

INTERNATIONAL HYDROGRAPHIC ORGANIZATION



**GUIDANCE FOR THE PREPARATION AND MAINTENANCE OF
INTERNATIONAL (INT) CHART AND ENC SCHEMES
AND
CATALOGUE OF INTERNATIONAL CHARTS**

Publication S-11

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INTERNATIONAL HYDROGRAPHIC ORGANIZATION



PART A

**GUIDANCE FOR THE PREPARATION AND MAINTENANCE OF
INTERNATIONAL (INT) CHART AND ENC SCHEMES**

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INTERNATIONAL HYDROGRAPHIC ORGANIZATION

S-11 Part A – Guidance for the Preparation and Maintenance of International (INT) Chart and ENC Schemes

PREFACE

1. The International Hydrographic Organization (IHO) was formed in 1921 as the result of a desire for greater standardization of nautical charts and associated publications and consequently for greater safety of mariners. It was felt that this standardization could be achieved in such a way that language and symbol differences would be minimized and that a chart produced by one country would be perfectly comprehensible to a navigator from another country.

2. Although measures have been taken since the formation of the IHO to develop standards to be followed nationally when producing charts and publications, it was not until 1967 that the concept of an international (INT) chart was proposed. It was felt that, instead of several different hydrographic offices each producing different charts of the same ocean area, often with differing data, scales and limits, it would be both more economic and safer if one hydrographic office would compile and produce an original chart to internationally agreed specifications. Other hydrographic offices would then be able to print the chart, using the basic reproductive material provided by the original producer nation but substituting their own language, if they wished.

3. The first step was to agree on the standardization of the format and symbols to be used on international charts. The 1967 International Hydrographic Conference (IHC) established a Commission which, working by correspondence, developed the 'Chart Specifications of the IHO' which were adopted at the 1982 IHC. These Specifications are now contained in IHO Publication S-4. They are applicable to all INT charts and recommended also for all national chart series.

4. It was also necessary to develop an agreed scheme, at agreed scales, to provide world-wide coverage. A system of two series of small scale paper charts at scales of 1:10 million (19 charts) and 1:3,5 million (60 charts) was agreed. The two series were published during a 15 year period starting in 1972. This provided international shipping with uniform modern chart coverage for all ocean passages. Specifications for these small scale INT charts are contained in S-4 Part C.

5. In 1982, the success of the small-scale INT Chart Series led to consideration of extending the concept to include charts at medium and large scales. Following the IHC of that year, the North Sea Hydrographic Commission began to assess the problem by conducting a pilot study of the North Sea. Once again, the IHO Member States involved had to agree to a chart scheme that would satisfy the needs of international shipping for that area. It was agreed that this would include medium scale charts of coastal and sea areas at scales between 1:150 000 and 1:1,5 million, and approach and harbour charts at scales greater than 1:150 000. Agreement was also reached that the maximum paper size should be defined as being A0 (1189 x 841 mm). Specifications for these medium and large scale INT charts are contained in S-4 Part B.

6. Following the study of INT charts at medium and large scales for the North Sea, Regional Chart Committees or Groups were established, within the relevant Regional Hydrographic Commissions (RHC), for a number of other regions around the world. Their task was to develop and maintain chart schemes of paper nautical charts for their regions, leading eventually to full world coverage of INT charts at medium and large scales for the world's main shipping routes, ports and port approaches. This coverage may be complemented by large scale national charts for navigation by mariners requiring a more detailed knowledge of a country's waters. INT charting regions were thus set up, covering the world's oceans.

7. Increased production of Electronic Navigational Charts (ENC) has driven the need for similar principles to those already applying to paper nautical charts, in respect of coordinated scheme development, production and maintenance. This created the concept of International Charting Coordination Working Groups (ICCWG) which, on a regional basis, collaborate and coordinate activities for both paper and electronic charts.

8. Hydrographic offices have created small scale ocean coverage ENCs from INT paper charts in the 1:10 million and 1:3,5 million scale series, essentially replicating the scheme for these small scale paper charts without the assistance of ICCWGs. However, constraints on the design and content of ENCs make simply replicating the schemes and content of larger scale paper charts impractical. Therefore, coordination and harmonization of ENC schemes through ICCWGs is considered to be beneficial.

9. Guidance for the Preparation and Maintenance of International (INT) Chart Schemes is contained in Section 100 of S-11 Part A. Guidance for the Preparation and Maintenance of ENC Schemes is contained in Section 200 of S-11 Part A. Generic Terms of Reference for ICCWG are included as Annex I.

10. The current status of development and production, at all scales and in all regions, is presented in S-11 Part B.

PART A: SECTION 100

Guidance for the Preparation and Maintenance of International (INT) Chart Schemes

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1. INTRODUCTION

1.1 **Regional Hydrographic Commissions (RHC)**, the creation of which was encouraged under IHO Resolution 2/1997 (as amended), bring together those Member States having common regional interests in nautical charting¹, research or data collection, so that cooperative solutions to these problems may be reached. Regional Charting Groups or Committees, later re-titled **International Charting Coordination Working Groups (ICCWG)**, may also exist at the regional level. These were set up following Decision 26 of the XII IHC in 1982 with “a primary objective of developing integrated schemes of International (INT) charts for the areas concerned”. They consist of any Member State with an interest in the charting of a particular region, and may provide recommendations to RHC in order to resolve overlaps and gaps in coverage; ensure compliance with the IHO standards; provide a regionally consistent level of high quality data; and support the provision of coordinated end-user services for INT charts. The coordinator of such a group is referred to as the **Regional Coordinator** (see Annex I), who advises and reports to the relevant RHC (see paragraph 3.10 of Annex I).

