HSSC3-10A

3RD MEETING OF THE HYDROGRAPHIC SERVICES AND STANDARDS COMMITTEE
IHB, Monaco, 8-10 November 2011

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XVIIIth INTERNATIONAL HYDROGRAPHICCONFERENCE

MONACO, 23 - 27 April 2012

REPORTS ON THE WORK OF THE IHO FOR THE PERIOD 2007 - 2012

WORK PROGRAMME No. 2

HYDROGRAPHIC SERVICES AND STANDARDS

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HYDROGRAPHIC SERVICES AND STANDARDS

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REPORT OF THE COMMITTEE ON HYDROGRAPHIC SERVICES AND STANDARDS (HSSC)

The HSSC was formed on 1 January 2009 as a result of Decisions 8 and 9 of the XVIIth IHC that brought into force a restructuring of the committees of the Organization. The HSSC provides governance, oversight and direction for the execution of the IHO's technical programme. Prior to the existence of the HSSC, the Committee on Hydrographic Requirements for Hydrographic Systems (CHRIS) performed a similar function for many parts of the IHO technical programme. The CHRIS was disbanded upon the formation of the HSSC.

This report provides information on the activities of CHRIS since the XVIIth IHC to 2009 and the HSSC since its formation.

1.	**Chairman:**	Captain V. NAIL (UK)	CHRIS HSSC	2007–2008 2009-2011
	Vice-Chairman:	Mr. P. OEI (Singapore)	CHRIS	2007
		Dr. M. Jonas (Germany)	CHRIS HSSC	2008 2009-2012
	Secretary:	Ing en chef M. HUET (IHB)	CHRIS	until 2008
		Captain R. WARD (IHB) assisted by Ing. en chef M. HUET (IHB)	HSSC	from 2009

2. Participants (..) denotes how many meetings attended

IHO Member States: Argentina (2), Australia (4), Brazil (4), Canada (4), Chile (4), China (2), Cuba (0), Denmark (3), Ecuador (0), Estonia (2), Finland (4), France (4), Germany (4), Greece (2), India (0), Indonesia (2), Italy (2), Japan (4), Rep. of Korea (4), Mexico (0), Netherlands (4), Norway (4), Portugal (3), Russian Federation (0), Singapore (2), South Africa 3), Spain (2), Sweden (2), UK (4), USA (4)

Observers:	
Chart and Nautical Instrument Trade Association(2)	CNITA
Comité International Radio Maritime (4)	CIRM
Cruise Lines Association International (2)	CLIA
Defence Geospatial Information Working Group (0)	DGIWG
General Bathymetric Chart of the Oceans (0)	GEBCO
Inland ENC Harmonization Group (2)	IEHG
Secretariat of the Intergovernmental Oceanographic Commission (0)	IOC
International Association of Aids to Navigation and Lighthouse Authorities (2)	IALA
International Centre for ENCs (3)	IC-ENC
International Chamber of Shipping (0)	ICS
International Electrotechnical Commission Technical Committee 80 (0)	IEC TC80

International Marine Pilots Association (2)	IMPA
Secretariat of the International Maritime Organization (0)	IMO
PRIMAR (1)	PRIMAR
Radio Technical Commission for Aeronautics (4)	RTCA
UN Department of Administration of the Law of the Sea (1)	UNDOALOS

Attendance at HSSC-3 meeting not available at time of drafting this report.

3. Meetings

The CHRIS and then the HSSC has met in each year since the XVIIth IHC, as follows:

CHRIS - 19	Rotterdam	The Netherlands	5-9 November 2007
CHRIS - 20	Niteroi	Brazil	3–7 November 2008
HSSC - 1	Singapore	Singapore	22-24 October 2009
HSSC - 2	Rostock	Germany	26-29 October 2010
HSSC - 3	IHB	Monaco	8-10 November 2011

4. Subordinate Bodies

The CHRIS, and subsequently HSSC, established a number of Working Groups in order to progress work inter-sessionally. In addition, the Advisory Board on the Law of the Sea (ABLOS) provided an annual report of its activities to the HSSC.

A report from the Chairs of each Working Group and ABLOS is provided in later sections of this report as follows:

Transfer Standard Maintenance and Applications Development Working Group	TSMAD
Data Protection Scheme Working Group	DPSWG
Digital Information Portrayal Working Group (Colours and Symbols Maintenance Working Group until 2009)	DIPWG
Standardization of Nautical Publications Working Group	SNPWG
Chart Standardization and Paper Chart Working Group	CSPCWG
Data Quality Working Group	DQWG
Marine Spatial Data Infrastructure Working Group	MSDIWG
Tidal and Water Level Working Group (Tidal Committee until 2009)	TWLWG
Hydrographic Dictionary Working Group (Committee on the Hydrographic dictionary until 2009)	HDWG
ENC Updating Working Group	EUWG
Advisory board on the Law of the Sea	ABLOS

5. General

5.1 The HSSC was fortunate to be able to build upon the well established procedures of the CHRIS. Participation in CHRIS meetings has increased. In particular, the increasingly active participation of Non-Governmental International Organizations (NGIO) has been of great benefit in providing a wider perspective and view on IHO activities.

Administration of Meetings

5.2 The HSSC business rules, inherited from the CHRIS, have undergone further improvement. Adherence to the timetables for the submission of agenda items and papers for consideration by the HSSC has meant that all Member States have a better opportunity to prepare their positions on subjects, even if they are unable to attend a particular meeting. Given the increased scope of the HSSC compared to CHRIS, the meetings are now supported by a Director and two Professional Assistants from the IHB. An informal meeting of the chairs of all subordinate bodies is now a regular pre-meeting activity. This meeting allows for an exchange of views, broad discussion of the topics on the agenda and better coordination between the various Working Groups.

Maintenance of Standards

5.3 Work on the maintenance of existing standards and the introduction of new ones has continued apace. More details are provided in the relevant working group reports that follow this report. The procedures for introducing new standards or making significant changes to existing standards have been further strengthened and documented more comprehensively,. This has resulted in revisions to IHO Resolution 2/2007 – *Principles and Procedures for Making Changes to IHO Technical Standards and Specifications*.

6. Important Issues

S-100

6.1 The introduction of the S-100 standard in 2009 was a particularly significant event for the IHO. It has provided a contemporary geospatial standard that should greatly assist in the widest possible use of hydrographic data and information in the custody of Member States in future. It has undoubtedly raised the profile and recognition of the IHO by other geospatial data providers.

6.2 There has been an increasing level of interest shown from other international organizations in the maritime domain that may not have a suitable geospatial standard and are therefore attracted to using S-100. The IMO is promoting the use of S-100 as a fundamental data model for data and information that will be available under its e-Navigation concept. IALA and other organizations have begun investigations to use S-100 for their information and data requirements. Meanwhile, the relevant HSSC Working groups are continuing to develop product specifications based on S-100 – particularly for next-generation ECDIS and digital nautical publications.

6.3 The S-100 Registry, developed and currently managed by the Chair of TSMAD through the support of the UKHO, is a very important supporting element of S-100. In the next few years it is expected that the list of active Submitting Organisations outside the IHO will increase as S-100 is more widely adopted. Plans are in hand to transfer the administration and management of the Registry to the IHB to ensure that a continuous and responsive service can be provided.

6.4 Further information on S-100 related developments are included in the relevant Working Group reports.

Operational Performance of ECDIS

6.5 From 2010, the HSSC has monitored the reports being made to the IMO concerning anomalies in the operation of some ECDIS systems being used at sea – particularly older systems. Causes include that older systems do not follow newer versions of the relevant IHO standards introduced to account for changes in IMO ECDIS Performance Standards and systems that do not follow the intentions of the IHO standards, sometimes because of ambiguity in the terms of the standards. In other cases, some deficiencies were identified in the ENC encoding practices of some Member States. These deficiencies were addressed quickly though appropriate amendments and clarifications to the standards being issued and subsequently acted upon by ENC Producers (see IHO Circular Letters 21 and 89 of 2010 for further information).

