

XVIIIth INTERNATIONAL HYDROGRAPHIC CONFERENCE

Monaco, 23-27 April 2012

REPORT OF WORLDWIDE ENC DATABASE WORKING GROUP (WEND-WG)

By the Chairman, Captain Jamie McMichael-Phillips (UK)

- 1. Chairmen:** Capt Jamie McMICHAEL-PHILLIPS (UK) from May 2010
Capt Abri KAMPFER (South Africa) 2009 to 2010
- Vice-Chair:** Capt Carlos Augusto Medeiros De ALBUQUERQUE (Brazil) from 2010
- 2. Membership:**

RHCs:

Mr Juha KORHONEN (Finland) (BSHC);
Mr NG Kwok-Chu (China) (EAHC)
Capt Ayo OLUGBODE (Nigeria) (EAHC);
Ms Kathryn RIES; (USA) (MACHC);
Ing en Chef Yves GUILLAM (France) (MBSHC);
Mr Jens Peter HARTMANN (Denmark) (NHC);
Capt Vinay BADHWAR (India) (NIOHC)
Capt Jamie McMICHAEL-PHILLIPS (United Kingdom) (NSHC)
Cdr Thani AL MAHOKI (Oman) (RSAHC)
Capt Abri KAMPFER (South Africa) SAIHC
Capt Carlos Augusto MEDEIROS DE ALBUQUERQUE (Brazil) (SWAHC)
Mr Mike PRINCE (Australia) (SWPHC)
Mr Sean HINDS (Canada) (USCHC)

Member States:

Dr Mathias JONAS (Germany)
Mr Satoshi SATO (Japan)
Mr Jae-Yon LEE (Republic of Korea)
Capt Evert FLIER (Norway)
Dr Parry OEI (Singapore)
Dr Paul CANHAM (UK)

RENCs:

Mr Kjell Magne OLSEN (PRIMAR)
Mr James HARPER (IC-ENC)

IHB:

Capt Robert WARD

Notes on Formation and Terms of Reference of WEND-WG

The First Meeting of the IHO Inter Regional Coordination Committee (IRCC) held in Monaco on 05 June 2009, approved the formation of the IRCC WEND Working Group as proposed by the WEND report, and continues many of the responsibilities and activities

formerly undertaken by the WEND Committee and the WEND Task Group. Both these latter bodies were dissolved in 2009 upon the formation of the IRCC.

The former WEND TG was constituted as a small group in order to reduce overheads, and to speed up any decision making processes required in the execution of investigation or the formulation of proposals for subsequent consideration by WEND Committee. This proved to be most successful. The IRCC WEND-WG Terms of Reference (ToRs) and Rules of Procedures (RoPs) have maintained a similarly limited membership to build on the success of the WEND TG. The WEND-WG membership comprises a representative from each RHC, a representative from each RENC (to reflect an emphasis on RENC-based services), two members of IRCC, the IHB, and invited expert contributors as required to address specific issues.

This report includes, where appropriate, agenda material and conclusions derived from the WEND Committee and the WEND TG activities since the IHC XVIIth IHC in May 2007.

3. Meetings:

- 13-14 October 2011 in Wollongong, Australia (WEND-WG Foundation Meeting)
- 2-5 September 2008 in Tokyo (WEND Committee)
- 30-31 August 2007 in Paris (WEND TG)

4. Agenda Items:

WEND-WG - Principle Objective: To monitor and advise IRCC on the development of adequate ENC coverage to meet the SOLAS V/19 carriage requirements for ECDIS.

The main subjects dealt with during the period were the following:

4.1 IHO ENC-related commitments to IMO

- (a). Support for mandatory carriage of ECDIS.
- (b). WEND Committee / WEND TG achievements since XVIIth IHC.
- (c). Current coverage status.
- (d). Compliance with WEND Principles.
- (e). Trademark proposals.
- (f). Raising ENC / ECDIS awareness amongst IMO delegates.

4.2 Coverage - Gap / Overlap Issues:

- (a). Amplification of the processes to deal with gaps and overlaps.

4.3 Quality, Consistency and Updating issues:

- (a). Handling of non-updated ENCs.
- (b). Handling of ENCs with content issues.
- (c). Promulgation of errors / issues.
- (d). Monitoring of RHC schemes.
- (e). Prioritisation of future ENC productions: assessment of Top 800 Ports, Main Shipping Routes traffic against ENC provision at all usage bands.
- (f). Inconsistent use of SCAMIN and data encoding.