1.2 **The Nautical Cartography Working Group (NCWG)** (formerly the Chart Standardization and Paper Chart Working Group (CSPCWG)) has a range of duties in the charting field, as set out in IHO Resolutions 2/1982 (as amended) and 11/2002 (as amended). In particular, it has an on-going role to:

- Keep under continuous review S-11 Part A ‘Guidance for the Preparation and Maintenance of International (INT) Chart and ENC Schemes’ in order to advise the IHO Hydrographic Services and Standards Committee (HSSC) on its updating;
- Advise the IHO Secretariat and RHCs, as appropriate, on the work of ICCWG in order to promote the production of INT charts; and
- Offer advice based on NCWG experience to ICCWG and individual Member States on chart schemes and cartographic work, in order to strongly encourage adherence to IHO charting specifications.

1.3 The guidance for application to INT charts was prepared by the Chairman and Secretary of the CSPCWG. It drew upon, and superseded, that contained in former IHO Publication SP-48. It is intended to be used as an aide-memoire and should be used in conjunction with the Regulations of the IHO for INT Charts in IHO Publication S-4 Part A, and the Specifications of the IHO for INT Charts in S-4 Parts B and C.

¹ Nautical chart: A chart specifically designed to meet the requirements of marine navigation, showing depths of water, nature of bottom, elevations, configuration and characteristics of coast, dangers and aids to navigation. May be a paper chart, electronic navigational chart (ENC) or a raster navigational chart (RNC). Also called marine chart, hydrographic chart, or simply chart. [IHO Hydrographic Dictionary]

2. OBJECTIVE AND CONCEPT

2.1 The overall objective for International (INT) charts differs from that for **national charts**, which must permit the safe navigation of **all** classes of vessels throughout their coastal waters. This includes major ports visited by the largest vessels and minor arms of the sea which are of purely local interest. National charts must also satisfy the requirement for an information source on behalf of a variety of national users other than navigators. The combined effect of these two requirements has caused national chart series to cover national waters in great detail. Very large scale charts may be used for port plans, and there are usually at least two continuous coastal paper chart series, one on a relatively large-scale, the other slightly smaller.

2.2 For **INT charts**, the overall objective is the creation of a compact set of medium and large scale charts that are specifically designed for planning, landfall and coastal navigation and access to ports used by ships engaged in international trade. Their content will, therefore, differ from that of national charts. A careful selection of detail on INT charts will allow updates to be restricted to items which are essential for international shipping, thus keeping the maintenance of the series manageable.

2.3 Conceived for the needs of the international mariner, INT chart design will be uninhibited by national boundaries or political considerations. They will not attempt to fulfil the needs of local shipping nor act as national information sources. However, it is recommended that, for the sake of economy, national chart series are designed so that selected charts can be used for the INT chart series (see 3.3.2).

2.4 The content of INT charts must be sufficiently complete and comprehensive to enable international mariners to navigate to their destination; there should be no need for them to use larger scale national charts.

2.5 The language must be English although other languages may be supplementary options within the chart.

3. PROCEDURE

3.1 Port Selection.

3.1.1 The ports to be covered by large scale and, where necessary, approach scale charts should be selected through consultation within the ICCWG. It is important to establish the frequency of use of the ports by international shipping and their charting needs for navigation (plan, execute, monitor, modify) and compliance under Chapter V of the International Convention for the Safety of Life at Sea (SOLAS). Statistical data for the volume of traffic at each port should be sought from the relevant authorities. This may include the net registered tonnage of ships arriving each year and the proportion of this tonnage under foreign flags. Where statistical data are not available, other approaches can be used, such as a study of the traffic of companies using a particular area, the number of charts sold or advice from the national authority.

3.1.2 In less developed areas, consideration can be given to including harbours because of their importance as regional centres or as the main port of an island or group of islands.

3.1.3 Other ports, anchorages, offshore terminals and production areas may need charts designed to meet the individual navigational requirements of certain sectors of users, such as the needs of cruise liners. Particularly for such selections, the type of chart to be produced (paper, ENC or both formats) must be specified so as to satisfy users' needs.

3.1.4 This selection of ports forms the framework around which the chart scheme is built. The choice of ports must be kept under review in light of new developments and the chart scheme adjusted accordingly.

3.2 Shipping Routes.

3.2.1 The major routes along the coasts and in the approaches to ports that are used by international shipping should be identified. AIS data can be utilised in locating shipping movements. The inclusion and impact of routing measures (both IMO-approved and national), vessel traffic services, pilotage and port operations management must also be considered. Where there is a good chance of obtaining a response, existing chart users and international commercial shipping companies should be consulted. In general, a better response will be obtained if users are asked to comment on options rather than to come up with solutions on their own.

3.3 Comparison of Catalogues.

3.3.1 All relevant IHO Member States' chart catalogues should be examined. The catalogues of other countries, in particular those providing extensive regional or world cover, are likely to give a good indication of the scales and numbers of charts likely to be appropriate for the international mariner.

3.3.2 Ideally, INT chart limits and scales should conform to the corresponding charts, present or projected, in the local national series. Such charts, which may not always be the largest scale national charts, can then be modified, or prepared from the start, to full INT specifications, as required for all INT charts. They can then often be published with a minimum of delay. It will not always be possible to simply select INT charts from existing national series. Where new limits and scales are proposed for INT charts, the member country should be encouraged to amend their national chart series to accommodate the INT coverage, so that, for example, the smaller of the two national coastal series may be utilised for INT charts.

