



**The 21st Baltic Sea Hydrographic Commission Conference,
27-29 September 2016, Klaipeda, Lithuania**

Final Minutes

A. Opening Formalities

A.1. Opening of the Conference

*Documents: A1.1_BSHC21 List of Participants
A1.2_BSHC21 List of Documents*

Due to the fact that the BSHC Chair Captain Sergey Travin could not attend the Conference it had been entrusted to the Head of the delegation of the Russian Federation Captain Leonid Shalnov to carry out the Chair of the Conference duties.

The Chair of the Conference Captain Leonid Shalnov opened the Conference and transferred to all participants the greetings and wishes to have a fruitful work from the BSHC Chair Captain Sergey Travin and welcomed hosts, delegates, observers and especially the IHB Director Mustafa Iptes to the 21st Conference of the Baltic Sea Hydrographic Commission.

The Chair thanked all BSHC Members for the documents and presentations prepared and submitted for the Conference.

He thanked the hosts for an ice-breaking reception and expressed hope that the warm atmosphere of the reception would contribute to constructive dialogues and productive discussions during the Conference.

All participants introduced themselves.

A.2. Welcome from the Host Country

Documents: A2_BSHC21 Preliminary Program

The Director of the Lithuanian Maritime Safety Administration Robertinas Tarasevičius welcomed delegates to Klaipeda and wished to have a productive work session. He pointed out the importance of the BSHC activities for the development of safe navigation in the Baltic Sea and the importance of the 21st Conference for the Lithuanian Hydrography.

The Acting Director of the Lithuanian Maritime Safety Administration and the Head of the Lithuanian delegation Mindaugas Česnauskis also welcomed delegates and gave information about practical issues of the Conference program.



A.3. Adoption of the Agenda

Documents: A3_BSHC21 Draft Agenda

The delegates of the Conference reviewed the Draft Agenda.

It was decided to move the Agenda items D.4 and E before Agenda items C... to have enough time to discuss and make decisions on the matters of allocation of future IHO Council seats to BSHC Member States and amendment of BSHC Statutes.

The Commission also agreed to add section D of the Agenda with information from Germany.

Amended Agenda of the Conference was approved.

A.4. Minutes and Actions from the previous BSHC Conference

*Documents: A4.1_BSHC21_BSHC20 Final Minutes
A4.2_BSHC21_Status of BSHC20 Actions*

Final Minutes of the 20th BSHC Conference were approved.

List of Actions of the 20th BSCH Conference was reviewed and all items were considered as done or on-going.

B. IHO Work Program 1 – Corporate Affairs

B.1. Information about activities of the IHB

Documents: B1_BSHC21_IHB Report to BSHC21

The IHB Director Mustafa Iptes welcomed the hosts and delegates of the Conference and pointed out the great importance of the Conference in regional development and successful BSHC work and great support in IHO activities.

He emphasized especially the great importance of the 21st BSHC Conference in Klaipeda at the site of the Lithuanian Maritime Safety Administration and the BSHC Associated Member to support the intention to become a full member state of the IHO.

After welcome Mustafa Iptes provided the report of the IHO Secretariat to the BSHC Conference.

He reported on the status of Approval of Amendments to the IHO Convention and noted that all IHO Member States in the BSHC had approved the Protocol of Amendments to the Convention on the IHO.

In accordance with the terms of the Protocol the Amended Convention on the IHO and its supporting Basic Documents would enter into force on November 8, 2016.

Reporting on the status of Membership of the IHO Mustafa Iptes pointed out that Lithuania that was the Associate Member of the BSHC and also not already Member State of the IHO had been encouraged to become member.



Mustafa Iptes informed the Conference on continuing work on the development of two main parts of the IHO GIS – a country information database and a regional information database.

Countries in the BSHC Region were invited to review their entry in the Yearbook (IHO Publication P-5) on an annual basis and provide the IHO Secretariat with the appropriate updates.

Reporting on developing a GIS database application to support IHO Publication C-55 he invited countries in the BSHC Region to review their entry on an annual basis and to provide the IHO Secretariat with the appropriate updates.

In the framework of development of the INTToGIS Project (INT Chart Management and Catalogue) Denmark and Russian Federation were invited to request an ID and password for the maintenance of the S-11 database.

Mustafa Iptes informed the Conference on the increasing level of activity of the IHO Capacity Building (CB) Program.

Concerning the Overall Status of the IHO Work Program it was noted on a six-monthly reporting regime for all IHO bodies.

The Conference was informed on the establishment the Crowd-Sourced Bathymetry Working Group (CSBWG). Member States were invited to nominate representatives to participate in the CSBWG.

Special attention was paid to the preparation of the first IHO Assembly scheduled to take place from April 24 to 28, 2017.

In accordance with the General Regulations of the IHO (enter into force on November 8, 2016) the first Assembly will have to approve the list of the members of the IHO Council.

The BSHC Member States were invited to publicize technical and other achievements in the Baltic Sea region. An editorial board comprising a representative from each region has been established. The representative for the BSHC is Dr. Mathias Jonas (Germany).

Actions (decisions):

1. The Commission noted the report.
2. The BSHC Member States were invited to:
 - provide continuous updates to S-11 Part B through Finland as coordinator for INT Region E;
 - review entries in IHO Publications C-55 and P-5 (Year Book) at least annually;
 - provide continuous updates to S-11 Part B for INT Region E through the INTToGIS tool and implement the procedure depicted in IHO CL 64/2015 for the review and monitoring of INT charts;
 - report to the IHO Secretariat on the status and description of the ENC schemes in the Region E;
 - consider appropriate arrangements to prepare the IHO Assembly to be held in April 2017;
 - consider submitting papers for publication in the IH Review.



B.2. Outcomes from the IRCC8 Meeting

Documents: B2_BSHC21_IRCC8 Outcomes_IHB Report

The IHB Director Mustafa Iptes provided the report and outcomes of the 8th Meeting of the IHO Inter-Regional Coordination Committee (IRCC) which took place in Abu Dhabi, UAE, from 29 to 31 May 2016.

The summary of the IRCC-8 report is as follows:

the 8th IRCC Meeting was attended by the Chairs or their representatives of the 15 Regional Hydrographic Commissions (RHCs) and the IRCC subordinate bodies (except the FIG-IHOICA and IBSC) and 20 observers. A total of 41 participants were present.

The meeting was chaired by Dr. Parry Oei (Singapore).