4.4 Service Provision:

- (a). Integrated Services.

- (b). Status of licensing necessary to facilitate integrated services.
- (c). Non-RENC ENC.

4.5 ECDIS Related Issues:

- (a). Updates from HSCC.

4.6 Review of WEND TG 2007 Resolutions

4.7 Capacity Building & Cooperation

4.8 RENC topics

- (a). RENC to RENC discussions.
- (b). Harmonisation Overview & update.
- (c). Consideration of WEND-WG/IRCC ownership of harmonization.
- (d). Consideration of Royalty based approach to ENC distribution.
- (e). RENC Membership.
- (f). How to guarantee independent checks on data quality.
- (g). Work Plan & Load Sharing Discussions.
- (h). Review of WEND Principles / Implementation Guidance.

5. Conclusions:

- a. The main conclusions and recommendations from the WEND-WG meeting are:
 - i. A Proposal to IHC would be drafted to revise and update the text contained in the WEND Principles and the associated Guidelines to take account of the IMO mandatory carriage of ECDIS; this would include amplification of processes for dealing with gaps and overlaps. Implementation of a structured approach to tackling the issue of ENC gaps and overlaps is necessary. The priority at the moment, linked to the phased introduction of the mandatory carriage of ECDIS, should also focus on meeting the requirements of the cruise sector and the tanker sector. The process will involve the RHCs. In the case of gaps, the proposal is that, as a last resort, the gap should be filled as an interim ENC by an HO with the support of IHO; the steps will be time bound to bring the process to a conclusion. For overlaps a risk based approach will be taken; the final stage is for IHO to support withdrawal of overlapping coverage. This would, of course create a gap and so a mechanism for completing coverage is in place.
 - ii. The proposition, subject to IPCC and IRCC ratification, that the RENC co-operation will be taken forward by the WEND-WG which will subsume the role of the IPCC. A RENC Harmonisation Sub-Group was established, to be co chaired by the Chairs of the IC-ENC Steering Committee and the PRIMAR Advisory Committee. Other members will be the operators and general managers of the two RENCs, plus the China delegate and a delegate from NOAA/OCS. This will take forward the topics identified as outstanding in the latest report to IPCC and other issues related to cooperation and harmonisation.
 - iii. The need to make RENC membership more attractive; noting the perception that part of the problem was a lack of transparency in the way the RENCs operated their business. It was agreed that, in order to improve transparency, the RENCs would publish, on line, appropriate documents concerning their governance and their operational models.

iv. The creation of a new WEND Task Force to take forward detailed policy work. France would chair and membership would be drawn from UK, Australia, Brazil and the IHB.

v. Good progress had been made at the inaugural WEND-WG meeting and it was agreed that another meeting would be scheduled either immediately preceding or following the 2012 HSSC meeting (circa November 2012).

b. Significant conclusions and achievements of the WEND Committee and WEND TG are as follows:

(a). Progress has been made in achieving better worldwide ENC coverage. Since the beginning of 2008, small scale ENC coverage has risen and is now approaching 100%. There has been a 28% increase in medium scale ENC coverage and a corresponding 34% increase in large scale ENC coverage over the same period. Five coastal states (and Antarctica) still have to produce five or more medium scale ENCs to match paper chart coverage. Seven coastal states have yet to produce large scale ENCs to match paper chart coverage. RHC chairs have been encouraged to address gaps within their region and a number of regions have been particularly successful in addressing resolution of gaps in this period.

Comparison of ENCs with corresponding paper charts for international voyages				
	May 2008	May 2009	May 2010	May 2011
Small scale ENCs (planning charts)	>90%	~100%	~100%	~100%
Medium scale ENCs (coastal charts)	60%	77%	84%	88%
Large scale ENCs (top 800 ports)	60%	84%	91%	94%

(b). At IRCC3, RHC chairs were requested to report on the implementation of each item of the WEND Principles and on the validity of coverage and overlap analysis. Responses were received from the majority of the 48 ENC producer nations, either individually, or collectively through the appropriate RHCs. Some 15 producer nations did not respond to the Circular Letter. Of the responses received all were in broad support of the WEND Principles

(c). Since 2009, there has been a modest increase in RENC membership with 4 new members joining and a fifth nation seeking dual membership.