3.4 Scale.

3.4.1 The choice of scales should depend upon the navigational requirements of international shipping and the need to provide a coherent and logical scheme of charts for a route or for port entry. Although the precise structure of the scheme may vary from area to area, reflecting different hydrographic and navigational requirements, it will usually be possible to identify the navigational purposes for INT charts:

- **Berthing.** Detailed data to aid berthing, at very large scales. It will often be appropriate to include these as inset plans on Harbour charts.
- **Harbour.** To provide for port entry, and navigating within ports, harbours, anchorages, bays, rivers and canals. Generally at scales larger than 1:30 000. Sometimes the largest scale equivalent national charts will be followed; sometimes the smaller of such scales will be adequate for the International series, since it is in harbour plans that the national information document role of nautical charts is most clearly seen.
- **Approach.** To provide for navigating in the approaches to ports, in major channels or through intricate or congested waters. Generally at scales between 1:30 000 and 1:75 000. Such areas may well contain complicated traffic routing measures. Uncomplicated port approaches should not warrant the provision of separate approach charts; in such cases, the harbour charts should be schemed with sufficient sea-room offshore to permit the safe transfer by the user from the appropriate chart of the coastal series.
- **Coastal.** To provide for coastal navigation and coastal shipping routes. It is desirable, but not essential, that a continuous coastal series should have a uniform scale since this offers a number of advantages to:
 - the navigator in being presented with a common display along a route and in transferring fixes;
 - the cartographer in compiling the overlaps; and
 - the database manager in facilitating the creation of a seamless database for the Navigational Purpose.

Generally at scales between 1:75 000 and 350 000. Where a national chart series has two continuous coverage coastal scales, usually the smaller scale will be adequate for the needs of international shipping. In some areas, however, it may be desirable to have intermediate scales to meet the needs of a large volume of offshore traffic or to give overall cover to extensive offshore shoal areas or outlying island groups.

- **General.** To provide for landfall identification and non-oceanic route planning. Generally at scales between 1:350 000 and 1:2 000 000.
- **Overview.** To provide for route planning and ocean passage before progressing to 'General' for landfall purposes. Generally scales at 1:2 000 000 and smaller, normally provided for by the two established series of small scale INT charts, details of which can be found in S-11 Part B.

3.4.2 It will not always be necessary to use all the above scale bands. For example, in uncomplicated areas an Approach chart will not usually be necessary where it is considered that a Coastal chart satisfies mariner requirements. For INT charts the best appropriate scale based on this guidance should be determined by the ICCWG. For national chart series, the scale bands may also be different. For example, the national Coastal band may include charts as large scale as 1:50 000 or as small scale as 1:500 000. Other values may be used if agreed by the ICCWG.

3.4.3 If there is no conflict with other important criteria, the charting scale should not be larger than the available source material.

3.5 Geodetic Datum and Projections.

3.5.1 INT charts should be referenced to WGS 84 Datum or equivalent and, where not, priority should be given to their re-positioning to WGS 84 Datum as a significant part of their modernisation (see S-4, B-201). The choice of projection for INT charts and in the case of Mercator projections, the mid-latitude, should be made in accordance with the INT Specifications, contained in S-4, B-203 and B-211.

3.6 Dimensions.

3.6.1 Within the standards laid down in the INT Specifications (S-4, B-222) the regional preferences for the chart dimensions should be determined. The printing capabilities of **all** potential Producer and Printer Nations should be investigated, in order to determine both the preferred and maximum sizes to be used

for charts in the regional scheme. Details of potential Printer Nations and the use of A0 size paper can be extracted from S-11 Part B – International Chart Web Catalogue.

3.7 Limits and Overlaps.

3.7.1 It is the detailed limits and the degree and arrangement of overlaps, which largely determine the quality of a scheme. In general, overlaps between INT charts should be sufficient to enable the mariner to safely transfer their position from one chart to the next. They should be designed so that changing charts in an area of complicated navigation is avoided. Larger overlaps may sometimes be necessary where, for example, an important strait is covered on two charts to allow an adequate depiction of both approaches. Particular care is needed to ensure the provision of adequate overlaps with schemes in adjoining regions. More specifically, the following should be considered:

- For schemes of **coastal charts**, ideally each major port should lie towards the centre of a sheet, allowing approach from all directions. This principle can, therefore, provide the starting point for the remainder of the sheet limits.
- The **area covered** by any chart should be a coherent unit where possible, for example: an ocean, a bay, a port approach, a strait. If the chart has an obvious title this condition is usually satisfied.
- Each chart should have **adequate sea room** and allow satisfactory transfer to adjoining charts and to the next larger or smaller scales. This is particularly important in any chart used for entering and leaving port.
- The **land area** shown should include the visual and radar horizons.
- **Overlaps** should include at least one good fixing point. They should be of such extent as to allow adequate time to transfer the course and ship's position, but not be so large as to create a need to duplicate updating unnecessarily. They need to avoid cutting off visual marks or radio-transmitted aids to navigation near the edges of charts that might be used in position fixing. On coasts where there are many off-lying islands and shoals, overlaps need to be large enough to include visual transits of objects in line.
- The **objects that determine the heading of a vessel** should appear on the chart even if it means having a large overlap.
- There should be room for the **chart title**, notes, scales etc, without obliterating important hydrographic detail, or reducing the effective overlap between charts.
- **Features** which should be within the chart's limits and not just outside them are:
 - Lights, radio aids, navigational buoys and beacons (especially landfall buoys on port approach sheets and beacons controlling transits in fairways).
 - Pilot boarding stations, anchorages, radio reporting points.
 - Prominent dangers, protruding coasts and offshore islands.
 - Routeing systems, dredged channels, recommended tracks etc. Features under this heading should not be split by chart limits, unless, like some traffic separation schemes, they are extensive enough to cover several charts.
 - Conspicuous or prominent features (natural or artificial) on the land, for example: radio masts, chimneys, hill summits.