The IHB was represented by the President Robert Ward who also attended as a Chair of the IHO Hydrographic Commission on Antarctica, Director Mustafa Iptes (IRCC Secretary) and Assistant Director Alberto Costa Neves.

The IRCC reviewed the reports and activities of the RHCs and its subordinate bodies, proposed amended Terms of Reference for Member States' consideration and approval and considered the need to have a better communication strategy.

The meeting was informed of the developments in ENC's for the leisure market and the requirement for chart products for Electronic Chart Systems on ships that are not subject to the ECDIS carriage requirements of SOLAS.

With respect to the Arctic Regional Hydrographic Commission the Meeting noted the efforts to resolve ENC overlaps and the project to develop an Arctic Marine Spatial Data Infrastructure and the engagement with stakeholders in relation to crowd-sourced bathymetry, satellite-derived bathymetry and hydrographic risk assessment.

The Committee was informed on the approval of the SafetyNET and NAVTEX Manuals by the International Maritime Organization and acknowledged the need for more engagement of Member States, National MSI Coordinators and Observers in matters related to the World-Wide Navigational Warning Service.

The meeting welcomed the development of new Capacity Building (CB) Procedures and the continued support from the Republic of Korea and from the Nippon Foundation of Japan to the CB Fund.

Difficulties in providing ENC updates at the same frequency as the equivalent paper chart updates were discussed.

The Committee agreed guidance on the conditions under which Marine Information Overlays (MIO) could be issued to assist in drawing attention to any differences between a published paper chart and a corresponding ENC.

The Committee was informed on the progress in updating IHO Publication C-17 (Spatial Data Infrastructures).

The Committee noted the progress of the work of the Crowd-Sourced Bathymetry Working Group and its preparation of a Guidance document on Crowd-Sourced Bathymetry.

The Meeting noted the work of the GEBCO Guiding Committee and its subordinate bodies, especially the evolution of the GEBCO grids, the incorporation of shallow water bathymetry in the GEBCO dataset and the current status of digitizing the GEBCO chart series.



The Meeting discussed the revision of the IHO Strategic Plan and agreed on the need to implement a more pragmatic performance monitoring system.

B.3.National Reports

B.3.1. National Report of Denmark

Documents: B3.1_BSHC21_National Report_Denmark

Mr. Jens Peter Weiss Hartmann presented the Hydrographic National Report of Denmark.

On January 1, 2016 the Danish Geodata Agency was divided into two new separate governmental agencies – the Danish Geodata Agency (DGA) with a new location in Aalborg and the Agency for Data Supply and Efficiency with a location in Copenhagen.

The DGA is responsible for cadaster and hydrography including the role as the Danish Hydrographic Office. The Agency is also responsible for the implementation of the Danish MSDI. The remaining tasks have been transferred to the Agency for Data Supply and Efficiency.

The Report provided information on hydrographic surveys and charting in Denmark, production of nautical charts of the waters surrounding Denmark, the Faroe Islands and Greenland, issuing Chart Corrections and related nautical publications.

It was also reported on a new survey concept for Greenland planned to be fully implemented in 2016. The concept aims at a more geographically flexible capacity with one large ship and two in situ launches for surveys in the narrow in shore routes.

Concerning capacity building activities it was informed on the participation of the DGA in the EU-project FAMOS and in the European project Efficient, Safe and Sustainable Traffic at Sea – EfficienSea 2.0.

B.3.2. National Report of Estonia

Documents: B3.2_BSHC21_National Report_Estonia

The head of the Estonian delegation Mr. Taivo Kivimäe presented the report on the activities of the Estonian Maritime Administration in the fields of hydrographic surveys, data processing, nautical charting and web-based services.

For maintaining and accessing survey data a web-accessible database called the Hydrographic Information System (HIS) is used. It is a seamless database for hydrographic information such as survey areas, depths, underwater objects, contours and storage for raw data.

The first version of a new WMS web page for smart devices is available.

Starting from 2015 EMA is publishing the full digital database of aids to navigation available only in Estonian language on the EMA home page.



B.3.3. National Report of Finland

Documents: B3.3_BSHC21_National Report_Finland

In his report the Head of the Finnish delegation Mr. Rainer Mustaniemi pointed out the successful performance of the annual quality audit, the 95% of fulfilling the HELCOM ministerial meetings decisions on category I and II fairways and shipping routes resurveys up to today's IHO S-44 (edition 5) standard, and goals in HELCOM category I and II surveys reached in April 2016, and enhanced Finnish part of the HELCOM-BSHC Revised Harmonised Hydrographic ReSurvey Scheme and updated database.

It was also informed on the participation of Finland into a EU INEA CEF Transport TEN-T grant program FAMOS Freja (2014-2016) and FAMOS Odin (2017-2018) application.

A research project to change the chart datum of nautical charts and navigational information from MSL-based to EVRS-based datum, "Transition to Baltic Sea Chart Datum 2000", has been done.

B.3.4. National Report of Germany

Documents: B3.4_BSHC21_National Report_Germany

The National Report of Germany was presented by the head of German delegation Dr. Mathias Jonas. It was informed on the activities carried out since the 20th BSHC Conference by the Federal Maritime and Hydrographic Agency (BSH) concentrated on the Baltic Sea.

In 2016 Germany continued to resurvey the main routes according to the latest S 44 Standard for the second time using multi beam.

The regular use of communication satellites to broadcast the GNSS corrections to the survey vessels in a higher precision and in real-time is currently under investigation.

No new ships have been put into service since the last report, but the survey, wreck search and research vessel ATAIR is going to be replaced by a new one in the coming years. This new vessel will probably be equipped with a hybrid engine using mainly Liquid Natural Gas.

The German waters are covered with 160 ENC's in various navigational bands. All the ENC's are updated on a weekly basis.

All the German produced ENC's and updates (ERs) are distributed through a network of ICENC authorized distributors.

45 German produced INT charts (for the North Sea and the Baltic Sea) have been updated. For the Baltic Sea, BSH is producer of 27 INT charts.

The overall chart portfolio of the German waters comprises 66 charts (including INT charts) and 11 Small Craft Charts Series. For the German waters of the Baltic Sea BSH issues 5 Small Craft Charts Series and a general planning chart.

Incoming hydrographic data is immediately assessed for vital information. Urgent updates are issued as chart-updating Notices to Mariners (NtMs) or Navigational Warnings (Radio Navigational Warnings - NAUTISCHE WARNNACHRICHTEN, NWN).