RENC Membership Status		
	Current Membership (Sept 11)	New Members since 2007 (IHC)

PRIMAR	12^{*#}	1^{**}
IC-ENC	26[*]	4^{***}
Non Members	16	n/a
<p>* <i>Russia, Greece & Brazil have dual membership.</i></p> <p>** <i>Brazil</i></p> <p>*** <i>Colombia, Ecuador, New Zealand, & Uruguay</i></p> <p># <i>PRIMAR also distributes ENCs from a number of hydrographic organisations that are not RENC members.</i></p>		

RENCs need to take a view on how they might increase membership to encompass more producer nations.

- (d). WEND-sponsored RENC-to-RENC discussions have been particularly active since the XVIIth IHC and significant progress has been made towards achieving closer cooperation and harmonising RENC policies in several important respects. Progress reports have been sent to the IHB and the chairs of both IC-ENC and PRIMAR.

6. Proposals for adoption by the XVIIIth I.H. Conference:

The Conference is invited:

- (a) to note the report;
- (b) to consider the following proposals:

PRO WENDWG-1 – Re-affirmation of the IHO's commitment to full ENC coverage

Re-affirmation of the IHO's commitment to full ENC coverage, subject to the needs of changing traffic patterns, and the availability of suitable source data and resources.

Recognizing that the Decision 20 and 21 from the 17th International Hydrographic Conference committed to achieving 'adequate coverage', availability, consistency and quality of Electronic Navigational Charts (ENCs) by 2010 in support of a carriage requirement for ECDIS;

Recognizing that the 54th meeting of the Safety of Navigation sub-committee (NAV54) of the International Maritime Organization (IMO) agreed a proposal for the adoption of a carriage requirement for ECDIS given assurance from the International Hydrographic Organization (IHO) that sufficient coverage of ENCs would be met by the dates being considered. NAV54 agreed the definition of sufficiency as being "equivalent to the best available paper chart coverage of either a Hydrographic Office providing global coverage or the Hydrographic Office of the Coastal State";

Noting that at NAV54 IHO predicted that the coverage of ENC in 2010 would be 100% for small scales, 95-100% for medium scales and 95-100% for large scales (for the top 800 priority ports);

Considering that the IHO report to IMO NAV57 in June 2011 indicated that 100% of small scale ENCs, 88% of medium scale (coastal charts) ENCs and 94% of large scale ENCs (covering the top 800 priority ports) had been completed. That there are now only six States, and Antarctica, where five or more ENCs remain to be produced in order to match

corresponding paper chart coverage at medium scale. For the world's top 800 ports (by total tonnage), only eight coastal States have yet to produce ENCs that match the coverage provided by paper charts of those same ports;

Noting that ENCs currently on issue cover over 90% of the top 1500 ports (by tonnage) worldwide (through which approximately 95% of international trade is conducted) but that the ENC coverage required for the full range of international voyages evolves over time and that cruise vessels have additional requirements (often not catered for by paper charts);

Considering the IHO as a consultative and technical body bound together by only 80 Member States representing less than 50% of the larger Coastal State community of the IMO;

Understanding that the IHO is highly respectful of the national rights of Coastal States and so has invested significant resources to urge States at the international level and at the regional level through the Regional Hydrographic Commissions (RHCs) to find internal, bilateral or multi-lateral arrangements to complete the ENC coverage in all waters and ports requested by NAV54 to support the carriage of ECDIS and will continue to do so, via the World-wide ENC Database (WEND) Principles and Implementation Guidelines (as amended);

Considering that the Inter-Regional Coordination Committee (IRCC) and the WEND Working Group (WENDWG) recommend that RHCs continue to assess and address the outstanding areas for future ENC coverage, quality and service improvements, along with subsequent reporting mechanisms;

Recognizing that the quality and consistency of ENCs is now a greater challenge than coverage given that the standard source for a majority of ENCs has been paper nautical charts and that these often contain inefficiencies stemming from historic data and technological limitations. Whilst more large scale ENCs are progressively being produced from modern, high data density surveys based on the WGS84 datum there are still very large areas of the world where available hydrographic survey data is inadequate to fully meet navigational requirements. This is especially true for remote regions of the globe where surveys are either non-existent or of sparse reconnaissance nature where even paper charts need to be used with considerable caution by the mariner;