3.7.2 It is possible occasionally to meet the above requirements by **moving the chart limits** in one direction or another, changing the scale or the mid latitude in a Mercator scheme, or increasing the number of charts. The remaining possibilities are:

- To break the inner border and continue the work to the outer border (but preferably not beyond).
- To continue the work which cannot be included in situ, in an inset plan, if there is room for this (not normally appropriate for fixing marks).
- To design the chart in separate sections, for example to cover a North/South oriented channel.

3.7.3 Charts with the longer side running east-west are in '**landscape**' format. They are convenient for use on chart plotting tables and are therefore the preferred format in scheming decisions.

3.8 Chart Numbering.

3.8.1 Blocks of approved INT chart numbers, sub-divided on a regional basis, have been allocated to major areas. These numbers are listed in S-4, A-204, together with the principles by which the numbers are allocated within a region. There should preferably be a logical order to the allocated INT numbers (for example, a series of charts numbered sequentially around a coast).

3.8.2 In some instances, these allocations will need to be agreed with the Coordinators of adjoining regions who may share the same block. It is possible, if necessary, to transfer blocks of numbers from one region to another, with the agreement of the relevant Regional Coordinators and the NCWG Chairman.

3.8.3 When a Producer replaces an existing INT chart by a new INT chart (that is, one where the area covered has changed significantly, see S-4 B-601.3) then a new INT number should be allocated by the Regional Coordinator. The old INT number should not be re-used for at least five years.

3.9 Draft Schemes.

3.9.1 A first draft of any new or amended INT chart scheme should be prepared. Indexes should be drawn on a large enough scale to show clearly where the proposed chart limits intersect coastline detail. These indexes should be accompanied by a list of chart numbers, together with the chart scales, geographical limits and inner neat-line dimensions. Where proposed INT charts correspond to existing national charts, this should be indicated. In some complex cases, explanatory notes of how particular charts were schemed should be included.

3.10 Consultation.

3.10.1 Cooperation and collaboration is important and essential to ensure the optimum outcome in the charts produced and the consistency of their content. Draft INT chart schemes should be circulated for comment to the following, as appropriate:

- All members of the ICCWG and, where appropriate, members of the RHC.
- The Coordinators of adjoining ICCWGs, if the scheme impacts on their region.
- Hydrographic offices producing or printing charts in the region.
- The Chairman of the NCWG.
- The IHO Secretariat.

3.10.2 Comments received should be considered and discussed as necessary and the initial scheme should be refined accordingly. It may be necessary to produce further draft versions before final agreement is obtained. In general, the smaller the scale the more necessary it is to obtain a wide consensus. This consultation can generally be effected by correspondence. However, meetings of the ICCWG at significant points may speed up the process. The final draft of the scheme should be submitted to the RHC for formal approval.

3.10.3 For minor changes to INT chart schemes, see 3.12.

3.11 Allocation of Producers.

3.11.1 In most cases, the allocation of Producer Nations for INT charts will be a fairly straightforward process. For most medium- and large-scale INT charts, the Producer Nation will be the IHO Member State with responsibility for charting the waters covered by these charts. There will, however, be some exceptions. (For further information, see S-4, A-203).

3.11.2 Where an INT chart covers the waters of more than one nation, a single Producer Nation should be agreed. Nations may collaborate in the production, the resulting chart carrying both nations' seals (crests). Examples of collaboration include:

- Two nations compiling sections of the chart to an agreed dividing line, such as the median line, with the Producer Nation joining the sections and producing the finished reprostat.

- One nation compiling the chart, the other nation completing quality control, reformat production and printing for both nations.

3.11.3 In such cases, the Producer Nation will usually be that nation which is responsible for the content and creation of the final chart.

3.11.4 An agreed production schedule should be determined when the allocation of Producer Nations has been completed for all the proposed INT charts. This will facilitate the forward planning for the adoption of these charts by potential Printer Nations and will enable the ICCWG to monitor future progress. It would also be advisable, at this stage, to give consideration to the preparation of a Regional INT Chart Catalogue. This would ultimately provide the source data for the IHO catalogue (S-11 Part B). In reality, some nations may start production before the allocation is completed.

3.11.5 Where a chart has been included in the INT scheme, but the national hydrographic office is unable to effect its production within an acceptable timescale, its production may be undertaken, with the agreement of the national hydrographic office concerned, by a potential Printer Nation.

3.12. Review.

3.12.1 It will be necessary to keep all INT chart schemes under continuous review. Adjustments will be required in order to cater, for example, for:

- The expansion of existing ports.
- The development of new ports.
- Changes to routeing measures.
- The re-positioning of major aids to navigation.

3.12.2 The consultation process (clause 3.10) needs not finalise every detail of every INT chart in a scheme. Once the general requirements, scales and limits have been agreed, it may be left to the designated Producer Nation to make the final detailed decisions. It will not normally be necessary to obtain the approval of the Regional Coordinator for a minor amendment to an individual chart. It can often take many years to finalise a regional INT chart scheme and, in that time, national charts which are candidates for inclusion may themselves have been re-schemed, although the adequacy of the overall coverage will not have changed. However, for major changes to a chart (for example, to scale or limits which could reduce overlaps or even create a gap in a scheme), for partial re-scheming and for the addition or deletion of an INT chart, the ICCWG should be consulted, via the Regional Coordinator.