The NtMs are issued weekly by the BSH.

NWN are issued by the VTS centers for their areas of responsibility and by the 24-h maritime warning service in Emden for the entire German warning area and are broadcast as radio messages. In special cases, the maritime warning service also informs about dangers outside its area of responsibility.

B.3.5. National Report of Latvia

Documents: B3.5_BSHC21_National Report_Latvia

The National Report presented by the Head of the Latvian delegation Jānis Krastiņš gave an overview of the main activities of Hydrographic Service of Maritime Administration of Latvia in 2016.

Hydrographic surveys were mainly provided according to HELCOM Hydrographic re-Survey plan for Baltic Sea and in port areas. All surveys were carried out according the IHO S-44 standards.

Latvian waters are fully covered with charts of relevant navigational bands. "Print on Demand" system is in use.

MAL folio contains 15 INT charts.

MAL chart folio contains 22 paper charts all of which are produced in accordance with IHO standard S-4. All paper charts are updated monthly and available in "Print on Demand" system. 6 new chart editions were produced in 2015 - 2016.

Latvia has 23 ENC cells in navigational purpose bands 2 to 6. ENCs are updated on a monthly basis with possible maintenance and new editions in meantime.

Within 2015 – 2016 all new paper chart editions were followed by new editions of relevant ENCs.

Local Navigational Warnings are broadcasted using National GMDSS VHF network along coastline. Service is provided by the Maritime Rescue Coordination Centre (MRCC Riga) of the Latvian Naval Flotilla Coast Guard Service twice per day in English and Latvian. Urgent Navigational Warnings are transmitted immediately on receiving them and then included in next MSI broadcast.

Notices to Mariners are published monthly.

MAL according to the INSPIRE directive is responsible for provision of several kind of data to the Latvian Geoportal, that is a gateway to the INSPIRE Geoportal.

MAL completed participation in the Maritime Spatial Planning of Latvia as the developer of graphical part, which was supervised by the Ministry of Environmental Protection and Regional Development.

B.3.6. National Report of Lithuania

Documents: B3.6_BSHC21_National Report_Lithuania

The National Report was presented by the head of Lithuanian delegation Mindaugas Cesnauskis.

Hydrographic activities are carried out by the Hydrographic and Aids to Navigation Division (HAtnD) of Lithuanian Maritime Safety Administration (LMSA).



LMSA is responsible for Maritime Safety and Hydrographical matters in Lithuanian waters.

LMSA operating procedures are certified according to ISO 9001:2008 quality management system standard.

For hydrographic surveying HAtND has a 20 m long catamaran type survey vessel "VARŪNA" equipped with ELAC Nautik multibeam echosounder "SeaBeam 1185".

Surveys are conducted in priority areas i.e. main shipping routes and approaches (CAT I) according to harmonized hydrographic resurvey scheme.

Nautical surveying is carried out according to the IHO S-44 standard and the data is used in nautical charting.

In 2016 LMSA after revision of resurvey areas decided to restructure priority areas and approved new hydrographic resurvey scheme.

CAT I area remained unchanged and part of CAT III area was upgraded to CAT II area.

LMSA participates in FAMOS Odin project.

B.3.7. National Report of Poland

Documents: B3.7_BSHC21_National Report_Poland

The National Report of Poland presented by the head of delegation Andrzej Kowalski summarized activities of the Hydrographic Office of the Polish Navy and the wider Polish Hydrographic Service in hydrography from the 20th to the 21st Baltic Sea Hydrographic Commission Conference.

During 2015 and 2016 hydrographic surveys were carried out in HELCOM routes, Southern Baltic (190 km²), coastal routes (75 km²) and in inland waters (17 km²).

All the surveys complied with the IHO S-44 Standards Special.

Polish waters are completely covered with all relevant navigational bands of ENC's updated in real time.

Overlaps are under permanent scrutiny.

Values A1, A2, B and C of CATZOC have been encoded in ENC's. The A1 and A2 are used in the areas where survey data were captured with modern survey techniques (multi-beam echo-sounders).

According to B areas where data had been captured with single beam echo sounders but are of good quality were qualified.

According to C the rest of the Polish sea areas have also been qualified.

All ENC's are distributed through the network of PRIMAR authorized distributors.

Playing the role of the National Hydrographic Service the HOPN is also a part of the wider Polish Maritime Administration and operates as the National Coordinator of Navigational Warnings in the Polish Area of Responsibility.

HOPN is developing new software editing NavWars and is creating NavWar records (complies with IHO/IMO/WMO guidelines laid down in NCSR&IHO documents).

The National Research Institute in Gdynia is responsible for oceanographic service and it provides daily forecasts of water temperature, salinity, currents, sea level, and ice for the Southern Baltic. All forecasts are available on the internet.



In 2016 the new hydrographic boats have their first full operational surveying season.

B.3.8. National Report of Russian Federation

Documents: B3.8_BSHC21_National Report_Russian Federation

The National Report of the Russian Federation was presented by the head of the delegation Leonid Shalnov.

The Report summarized activities of the Hydrographic Office of the Russian Federation in hydrography from the 20th to the 21st Baltic Sea Hydrographic Commission Conferences.

In 2015 and 2016 hydrographic surveys were mainly carried out in water areas and approaches to Saint Petersburg, Bronka, Vyborg and Vysotsk sea ports.

During the intercessional period 23 ENC's were issued.

In 2015 and 2016 5 INT charts and 11 national paper charts were issued.

Notices to Mariners are issued weekly and are available in pdf. on the website of the Hydrographic Office.

Within the WWNWS the Hydrographic Office of the Russian Federation is responsible in the south eastern part of the Baltic Sea (Coastal Warnings Kaliningrad) and the eastern part of the Gulf of Finland (Coastal Warnings Saint Petersburg).

B.3.9. National Report of Sweden

Documents: B3.9_BSHC21_National Report_Sweden

The National Report of Sweden presented by the head of delegation Patrik Wiberg gave a summary of the main activities within the Swedish Hydrographic Office since the 20th BSHC meeting.

The Swedish Hydrographic Office is organized within the Swedish Maritime Administration and employs 120 persons including the hydrographic survey personnel.

The operations are certified in accordance with ISO 9001 and from 2014 also certified in accordance with the environmental standards ISO 14001.