Recognizing that hydrographic survey technology and navigational technology is evolving at unprecedented rates, that the maritime shipping industry is continually embracing technical solutions intended to facilitate navigation at the margins of safety in response to global economic competition, and that these realities continue to challenge the capacity of the international hydrographic community to improve its services on several fronts simultaneously;

Noting the resources and time associated with obtaining adequate hydrographic survey coverage needed to meet all the requirements of modern navigation (especially of remote regions) is a challenge that requires new thinking, new technologies and new methodologies by Hydrographic Offices, navigation regulators and the maritime shipping industry;

Recognizing these challenges need to be undertaken in a collaborative and transparent fashion between the hydrographic community and the maritime community at large, so that priorities are understood and risks are shared and mitigated;

Considering the recommendations from the WENDWG to improve management of ENC services, including more transparency in service and greater ease of access, through cooperation among ENC Producer Nations, End-User Service Providers, RHCs, Regional

ENC Centres (RENCs), Original Equipment Manufacturers (OEMs) and the Mariner User community they serve;

Concludes that the Member States of the International Hydrographic Organization should commit to:

- continuing through best international collaborative efforts and technological innovation to complete the outstanding requirement established for adequate ENC coverage as outlined at IMO NAV54;
- working with IMO Member States to promote the need for improved hydrographic survey and nautical charting services as required by SOLAS Chap. V, Reg. 9 and to provide support through the respective IHO and IMO capacity building programs;
- encouraging bilateral and multilateral cooperation within and across RHCs to improve consistency and harmonization of ENC cells (including the removal of any overlapping data) and services;
- establishing a systematic methodology, through the IRCC and the WEND-WG and in conjunction with the RHCs and RENCs, for monitoring evolving ENC coverage requirements, agreeing production priorities and for supporting the provision of integrated ENC services;
- informing mariners, through such things as IMO Safety of Navigation circulars and other national and international navigational warning mechanisms, the areas of national waters where the use of electronic navigation systems is not possible due to the limited quality or absence of source hydrographic data reflected in the nautical charts.

PRO WENDWG-2 - Implementation of the WEND Principles

The WEND Principles require updating to take account of the IMO mandatory carriage of ECDIS. The guidelines to the WEND Principles should also be expanded to include a process that amplifies the details already contained within the Principles and Guidelines that acknowledge, as a last resort, that existing paper chart producers can fill the gaps in ENC coverage and a similar process that can identify areas of overlapping data that impacts on safety of navigation, and after notification to the Producer States and the observance of due process, inform mariners and IMO if the matter cannot/will not be resolved by those Producer States. These revised guidelines should be added to the existing WEND Principles. This process will involve the RHCs.

Recognising that Technical Resolution K 2.19, Principles of the Worldwide Electronic Navigational Chart Database (WEND), was revised last at the 9th WEND Committee meeting in April 2005 and the revision was approved by Member States in August 2005;

Recognising that the IMO Maritime Safety Committee, at its 82nd Session (MSC 82), adopted revisions to the High Speed Craft Codes, making the carriage of ECDIS compulsory for new build craft from 1 July 2008 and for existing craft from 1 July 2010; and at the 86th Session (MSC 86 in June 2009), this was extended to a wide range of vessels (including all vessels over 10,000GT) in a rolling programme commencing from July 2012 and running until July 2018;

Noting that the 1st WEND Working Group met in October 2010 and endorsed minor updates to the main text of K 2.19, the Principles of WEND, taking into account the IMO mandatory carriage of ECDIS; No changes were proposed to the Annex to K 2.19, the Principles of WEND.

Recognising that the Guidelines for the Implementation of the WEND Principles were endorsed at the 11th WEND Committee Meeting in September 2008;

Noting that the 1st WEND Working Group meeting in October 2011 endorsed both minor amendments to the Guidelines for the Implementation of the WEND Principles to take into account the IMO mandatory carriage of ECDIS; and the inclusion of an amplifying annex on processes for dealing with gaps and overlaps in ENC coverage.

Concludes that the Member States of the International Hydrographic Organization should approve:

- the minor updates to the main text of K 2.19, the WEND Principles, as per the attached draft text at Annex A;
- the amendments to the Guidelines for the Implementation of the WEND Principles as per the attached text at Annex B;
- the inclusion of an amplifying Annex to the Guidelines for the Implementation of the WEND Principles as per the attached text at Annex C.

