Contracting Hydrographic Surveys
12.30 – 13.30	Lunch break
Session 3 (13.30 – 15.00)	11-3-1 Satellite Bathymetry
	11-3-2 Bilateral Agreements and Contracts for Charting Support
15.00 – 15.30	Coffee break
Session 4	11-4-1 Review of National Hydrographic Regulations

(15.30 – 17.00)	*11-4-2 Exercise* *1. Review hydrographic arrangements for represented States,* *2. Develop national action plan for meeting hydrographic obligations (groups)*
DAY 12 : Friday, 27 June 2014	
Session 1 (09.00 – 10.30)	12-1-2 Considerations with ECDIS and ENC
	Revision exercise and discussion
10.30 – 10.45	Coffee break
Session 2 (10.45 – 12.15)	*Group Discussion - Experience of working in a Hydrographic Office* *Resource priorities, recruitment and training, retention,*
12.15 – 12.45	Lunch break
Session 3 (12.45 – 14.15)	12-3-1 The Need for Hydrography
	Course Summary Discussion - Review of SOLAS Obligations and Economic Benefits of Hydrography (Refer to previous presentations as required – to clarify uncertainties)
Session 4 (14.15 – 14.45)	a- Completion and Submission of Course Evaluation Forms b- Course Evaluation Discussion
(14.45 – 15.00)	Closing Remarks – By Director of Applied Geoscience & Technology Division (SOPAC), Mr. Mike Patterson. Closure of the Course
15.00 – 15.30	Coffee break

Annex C Summary table of IMO feedback Questionnaires

Arrangements Prior to the Activity

	Yes	No	N/A
1- Was the invitation received in good time?	13	1	
2 - Did you receive the information listed below about the event before your participation:			
• on its objective and scope	12	2	
• subject areas and programme	12	2	
3 - Were the instructions on the following clear and easy to understand:			
• profile required of participant	13		
• completion and submission of the nomination form	13		
4 - Did you receive logistical information on:			
• venue	13		
• travel arrangements	12		2
• DSA payments	12		2
• accommodation	12		2
5 – If you were given any pre-event assignment, was it useful?	9		4

During the Activity

Question 6	Too Long	Just Right	Too Short
Was the event:		11	3

	Excellent	Good	Satisfactory	Poor
7 - How do you rate the event as regards to the following?				
7-a: Venue	10	4		
7-b: Facilities	8	5	1	
7-c: Equipment	8	5	1	
8 – How do you rate the following aspects of the material?				
8-a: Presentation	10	4		
8-b: Clarity	8	6		
8-b: Technical content	9	4	1	
8-d: Comprehensiveness	8	5	1	
8-e: Quantity	9	4	1	
9 – How would you rate the following aspects of the presentations?				
9-a: Design and structure	7	7		
9-b: Clarity	7	6	1	
9-c: Technical content	6	6	2	
9-d: Comprehensiveness	6	7	1	
10 – How would you rate the use of the following?				
10-a: Course materials	8	5	1	
10-b: IMO reference material	10	4		
10-c: Other resource materials	7	7		
10-d: Group or practical activities	7	6	1	
10-e: Field trips	8	4	2	

After the Activity

Question 11	Excellent	Good	Satisfactory	Poor
Adam Greenland				
a- Content of lecture	10	4		
b- Presentation	10	4		
c- Ability to transfer knowledge	11	2	1	
d- Effectiveness in • answering questions • suggesting solutions to issues	11 11	3 3		
Stuart Caie				
a- Content of lecture	10	4		
b- Presentation	11	3		
c- Ability to transfer knowledge	11	3		
d- Effectiveness in • answering questions • suggesting solutions to issues	11 10	3 4		
Jennifer Ryan				
a- Content of lecture	10	3	1	
b- Presentation	10	4		
c- Ability to transfer knowledge	10	3	1	
d- Effectiveness in • answering questions • suggesting solutions to issues	9 8	4 5	1 1	
Melanie Lovett				
a- Content of lecture	9	5		
b- Presentation	9	5		
c- Ability to transfer knowledge	11	3		
d- Effectiveness in • answering questions • suggesting solutions to issues	9 9	5 5		

Question 12	Themes	Frequency
12.1- What was of most interest and relevance to you?	Hydrographic services (survey planning, charting, NtMs, ENCs, MSI)	10
	Hydrographic Governance (economic benefits, coordination & cooperation, risk assessment, international obligations, standards)	7
	Everything	2

Question 13	Yes	No
Are there any topics which should be added?	5	9
Yes comments included:		
To practically & physically see equipment – SSS, SBES & MBES		
Dredging surveys & volume calculations		
Charts scheming/ENCs		

Question 14	Yes	No
Do you consider that the objective of the event was met?	14	

Question 15	Yes	No
Are you likely to use the information you gained on the course when you return to work?	14	

Question 16	Yes	No
Will you have the opportunity to transfer the knowledge gained to your colleagues at work?	14	