Most Swedish waters are surveyed to some degree over the years but the long term objective is that all Swedish waters should be surveyed in accordance with the IHO standard S-44. Sweden and Finland have implemented a common Finnish-Swedish realization of S-44 named FSIS-44.

Surveys and re-surveys now and in the coming years are focused on shipping routes as defined as HELCOM Cat I and II areas in the Hydrographic Re-Survey plan for the Baltic Sea.

Since 2011 the Swedish HO together with other Baltic Sea Hos has received co-financing from the EU TEN-T and Connecting Europe Facility (CEF) program for hydrographic surveying activities.

The first phase of the global FAMOS project FAMOS Freja is ongoing 2014-2016 with co-financing from the CEF-program. The HOs from Denmark, Estonia, Finland, Germany, Latvia and Sweden is participating in FAMOS Freja.



In 2015 a total amount of 4 627 km² were surveyed in Swedish waters. Together with the surveys performed the first half of 2016 it means that 52% of Swedish waters are surveyed in accordance with FSIS-44.

The depth database DIS (Depth Information System) is managed in an ESRI-system with some specialized tools developed by a Swedish GIS company specialized on ESRI tools. 117,9 billion (117 917 708 407) depths was stored in the depth database.

The Swedish paper chart portfolio consists of approximately 120 paper charts and 16 series of small craft charts.

For S-57 deliveries the PRIMAR service "GeoViewer" is used.

62 New Editions of paper charts have been published from August 2015 – August 2016. During the same period, all 572 Swedish ENC's have been published as New Editions.

Within the BSHC it has been agreed upon that all chart products within the Baltic Sea should be adjusted to a common vertical reference level: Baltic Sea Chart Datum 2000.

As part of the commitment made in BSHC the SMA has started the Chart Improvement project (Sjökortslyftet) in order to adjust the chart products to this new reference level.

For the season 2016 were the three series of Swedish small craft charts covering Stockholm archipelago, the two covering the Swedish West Coast and the inland series Mälaren-Hjälmaren produced as New Editions.

All Swedish navigational warnings are drafted and broadcasted by the station MSI SWEDEN. This station also performs the NAVTEX broadcasting of MSI for the entire Baltic Sea with exception of area "U" which is covered by Tallinn Radio.

The NtM department at the Hydrographic Office in Norrköping maintains the role "Baltic Sea Sub-area Coordinator" with the responsibility of international coordinator of MSI in the Baltic Sea area.

The latest update regarding Sweden in the C-55 database was delivered to the IHB in June 2016.

The SMA was appointed by the Swedish Government to perform an investigation of environmental hazardous wrecks in Swedish Waters.

The Swedish HO has received funding from Swedish Contingencies Agency to perform a study to evaluate survey methods in shallow waters 0-10 meter depth.

The digitizing of soundings from fair sheets and similar maps in our archive continues with the overall aim of creating national coverage in the depth database.

The overall objective of the Assure Depth of fairways for Archipelago Public Transportation (ADAPT) project is to develop and implement safe, time-saving and fuel-efficient routes for the transportation of passengers and goods in the Åland and Stockholm archipelagos.

The project started 1 March 2016 and surveying in Sweden and Åland is in progress in 2016-2017.



B.4. Status Report from the IHO-EU Network WG (IENWG)

Documents: B4_BSHC21_IHO-EU WG Status Report_SE

Sweden (Magnus Wallhagen) as a representative of the BSHC provided the Conference the Status Report from the IHO-EU Network Working Group (IENWG).

Since the 20th BSHC meeting one IENWG meeting has been arranged in Paris January 2016. The meetings are always open for any IHO member state to participate in.

A consortium led by SHOM (FR) was created with 19 partners from 15 countries. In 2015 the DG MARE announced that this consortium was selected for the Coastal Mapping project consisting of the following main Work Packages:

- WP1 – Digital Mapping;
- WP2 – Share experience, standards and practices;
- WP3 – Future program (JECMaP);
- WP4 – Management and communication.

The Coastal Mapping portal was opened in December 2015. Individual uploads of suitable data sets, covering the coastal zone between land and sea, are available in the portal.

The DG MARE has launched the EMODnet in order to be able to give easy access to marine data of the EU member states waters to the society as a whole. A previous phase 1 and an ongoing phase 2 of the EMODnet project should be seen as tests on how a portal on marine data could be achieved. However the third phase of EMODnet phase 3 is aimed to achieve a more permanent solution of a portal with high resolution marine data.

It was recommended that the BSHC continued to monitor the ongoing work within the EC through participation in the future IHO-EU Network. Sweden (Magnus Wallhagen) is willing to continue to represent the BSHC.

Actions (decisions):

1. The Commission noted the report.
2. The BSHC Member States were invited to inform Sweden about their point of contact for IENWG issues.

B.5. MSI activities in the Baltic Sea Region

Documents: B5_BSHC21_MSI Report_Sweden

Sweden presented a short description of the MSI organization in the Baltic Sea area and a summary of main activities concerning MSI in the area since the previous BSHC Conference.

In accordance with GMDSS Maritime Safety Information (MSI) for coastal waters in the Baltic Sea region is provided to shipping by means of the international NAVTEX system. In addition to NAVTEX MSI is provided to ships in the region by means



of various national systems such as VHF, national NAVTEX, FM-radio, Smart Phone Apps, TV-text and national websites.

The 7th Baltico Meeting was arranged by the Estonian Maritime Administration and RIKS (Tallinn Radio) in Tallinn on the 24th and 25th of May 2016.

Among many items on the agenda the following could be of interest to the BSHC Conference:

- changes of names of water areas and limits between areas;

- disturbance to NAVTEX;

- presentation of national websites with map interface.

The new system “Sea Traffic” was demonstrated at the Baltico Meeting. The system is based on a map-tool and each “case” such as a Navigational Warning is created from the map.

Actions (decisions):

The Commission noted the report.

C. IHO Work Program 2 – Hydrographic Services and Standards

C.1. Re-Survey MWG Report to the BSHC 21st Conference

Documents: C1_BSHC21_MWG Report_FI

The Chair of the Re-Survey Monitoring Working Group Seppo Mäkinen (Finland) presented the Report to the 21st BSHC Conference.

All the BSHC countries have nominated members to the working group however not all have been active or participated to the meetings.

The main tasks for the MWG has been to continue the development of the Re-Survey database and to encourage the member states to continue the up-to-date surveys of their waters.

The communication within the MWG has been by MWG Letters and e-mails. The 13th Meeting was held on 10 February 2016 at Swedish Maritime Administration in Norrköping, Sweden.