6.6 In support of various cautionary notices issued by the IMO in 2010 and 2011, the IHO issued a check dataset in October 2011 that enabled mariners to conduct an ENC Portrayal and Operation check on their ECDIS fitted in ships. From the check, mariners could ascertain whether their ECDIS was performing as generally intended by the relevant IHO standards. In cases where this was not so, advice was provided on work around solutions until such time as a system software upgrade could be provided. At the same time, the HSSC embarked on the review of a number of its ECDIS related standards to remove any ambiguities and to include clarifications or revisions to make the standards more robust.

6.7 *brief description of action to revise IHO ECDIS related standards in here (if agreed by HSSC-3)*

Technical Advice and Outreach

6.8 As a consequence of the success of its standards, the IHO has been called upon to provide increasing levels of guidance, explanation and assistance in the use of its standards. This support covers various aspects, but is particularly concentrated on the standards associated with digital data, particularly S-57 – *Transfer Standard for Hydrographic Data*, S-63 – *Data Protection Scheme for ENCs* and S-100 - *Universal Hydrographic Data Model*. Enquiries relating to ENC performance and ECDIS have also increased significantly. Support has been provided through a combination of the staff at the IHB seeking advice from the relevant Working groups or from certain members of the Working Groups providing advice directly.

6.9 brief description re-arranged WG structure in here, if approved by HSSC-3

6.10 brief description of any HSSC-3 comment on UK IHC PRO 2 in here

Industry Support

6.11 Many of the IHO standards for digital data are increasingly sophisticated and specialist in nature. In some cases, their development relies on expertise and experience that is not available directly from Member States – ENC data protection and ECDIS data portrayal are examples. Over the years, the IHO has relied on the very generous support of the *expert contributors* from industry participating in the Working Groups. Their continuing involvement represents a very significant contribution, both in terms of expertise and money. Even so, there has always been a requirement to pay for some aspects of the work under contract terms. So far, this has been associated mainly with the maintenance of the ECDIS Presentation Library and more recently, the development of the Data Portrayal section of S-100. As the demand and complexity of S-100 products increases, reliance on industry or contracted support may increase. Examples include the development of a feature catalogue builder, a portrayal catalogue builder, and product catalogue services.

7. Work Programme

7.1 The HSSC work Programme is derived from the IHO 5-Year Work Programme and is reviewed annually. At its 3rd Meeting in November 2011 the HSSC endorsed the relevant proposals for the IHO Work Programme 2013-2017 taking into account proposals provided by each of its subordinate bodies. These proposals were forwarded to the IHB and are reflected in the proposal *??* *see IHC CONF18_???*

8. Terms of Reference

The HSSC reviewed its ToRs at its 3rd meeting in November 2011 ?discuss any proposed changes here?. It is proposed that ?outline any significant proposed changes here?. In addition, an editorial change is required to revise all references to *Resolution T1.1* to now read *Resolution 11/1962 as amended*. This is as a result of the renumbering of all the IHO Resolutions that took place in 2010.

9. Proposals for adoption by the XVIIIth I.H. Conference

The XVIIIth IH Conference is invited to:

Approve this report, including the reports of the HSSC subordinate Working Groups and ABLOS.

Approve the ongoing existence of HSSC under the Terms of Reference shown at Annex A.

Approve …any other proposals from HSSC-3 to go in here…

Acknowledge the increasing and very important contribution being made by industry in their role as Expert Contributors, especially in the development of S-100 and its related applications, but also in the maintenance of many other IHO technical standards.

ANNEX A

COMMITTEE ON HYDROGAPHIC SERVICES AND STANDARDS (HSSC)

Terms of Reference

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HYDROGRAPHIC SERVICES AND STANDARDS COMMITTEE (HSSC)

Terms of Reference and Rules of Procedure

Ref: IHB Circular Letter No. 115/2007, dated 10 December 2007

Considering the need to promote and coordinate the development of standards, specifications and guidelines for official products and services to meet the requirements of mariners and other users of hydrographic information, the International Hydrographic Organization establishes a Hydrographic Services and Standards Committee (HSSC) with the following Terms of Reference and Rules of Procedure. The HSSC shall be the IHO Technical Steering Group acting on behalf of all Member States and shall report to each ordinary session of the International Hydrographic Conference ("*each ordinary session of the International Hydrographic Conference*" to be replaced by "each ordinary session *of the Assembly through the Council*" when the Council and Assembly are established).

1. Terms of Reference

1.1 Monitor the requirements of mariners and other users of hydrographic information concerning the use of hydrographic products and information systems that may require data and information provided by national hydrographic authorities, and to identify those technical matters that may affect the activities and products of those authorities.

1.2 Monitor the work of specified IHO Inter-Organizational Bodies engaged in hydrographic services, standards and related technical activities as directed by the International Hydrographic Conference ("*International Hydrographic Conference*" to be replaced by "*the Assembly*" when the Assembly is established) and provide advice and guidance to the IHO representatives as required.

1.3 Study and propose methods and standards for the acquisition, assessment and provision of official hydrographic data, nautical products and other related services.

1.4 Maintain technical liaison with other relevant stakeholders, such as type-approval authorities, navigation equipment manufacturers, and the hydrographic data user-community.

1.5 Prepare and maintain publications related to the objectives of the Committee.

1.6 Prepare a Committee Work Program and propose it to each ordinary session of the International Hydrographic Conference ("*each ordinary session of the International Hydrographic Conference*" to be replaced by "*the Assembly*" via the Council when the Assembly and the Council are established). Consider and decide upon proposals for new work items under the Committee Work Program, taking into account the financial, administrative and wider stakeholder consequences and the IHO Strategic Plan and Work Program.

1.7 Monitor the execution of the Committee Work Program and report to each ordinary session of the International Hydrographic Conference ("*ordinary session of the International Hydrographic Conference*" to be replaced by "*meeting of* the *Council*" when the Council and Assembly are established), including an evaluation of the performance achieved.

1.8 Propose to the International Hydrographic Conference (" *the International Hydrographic Conference*" to be replaced by "*the Assembly through the Council*" when the Council and Assembly are established), the establishment of new Sub-Committees, when needed, supported by a comprehensive cost-benefit analysis.

1.9 As required, establish Working Groups to fulfil the Committee Work Program, in conformance with IHO Technical Resolution 11/1962 as amended (*IHO Technical Resolution 11/1962 as amended* to be replaced by *Article 6 of the General Regulations* when the revised IHO Convention enters force) and approve their Terms of Reference and Rules of Procedure.

1.10 Monitor the work of its Sub-committees, Working Groups and other bodies directly subordinate to the Committee.

1.11 Review annually the continuing need for each Working Group previously established by the Committee.

1.12 Liaise and maintain contact with relevant IHO and other bodies to ensure that IHO work activities are coordinated.

1.13 Liaise with other relevant international organizations and Non-Government International Organizations (NGIOs).

1.14 These Terms of Reference can be amended in accordance with Technical Resolution 11/1962 as amended (to be replaced by Article 6 of the General Regulations when the revised text of the IHO Convention enters into force).

2. Rules of Procedure

2.1 The Committee shall be composed of representatives of Member States. The Chairs of the relevant subordinate bodies of the Committee shall attend and report at all Committee Meetings. International Organizations and accredited Non-Government International Organizations (NGIOs) may attend Committee Meetings.

2.2 A Director of the International Hydrographic Bureau ("*the International Hydrographic Bureau*" to be replaced by "*the Secretariat*" when the Secretariat is established) shall act as Secretary to the Committee. The Secretary shall prepare the reports required for submission to each ordinary session of the Conference (*the Conference* to be replaced by *Assembly* and *Council* when the Council and Assembly are established).

2.3 The Chair and Vice-Chair shall be a representative of a Member State. The election of the Chair and Vice-Chair shall be decided at the first meeting after each ordinary session of the Conference (*Conference* to be replaced by *Assembly* when the Council and Assembly are established) and shall be determined by vote of the Member States present and voting. If the Chair is unable to carry out the duties of the office, the Vice-Chair shall act as the Chair with the same powers and duties.