PRINCIPLES OF THE WORLDWIDE ELECTRONIC NAVIGATIONAL CHART DATABASE (WEND)	1/1997 as amended	11/2007	K 2.19
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As updated and endorsed by the 1st WEND WG Meeting (Wollongong, Aus, 13-14 October 2011)

1. The purpose of WEND is to ensure 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.

2. Service Provision

- a) Member States will strive to ensure that, mariners, anywhere in the world, can obtain fully updated ENC^s for all shipping routes and ports across the world.
- b) Member States will strive to ensure that their ENC data are available to users through integrated services¹, each accessible to any ECDIS user (i.e., providing data in S-57 form), in addition to any national distribution or system-specific SENC delivery.
- c) Member States are encouraged to distribute their ENC^s through a RENC² in order to share in common experience and reduce expenditure, and to ensure the greatest possible standardization, consistency, reliability and availability of ENC^s.
- d) Member States should strive for harmonization between RENC^s in respect of data standards and service practices in order to ensure the provision of integrated ENC services to users.
- e) Methods to be adopted should ensure that data bear a stamp or seal of approval of the issuing HO.
- f) When an encryption mechanism is employed to protect data, a failure of contractual obligations by the user should not result in a complete termination of the service. This is to assure that the safety of the vessel is not compromised.
- g) ~~In order to promote the use of ENC^s in ECDIS,~~ Member States are to strive for the greatest possible user-friendliness of their ENC services and to facilitate integrated services to the mariner in order to maximise the use of ENC^s.

3. Rights and Responsibilities

- a) SOLAS Chapter V, Regulation 9, requires Contracting Governments to ensure that hydrographic data are available in a suitable manner in order to satisfy the needs of safe navigation. ~~Once the carriage of ECDIS becomes mandatory, there will be a consequential requirement to ensure that such data, as agreed by IMO, are available in a form suitable for use in ECDIS.~~ The introduction from 2012 of an IMO mandatory carriage requirement for ECDIS imposes a requirement on Contracting Governments to ensure that such data are available in a form suitable for use in ECDIS.

¹ *Integrated services are a variety of end-user services where each service is selling all its ENC data, regardless of source, to the end user within a single service proposition embracing format, data protection scheme and updating mechanism, packaged in a single exchange set.*

² *RENCs are organisational entities where IHO members have established co-operation amongst each other to guarantee a world-wide consistent level of high quality data, and for bringing about co-ordinated services with official ENC^s and updates to them.*

- b) ~~It is expected that Member States, for waters of national jurisdiction, will have mature supply systems for ENC's and their subsequent updating in place by the earliest date for mandatory carriage of ECDIS. It is expected that Member States will have mature arrangements in place for the issue of ENC's and their subsequent updating for waters of national jurisdiction in order to support the IMO requirement for the mandatory carriage of ECDIS.~~
- c) By the dates established by IMO³, Member States will strive to either:
- i. Provide the necessary ENC coverage, or
 - ii. Agree with other States to produce the necessary ENC coverage on their behalf.
- IHO will address overall coverage on a regional basis through Regional Hydrographic Commissions. Guidelines on the implementation of the WEND Principles are published separately. These should be employed to facilitate the provision of appropriate ENC coverage within a suitable timeframe.
- d) The INT chart system is a useful basis for initial area selection for producing ENC's.
- e) Member States are encouraged to work together on data capture and data management.
- f) Responsibilities for providing digital data outside areas of national jurisdictions must be established (see guidance in Annex).
- g) Technically and economically effective solutions for updating are to be established conforming to the relevant IHO standards. The updating of ENC's should be at least as frequent as that provided by the nation for correction of paper charting.
- h) The Member State responsible for originating the data is also responsible for its validation in terms of content, conformance to standards and consistency across cell boundaries.
- i) A Member State responsible for any subsequent integration of a country's data into a wider service is responsible for validating the results of that integration.
- j) National HOs providing source data are responsible for advising the issuing HO of update information in a timely manner.
- k) Member States should work together so that the IHO Data Protection Scheme (S-63) is used for ENC distribution to end users, to ensure data integrity, to safeguard national copyright in ENC data, to protect the mariner from falsified products, and to ensure traceability.
- l) In producing ENC's, Member States are to take due account of the rights of the owners of source data and if paper chart coverage has been published by another Member State, the rights of that State.
- m) Member States should recognize their potential exposure to legal liability for ENC's.