The main subject was to have a hands-on workshop on 9 February, 2016 and its outcome to the development of the re-survey database and the user interface.

The national hydrographic survey status and plans were discussed and reviewed.

The MWG TORs and the Work Program for the years 2015-2016 were found accurate.

Cooperation with FAMOS Freja-project (Finalising Surveys for the Baltic Motorways of the Sea) and especially activity 1, hydrographic surveys, was noted to be important to support the work of MWG.



Actions (decisions):

1. The Conference noted the report.
2. The BSHC Member States were invited:
to study and define Cat I & II areas in their waters based on the existing AIS-information on commercial shipping;
to perform re-surveys in areas of commercial shipping;
to participate in MWG work.

C.2. CDWG Report to the BSHC 21st Conference

Documents: C2_BSHC21_CDWG Report_FI

The Chair of the BSHC Chart Datum Working Group (CDWG) Jyrki Mononen (Finland) presented the annual report to the BSHC Conference.

Mr. Jyrki Mononen has acted as the Chair. Dr. Wilfried Ellmeier was elected as the secretary of the 8th CDWG meeting. All the BSHC countries have nominated members to the working group however not all have been active or participated to the meetings.

BOOS has nominated their Point of Contact.

There are observers from Finnish Geodetic Institute, Finnish Meteorological Institute, Swedish National Land Survey, Federal Agency for Cartography and Geodesy (Germany), Norwegian Mapping Authority.

One of the most important tasks agreed in the 7th CDWG meeting on 11-12 February 2015 was to formulate a separate specification document for the Baltic Sea Chart Datum 2000.

The draft specification was reviewed and approved in the 8th CDWG meeting.

The main tasks for the CDWG has been to continue the implementation of the EVRS in the Baltic Sea, to review the progress of transition to the harmonized vertical reference, to promote development of a common geoid model for the Baltic Sea, and to cooperate with relevant other international bodies.

One of the most important items of the 8th CDWG meeting (23-24 February 2016, Helsinki, Finland) was to review and approve the first draft of the specification for the Baltic Sea Chart Datum 2000.

The specification consists of four sections which are 1) definition, 2) realization, 3) comments and remarks and 4) references. It was noted that specification was an essential document for applying and realizing the Baltic Sea Chart Datum 2000 and it could be applied in all BSHC member states.

It should be taken into account that in some countries vertical datum differs from the specification but the differences can be determined. It was deemed to be important that the specification should be used in national Hydrographic Offices



as a guideline for using their national GNSS reference station networks as the realization of the Baltic Sea Chart Datum 2000.

It was noted that if using other GNSS reference station services e.g. commercial services national HOs should check their conformity with the specification.

Other main themes were to review national plans and status of transition to common vertical reference, plan the cooperation with BOOS in future, to review and update the TORs and the Work Program for the years 2016-2017 and plan the future work of CDWG.

The national implementation plans were reviewed by participants.

Sweden has already published some charts in Baltic Sea Chart Datum 2000 (RH2000). In Germany EVRS realization is already used in practice. In the Russian Federation decisions follows after the implementation of the new State Coordinate system.

The status of FAMOS-project (Finalizing Surveys for the Baltic Motorways of the Sea) and especially activity 2 geoid model was reviewed. The goal for FAMOS activity 2 is to improve the geoid model for the whole Baltic Sea.

The most important result was finalizing the first version of the specification for the Baltic Sea Chart Datum 2000.

Actions (decisions):

1. The Commission noted the report.
2. The BSHC Member States were invited:
to note the first version of the specification for the Baltic Sea Chart Datum 2000;
to endorse CDWG TORs;
to endorse CDWG Work Program 2016-2017;
to support CDWG defined proposal and clarification for displaying the name "*Baltic Sea Chart Datum 2000*" in paper charts;
to note the answers of questionnaire on national naming of chart datum on chart.

C.3. BSBD-WG Report to the BSHC 21st Conference

Documents: C3_BSHC21_BSBDWG Report_SE

The report to the 21st BSHC Conference of the Baltic Sea Bathymetry Database Working Group was presented by Sweden.

The BSBDWG has not held any meeting during the last year.

Since the last conference the portal has been up and running without any downtime on the viewing services. The bathymetric model at present time is the same as the version published in December 2013.

The portal address remains as data.bshc.pro.



The site is fairly widely used and the number of visits on the portal between the first of July 2015 and first of July 2016 is 11 991 visits made by 9 208 unique visitors.

The number of returning visitors is up to 25% indicating that there are a solid number of users returning to the site.

It has so far been registered active links to the portal from 176 sites (previous year 128).

Of the Baltic countries HO only few seems to link to our portal and we would like to ask that all countries add active links to the site from their national webpages in order to further promote the portal.

SMA have had plans to create a newer version of the BSBD 500m grid.

Data deliveries for the territorial waters are still pending formal clearance in Finland some lesser restrictions for the northern part of Finland has been announced. Until clearance has been given only sea chart figures are available.

SMA now has a general approval to use 300m resolution for the compilation of the territorial waters and it is working on getting approval of higher resolution (250 or 200 m). In some areas 100 m or higher resolutions may already be used for the compilation.

GEBCO recognizes the BSHC database as a Regional Mapping Project.

BSBD uses the GEBCO dataset for areas where no data has been provided by national HO, Russia, Lithuania and a part between Denmark and Poland.

BSBD is still used in the latest EMODnet phase II model. There is a plan to assist in deliveries to EMODnet “High Resolution Seabed Mapping” (phase III).

The work to reorganize BSBD tasks into a maintenance organization at SMA will continue after the change of chart production system when some personnel resources will have a lower workload.

Actions (decisions):

1. The Commission noted the report.
2. The Commission endorsed future cooperation with GEBCO and EMODnet.

C.4. Status report of Baltic Sea and North Sea Marine Spatial Data Information Working Group (BS-NSMSDIWG)

Documents: C4_BSHC21_BS-NSMSDIWG Report_DK

The Report was presented by the Chair of BS-NSMSDIWG Jens Peter Hartmann (Denmark).

MSDI delivers the instruments for the enhanced scope of hydrographic information users. From an HO perspective it is important that the IHO takes the lead



in addressing MSDI matters for the maritime sphere through its MS. The BS-NSMSDIWG is seen as an appropriate WG to deal with these opportunities from a regional approach.