Annex D List of Acronyms used in the Report

AHS	Australian Hydrographic Service
CHP	Civil Hydrography Programme
DGPS	Differential Global Positioning System
ECDIS	Electronic Chart Display & Information System
ENC	Electronic Navigational Chart
GMDSS	Global Maritime Distress Safety System
GNSS	Global Navigation Satellite System
HGG	Hydrographic Grab-and-Go
HO	Hydrographic Office
IALA	The International Association of Marine Aids to Navigation and Lighthouse Authorities
IHO	International Hydrographic Organisation
IHO CB	IHO Capacity Building
IMO	International Maritime Organisation
ICTP	IMO Integrated Technical Cooperation Programme
LDC	Least Developed Countries
LiDAR	Light Detection and Ranging
LINZ	Land Information New Zealand
MBES	Multi-Beam Echo Sounder
MSAF	Maritime Safety Authority Fiji
MSDI	Maritime Spatial Data Infrastructure
MSI	Maritime Safety Information
NMSA	National Maritime Safety Authority
RENC	Regional ENC Coordination Centre
SBES	Single-Beam Echo Sounder
SIDS	Small Island Developing States
SOLAS	Safety Of Life At Sea
SOPAC	Applied Geoscience and Technology Division of SPC
SPC	Secretariat of the Pacific Community
SSS	Side Scan Sonar
SWPHC	South West Pacific Hydrographic Commission
UN	United Nations
WMO	World Meteorological Organisation
wrt	with respect to
WWNWS	World-Wide Navigational Warning Service

Annex E Status of PICs wrt IHO Capacity Building Strategy and actions

SWPHC Status: FM = Full Member, AM = Associate Member, O = Observer

Country	SWPHC Status	IHO Member	Bilateral (Y/N)	IHO CB Phase 1 - Collection and circulation of nautical information, necessary to maintain existing charts and publications up to date			Phase 2		Phase 3		PCA
							Hydro Survey		Charting		
	FM/AM/O			Hydro Governance	National MSI Coordinator	NHCC (who & how often do you meet?)	In-house	Bilateral	In-house	Bilateral	
PNG	FM	Y	Y	MoU btwn DoT & PNG Govt. NMSA	Yes. Nick Pion (NMSA)	No. Requirements are through Nick Pion (with other govt. depts.) relay to AHS		Yes, with AHS	Distribution of paper charts, thro' AHS POD.	Yes, with AHS	AU
					attending IHO MSI training Aug 2014						
Cook Islands	AM	X	X	None	No	No	X	X	X	X	NZ
		To be proposed following IMO course	with NZ?	National legislation in place by 30 June 2015, ideally. (attending IHO MSI training Aug 2014)				with NZ?		with NZ?	
Samoa	O	X	X	None	No	No	X	X	X	X	NZ
		Sign in August 2014			attending IHO MSI training Aug 2014						
Tonga	FM	Y	X	None	Coastal Radio Stns & Met office Info. supplied by MOIPD & forwarded to PCA	No	HMDF	X	X	X	NZ
			with NZ?	to be discussed & clarified by Govt.	to be confirmed (attending IHO MSI training Aug 2014)	to be confirmed		with NZ. TBC		with NZ. TBC	
Fiji	FM	Y	Y	Maritime Transport Decree (MTD) in force Sept 2014, provision for hydro services	MSAF, Sunil Kumar	Chart users panel & national hydro committee, 1990, but not active	Fiji Navy	X	Fiji Navy	Yes, with UKHO	UK
	To be raised with IHB. Action for SWPHC Chair (AU)					Fiji to seek clarification & communicate to SWPHC Chair					
Kiribati	AM	X	? With UKHO?	None	No formall position, but is provided by Marine Division, the MSA (broadcast by Marine Guard, the CG)	?	X	Informal arrangement btwn SPC & GOK.	X	?with UKHO?	UK
				IHO technical report with recommendations, 2011. Funding approved for follow up visit. Date; 2014/15 by UK							
Tuvalu	O	X	X	Funding approved for follow up visit. Date; 2014/15 by UK	No	No	X	X	X	?with UKHO?	UK
		to sign Statutes			attending IHO MSI training Aug 2014						
Vanuatu	AM	X	Y	Land Survey Act includes hydro charts & sale of charts. Distribution, no for hydro services.	No. Although position advertised for Director of Maritime Affairs, a new VMSA. MSI handled by Ports & Harbour?	Yes	X	X	X	?with UKHO?	UK
					attending IHO MSI training Aug 2014						
Solomon Islands	AM	X	Y	Maritime Act 2009, SIMSA	SIMSA, National Hydrographer	Yes	Y	Request for survey with SPC SOPAC	Fairsheets QA'd by AHS; UKHO for charting action	UKHO	UK
		application submitted			attending IHO MSI training Aug 2014						
Palau	AM	X	? USA ?	None	No	No	X	X	X	X	US
				consider IHO awareness & technical visit. TBA before meeting inFeb 2015							