3.13 Maintenance.

3.13.1 Any changes to scale, limits or numbering of INT charts, which affect S-11 Part B 'International Chart Web Catalogue', must be notified by the Regional Coordinator or other designated regional representative to the IHO Secretariat, who will update the Catalogue.

3.14 Monitoring of INT Charts.

3.14.1 The following procedure is to be implemented by the Regional INT Chart Coordinators (or the ICCWG):

- a. **New INT Chart Producer Nations** are to provide the first edition of any INT chart to the relevant Regional INT Chart Coordinator (or ICCWG) for review as soon as convenient during the production cycle;
- b. **INT Chart Coordinators/ICCWGs** are to:
 - Manage the review of any first edition INT chart produced by a new INT Chart Producer Nation to verify its compliance with the IHO standards; and
 - Provide feedback to the Producer Nation and report results to the next RHC meeting.

This review can be supported using the *basic quality assurance check-list for review of INT charts* available in Annex II;

- c. **All INT Chart Producer Nations** are to provide first editions and details of the new editions of INT charts to the relevant Regional INT Chart Coordinator (or ICCWG) at least three months prior to every RHC meeting to enable the Regional INT Chart Coordinator (or ICCWG) to validate the current INT chart scheme;
- d. All editions of INT charts submitted under actions a) and b) are to be subsequently forwarded to the IHO Secretariat to be included in the IHO Secretariat INT Chart Reference Collection, for internal use; and
- e. **All Member States** are to provide an update to the IHO published list of on-line chart catalogues, either directly or systematically, when updating the Yearbook.

PART A: SECTION 200

Guidance for the Preparation and Maintenance of ENC Schemes

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1. INTRODUCTION

1.1 The **Hydrographic Services and Standards Committee** (HSSC) tasked the **Chart Standardization and Paper Chart Working Group** (CSPCWG – now Nautical Cartography Working Group (NCWG)) to extend the guidance developed for INT charts to include guidelines for the development and maintenance of small and medium scale Electronic Navigational Chart (ENC²) schemes. This extended guidance was prepared by the **North Sea ENC Harmonisation Working Group** (NSEHWG), under the direction of its Chairman and Secretary (2013), building on earlier work by the **Worldwide Electronic Navigational Chart Database Working Group** (WENDWG); and to fulfil parts of the requirements of Resolution 1/1997 (as amended). It should be used in conjunction with Resolution 1/1997, IHO Publication S-57 and its Appendices, as well as S-4.

1.2 **Regional Hydrographic Commissions** (RHC) bring together those Member States having common regional interests in nautical charting, research or data collection, so that cooperative solutions to these problems may be reached. **International Charting Coordination Working Groups** (ICCWG) may also exist at the regional level, with ‘a primary objective of developing integrated schemes of International (INT) charts for the areas concerned’, which has since been extended to include ENC schemes. They consist of any Member State with an interest in the charting of a particular region, and may provide recommendations to RHC in order to resolve overlaps and gaps in ENC coverage; ensure compliance with the IHO standards; provide a regionally consistent level of high quality data; and support the provision of coordinated end-user services for ENCs. The coordinator of such a group is referred to as the **Regional Coordinator**, who advises and reports to the relevant RHC (see Annex I).

1.3 **The Nautical Cartography Working Group** (NCWG) has a range of duties in the charting field, as set out in IHO Resolutions 2/1982 (as amended) and 11/2002 (as amended). In particular, it has an on-going role to:

- Keep under continuous review S-11 Part A ‘Guidance for the Preparation and Maintenance of International (INT) Chart and ENC Schemes’ in order to advise the IHO Hydrographic Services and Standards Committee (HSSC) on its updating;
- Advise the IHO Secretariat and RHCs, as appropriate, on the work of ICCWG in order to promote the production of ENCs; and
- Offer advice based on NCWG experience to ICCWG and individual Member States on ENC schemes and ENC production, in order to strongly encourage adherence to IHO charting specifications.

² ENC: The data base, standardized as to content, structure and format, issued for use with ECDIS on the authority of government authorized hydrographic offices. The ENC contains all the chart information necessary for safe navigation and may contain supplementary information in addition to that contained in the paper chart (e.g. sailing directions) which may be considered necessary for safe navigation. [IHO Hydrographic Dictionary].

2. OBJECTIVE AND CONCEPT

2.1 An Electronic Navigational Chart (ENC) is a digital vector chart, issued by or on behalf of a government authorized hydrographic office or other relevant government institution, which complies with the IHO ENC Product Specification and, when used in a type-approved Electronic Chart Display and Information System (ECDIS³), meets the requirements of Chapter V of the International Convention for the Safety of Life at Sea (SOLAS) regulations for carriage of nautical charts. Within the ECDIS, the features and their attributes (for example: position, colour, shape) can be selectively displayed and queried, enabling the chart image to be manipulated on the screen. This not only provides ECDIS users with control over the level and type of detail they wish to see, but can also be linked to other onboard systems to provide additional features such as automatic alarms and indications.