³ *The IMO Sub-Committee on Safety of Navigation, at its 51st Session (NAV 51):*

- *Agreed to recommend to the IMO Marine Safety Committee the mandatory carriage requirement of ECDIS for High Speed Craft (HSC) by 1 July 2008.*
- *Did not decide on a mandatory carriage requirement for other types of ship; this will be considered in conjunction with a Formal Safety Assessment (FSA) to be conducted into the use of ECDIS in ships other than HSC and large passenger ships*

Maritime Safety Committee, at its 82nd Session (MSC 82), adopted revisions to the High Speed Craft Codes, making the carriage of ECDIS compulsory for new build craft from 1 July 2008 and for existing craft from 1 July 2010. At the 86th Session (MSC 86 in June 2009), this was extended to a wide range of vessels (including all vessels over 10,000GT) in a rolling programme commencing from July 2012 and running until July 2018. Also, as directed by MSC81, the IMO Sub-Committee on Safety of Navigation is considering possible mandatory carriage requirements for other types of ships.

4. Standards and Quality Management

- a) A Quality Management System should be considered to assure high quality of ENC services. When implemented, this should be certified by a relevant body as conforming to a suitable recognised standard; typically this will be ISO 9001:2008 ~~08~~ (as amended).
- b) There must be conformance with all relevant IHO and IMO standards.

5. Assistance and Training

- a) Member States' HOs are strongly recommended to provide, upon request, training and advice to HOs that require it to develop their own national ENC provision.

Annex to 1/1997 as amended (K2.19)

Guidance for the Establishment of ENC Production Boundaries

1. ENC duplication should be avoided. A single ENC producing country should exist in any given area.
2. A country is normally the ENC producing country for waters within its national jurisdiction.
3. Responsibility for the production of ENC can be delegated in whole or in part by a country to another country, which then becomes the producing country in the considered area.
4. When the limits of waters of national jurisdiction between two neighbouring countries are not established, or it is more convenient to establish boundaries other than established national boundaries, producing countries are to define the boundaries for ENC production within a technical arrangement. These limits would be for cartographic convenience only and shall not be construed as having any significance or status regarding political or other jurisdictional boundaries.
5. In international waters, the INT chart producer nation shall be assumed to be the producer of the corresponding ENC. Where the offshore limits of waters under national jurisdiction have not yet been established, clause „4“ should apply.
6. In areas where the paper INT charts overlap, neighbouring producer nations should agree a common limit of ENC production in the overlapping areas. Cartographic boundaries should be as simple as possible; for example: a succession of straight segments and turning points corresponding to such things as meridians, parallels, or chart limits. Where different producer nations are responsible for INT coverage of the same area at different scales, those nations should agree on a suitable set of boundaries so as to provide the user with the most coherent service possible.
7. In areas of national jurisdiction for which there is no recognised ENC producer nation, the Regional Hydrographic Commission (or similar body) should determine the ENC producer nation. ENC's produced under such arrangements should be offered for transfer to the Coastal State in the

event that the Coastal State subsequently develops the capacity to maintain the ENC's. Such transfer should respect the moral rights of the Coastal State and the commercial rights of the producer nation.

8. When the production limits are the official limits for national jurisdiction waters, commercial rights shall belong to the ENC producing country.

9. When the production limits are cartographic boundaries as opposed to national boundaries, the commercial rights shall normally belong to the ENC producing country but may possibly be encumbered by the payment of royalties to the relevant country through a technical arrangement (see clause 4).

GUIDELINES FOR THE IMPLEMENTATION OF THE WEND PRINCIPLES

*As endorsed by the 11th WEND Committee Meeting (Tokyo, 2-5 September 2008)
With minor amendments as endorsed by the 1st WEND WG Meeting (Wollongong 13-14 October 2011)*

The International Hydrographic Organization (IHO) is encouraging the transition from paper charts to electronic navigation through its support of a carriage requirement for ECDIS. It follows that the IHO should ensure that mariners are well served by adequate ENC services.

Noting that there are significant improvements required related to coverage, consistency, quality, updating and distribution of ENCs for many parts of the world and that this needs urgent attention, the Wend committee invites IHO Member States to apply the following guidelines for the implementation of the Wend principles (~~Technical Resolution K2.19~~[IHO Resolution 1/1997 as amended](#)).