ACTIONS

PNG	Vice-Chair of SWPHC. Offer advice and assistance to PICTs
Cook Islands	1. Raise awareness within Government of IMO SOLAS obligations for the provision of hydrographic services & IMO audit (Cook Is) 2. National legislation in place by 30 June 2015 (Cook Is) 3. Prepare for SWPHC13, Feb 2015 (Cook Is) 4. Bilateral with NZ for the provision of hydrographic services (Cook Is/NZ) 5. High level IHO visit (IHO President) (Cook Is/SWPHC)
Samoa	1. Raise awareness within Government of IMO SOLAS obligations for the provision of hydrographic services & IMO audit (Samoa) 2. Associate Member of SWPHC - sign statutes (Samoa) 3. IHO Technical Visit with recommendations (SWPHC CB Coordinator) 4. Hydrography Risk Assessment (SWPHC CB Coordinator/NZ) 5. Bilateral with NZ for the provision of hydrographic services (Samoa/NZ)
Tonga	1. Raise awareness within Government of IMO SOLAS obligations for the provision of hydrographic services & IMO audit (Tonga) 2. Clarify governance (Legislation, MSI, NHCC) and national focal point for the provision of hydrographic services (Tonga) 3. Bilateral with NZ for the provision of hydrographic services (Tonga/NZ)
Fiji	1. Raise awareness within Government of IMO SOLAS obligations for the provision of hydrographic services & IMO audit (Fiji) 2. Clarify governance (Legislation, MSI, NHCC) and national focal point for the provision of hydrographic services (Fiji) 3. SWPHC Chair to request clarification from Fiji for item 2 above. (SWPHC Chair/IHO)
Kiribati	1. Raise awareness within Government of IMO SOLAS obligations for the provision of hydrographic services & IMO audit (Kiribati) 2. Clarify governance (Legislation, MSI, NHCC) and national focal point for the provision of hydrographic services (Kiribati) 3. Hydrography Risk Assessment (SWPHC CB Coordinator/NZ) 4. IHO Technical Follow-up visit 2014/15 (SWPHC/UK)
Tuvalu	1. Raise awareness within Government of IMO SOLAS obligations for the provision of hydrographic services & IMO audit (Tuvalu) 2. Associate Member of SWPHC - sign statutes (Tuvalu) 3. IHO Technical Visit with recommendations (SWPHC CB Coordinator) 4. Hydrography Risk Assessment (SWPHC CB Coordinator/NZ)
Vanuatu	1. Raise awareness within Government of IMO SOLAS obligations for the provision of hydrographic services & IMO audit (Vanuatu) 2. Clarify governance (Legislation, MSI, NHCC) and national focal point for the provision of hydrographic services (Vanuatu) 3. IHO Technical Follow-up visit 2014/15 (SWPHC/NZ/PNG)
Solomon Islands	1. Raise awareness within Government of IMO SOLAS obligations for the provision of hydrographic services & IMO audit (Solomon Is) 2. Clarify governance (Legislation, MSI, NHCC) and national focal point for the provision of hydrographic services (Solomon Is) 3. Technical advice and support for hydrographic surveys (SWPHC CB Coordinator) 4. Hydrography Risk Assessment (SWPHC CB Coordinator/NZ)
Palau	1. Raise awareness within Government of IMO SOLAS obligations for the provision of hydrographic services & IMO audit (Palau) 2. Clarify governance (Legislation, MSI, NHCC) and national focal point for the provision of hydrographic services (Palau) 3. High level IHO visit (IHO President) (Palau/SWPHC) 4. IHO Technical Visit with recommendations (SWPHC CB Coordinator)
SPC	1. Raise awareness with SPC Member States of IMO SOLAS obligations for the provision of hydrographic services & IMO audit (John Rounds) 2. Provision of hydrographic services (SOPAC) 3. Provide assistance to SPC Member States to establish governance (Legislation, MSI, NHCC) and national focal point for the provision of hydrographic services (John Rounds)

Annex F Hydrographic Grab-and-Go (HGG) data pack

Document

11-1-1 Review of International Obligations to Provide Hydrographic Services.ppt

11-1-2 The IMO Voluntary Audit Scheme and Hydrographic Obligations.pdf

11-2-1 Meeting National Hydrographic Obligations.ppt

11-2-1-1 DRAFT Capacity Building Maturity Model.pdf

11-3-2 Billateral Agreements and Contract for Charting Services.ppt

11-4-1 Review of National Hydrographic Regualtions.ppt

Current & Future State of SWP PICTs wrt IHO CB Stragtegy.xlsx

DENARAU COMMUNIQUE_FINAL_8April2014_PDF.pdf

IHO C-17 Maritime Data Infrastructures 2011.pdf

IHO M-2 The Need for Hydrographic Services Jan 2014.pdf

IMO ACTUAL PROGRAMME Ver 1.1 - with presenters & resources.docx

PICTs Actions - IMO SOLAS Provision of Hydrographic Services - June 2014.pdf