2.2 The principles for the provision of ENC services in terms of coverage, consistency, quality, updating and distribution are encapsulated in the Worldwide Electronic Navigational Chart Database (WEND) Principles (IHO Resolution 1/1997 as amended). These principles have been developed to ensure 'a world-wide consistent level of high quality, updated official ENCs through integrated services that support the chart carriage requirements of SOLAS Chapter V, and the requirements of the IMO Performance Standards for ECDIS'.

2.3 ENC scheme design will be uninhibited by national boundaries or political considerations (see paragraph 3.10.4).

2.4 The content of ENCs must, as a minimum, be sufficiently complete and comprehensive to enable international mariners to navigate to their destination. However, additional content intended to satisfy national requirements may also be included in ENCs, particularly in the larger scale (Navigational Purpose 3 to 6) ranges, noting that in using ENCs in an ECDIS, the burden on the user for updating and maintenance is much lighter compared to a paper chart folio. The objective of providing a folio of ENCs designed for planning, landfall and coastal navigation, nominally within (but not restricted to) ENC Navigational Purposes 1 to 3, should be considered in determining content and level of detail to be charted.

2.5 The language must be English although other languages may be supplementary options within the ENC.

³ ECDIS: A navigation information system which with adequate back-up arrangements can be accepted as complying with the up-to-date chart required by regulations V/19 and V/27 of the 1974 SOLAS convention, as amended, by displaying selected information from a System Electronic Chart (SENC) with positional information from navigation sensors to assist the mariner in route planning and route monitoring, and if required display additional navigation-related information. [IHO Hydrographic Dictionary]

3. PROCEDURE

3.1 Port Selection.

3.1.1 All ports that are selected for inclusion in the INT chart scheme, in accordance with the guidance at paragraph 3.1.1 of Section 100, must be included in large scale (that is, Berthing or Harbour Navigational Purpose) ENC schemes. Other ports, anchorages, offshore terminals and production areas may need ENCs designed to meet national requirements including the individual navigational requirements of certain sectors of users, such as the needs of cruise liners.

3.2 Shipping Routes.

3.2.1 The major routes along the coasts and in the approaches to ports that are used by shipping should be identified. AIS data can be used in identifying shipping movements. The inclusion and impact of routing measures (both IMO-approved and national), vessel traffic services, pilotage and port operations management must also be considered. Where there is a good chance of obtaining a response, existing ENC users and commercial shipping companies should be consulted. In general, a better response will be obtained if users are asked to comment on options rather than to come up with solutions on their own.

3.3 Comparison of Schemes.

3.3.1 All relevant regional (if they exist) and IHO Member States' national ENC schemes should be examined. The schemes of other countries, in particular those providing extensive regional coverage, are likely to give a good indication of the scales and numbers of ENCs likely to be appropriate for the international mariner.

3.4 Scale.

3.4.1 The choice of scales should depend upon the navigational requirements of international shipping and the need to provide a coherent and logical scheme of charts for a route or for port entry. Although the precise structure of the scheme may vary from area to area, reflecting different hydrographic and navigational requirements, the Navigational Purpose of each ENC must be clear. Navigational Purposes are derived from and defined in S-57 Appendix B.1 – ENC Product Specification; and a further theoretical link between scale and Navigational Purpose is defined within the ENC consistency recommendations in IHO Publication S-65 – Electronic Navigational Charts (ENCs) Production, Maintenance and Distribution Guidance. S-65 also provides a more detailed correlation between scale, Navigational Purpose and selectable radar range display scales. For ENCs it is important that, where possible, there be a regional commonality of scale across at least the Overview and General Navigational Purposes, noting that the suggested alignment of Navigational Purposes to scale ranges in S-65 is not mandatory.

3.4.2 The term 'compilation scale' is used differently for paper (raster) charts and ENCs. In paper chart construction, compilation scale is that of the final analogue (printed) chart which displays content statically as it is designed by the hydrographic office to be shown. In ENCs, compilation scale refers to the optimum scale at which the compiling hydrographic office intends the ENC data to be displayed for the Navigational Purpose, while recognising the user's ability to modify the actual scale at which the ENC is viewed in the ECDIS. While there is no requirement to do so, consideration should be given to making the relationship between the compilation scales of at least the smaller scale Navigational Purposes for ENCs and corresponding INT charts consistent, in order to simplify chart maintenance requirements and provide greater consistency of product portfolios to the end user.

3.4.3 The following are general parameters in order to identify the Navigational Purposes for ENCs:

- **Berthing (Navigational Purpose 6).** Detailed data to aid berthing, at very large scales. The Berthing Navigational Purpose is recommended to have compilation scales larger than 1:4 000. Where the source data used to produce the ENC is of a scale larger than 1:4 000, then that source scale may be used as the compilation scale for the ENC.

- **Harbour (Navigational Purpose 5).** To provide for port entry, and navigating within ports, harbours, anchorages, bays, rivers and canals. The Harbour Navigational Purpose is recommended to have compilation scales between 1:4 000 and 1:21 999. The available corresponding compilation scales for the Harbour scale band as related to standard selectable radar range display scales are 1:4 000, 1:8 000 and 1:12 000.
- **Approach (Navigational Purpose 4).** To provide for navigating in the approaches to ports, in major channels or through intricate or congested waters. Such areas may well contain complicated traffic routing measures. Uncomplicated port approaches should not warrant the provision of separate approach ENCs; in such cases, the harbour ENCs should be scribed with sufficient sea-room offshore to permit the safe transfer by the user from the appropriate ENCs of the coastal series. The Approach Navigational Purpose is recommended to have compilation scales between 1:22 000 and 1:89 999. The available corresponding compilation scales for the Approach scale band as related to standard selectable radar range display scales are 1:22 000 and 1:45 000.
- **Coastal (Navigational Purpose 3).** To provide for coastal navigation and coastal shipping routes. It is desirable, but not essential, that a continuous coastal ENC series should have a uniform scale since this offers a number of advantages to:
 - the navigator in being presented with a common display along a route;
 - the cartographer in achieving 'horizontal consistency' along ENC cell boundaries; and
 - the database manager in facilitating the creation of a seamless database for the Navigational Purpose.