2.4 The Committee shall meet once a year, unless decided otherwise by the Committee, whenever possible in conjunction with another relevant conference or meeting. The venue and date of the meeting shall be decided at the previous meeting, in order to facilitate

participants' travel arrangements. Meetings should normally be scheduled to precede a session of the International Hydrographic Conference ("*International Hydrographic Conference*" to be replaced by "*Council or Assembly*" when the Council and Assembly are established) by approximately four months. The Chair or any member of the committee, with the agreement of the simple majority of all members of the Committee, can call extraordinary meetings. Confirmation of the venue and date shall normally be announced at least six months in advance. All intending participants shall inform the Chair and Secretary ideally at least one month in advance of their intention to attend meetings of the Committee.

2.5 Decisions shall generally be made by consensus. If votes are required on issues or to endorse proposals presented to the Committee, decisions shall be taken by a simple majority of Committee Members present and voting. When dealing with inter-sessional matters by correspondence, a simple majority of all Committee Members shall be required.

2.6 The draft record of meetings shall be distributed by the Secretary within six weeks of the end of meetings and participants' comments should be returned within three weeks of the date of despatch. Final minutes of meetings should be distributed to all IHO Member States and posted on the IHO website within three months after a meeting.

2.7 The working language of the Committee shall be English.

2.8 The Committee shall progress its work primarily through Working Groups, each of which shall address specific tasks. If required, a coordinating Sub-committee on Data Acquisition & Transfer Standards and a coordinating Sub-committee on Symbology & Data Presentation Standards shall coordinate the work of those working groups dealing with data and presentation standards respectively. Sub-committees and Working Groups shall operate by correspondence to the maximum extent practicable.

2.9 Recommendations of the Committee shall be submitted to IHO Member States for adoption through the IHB or International Hydrographic Conference as appropriate. ("*IHB or International Hydrographic Conference*" to be replaced by *"through the Council to the Assembly*" *when* the Council and Assembly are established).

2.10 These Rules of Procedure can be amended in accordance with Technical Resolution 11/1962 as amended (to be replaced by Article 6 of the General Regulations when the revised text of the IHO Convention enters into force).

REPORT OF THE TRANSFER STANDARD MAINTENANCE AND APPLICATION DEVELOPMENT WORKING GROUP (TSMAD)

1. Chair:	Mr. B. GREENSLADE (UK)	2007–2012
Vice-Chair:	Mr. D. VACHON (Canada)	2007 -2009
	Ing en chef. J-L DÉNIEL (France)	2009 - 2011
	Mrs. J. POWELL (USA)	2011-2012
Secretary:	Mr. A. PHARAOH (IHB)	2007 - 2012

2. Participants (..) denotes number of meetings attended

IHO Member States: Australia (11), Belgium (0), Brazil (4), Canada (9), Denmark (9), Estonia (0), Finland (8), France (11), Germany (11), Italy (1), Japan 8), Republic of Korea (2), Netherlands (3), New Zealand (2), Norway (10), Republic of South Africa (5), Singapore (1), Spain (1), Sweden (9), UK (16), USA (15), Venezuela (1)

Expert Contributors:
Caris (Canada) (15)
ESRI (USA) (13)
Furuno (Finland) (4)
GEOMOD (France) (3)
IDON Technologies (Canada) (1)
IIC Technologies (Canada) (11)
International Centre for ENCs (8) (IC-ENC)
Jeppesen Marine (Canada, Italy, Germany) (14)
L-3 Communications (Australia) (1)
PRIMAR (7)
SevenCs (Germany) (12)
TKartor (Sweden) (6)
Transas (Russia) (7)

3. Meetings

Since the XVIIth IHC, TSMAD and its associated task groups have met as follows:

TSMAD-14	Taunton	UK	4 - 8 June 2007
TSMAD-14 (continued) / CSMWG-17 joint meeting	Stavanger	Norway	11 - 13 June 2007
TSMAD S-100 Focus Group	Hamburg	Germany	17-21 September 2007
TSMAD-15	IHB	Monaco	14 - 18 January 2008
1st ECDIS S-101 Stakeholder Workshop	IHB	Monaco	3 - 7 March 2008
TSMAD 16/CSMWG 18 Joint Meeting	Cape Town	South Africa	5 - 9 May 2008

TSMAD-MEPTG	San Francisco	USA	3 - 5 June 2008
TSMAD-17	Seattle	USA	8-12 September 2008
TSMAD 18/DIPWG-1, Joint Meeting	Ottawa	Canada	4 - 8 May 2009
TSMAD S-100 Sub-WG	Taunton	UK	1 - 3 May 2009
TSMAD-19	Sydney	Australia	26 - 30 Oct 2009
2nd S-101 Stakeholders' Workshop	Taunton	UK	9 - 11 March 2010
TSMAD 20/DIPWG-2 Joint Meeting	Rostock	Germany	3-7 May 2010
TSMAD S-101 Sub-WG	Taunton	UK	17 - 19 Aug 2010
TSMAD-21	Victoria	Canada	29 Nov-3 Dec 2010
TSMAD-22 / DIPWG-3 Joint Meeting	Seoul	Republic of Korea	11 - 15 April 2011
TSMAD / IALA e-Navigation liaison meeting	Taunton	UK	3 - 5 May 2011
TSMAD / DIPWG S-100 Sub-WG	Hamburg	Germany	14 - 15 June 2011
TSMAD-23	Wellington	New Zealand	16 - 20 Jan 2012

4. Important Issues Considered

4.1 The following section describes the main topics that TSMAD has progressed during the period of the report. More details can be found in the minutes of TSMAD meetings on the IHO website. Of particular note are the regular joint meetings held with the Digital Information WG that have been essential in the development of the portrayal content of S-100 and S-101.

S-100 IHO Universal Hydrographic Data Model

4.2 The major project for TSMAD has been the continued preparation of S-100. Included with this, a web interface has been developed to service the S-100 Geospatial Registry. TSMAD, in co-operation with IHB, developed S-99 - *Operational Procedures for the Organization and Management of the S-100 Geospatial Information Registry*. S-100 was adopted as an IHO standard on 1 January 2010. S-99 was adopted one year later.

S-101 ENC Product Specification

4.3 S-101 is the next-generation ENC Product Specification. It is being developed in four stages of which the first stage was completed in December 2011. The first stage demonstrates the ability to create basic S-101 data from existing S-57 data. A converter has been developed by the United States (NOAA) and ESRI to test this capability. The availability of this converter will also avoid the need for HO's to upgrade or replace existing ENC production software in the short to medium term, until such time as they wish to create S-100 based ENC data. Once extensive testing has been completed the converter tool will be available free-of-charge from the IHO.

4.4 Subsequent stages of S-101 development will include the new components and functionality contained in S-100. They include improved management of text and picture files, improved portrayal of S-101 data within an ECDIS and utilize the plug and play capabilities of exchangeable feature and portrayal catalogues. This will require the development of a test-bed in the form of a viewer to

thoroughly test S-101 before any test data is distributed more widely. It is hoped that this test-bed will be developed shortly. It is planned that the main part of S-101 will be completed late in 2012 or early in 2013. However, S-101 will not be submitted to MS for adoption as an IHO standard until exhaustive testing has been completed.

S-102 Bathymetric Surface Product Specification

4.5 A final draft of S-102 - *Bathymetric Surface Product Specification* was completed in 2011 and is likely to be submitted to Member States for adoption as an IHO standard in early 2012. S-102 has been developed as an S-100 compliant version of the Bathymetric Attributed Grid (BAG) specified by the Open Navigation Surface project initiated by academics primarily from The Center for Coastal and Ocean Mapping (CCOM)/ Joint Hydrographic Center (JHC) of the University of New Hampshire, USA. The Open Navigation Surface Project is an open-source software project designed to provide a freely available, portable source-code library to encapsulate gridded bathymetric surfaces with associated uncertainty values. BAGs may be used alone or may be combined with ENC or other S-100 compatible data. As such the Bathymetric Surface product specification serves as one of the many possible additional layers that may be integrated with other S-100 products for use with ENCs in the future.