The 20th BSHC meeting approved a request from NSHC to expand the BSMSDIWG also to include the NSHC in a dual MSDI WG with the task to study MSDI in the Baltic Sea and the North Sea.

The 5th meeting of the BS-NSMSDIWG is planned to take place in Riga, Latvia at the Latvian Hydrographic Offices in late-2016 or first part of 2017. All MS from BSHC and NSHC will be invited to participate in the meeting.

At the 4th meeting of the BS-NSMSDIWG the work group adjusted the draft work program. The work plan is now divided in 6 work items and there are relevant milestones and coordinators for each item. The draft work program focuses on tasks that are foreseen to be important and challenging from a regional and a national perspective. At the 20th BSHC meeting the work program was approved.

The 18th International Hydrographic Conference confirmed the importance of marine spatial data infrastructure (MSDI) activities for the IHO and its Member States.

The key interest for the IHO is that MSDI provides a framework for the provision of hydrographic information beyond the traditional field of surface navigation to support asset management and decision support by users such as scientists, engineers, environmental consultants, ports operators, marine planners, energy companies and fisheries.

The IHO is committed through its Capacity Building Program for 2013-2017 to support MS improve their corporate governance in respect of data management, database design and MSDI through a variety of training courses and briefing sessions.

MSDIWG has been cooperating with the Open Geospatial Consortia (OGC), the world-wide body responsible for developing de-facto standards for the geospatial industry and has contributed to the development of an OGC compliant Conceptual Model for Oil Spill Response.

Towards Data Centricity the output of most HO/HS is focused on products rather than data with focus centered on supplying products to a narrow group of users, driven by the need for compliance with SOLAS or support to national navies. Although a large amount of data is collected, only a small amount (less than 5%) is passed on to the recipient in that product. Thus, the extent of knowledge transfer is only a small part of the potential of the original data. However, most hydrographic data sets have the potential of delivering a wider range of information to a wider range of users.

MSDI requires data to be held in a generic way, rather than as a particular product for a specific user group or purpose. The development of the Universal Hydrographic Data Model (S-100) is a strong enabler of enhanced data sharing across multi-disciplinary groups.

S-100 is well understood to contribute to e-navigation, but its development is still relatively immature with very little data existing yet. The potential for HO/HS to contribute to MSDI and e-navigation is becoming more realistic, but requires serious consideration in terms of how data is managed.



Actions (decisions):

1. The Commission noted the report.
2. The BSHC Member States were invited:
 - to discuss the implication of MSDI from a HO perspective and how MS can benefit from a regional approach to MSDI;
 - to approve the suggested textual amendments from NSHC with regards to the ToR for the BS-NSMSDIWG;
 - to discuss if information/status about MSDI should be included in the National report from MS to BSHC meetings.

C.5. New national ENC service for leisure craft users

Documents: C5_BSHC21_New National ENC Service for Leisure Craft users_DK

Denmark presented a new national ENC service for leisure craft users.

In 2013 the Danish Geodata Agency (DGA) initiated the Safe Course pilot project. The aim of the project was to obtain background information for developing an official digital solution acceptable as a primary navigational aid for leisure crafts.

The project tested an ENC service (updated Danish and Swedish ENCs) for leisure craft navigation and involved 132 Danish and Swedish test users all of whom were experienced leisure craft mariners. The ENCs were displayed on a tablet through a software solution developed by the Swedish company Seapilot AB and were used as the primary aid for navigation.

The service and the technical setup proved to be a success in the pilot project and it was decided to set up a Danish national ENC service for the leisure craft market.

After the project an implementation plan was developed in order to have the new Danish ENC services operational from the 1st of April 2016.

C.6. FAMOS Project Report

Documents: C6_BSHC21_FAMOS Project Status Report_SE

The FAMOS Project Status Report to the 21st BSHC Conference was presented by Sweden.

At present the project consortium includes the Hydrographic Offices of all Baltic Sea countries except Poland and Russia as well as national geodetic authorities and institutes and one private company.

The FAMOS project focuses on surveying areas relevant for commercial shipping in the Baltic Sea according to the BSHC-HELCOM re-survey scheme. Furthermore it serves as a platform for implementing the common Baltic Sea Chart Datum as proposed by the BSHC Chart Datum Working Group and agreed upon within BSHC.



Hydrographic surveying of approximately 96 000 km² of areas important for commercial shipping in the Baltic Sea and corresponding production of nautical charts. For the participating BSHC MS the surveys follow the BSHC-HELCOM harmonized re-survey scheme as decided at the HELCOM Copenhagen Ministerial Meeting 2013.

Implementing a common geodetic vertical Baltic Sea chart reference level (Baltic Sea Chart Datum 2000) in line with the BSHC Chart Datum Working Group goals. This includes measurements of gravity during hydrographic surveys, verification of existing gravity data, and the computation of a new, more accurate geoid model.

The survey seasons 2014 and 2015 have been completed successfully with surveys of 8750 km² and 15820 km², respectively. The 2016 surveying season is on-going with both project internal and externally procured resources.

In sub-activity four gravity surveys have been conducted in 2015. Two more surveys have been carried out in 2016.

Work with databases, geoid modeling and Mean Sea Surface modeling has started. GNSS data processing is on-going. The chart datum changed in Sweden, has started in the Northern Bay of Bothnia and the project is delivering according to plan. New official electronic charts have been published with the new chart datum.

Smaller survey boats and other relevant equipment have been procured by the maritime administrations of Latvia and Estonia. The boats have been delivered in 2015 and 2016.

Various workflow and software upgrades have been performed by the relevant project partners. Most notably, Sweden procured a new Chart Production System (CARIS HPD), which is currently being implemented.

The project has been presented at relevant EU and maritime forums.

FAMOS has been awarded the Flagship Project status under the EU Strategy for the Baltic Sea Region (policy area on maritime safety and security).

Actions (decisions):

The Commission noted the report.

C.7. New Chart Production System at the Swedish Hydrographic Office

Documents: C7_BSHC21_SMA New Chart Production System_SE

Sweden presented a New Chart Production System at the Swedish Hydrographic Office.

A requirements specification was produced in 2014-2015 and finalized in April 2015. A public open procurement was prepared and the request for proposals was announced in May 2015.



Two tenders were received from Caris and Esri respectively. In October the Caris proposal was selected after a very tight race. Contract was signed in early November.

From November 2015 the project activities have been intense and sometimes in parallel and at times stressing the available resources within the office.