The Coastal Navigational Purpose is recommended to have compilation scales between 1:90 000 and 1:349 999. The available corresponding compilation scales for the Coastal scale band as related to standard selectable radar range display scales are 1:90 000 and 1:180 000.

- **General (Navigational Purpose 2).** To provide for landfall identification and non-oceanic route planning. The General Navigational Purpose is recommended to have compilation scales between 1:350 000 and 1:1 499 999. The available corresponding compilation scales for the General scale band as related to standard selectable radar range display scales are 1:350 000 and 1:700 000.
- **Overview (Navigational Purpose 1).** To provide for route planning and ocean passage before progressing to 'General' for landfall purposes. The Overview Navigational Purpose is recommended to have compilation scales smaller than 1:1 499 999, and should be based on the 1:3 500 000 small scale INT paper chart series to provide a seamless and consistent scale coverage. The available corresponding compilation scales for the Overview scale band as related to standard selectable radar range display scales are 1:1 500 000 and 1:3 000 000. Where the source data used to produce the ENC is of a scale smaller than 1:3 000 000, then that source scale may be used as the compilation scale for the ENC.

3.4.4 It will not always be necessary to use all the above Navigational Purposes. For example, in uncomplicated areas an Approach ENC will not usually be necessary where it is considered that a Coastal ENC satisfies mariner requirements. S-57 and S-65 provide guidance only for the assignment of ENC Navigational Purpose to compilation and standard selectable radar range scales – the best appropriate scale based on this guidance should be determined by the ICCWG. For example, the Coastal band may include ENCs as large scale as 1:45 000 or as small scale as 1:350 000.

3.5 Geodetic Datum and Projections.

3.5.1 All ENCs must be referenced to WGS 84 Datum. There is no projection defined for ENC.

3.6 Dimensions.

3.6.1 ENC cells must be rectangular, defined by 2 parallels of latitude and 2 meridians of longitude. However the area covered by data within a cell does not need to be rectangular. It is important to note that the geographic extent of an ENC cell is not restricted by paper size. The geographic extent of the cell must be chosen to ensure that the resulting dataset file contains no more than 5 Megabytes of data. Subject to this consideration, the cell size must not be too small in order to avoid the creation of an

excessive number of cells.

3.7 Coverage.

3.7.1 A mandatory carriage requirement for ECDIS means a consequential expectation that coastal States will ensure the provision of ENCs.

3.7.2 When scheming ENC cell limits, coverage may be based on 'equivalent' paper chart limits, a grid or a combination of both. If possible a Producer should not mix a combination of grid and paper chart limits in the same Navigational Purpose.

- The **area covered** in a given Navigational Purpose must be split into cells in order to facilitate the efficient processing of ENC data in ECDIS.
- Each cell must be contained in a physically separate, **uniquely identified file** on the transfer medium, known as a data set file (see S-57 Appendix B.1, clause 5.6.3).
- The **ENC scheme** must take account of ENCs that are already produced.
- Where a cell's data content is **captured from paper charts**:
 - Selection of data should be based on the most appropriate paper chart (for example: scale, currency).
 - In some cases, data may be incomplete due to the paper chart's design (for example: placement of chart title, scale etc) leading to the creation of 'no coverage areas'. Consideration should be given to compiling such areas from source, where data exists.
- When **edge matching** it is important for ENC Producers to use the same Coordinate Multiplication Factor (COMF). Producers should follow the IHO recommendations as defined in S-57 Appendix B.1, Annex A – Use of the Object Catalogue for ENC, clause 2.1.7, to hold the ENC production systems at a resolution of 0.0000001 (10^{-7}) and the COMF value in the ENC cell header to 10 000 000 (10^7). It is also recommended to use the same Compilation Scale of Data (CSCL) in the ENC cell header for cells in the same Navigational Purpose; this helps to bring consistency at the boundary between two Producers.
- **Overlaps.** Cells with the same Navigational Purpose may overlap, however data within cells in the same Navigational Purpose must not overlap. Therefore, in an area of overlap only one cell may contain data, and all other cells of the same Navigational Purpose must have a meta object M_COVR with attribute CATCOV = 2 (no coverage available) covering the overlap area. This rule should apply even if several Producers are involved; however, if it is difficult for technical reasons to achieve a perfect join at agreed adjoining national data limits, a 5 metre (on the ground) overlapping buffer zone may be used.

It has also been found that in addition to the unpredictable performance of ECDIS when cells of the same Navigational Purpose overlap, similar performance issues occur when data having the same compilation scale and within different Navigational Purposes overlap. Such performance issues reduce mariner confidence in using ECDIS and may impact on safety of navigation. ENC Producers should therefore ensure that data within cells having the same compilation scale and different Navigational Purposes does not overlap, in addition to ensuring that data within cells of the same Navigational Purpose does not overlap.

- **International boundaries.** See paragraph 3.10.4.
- A **data gap** between ENC cells designed to adjoin each other in the same Navigational Purpose must be avoided.

3.7.3 It is generally accepted that 87 degrees north is approximately the northern limit at which ENCs will perform adequately in an ECDIS; some ECDIS systems are limited in their ability to display ENCs for latitudes further north.