1. Responsibilities of Coastal States

1.1. A mandatory carriage requirement for ECDIS means a consequential obligation on Coastal States to ensure the provision of ENCs.

1.2. If the coastal State is the issuing authority (in terms of SOLAS V 2.2) then responsibility for the ENCs should lie with it regardless of whether the production and maintenance is undertaken with the assistance of commercial contractors or another Member State.

1.3. Where agreement is given to another Member State to produce and issue ENCs on behalf of a Coastal State the producing / issuing Member State should carry the responsibility for the ENC.

1.4. States providing source data to another State for the compilation of ENCs should advise that producer State of update information in a timely manner.

1.5. Member States should take into consideration the complexity and resource requirements of the ENC production and maintenance task in relation to their own capabilities and options when deciding how to best ensure the provision of ENCs for their waters.

1.6. Subject to appropriate agreement, it is acceptable for a Member State or a group of Member States to produce ENCs as an interim measure to fill gaps in existing coastal States' coverage to promote contiguous coverage. Such ENCs should be withdrawn when adequate coverage is made available by the coastal State. [Further guidance on dealing with gaps is offered at the Annex to these guidelines.](#)

1.7. The S-57 standard requires that there is no overlap of ENC data within usage bands. ECDIS systems will operate unpredictably in areas where overlapping ENC data is present; for this reason overlapping ENC data is not acceptable in end-user services. Where overlapping coverage exists the producing States should recognize their responsibility and take the necessary steps to resolve the situation. In situations where overlapping data cannot be resolved through negotiation, the ENC producer(s) can anticipate that an end user service provider may need to take action itself to eliminate the overlap or discontinue services until the issue is satisfactorily addressed. Any such action to eliminate overlap should be communicated in advance to the affected ENC producer(s) and be based on guidelines that emphasize navigation safety, such as the following:

1. Scale of the data compiled in the ENC,
2. Currency of data in the ENC - i.e. most recent surveys, shoalest soundings, wrecks, rocks, and obstructions,
3. Avoidance of dividing navigationally significant features between producers. For example, Traffic Separation Schemes should be handled by one producer or the other.

[Further guidance on dealing with overlapping data is offered at the Annex to these guidelines.](#)

1.8. Exceptionally, a Member State may create additional ENC's to facilitate unified coverage where such production is undertaken specifically to address issues inhibiting provision of ENC coverage for the safety of navigation in accordance with the long term aims of the WEND Principles. A Member State undertaking such

production should have very valid reasons for its actions and, beforehand, should have made reasonable efforts to negotiate with and come to some agreement with the State that has jurisdiction over the area in question. RHCs should place a high priority on filling ENC gaps.

1.9. In order to ensure uniform quality and consistency of the WEND, Member States should cooperate in accordance with clause 1.3 of the WEND Principles.

1.10. To ensure that the WEND database is maintained to the highest quality standard Member States that identify an error or any other deficiency in an issued ENC, or that receive information indicating such a deficiency, must bring this to the attention of the ENC producer so that the problem can be resolved at the earliest opportunity. Member States should act to ensure that appropriate actions are taken so that the safety of navigation is not compromised.

2. Reference Standards and Implementation

2.1. Harmonization means the uniform implementation of S-57 and other applicable standards, according to common IHO implementation rules as described in S-58, S-65 and the S-57 Encoding Bulletins.

2.2. Member States not wishing to join a RENC should make appropriate arrangements to ensure that their ENC's meet WEND requirements for consistency and quality and are widely distributed.

3. Capacity Building and Cooperation

3.1. Assistance to coastal States may cover aspects such as development of an ENC production capability, ENC quality and the role of RENCs in ENC validation and distribution.

3.2. It is essential that coastal States have established cartographic capability and infrastructure prior to undertaking ENC production and maintenance tasks themselves so as to ensure that the ENC's within the WEND database meet the high quality standards necessary to fulfil SOLAS requirements.

3.3. IHO Member States should consider ENC related projects as high priority capacity building initiatives.

4. Integrated services

4.1. Member States and RENCs should cooperate to ensure that ENC's are harmonised to the same quality standards thereby facilitating integrated services.

4.2. Member States only need to consider the use of S-63 if they intend to deliver a service to end users. Data Servers (i.e. service providers) and equipment manufacturers are responsible for implementing S-63 and form part of the 'S-63 trusted circle' (i.e. are entrusted to protect the ENC's and the encryption process).