A pilot test period has been completed in February 2016. The aim has been to increase knowledge of Caris HPD and to evaluate the most important use cases.

In March 2016 a pre-study was completed to suggest a migration strategy for cartographic information. It has been concluded that the migration of data for ENC production is straight forward; there is a standard. But for cartographic products it is another story. The old present system and Caris HPD handles this in different ways and there is no specific standard for data transfer to use here.

In March 2016 Design specification was approved. Cartographic pre-study evaluated and initial directions decided. We will attempt to develop an interface that enables transfer of large parts of the cartographic information. We also foresee that manual editing will be necessary to completely recreate our cartographic products.

External and internal customers were informed about the project and especially the consequences for specific product categories, if there will be longer delivery times, standstills etc.

Review and change all relevant processes and instructions in our quality management system is a high priority task and consume considerable resources.

In August 2016 the complete system, with functionality to satisfy our requirements will be delivered and installed.

In September 2016 – system acceptance test (SAT) of delivered system.

In September 2016 – October 2016 there is a plan of comprehensive user training for all staff that will operate the system. The training will partly be assisted by our own expert users in order to link with processes and procedures in our quality management system.

On the 30th of September 2016 all updating in present "old" system stops.

The process of reestablishing all cartographic products such as paper charts, leisure craft charts, digital raster products and all other chart products and services starts immediately at PSU and in the current plan we have given ourselves two years to be completely on track again, i.e. end of 2018.

Actions (decisions):

The Commission noted the report.



C.8. LIDAR Investigations in the German Baltic Sea – Status and further activities

Documents: C8_BSHC21_ALB Explanatory Note_DE

Germany provided the Conference a brief summary of the project on the use of LIDAR in the southern Baltic Sea “Investigations on the use of airborne laser bathymetry in hydrographic surveying”.

The method of bathymetry LIDAR represents a new technique of airborne surveying of the sea floor in shallow waters as an alternative to the conventional ship based echo sounding which is time consuming and costly. The task was to investigate whether comparable accuracies can be obtained and whether this method is economically advantageous.

In three surveying campaigns at a test area next to the island of Poel different state-of-the-art sensors were used to derive a three dimensional model of the sea floor with the main focus of the processing to derive the maximum depth to be detected, the data density in different water depths as well as the vertical accuracy of the resulting point cloud. The limitation in the visibility in the water is the substantial and limiting environmental factor.

Depending on the sensor up to a depth of twice the Secchi-depth the requirements of order 1b of the Standards for Hydrographic Surveying of the IHO can be fulfilled by a good portion. An exception constitutes the detection of wrecks and other obstructions. With the current state of the technology object detection is not reliable.

The cost-effectiveness was investigated in the frame of the project additionally to the quality evaluation of the point cloud and the estimated costs of a survey executed with ALB and of a ship-based echo sounding of the sea floor were compared.

The derived data would still have a higher point density as echo soundings and cover additional areas in the extreme shallow waters at the coast which are out of reach for vessels and launches. These areas are of interest for example for coastal protection.

In the end of the report the experiences of the parameters are recapped regarding tenders of ALB.

Actions (decisions):

The Commission noted the report.



D. IHO Work Program 3 – Inter Regional Coordination and Support

D.1. The BSHC WENDWG Representative Report to the BSHC21

Documents: D1_BSHC21_WENDWG Report_FI

A BSHC WENDWG representative Jarmo Mäkinen (Finland) presented the report to 21st BSHC Conference.

WENDWG is a working group under the IRCC Committee. The purpose of the WEND Working Group is to advise IRCC and to assist in facilitating a world-wide consistent level of high-quality, updated official ENC's through integrated services that support chart carriage requirements of SOLAS Chapter V, and the requirements of the IMO Performance Standards for ECDIS.

The 6th WENDWG6 meeting took place on 8-10 March 2016 in Norway. 24 delegates from 16 Member States representing 11 Regional Hydrographic Commissions 2 Regional ENC Coordinating Centers and the IHB attended the meeting.

One of the main objectives of the WENDWG is to monitor the application of the WEND Principles by the Hydrographic Offices and the Regional Hydrographic Commissions.

Status of full implementation of WEND principles was studied by a subgroup lead by France.

Global ENC coverage has now reached the point where further progress is primarily dependent upon new surveys or re-surveys being carried out in the areas not yet covered by ENC's. There still remain numerous cases of overlapping ENC's which is contrary to the ENC production principles established by the IHO. One of the reasons identified is that most of the RHCs do not set up "Approved" ENC Schemes as they do for INT paper charts.

Global analysis for overlaps and coverage made by UKHO was presented. Little progress has been made to resolve overlaps. This study also includes some overlaps in the Baltic Sea. Mostly these are not significant.

Both RENCs gave a status report, including harmonization activities.

The WENDWG noted the progress made by the RENCs in supporting the WENDWG program of work.

The UKHO provided a global analysis of the situation in terms of ENC coverage. There was almost no change from the year 2014.

The meeting was informed that progress had been made by several regional International Charting Coordination Working Groups (ICCWG) that are now using ENC coverage as part of their systematic risk assessment analysis protocols.

RHCs are encouraged to implement systematic risk assessment methodologies to assess and further design the optimal ENC coverage.



Following up on issue discussed at the last IRCC and HSSC since 2014, WENDWG discussed further about overlay services.

France gave a comprehensive analysis on the barriers that prevent the full implementation of the WEND Principles and listed the possible consequences.

Actions (decisions):

1. The Commission noted the report.
2. Mr. Jarmo Mäkinen (Finland) was invited to continue his work as a BSHC representative for the WENDWG.

D.2. Baltic Sea International Charting Coordination Working Group Status Report

Documents: D2_BSHC21_BSICCWG Report_FI

The Baltic Sea International Charting Coordination Working Group (BSICCWG) Status Report to the 21st BSHC Conference was presented by the BSICCWG Chair Jarmo Mäkinen (Finland).

According to ToRs and RoPs BSICCWG has to report annually to the BSHC at issues as follows:

- updated Regional INT Chart Catalogue;
- updated ENC Catalogue relevant to the Region;
- changes to the scheme of INT Charts for the Region;
- changes to the small/medium scale ENC scheme for the Region;
- updated Work Plan (if used);
- status of BSEHWG Harmonization recommendations.

The 3rd BSICCWG meeting took place in Copenhagen, Denmark on 20-21 October 2015. 10 delegates from Estonia, Denmark, Finland, Germany, Poland and Sweden attended the meeting.