S-57 Supplements Numbers 1 and 2

4.6 Due to the S-57 data transfer standard being frozen, a new concept of publishing a supplement to S-57 was introduced in 2007as a method of extending key appendices.

4.7 Supplement No. 1 addressed new IMO requirements for Archipelagic Sea Lanes (ASL), Particularly Sensitive Sea Areas (PSSA) and Environmentally Sensitive Sea Areas (ESSA). At the same time a new feature NEWOBJ (new object) was included to allow for the encoding and display of other, as yet unknown, navigationally important requirements in the future.

4.8 Supplement No. 2 was promulgated to address issues with the temporal attribution of certain equipment objects and to update details of the attribute Category of Zone of Confidence. The contents of Supplement No. 1 were merged into Supplement 2.

S-57 APPENDIX B.1 Annex A - *Use of the Object Catalogue for ENC*

4.9 The *Use of the Object Catalogue for ENC* was revised in 2011 in order to rationalize the encoding advice which had proliferated in the form of Encoding Bulletins, Frequently Asked Questions and appendices to S-65 since 2000 when the S-57 standard was effectively frozen.

Maintenance of Other TSMAD Publications

4.10 A new version of S-64 - *IHO Test Data Sets for ECDIS* was produced in 2008 to address the various changes and requirements for new tests since its first publication in 2003. Further revision and updating is currently taking placed to enable testing for issues that have been identified more recently.

4.11 Several new versions of S-58 - *Recommended ENC Validation Checks* were published between 2007 and 2011 in order to maintain or introduce new tests and ensure that the critical validation of ENCs is as efficient as possible.

Outreach

4.12 TSMAD has provided technical support to various IHO working groups and external organizations, mostly in support of the use of S-100. These include the SNPWG, TWLWG, DQWG, UNDOALOS and the IALA e-Navigation Committee.

4.13 Assistance to UNDOALOS enabled the development of an UNCLOS, S-100 based product specification for the delivery of boundary limit geospatial data.

4.14 TSMAD also hosted two S-101 Stakeholders' meetings to obtain user input to the development of S-101 and to keep stakeholders informed of progress.

5. Closing Remarks

5.1 The period covered by this report has been the busiest for TSMAD since the development of S-57 in the early 1990s. S-100 is beginning to fulfil its intended potential to support better interoperability between product specifications leading to more cost effective implementation of system requirements. This would not have been possible without the participation and generosity of those expert contributors from industry that have participated in the development and maintenance of the standards assigned to TSMAD.

5.2 S-101, the new generation ENC product specification is progressing well, but it must be stressed that its introduction and adoption as an IHO standard depends on thorough testing, stakeholder involvement and a viable transition strategy that allows HO's, ECDIS equipment manufactures and mariners to move smoothly from S-57 to S-101.

5.3 The following list details the current versions of publications maintained by TSMAD:

S-57 3.1.0 published November 2000

S-64 1.1.0 published December 2008

S-57 Supplement No. 2 published June 2009

S-65 1.2.0 published October 2009

S-100 1.0.0 published as an active standard January 2010

S-100 1.0.0 Geospatial Information Registry launched January 2011

S-58 4.2.0 published February 2011

REPORT OF THE DATA PROTECTION SCHEME WORKING GROUP (DPSWG)

1.	**Chair:**	Mr. J. Pritchard (UK)	2007–2012
	Vice-Chair:	Vacant	
	Secretary:	Mr R Coombes (UK)	2007 - 2012

2. Participants (..) denotes number of meetings attended

IHO Member States:	Australia (3), Brazil (0), Canada (0), France (1), Germany (1), Japan (0), Norway (2), UK (3)
Expert Contributors:	Kelvin Hughes (UK) (1) ChartWorld (Germany) (1) Datema Delfzijl BV (Netherlands)(1) Transas (Russian Federation) (3) Furuno (Finland) (1) Raytheon (USA) (1) Primar (Norway) (1)

3. Meetings

Since the XVIIth IHC, DPSWG has met as follows:

DPSWG6	IHB	Monaco	28-30 May 2007
DPSWG7	IHB	Monaco	31 Mar - 1 Apr 2009
DPSWG Workshop	IHB	Monaco	17-18 Feb 2011

Work undertaken and Important Issues Considered

4.1 The following section describes the scope of work undertaken by the DPSWG in meetings and correspondence during the period covered. It is important to note that in addition to regular working group meetings, various members of DPSWG also provide support to the ongoing management of the Data Protection Scheme when requested by IHB staff. The data protection scheme is administered by the IHB. The IHB concludes the standard form of licence contract with applicants and issues the relevant data keys. The current network of ECDIS manufacturers totalled 190 by September 2011. Not all of the licensees manufacture type-approved ECDIS – but all have a requirement to embed the S-63 ENC data protection scheme in their equipment. The licensees cover a wide variety of companies across the World. The S-63 scheme is being used as the basis of several global ENC distribution services and many national Hydrographic Offices also use it to implement local ENC distribution services.

Publication of the S-63 standard

4.2 The initial release of S-63 (edition 1.0) was in 2003. A revised version of the standard, was issued as edition 1.1 in 2008. The new edition of the standard contained numerous clarifications and, in some cases, amendments. It was intended to make the standard clearer and easier to implement by the data protection scheme users. The new edition also contained some enhancements designed to ensure manufacturer systems were compatible with a wide range of services (both local and global) and added support for large media encoding of ENC data, such as on DVD. Given the size of the

worldwide ENC database, the ability to distribute ENCs on DVD media is a feature much valued by end users.

4.3 The move by users to the new version of S-63 is not complete. This is because global providers of ENC services are required to cater to a wide range of end users that use a wide variety of ECDIS systems, some of which are known to have problems importing S-63 edition 1.1 data within particular configurations. The DPSWG has provided, and continues to provide guidance for service providers in managing this transition and it is hoped that, in time, all service providers will adopt the latest edition of the standard for all its users.

4.4 Since the publication of S-63 edition 1.1, DPSWG meetings have focused on the production of a new edition of the standard specifically designed to interface with S-100 and its product specifications (starting with S-101, the standard for ENC). A new edition of the standard will provide at least the same protection from corruption and unauthorised use as the current standard, but may use different tools and technologies in order to do so.

5. Closing Remarks

5.1 Maintaining an appropriate data integrity and security standard will continue to be an important task in the future. As S-100/S-101 develops it will become clearer what is the optimal solution for the next-generation ECDIS.

REPORT OF THE DIGITAL INFORMATION PORTRAYAL WORKING GROUP (DIPWG)

1. Chair: Mr C. HARMON (USA) 2009 - 2012
Dr M. JONAS, Germany 2007 - 2008

Vice-Chair: Mrs J. POWELL (USA)

Secretary: Mr R. COOMBES (UK)

IHB: Ing en chef M. HUET

2. Participants: (..) denotes number of meetings attended

IHO Member States	Australia (5), Brazil (2), Canada (4), Denmark (4), Finland (5), France (4), Germany (5), Japan (3), Netherlands (2), New Zealand (1), Norway (5), South Korea (1), Sweden (3), UK (5), USA (5)
Expert contributors	CARIS (Canada) (4) ECC (Norway) (3) ESRI (USA) (3) Furuno (Finland) (3) GEOMOD (France) (4) HydroService AS (Norway) (1) IC-ENC (UK) (4) IIC Technologies (Canada) (4) Jeppesen Marine (Germany/Norway) (5) SevenCs (Germany) (4) T-Kartor (Finland) (3) Transas Group (Russia) (5)

Attendance at DIPWG-4 meeting not available at time of drafting this report.

3. Meetings

CSMWG-17	Stavanger	Norway	11-13 June 2007
CSMWG-18	Cape Town	South Africa	7-9 May 2008
DIPWG-1	Ontario	Canada	4-8 May 2009
DIPWG-2	Rostock	Germany	3-7 May 2010
DIPWG-3	Seoul	Republic of Korea	11-15 April 2011
DIPWG-4	IHB	Principality of Monaco	7-11 May 2012

4. Name Change

The Colours and Symbols Maintenance Working Group (CSMWG) was changed to the Digital Information Portrayal Working Group (DIPWG). The Terms of Reference of the working group were also amended to reflect its responsibilities not only to "*Maintain IHO Special Publication S-52, its*

accompanying Presentation Library" but also, "*the portrayal related elements of IHO Special Publications S-100 and S-101, as well as the Portrayal Register of the Geospatial Information Infrastructure (GII)*."