Annex to
Guidelines for the Implementation
of the WEND Principles

Further Guidance on the procedure for resolving ENC issues

The intent of these Guidelines is to facilitate the provision of ENC coverage by the IHO community to support the use of ECDIS. The IHO commitment to IMO is to provide ENC coverage of appropriate quality and updatedness that is the equivalent to that available in an international paper chart series or in national paper chart series and should be employed to achieve this aim. This Annex is intended to outline the procedures to be employed to resolve issues such as gaps and overlaps where these undermine the IHO commitment to IMO, the WEND Principles and there is otherwise no likely or timely alternatives.

NB The Guidelines (including this Annex) are NOT intended to be used to improve on existing chart coverage to meet the extended requirements of some sections of the shipping industry (eg cruise companies). In many cases these extended requirements can not be met due to the inadequacy of survey data which may also prevent the conversion of existing paper charts into ENCs. In these cases the provision of ENCs by the responsible national HO will have to await new survey work.

A. Dealing with Gaps in ENC coverage

Where gaps in Coastal States' ENC coverage remain then RHCs will need to take action and a Member State or a group of Member States will need to provide the required ENCs as an interim measure. The following procedures should be undertaken in priority order until there is satisfactory resolution, agreed by the RHC, to close the gaps where it is feasible to make quality ENCs from existing paper chart coverage:

- a. Each RHC shall identify gaps in ENC coverage within their area of responsibility and desired timeframe for resolution, noting initial targets for coverage of shipping routes and priority ports, as well as subsequent coverage requirements.
- b. The RHC shall liaise with the relevant Coastal State to determine whether the State has the capacity to meet the required timeframe as well as quality and maintenance requirements. If these requirements can be met the Coastal State shall then fill the identified gap in ENC coverage.
- c. In the event the Coastal State cannot meet these requirements, or cannot meet the timeframe, the RHC shall report these concerns to the WEND Working Group for further consideration and reporting by the IHB.
- d. If the identified gap is covered by an existing paper chart produced under a Bilateral Arrangement between the Coastal State and an ENC producer nation, the producer nation shall be invited by the RHC to produce and maintain interim ENC coverage under its own producer code until such time as it may be possible to hand the ENC and its maintenance back to the Coastal State. If there is more than one producer nation then the RHC will decide which one of them will release the ENCs.
- e. If the identified gap is covered by an existing paper chart produced under an informal arrangement by one or more third party producer nations, the RHC shall determine the most appropriate producer nation. The selected producer nation shall then be invited by the RHC to produce and maintain interim ENC coverage under its own producer code until such time as it may be possible to hand the ENC and its maintenance back to the Coastal State.
- f. If a Bilateral Arrangement is subsequently created between the Coastal State and a producer nation, or the Coastal State establishes the capacity to adopt and maintain the interim ENC

under their own producer code, this arrangement shall supersede those already in place with the interim ENC handed back to the Coastal State or the nominated producer nation.

B. Dealing with Overlaps in ENC coverage

Where there are overlaps in Coastal States' ENC coverage exist then RHCs will need to take action to ensure that safety of navigation is not compromised. The following procedures should be undertaken:

a. RHCs should create and maintain, through periodic audit, an inventory of (or some means to identify and note) areas of overlapping ENC and highlight those areas where there are navigationally significant differences in the overlaps

b. RHCs should take a proactive approach to resolving overlap issues within their regions. They should produce a risk evaluation report for areas of overlap where navigationally significant differences exist and submit this to the IRCC Chair and the IHB. Appropriate action should then be initiated to inform IMO; the RHC report should highlight:

1. the desired actions to be taken by the Governments of the involved producer States and the risks associated with inaction,

2. the action that may be or has been taken, in the interests of maritime safety and protection of the marine environment, by an End User Service Provider (EUSP) to eliminate the overlap (including the withdrawal of ENCs) pending the satisfactory resolution of matters by the coastal States concerned.

c. Where urgent action is required to alert mariners to navigationally significant issues then RHCs should initiate promulgation of appropriate warnings directly with the regional NAVAREA coordinator keeping the IRCC Chair and IHB informed.

d. RHCs should maintain records of instances where independent action has been taken by an End User Service Provider to eliminate an overlap. RHCs should request an explanation from EUSPs where such action has been taken if this has not been provided. This is particularly relevant for areas where coverage is not distributed via a RENC.