The BSHC20 actions # 12 and # 13 were reviewed.

Actions from the 3rd BSICCWG meeting (20-21 October 2015, Denmark) were also reviewed.

After experimentation phase (2014-15) and transition phase (Spring 2016) new INT Chart Web Catalogue and the associated INT Chart on-line Web Manager services Web based services are now in use.

INT chart Producer and Printer Nations and INT Chart Coordinators/ICCWGs are now expected to maintain regional databases using INTOGIS.

Almost all the Baltic Sea member states have started to update their charts in Region E.

A workshop for all Regional INT Chart/ENC Coordinators took place on 25 April and back-to-back with the 2nd NCWG meeting at the IHB in Monaco.



The study of the gaps and overlaps in the Baltic Sea according to the WENDWG report and with different tools is an ongoing effort.

Most of the Baltic Sea ENC harmonization recommendations are implemented or in process to be implemented by the member states.

Actions (decisions):

1. The Commission noted the report.
2. The BSHC Member States were invited:
to give further guidance to the BSICCWG on BSHC20 action #12;
to give guidance for recourses of ENC related tasks.

D.3. Maintenance of the BSHC Web Site (www.bshc.pro)

Documents: D3_BSHC21_BSHC Web Site_SE

The BSHC web site was initiated by Germany and has from 2013 been managed by Sweden.

As a result from the 20th BSHC meeting the following actions and decisions were taken to the minutes:

action #14 – WG chairs to forward information about WG for inclusion in the BSHC web site to Sweden – most of the WG Chairs have communicated with SMA about content for the respective WG but there are still some WG totally missing and some are sparse with information;

action #15 – all WG to include e-mail address of bshc.pro in their correspondence in order to post documents on the web – the sma@sjofartsverket.se e-mail address is probably not included in much correspondence within the respective WG;

decision #4 – to post the info of BSHC on the web and also the most up-to-date version of the statutes of BSHC should be posted – the sma@sjofartsverket.se e-mail address is probably not included in much correspondence within the respective WG.

As a result of discussions at the 20th BSHC meeting Sweden has allocated some administrative resources to work operationally with the web site maintenance.

Some improvements in the web site content have been made since BSHC20.

Valid and up-to-date content from BSHC working groups is vital to the BSHC web site. A possible way forward is to establish a more active web site manager (and allocate proper resources) with a mandate for direct dialogue with WG chairs and HSSC chair regarding web site content.

Sweden is willing to strengthen the resources for an active web site management as indicated above if MS agree.



Actions (decisions):

1. The Commission noted the report.
2. The BSHC Member States were invited:
to recommend further action;
to confirm the BSHC20 Decision #4.

D.4. Allocation of future IHO Council seats to BSHC Member States

Documents: D4_BSHC21_Council Explanatory Note_DE

Germany presented a short Explanatory Note concerning the allocation of future IHO Council seats to BSHC member states.

The progress reported for the approval of the Protocol of Amendments to the Convention on the IHO at Reference A indicates that the Protocol will enter into force before the end of 2016.

Due to the new General Regulations the Council will be established as a new important organ during the first Assembly with the expectation to assemble in autumn 2017 for the first time. It is now up to the BSHC to set up its procedures for the selection process of the respective representatives to the Council as various RHC did already.

Germany proposes to adopt the selection procedures endorsed by the North Sea Hydrographic Commission (June 2016, Dublin).

Actions (decisions):

1. The Commission discussed and adopted proposed NSHC procedures.
2. The Commission considered possible alternatives to the NSHC template.
3. The BSHC Member States were invited to make a final decision about the procedures to be applied to designation of Council seats as soon as the status of approval of the Protocol of Amendments to the Convention on the IHO required this.

E. Proposal for amendment of the BSHC Statutes, Article 6c

Documents: E_BSHC21_Amendment of BSHC Statutes_SE

At the 20th BSHC conference the delegates discussed the necessity to have the input papers available in good time before the conference in order for MS to have enough time to read them through and to make appropriate preparations.

It was noted that the current version of the BSHC Statutes gave no indication when to submit input papers to the BSHC conference or make them available. The BSHC agreed that it would be beneficial to have a time indication for when input papers should be submitted and made available.



The 20th BSHC conference decided that Sweden together with Latvia and Denmark was to put forward a proposal of an amendment in Article 6c to be decided at the 21st BSHC conference.

Current version of the Article 6c is the following:

Proposals to be included in the Agenda of a Conference must be sent to the Chairman at least four months before the date fixed for the opening of the Conference. The Chairman shall prepare the provisional Agenda and forward it to the participants at least one month before the opening of the Conference. The first item shall be the Chairman's report on the activities of the Commission since the last Conference.

Proposal of amendment to be decided at the 21st BSHC conference:

Proposals to be included in the Agenda of a Conference must be sent to the Chairman at least four months before the date fixed for the opening of the Conference. The chairman shall prepare the provisional Agenda and forward it to the participants at least two month before the opening of the Conference. The member states must send reports and submissions for the agenda items minimum five weeks in advance to the chairman. Reports and submissions should be published at the IHO-website four weeks in advance of the meeting. Submissions that are submitted later than the time limits above, can be considered for adoption in the agenda by the conference, but may be given a lower priority. If time does not allow such late submitted agenda items to be presented, they may be postponed to the conference of the following year or be handled by correspondence. The first item shall be the Chairman's report on the activities of the Commission since the last Conference.

Actions (decisions):

1. The Commission noted the Proposal.
2. The Commission approved the amendments.

F. Election of new Chair and Vice-Chair

Mr. Mindaugas Cesnauskis (Lithuania) was elected as a Chair of the BSHC, and Mr. Thomas Dehling (Germany) was elected as a Vice-Chair of the Commission.

G. Place and Date of next Conference

Germany was chosen as host for the next BSHC Conference. Germany confirmed its ability and readiness to be the host.

Planned date and place of the next Conference – September 2017, Rostock, Germany.

H. Review of BSHC21 List of Actions

The Chair of the Conference asked the delegates to provide comments to Draft Minutes and Draft List of actions.



I. Closing Ceremony

The IHB Director Mustafa Iptes expressed gratitude for productive work and thanked the hosts for their hospitality.

The Chair of the Conference Captain Leonid Shalnov thanked the delegates for their input in successful sessions and thanked the hosts for the excellent meeting arrangements.