5. Summary of Work Undertaken

S-52 Maintenance – The routine review and maintenance of S-52 -*Specifications for Chart Content and Display Aspects of ECDIS* and its accompanying Presentation Library brought several portrayal issues to the attention of the working group. Maintenance Documents (MD) 07 and 08 were issued during this reporting period. These deferred amendments provided minor corrections and extensions to the Presentation Library related to the addition of a new symbol, changes to the symbolisation rules within look-up tables and conditional symbology procedures and the extension of colour tables to provide additional colours for the portrayal of non-charted items (mariner objects).

Reorganisation and simplification of S-52 – Edition 6.0 of S-52 was revised as a result of the IMO adoption of a revised ECDIS Performance Standard in Dec 2006 and the consequent publication of a new version (edition 3) of IEC61174 – *ECDIS - Operational and performance requirements, methods of testing and required test results*. DIPWG took advantage of the opportunity to simplify the presentation of S-52 by combining the former S-52 Appendix 2 into the main body of the standard and by eliminating redundant language.

S-100 Portrayal Register – Significant progress was made in the development of the Portrayal Register that supports S-100. The initial implementation of the register will hold S-52 symbol definitions including the storage of symbols in a graphics format that has yet to be determined. Work is nearing completion on converting S-52 symbolization rules and Conditional Symbology Procedures (CSPs) from the Nassi–Shneiderman logic diagrams used in S-52 into machine readable format that will become part of the register.

S-101 Portrayal – DIPWG worked with TSMAD to develop the S-101 Portrayal Catalogue and portrayal section of the S-101 specification. Most of this work was preparatory in nature pending the finalization of the S-100 Portrayal Register. Preparations included reviewing the existing S-52 standard and determining which sections are relevant in S-101.

ECDIS Chart 1 – An "ECDIS Chart 1" in the form of a series of ENC cells populated with an array of the most prominent S-57 feature/attribute combinations, sorted by traditional INT1 symbol categories, was developed. This will be a useful reference for mariners, as well as for type-testing procedures.

6. Closing Remarks

During the period the CSMWG broadened its focus from the maintenance of S-52 and its associated Presentation Library to also include – in partnership with TSMAD – the development and maintenance of the portrayal aspects of S-100 and S-101 and the associated Portrayal Registry and Hydro Portrayal Register. This additional role was marked by the work group changing its name to the Digital Information Portrayal Working Group (DIPWG).

The progress that DIPWG has made in these efforts is directly related to the consistent support from participating Member States, equipment manufacturers and other industry subject-matter experts, and the IHB staff.

REPORT OF THE STANDARDISATION OF NAUTICAL PUBLICATIONS WORKING GROUP (SNPWG)

1. Chair: Mr. D. ACLAND (UK)

Vice-Chair: Herr J. SCHRÖDER-FURSTENERG (Germany)

Secretary:

IHB: Mr A. PHARAOH

2. Participants: (..) denotes number of meetings attended

IHO Member States	Argentina (2), Brazil (3), Denmark (6), Estonia (3), Finland (1), France (6), Germany (6), Japan (5), Korea, Rep of (3), The Netherlands (2), Norway (4), Spain (1), UK (6), USA (6).
Expert contributors	CARIS (Canada) (2) CherSoft (UK) (1) Esri (Japan) (1) Interschalt (Germany) (2) Jeppesen Marine (US) (5) NOVACO (UK) (2) University of New Hampshire (US) (1)

3. Meetings

3.1 Since the XVIIth IHC the SNPWG met as follows:

SNPWG 8	Monaco	Monaco	3-7 Sep 2007
SNPWG 9	Brest	France	21-25 Apr 2008
SNPWG 10	Norfolk	USA	23-27 Feb 2009
SNPWG 11	Monaco	Monaco	7-11 Sep 2009
SNPWG 12	Tokyo	Japan	21-25 Jun 2010
SNPWG 13	Stavanger	Norway	4–8 Apr 2011
SNPWG 14	Monaco	Monaco	13-17 Feb 2012

4. Summary of Work Undertaken

4.1 The scoping statement for nautical publications, agreed shortly before this reporting period, was used as the principal input to build the nautical publications Feature Concept Dictionary (FCD). This task started using MS Word but was subsequently transferred to a website using Wikipedia technology. The FCD continues to expand. A start has been made to populate the NPUBS domain of the S-100 Geospatial Information Registry with the features and attributes developed in the SNPWG Wikipedia website.

4.2 Sample textual datasets were written for the waters covered by the S-64 test datasets. Excerpts from these and other nautical publications were then mapped to the rapidly expanding SNPWG data model in order to test the concept.

4.3 A sample product specification was produced for a notional product. As soon as the character of S-100 became clear, work began to draft a simple product specification for a real product.t The Marine Environmental Protection Programme task provided a suitable candidate. An application schema was drafted for Marine Protected Areas using features and attributes from both the HYDRO and NPUBS domains. An MPA product specification is now in draft form.

4.4 SNPWG was kept informed of investigative work being conducted by the hydrographic authorities of Denmark, Germany and Norway, and Jeppesen Marine on the development of other related product specifications. Discussion with DIPWG has now started on the portrayal of nautical publications information.

5. Closing Remarks

5.1 The content of nautical publications covers a far wider spread of subject matter than is contained on a nautical chart so the NPUBS Feature Concept Dictionary will probably contain more features and attributes than found in ENCs. NPUBS contain several classes of information which are not geographic so this information will be held as information features. A change to the general feature model of S-100 was required to support the relationships which exist between information and geographic features contained in nautical publications.

5.2 It is possible to map very well structured text held in nautical publications to features in the SNPWG data model, but it becomes increasingly difficult with information currently held in long textual paragraphs.

5.3 Population of the NPUBS domain of the S-100 GI Registry should proceed slowly and only when the design of features is sufficiently stable.

5.4 The production of feature-based products containing information from nautical publications is likely to be a long term project that will take many years to achieve.

REPORT OF THE CHART STANDARDIZATION AND PAPER CHART WORKING GROUP (CSPCWG)

1.	**Chair:**	Mr P. JONES (UK)	2007–2012
	Vice-Chair:	Mr. J. MÄKINEN (Finland)	2007
		Mr C. ROBERTS (Australia)	2007 – 2008
		Mr J. WOOTTON (Australia)	2008-2012
	Secretary:	Mr A. HEATH-COLEMAN (UK)	2007 - 2012

2. Participants (..) denotes number of meetings attended (out of 5)

IHO Member States: Australia (4), Brazil (2), Canada (4), Chile (0), Colombia (0), Denmark (4), Finland (3), France (4), Germany (4), Greece (0), India (0), Indonesia (1), Iran (0), Italy (1), Japan (1), Republic of Korea (2), Latvia (1), Netherlands (2), New Zealand (1), Norway (3), Pakistan (0), Russia (0), Republic of South Africa (1), Spain (3), Sweden (3), Ukraine (0), UK (4), USA (4).

NB: France, Germany, Spain & UK also attended subWG meeting in Cadiz.

Attendance at CSPCWG-8 meeting not available at time of writing this report.

Expert contributors: ESRI (1), Jeppesen (1)

3. Meetings:

Since the XVIIth IHC, CSPCWG and its associated sub-WG have met as follows:

CSPCWG 4	IHB	Monaco	13-15 Nov 2007
CSPCWG 5	Sydney	Australia	18-21 Nov 2008
CSPCWG 6	IHB	Monaco	01-03 Dec 2009
CSPCWG 7	Simon's Town	South Africa	23-26 Nov 2010
CSPCWG 8	Turku	Finland	29 Nov–02 Dec 2011
INT1 subWG	Cadiz	Spain	16-17 Jun 2010

4. Important Issues Considered

4.1 The following activities have been carried out mainly by correspondence between CSPCWG representatives and with additional contributions from other WGs and organizations, such as IMO, IALA, Trinity House (UK):

- The principal activity of the CSPCWG during the period has been a full (and on-going) revision of S-4 Part B - *The Chart Specifications of the IHO*. New editions or revisions of S-4 have been published at the rate of about 2 per year. Existing chart-related IHO Technical

Resolutions have been incorporated into S-4 wherever possible. A completely new section B-600 - *Chart Maintenance (including the Notice to Mariners system)* was added in 2010.

- Related to the above has been the publication of more closely aligned official language versions (English, French and Spanish) of INT1 - *Symbols, Abbreviations and Terms used on Paper Charts* (by Germany, France and Spain). This work has been expedited by a subWG comprising the CSPCWG Secretary and representatives from Germany, France and Spain.
- A new edition of S-11 Part A - *Guidance for the Preparation and Maintenance of INT Chart Schemes* was published March 2010.
- A 2nd edition of S-49 - *Standardization of Mariners' Routeing Guides* was published in April 2010, under the guidance of a correspondence subWG led by Germany.

4.2 Annual meetings of the CSPCWG have been concerned mainly with consideration of new symbols and particular specification issues, as follows:

- **CSPCWG4 (2007):**

Symbols

- Mangrove
- Glossaries on charts
- Sea boundaries
- Magnetic anomalies – colour on charts
- Racon wave bands
- Offshore renewable energy installations

Specifications

- Symbol library
- Annex to S-4 suggested by INT 1 subWG
- Adoption of S-4 symbols as IHO paper chart symbol library
- Procedures for new/revised routeing measures (including ENC)
- Conventions for use of capital letters v upper/lower case letters
- Recommended tracks term
- Initial discussions about a new 'Maintenance section' (published as B600 in 2010)
- B-450-479 revision
- Omission of redundant abbreviations for colours on multi-coloured charts
- Submission from Tidal Committee

- **CSPCWG5 (2008):**

Symbols

- Rounding rules for depths
- Tonnage
- Pipelines in tunnels
- Bridge supports & detail under bridges
- Offshore Renewable Energy Installations (OREI)
- Inadequately surveyed/unsurveyed areas
- New 'Tidal' TR A2.16: adding epoch to Chart Datum
- Virtual AIS
- Emissions Control Areas

- Disused and dismantled platforms
- New symbol for K47 Shellfish Beds

Specifications

- Use of pictures/photographs in S-4
- Symbol library
- B-600 Chart Maintenance – New section
- T&P NMs
- B-480-499 draft

- **CSPCWG6 (2009):**

Symbols

- Wrecks and other obstructions – use of danger circle
- Foul Ground/area
- AIS:

  Aid to navigation symbols

  Danish trials experience
- Chart graticule degree figures
- Supplementary graduation
- Small craft (leisure) symbols
- Chart Accuracy notes
- Depiction of sectors at oscillating lights
- Floating Wind turbines
- Above water wellheads
- Artificial Islands
- Dredged areas (project depth)
- Interval of symbols in area limits
- Size of symbols
- Floating Waste Bin
- Fish Aggregating Devices (FAD)
- 'Suspended' Oceanographic Instrumentation Moorings

Specifications

- B-600 progress
- Maintenance regime: comparison paper charts with ENC
- Representation of swathe surveys on Source Diagrams
- Improved Data Exchange for Paper Chart Production through ENCs
- Exchange for Paper Chart Production through ENCs
- Progress on new specifications currently under consideration

- **CSPCWG7 (2010):**

Symbols

- Wrecks and other obstructions – use of danger circle
- Artificial Islands
- Depiction of surveys on Source Diagrams
- Historic wrecks
- Wharfside obstructions
- Lighthouses

- Reed beds
- Diving Prohibited
- Lights on Multicoloured charts
- Depiction of lights on platforms on multicoloured charts
- Depiction of imprecise shoal depth areas
- Development dredging

Specifications

- A-400 – consequential review required on publication of B-600
- Colours under bridge lighting
- Sub-surface operations
- GPS vulnerability – consequences for charting
- Enhancements to support ENC / paper chart consistency of presentation
- Colour abbreviations for orange and amber lights
- Superbuoys

- **CSPCWG8 (2011):**

  This meeting had not taken place at the time this report was written.

5. Closing Remarks

5.1 All significant proposals for changes to specifications and for new chart symbols have been submitted for Member States approval and subsequently incorporated into S-4 and INT1.

5.2 S-11 Part A and S-49 New Editions have been approved by Member States and published..

REPORT OF THE DATA QUALITY WORKING GROUP (DQWG)

1.	**Chair:**	Cmdr. S. SMITH (USA)	2007 – 2009
		Mr. C. HOWLETT (UK)	2009 –
	Vice-Chair:	Mr. C. HOWLETT (UK)	2007 – 2009
		Vacant	2009 – 2011
		Mr. R. HARE (Canada)	2011 – 2012
	Secretary:	Vacant	2007 – 2011
		Mr. E. MONG (Jeppesen)	2011 –

2. Participants (..) Denotes number of meetings attended (out of 5)

IHO Member States: Brazil (0), Canada (2), Denmark (0), Ecuador (0), Finland (3), France (0), Indonesia (0), Italy (0), Japan (1), Korea (Rep of) (0), Netherlands (2), Norway (1), Slovenia (1), Sweden (1), UK (3), USA (2)

Expert Contributors
Caris (Canada) (3)
Fugro-Pelagos (USA) (1)
Jeppesen (USA) (2)
University of New Hampshire (USA) (1)
Warsash Maritime College (UK) (0)

Attendance at DQWG-5 meeting not available at time of drafting this report.

3. Meetings

The DQWG has met on five occasions, as follows:

DQWG-1	Bath, UK	23 September 2008
DQWG-2	Portsmouth, USA	10 May 2009
DQWG-3	Rostock, Germany	5 November 2010
DQWG-4	Helsinki, Finland	14 – 17 June 2011
DQWG-5	IHB, Monaco	15 – 18 November 2011

4. Summary of Work Undertaken

4.1 The DQWG was re-formed in 2007 by CHRIS-19. Since then it has investigated how data quality indicators are used within existing products.

4.2 The first task of the DQWG was to identify how the textual descriptors relating to CATZOC A1 and A2 could be adjusted to make it more practical. The existing wording required surveyors to find and measure ALL significant features - this was considered to be an almost impossible requirement. The DQWG proposed a change to the wording that was promulgates as a change to the CATZOC definitions in CL32/2009.

4.3 The DQWG then investigated how ENC producing HOs created their ENCs. CL 17/2010 sought information on which quality indicators were populated by HOs and CL 59/2010 asked how ENC producing HOs populate the CATZOC attributes that are based on legacy data.

4.4 The final part of the DQWG fact finding exercise was the release of a questionnaire issued to mariners in February 2011. The questionnaire sought to discover mariners' views on data quality indicators and how well they understood the existing indicators that are shown on paper charts and in ENCs.

4.5 The results of the various enquiries into data quality indicators will be analysed by the DQWG as part of developing more meaningful method of depicting quality in navigational products. Various organisations including maritime colleges and universities will assist with this by allowing their students to evaluate the different proposals that are developed by the DQWG before proposing them to Member states for approval.

REPORT OF THE MARINE SPATIAL DATA INFRASTRUCTURE WORKING GROUP (MSDIWG)

1.	**Chairman:**	Mr J. PEPPER (UK)	2008–2010
		Ms M. KENNY (USA)	2010-2012
	Vice-Chairman:	Ms M. KENNY (USA)	2008-2010
		Vacant	2010-2012
	Secretary:	Vacant	2008 - 2012
	IHB	Ing en chef M. HUET	

2. Participants: (..) denotes number of meetings attended

IHO Member States: Argentina (0), Australia (3), Brazil (0), Canada (0), Cuba (0), Denmark (3), Estonia (2), Finland (3), France (3), Germany (1), Italy (0), Japan (0), Republic of Korea (0), Latvia (0), Netherlands (3), Nigeria (1), Norway (3), Portugal (0), Romania (0), Singapore (0), Slovenia (2), Spain (1), Sweden (1), Ukraine (0), UK (3), USA (3)

Expert Contributors: CARIS (Canada)
Independent Consultant/Osborne
John Pepper Consultancy Ltd
SeaZone (UK) (2)
University of Melbourne, Australia

3. Meetings

Since the XVIIth IHC, MSDIWG has met as follows:

MSDI 1	IHB	Monaco	4-5 February 2008
MSDI 2	IHB	Monaco	10-11 September 2008
MSDI 3	IHB	Monaco	2-3 April 2009

4. Agenda Items and Activities:

4.1 The following section describes the principal agenda items and subjects that MSDIWG has addressed during the period of the report. More details can be found in the minutes and associated documents of MSDIWG meetings on the IHO website.

Audit for MS on SDI Capabilities and Knowledge

4.2 The MSDIWG's first meeting was held in February 2008 shortly after it was established. In order to fulfil its terms of reference, the WG decided to focus on asking the IHO Member States to declare their level of knowledge and understanding of the benefits of supporting national spatial data initiatives and their capability in supporting SDI development. A questionnaire was developed that gathered information on the following categories:

- Strategy and Policy
- Communications and People
- Data Management
- Data Frameworks and Standards
- Data Dissemination

Input was also requested on where each HO felt it might be with regard to MSDI in three years time, what activities were planned, what barriers had been identified that might impede progress, and how the IHO could assist. The questionnaire was circulated in April 2008 with 43 States responding. The results of the survey indicated that an IHO document that provided general guidance on how HO's could become more involved in MSDI would be useful.

Special Publication C-17 and Annexes Development

4.3 In 2009, the WG began drafting an IHO publication that provided definitive procedural guidance on how to establish the role of a national hydrographic authority in marine SDI. The WG also assembled supporting material to be made available via the IHO website. The publication C-17 - *Spatial Data Infrastructures: "The Marine Dimension" – Guidance for Hydrographic Offices* was completed in mid-2009 and adopted by Member States in 2010. Four supporting papers were developed that same year covering:

- SDI Frequently Asked Questions
- Capacity Building Material – SDI Awareness Training Course (Template)
- SDI Stakeholders
- Hydrographic Data Policy for SDI – Best Practice Guidelines for HOs

These papers were added to C-17 as annexes in 2010.

Information Paper Updating Marine SDI Activities of Various Member States

4.4 An Information Paper was submitted to the HSSC in 2010 that provided an update on marine SDI activities in certain States. This paper was compiled from input obtained from various MSDIWG members and expert contributors on activities that had occurred in the recent past. An overview on the EU INSPIRE initiative was also included.

Work Plan Development

4.5 In the last year, those Member States that have been active in the MSDIWG have participated in two conference calls to discuss the work plan for the upcoming year and to discuss the future of the group. The use of conference call services and WebEx proved very successful for allowing exchange of ideas and encouraging open dialogue.

5. Closing Remarks

5.1 Responses from the questionnaire distributed in 2008 identified that there was a large gap between the developed and emerging nations as to how SDI has been implemented, and that some MS anticipated making gains in this arena over the next 3 years (by 2011). During the remainder of 2011, the working group will evaluate the usefulness of sending out a follow-up questionnaire in early 2012 to update how MS have implemented SDI in their countries. A recommendation will be forwarded to the HSSC that the working group proceed with developing it if it is determined such a follow-up questionnaire would be useful. The results could serve as a constructive tool in determining future activities of the working group.

5.2 In 2010, MS reported that the non-navigational use of hydrographic data continues to increase. Accordingly, work is ongoing in those MS to make their hydrographic data more accessible. Due to funding or resource constraints, progress in the marine SDI arena is, at times, still being hampered

affecting metadata and data availability in acceptable standards. Also, the hydrographic and oceanographic communities still lag behind the land and air side in implementing SDI. To encourage the continued progress toward the development of SDI within MS, the active members of the MSDIWG, during discussions on two telephone conference calls in September 2011, feel it is important for the working group to continue to exist. Through its existence, the MSDIWG can convey the message that SDI is key to integrated management of spatial data, information, and services.

5.3 The MSDIWG feels that much of the work also resides with the Capacity Building Sub-Committee (CBSC) and the Regional Hydrographic Commissions to continue with the education of both developing and developed MS on the benefits of SDI and to facilitate discussion on this topic as opportunities arise. The MSDIWG is pleased to note that, in the draft working plan of the CBSC, the development of a regional MSDI workshop is being proposed for the North Indian Ocean Hydrographic Commission. These types of activities are of great value in furthering the implementation of SDI across MS.

REPORT OF THE TIDAL AND WATER LEVEL WORKING GROUP (TWLWG)

The TWLWG was formed on 1 January 2009 as a result of Decisions 8 and 9 of the XVIIth IHC that brought into force a restructuring of the committees of the Organization. The task of the TWLWG is to provide technical advice and coordination on tidal, water level and vertical datum matters. Prior to the existence of the TWLWG, the Tidal Committee (IHOTC) performed the same function. The IHOTC was disbanded upon the formation of the TWLWG.

1.	**Chair:**	Mr J. PAGE (UK)	2007
		Mr S. GILL (USA)	2008 - 2012
	Vice-Chair:	Mme L. PINEAU (France)	2009 - 2010
		Ms Z. JAYASWAL (Australia)	2011 - 2012
	Secretary:	Mr S. SHIPMAN (IHB)	2007 - 2012

2. Participants (..) Denotes number of meetings attended

IHO Member States: Australia (4), Brazil (3), Canada (3), Chile (3), China (1), Cuba (0), Denmark (2), Ecuador (0), Estonia (1), Finland (3), France (4), Germany (0), India (0), Indonesia (0), Italy (0), Japan (1), Republic of Korea (2), New Zealand (0), Norway (4), Peru (1), Portugal (3), South Africa (3), Spain (3), UK (4), Uruguay (0), USA (3), Venezuela (1).

3. Meetings

Since the XVIIth Conference, four meetings have taken place, as follows:

TC8	Halifax, Canada	23 – 26 October 2007
TWLWG1	Niteroi, Brazil	30 March – 1 April 2009
TWLWG2	Stavanger, Norway	27 – 29 April 2010
TWLWG3	Jeju Island, Republic of Korea	5 – 7 April 2011

4. Summary of Work Undertaken

4.1 The Standard Tidal Constituent List and an inventory of tide gauges used by IHO Member States was updated and published on the TWLWG web page.

4.2 An XML format for the exchange of Harmonic constants was published.

4.3 Amendments to IHO resolutions concerning tidal and water level matters were reviewed and subsequently adopted by Member States. The TWLWG advised the CSPCWG on tidal and water level matters with respect to IHO Publication S-4 “Regulations of the IHO for International (INT) Charts and Chart Specifications of the IHO”.

4.4 TWLWG assisted in the preparation of an English text of a French publication on “Coastal Tides” by providing advice to the translator; and proof reading the English translation. This manual was written by, M Bernard SIMON, a former French member of the Tidal Committee and will be published by the Institut Océanographique in Paris. A free copy will be made available to IHO Member States.

4.5 Progress was made on the development of standards for Digital Tide Tables and for the transmission of real-time tidal data.

4.6 Progress was made on the dynamic application of tides in ECDIS in association with the work of TSMAD and the DIPWG.

4.6 An outline structure for a short course on “Tides for Hydrography” was prepared for the Capacity Building Sub-Committee.

4.7 A study to compare tidal predictions generated from a common data set using different analysis software is continuing.

4.8 A study of long term data sets for the determination of global sea level rise is continuing.

REPORT OF THE HYDROGRAPHIC DICTIONARY WORKING GROUP (HDWG)

The HDWG was formed on 1 January 2009 as a result of Decisions 8 and 9 of the XVIIth IHC that brought into force a restructuring of the committees of the Organization. The task of the HDWG is to maintain IHO Publication S-32 - *Hydrographic Dictionary*. Prior to the existence of the HDWG, the Committee on the Hydrographic Dictionary (CHD) performed the same function. The CHD was disbanded upon the formation of the HDWG.

1.	**Chair:**	Mr J. MILLS (USA)	2007–2012
	Vice-Chair:	Vacant	
	Secretary:	Mr S. SHIPMAN (IHB)	2007 - 2012

2. Participants

IHO Member States: Australia, Brazil, Chile, France, Malaysia, Mexico, Uruguay, USA

3. Meetings

Since the XVIIth IHC, both the HDWG and its predecessor the CHD, have conducted their work entirely by correspondence. The work of HDWG is conducted using a "discussion forum" at: http://iho-discussions.org.

4. Summary of Work Undertaken

4.1 The HDWG reviewed the terms previously included in S-52 Appendix 3 – "Glossary of ECDIS related terms" and prepared a new S-32 Appendix 1 - "Glossary of ECDIS related terms" containing 152 of the definitions originally included in S-52 Appendix 3. The 29 terms not included in S-32 Appendix 1 were further reviewed and HDWG prepared ten new and seven amended definitions for inclusion in S-32.

4.2 Following proposals from TSMAD the HDWG reviewed definitions from S-57 (IHO Transfer Standard for Hydrographic Data) and prepared forty-two new or amended definitions for inclusion in S-32 to align it with S-57.

4.3 The HDWG considered a proposal from the Sub-Committee on Undersea Feature Names (SCUFN) for standardization between S-32 and terminology used in publication B-6 – "Standardization of Undersea Feature Names", and prepared 26 new or amended definitions for inclusion in S-32.

4.4 The HDWG reviewed proposals from CSPCWG and prepared 18 new or amended definitions for inclusion in S-32.

4.5 HDWG considered proposals from the Chair of the S-44 WG (now disbanded) and prepared seven new or amended definitions for inclusion in S-32.

4.6 HDWG considered proposals from the Chair of the WWNWS SC and prepared 17 new or amended definitions for inclusion in S-32.

4.7 As requested by HSSC the HDWG prepared a definition of "Navigable Inland Waters" based on the recommendation of the Hydrography and Cartography of Inland Waters WG (HCIWWG).

4.8 The HDWG prepared a revised text of IHO Resolution 7/1929, as amended, - *Hydrographic Dictionary* which was subsequently adopted by the Organization.

4.9 The HDWG prepared a set of Business Rules setting out guidance on entries that would be appropriate for inclusion in the Hydrographic Dictionary and the way in which those entries would be managed. The criteria for inclusion of terms are based on the guidance adopted by Decision 42 of the XIIIth IHC in 1987.

REPORT OF THE ENC UPDATING WORKING GROUP (EUWG)

The EUWG was created by the CHRIS at its 20th meeting (November 2008) to develop pragmatic solution to help overcome inconsistencies in the promulgation and distribution of Temporary and Preliminary (T&P) Notices to Mariners (NtM) intended for use in ECDIS. The EUWG was also tasked to review and revise the updating mechanisms as contained in S-52 Appendix 1 - *Guidance on updating the ENC* (December 1996) for incorporation in S-65 - *ENC production guidance*.

1.	**Chair:**	Mr Y. Le FRANC (France)	2009–2012
	Vice-Chair:	Mr R. COOMBES (UK)	2009–2012
	IHB	Ing en chef M. HUET	

2. Participants

IHO Member States	Australia, Canada, Denmark, Finland, France, Germany, Italy, Japan, Korea (Rep. of), Latvia, Netherlands, New Zealand, Norway, Portugal, Slovenia, South Africa, Spain, Ukraine, United Kingdom, USA.
Expert Contributor Organisations	IC-ENC, Jeppesen Marine, PRIMAR

3. Meetings

According to its Terms of Reference, the WG worked by correspondence. Meetings were not necessary to complete the work.

4. Summary of Work Undertaken

4.1 The EUWG developed guidelines defining the best practices to produce ENC updates equivalent to T&P NtM. Through a set of pragmatic recommendations, the guidelines identify key principles. These guidelines were published in October 2009 in edition 1.2 of S-65. These Guidelines have since been included in a new edition of Annex A to Appendix B. 1 of S-57 - *Use of the object catalogue for ENC.*

4.2 At the invitation of HSSC2 (October 2010), the IHB surveyed Member States regarding the application of these Guidelines. From the results of the survey made in 2011, it appears that the situation regarding the standardised production of T&P ENC updates is evolving most favourably.

4.3 The EUWG reviewed S-52 Appendix 1. Guidance for the production and the distribution of up to date ENC was proposed for inclusion in a new edition of S-65. The EUWG forwarded recommendations to TSMAD concerning clarifications that were required in S-57. Some were addressed in a new edition of Annex A to Appendix B. 1 of S-57. A new edition of S-52 Appendix 1 - *Guidance on updating the ENC* was drafted. It only contains elements related to the processing of up to date ENC data into an ECDIS. These elements are almost unchanged to avoid any impact on IMO and IEC specification documents on ECDIS.

[4.4 HSSC 3 endorsed the draft new editions of S-65 and S-52 Appendix 1. The EUWG achieved its objectives and will be dissolved after Member States have approved the two new editions.]

REPORT OF THE ADVISORY BOARD ON THE LAW OF THE SEA (ABLOS)

ABLOS is a joint board established by the International Hydrographic Organization (IHO) and the International Association of Geodesy (IAG). Following Decisions 8 and 9 of the XVIIth IHC which restructured the committees of the Organization, ABLOS was placed under the Hydrographic Services and Standards Committee (HSSC) for reporting purposes within IHO. ABLOS also reports to the Executive Committee of IAG. The task of ABLOS is to provide advice on the technical aspects of the Law of the Sea.

1.	**Chair:**	Mr S. TANI (Japan)(IHO)	2007 - 2008
		Prof C. RIZOS (Australia)(IAG)	2008 - 2010
		Mr C. CARLETON (UK)(IHO)	2010 - 2012
	Vice-Chair:	Dr Z. GRŽETIĆ (Croatia)(IHO)	2007 - 2008
		Mr C. CARLETON (UK)(IHO)	2008 - 2010
		Prof S BISNATH (Canada)(IAG)	2010 - 2012
	Secretary:	Mr S. SHIPMAN (IHB)	2007 - 2012

2. Participants (..) Denotes number of meetings attended

IHO Member States: Brazil (5), Chile (2), Croatia (4), India (3), Japan (5), Pakistan (3), UK (5)

IAG representatives: Australia (4), Canada (4), Indonesia (4), New Zealand (1), Sweden (3)

3. Meetings

Since the XVIIth Conference, ABLOS has met on five occasions, as follows:

ABLOS14	Dubrovnik, Croatia	30 - 31 October 2007
ABLOS15	IHB, Monaco	14 – 15 October 2008
ABLOS16	Bali, Indonesia	4 – 5 August 2009
ABLOS17	IHB, Monaco	25 and 28 October 2010
ABLOS18	Valparaiso, Chile	9 – 11 November 2011

WG on IHO Publication C-51 "*TALOS Manual*" 8 November 2011 (with ABLOS 18)

4. ABLOS Conferences

The following ABLOS Conferences were held at the IHB in Monaco:

5th	Theme: *Difficulties in Implementing the Provisions of UNCLOS*	15 – 17 October 2008
6th	Theme: *Contentious Issues in UNCLOS - Surely Not?*	25 – 27 October 2010

5. Summary of Work Undertaken

5.1 Two major Law of the Sea Conferences as set out in paragraph 4 above were organised.

5.2 A "Standard Training Programme" on the "*Technical aspects of maritime boundaries, baselines and the extended continental shelf*" for the Capacity Building Sub-Committee (CBSC). ABLOS also delivered this course in Bangkok, Thailand from 15 – 19 November 2010, for the East Asia Regional Hydrographic Commission was prepared.

5.3 A draft 5th Edition of IHO Publication C-51 "A manual on the technical aspects of UNCLOS" the 4th Edition of which was published by the IHO in March 2006 is currently being prepared.