3.8 **ENC Cell Naming.**

3.8.1 ENC cells must be named (numbered) according to the convention in S-57 Appendix B.1 - ENC Product Specification, clause 5.6.3. If an ENC cell is cancelled, the ENC cell name (number) must not be re-used.

3.9 **Consultation.**

3.9.1 In order to enhance consistency such that ENCs appear seamless in an ECDIS (termed 'ENC harmonization'), it is important to establish common ENC content standards (where open to interpretation) both within a national ENC scheme and between different Producers' data where they adjoin. This should be achieved in consultation with neighbouring Producers; and with all nations within a Regional Electronic Chart Coordinating Centre (RENC), ICCWG or RHC, as appropriate. Examples of some obvious features that affect the mariner's use of data in an ECDIS include the application of SCAMIN, routeing measures, critical information and depth contour intervals.

3.9.2 Cooperation and collaboration is important and essential to ensure the optimum outcome in the ENCs produced and the consistency of their content. Draft ENC schemes should be circulated for comment to the following, as appropriate:

- All members of the ICCWG and, where appropriate, members of the RHC.
- The Coordinators of adjoining ICCWGs, if the scheme impacts on their region.
- Hydrographic offices producing ENCs in the region.
- RENCs.
- Technical Experts Working Groups (for example: a regional ENC Harmonisation Working Group).
- The IHO Secretariat.

3.9.3 Comments received should be considered and discussed as necessary and the initial scheme should be refined accordingly. It may be necessary to produce further draft versions before final agreement is obtained. In general, the smaller the scale the more necessary it is to obtain a wide consensus. This consultation can generally be effected by correspondence. However, meetings of the ICCWG at significant points may speed up the process. The final draft of the scheme should be submitted by the Regional Coordinator to the RHC for formal approval.

3.9.4 For minor changes to ENC schemes, see 3.11.

3.10 **Allocation of Producers.**

3.10.1 The production of individual ENC cells can be assigned to only one ENC Producer Nation.

3.10.2 In most cases, the allocation of Producer Nations for ENCs will be a fairly straightforward process. For most medium- and large-scale ENCs, the Producer Nation will be the IHO Member State with responsibility for charting the waters covered by these ENCs.

3.10.3 Responsibility for the production of an ENC can be delegated by a national hydrographic office to another hydrographic office, which then becomes the Producer Nation in that area until such time as the national hydrographic office develops the capacity to maintain the ENC.

3.10.4 When the maritime limits of national jurisdiction between two neighbouring countries are not established, or it is convenient to agree boundaries other than at established international boundaries, producing countries should define the cartographic boundaries for ENC production within a technical arrangement. These limits are for cartographic convenience in ENC production only and do not have any significance, legal effect or status regarding political or other jurisdictional boundaries. Where agreed, such cartographic boundaries should be as simple as possible (for example a succession of straight segments and turning points, corresponding to meridians and parallels or paper chart limits). For technical reasons, diagonal lines should be avoided. When determining the boundaries of ENC coverage between adjoining States, it is important that a rigorous consultation process be initiated (see clause 3.9).

3.10.5 In areas of national jurisdiction for which there is no recognised ENC Producer Nation, the ICCWG or RHC must determine the ENC Producer Nation in consultation with the relevant coastal State. ENCs

produced under such arrangements should be offered for transfer to the national hydrographic office of the coastal State in the event that the national hydrographic office subsequently develops the capacity to maintain the ENCs.

3.11 **Review.**

3.11.1 It will be necessary to keep all ENC schemes under continuous review. Adjustments will be required in order to accommodate changes, such as:

- The expansion of existing ports.
- The development of new ports.
- Changes to routing measures.
- The re-positioning of major aids to navigation.

3.11.2 The consultation process (clause 3.9) needs not finalise every detail of every ENC cell in a scheme. Once the general requirements, Navigational Purpose, compilation scales and cell limits have been agreed, it may be left to the designated Producer Nation to make the final detailed decisions. It will not normally be necessary to obtain the approval of the Coordinator of the ICCWG for a minor amendment to an individual ENC cell, or for re-scheming of large scale (Navigational Purpose 4 to 6) ENCs where no other Producer Nation has adjoining or overlapping ENC coverage. However, for major changes to a cell (for example: scale and limits, to avoid overlaps or gaps), for partial re-scheming and for the addition or deletion of an ENC cell, the ICCWG should be consulted, via the Regional Coordinator. This applies particularly for ENC cells that adjoin another Producer Nation's ENCs in the same Navigational Purpose; or overlap another Producer Nation's ENCs of different Navigational Purpose.

3.12 **Maintenance.**

3.12.1 Any changes to scale, limits or naming of ENCs, which affect S-11 Part B must be notified by the Regional Coordinator or other designated regional representative to the IHO Secretariat, who will update the Catalogue.

ANNEX I

TERMS OF REFERENCE FOR INTERNATIONAL CHARTING COORDINATION WORKING GROUPS (ICCWG) (formerly known as Regional Charting Groups)

Introduction

The activity of coordinating International nautical chart production is long-established in certain regions. Where established, these coordinating bodies operate under the direction of the relevant Regional Hydrographic Commission (RHC).

In September 2008 the 11th meeting of the IHO WEND Committee agreed '*RHCs and INT Chart coordinators to coordinate the development of small/medium scale ENC schemes*'. In October 2009 the first meeting of the IHO Hydrographic Services and Standards Committee took this initiative forward by recommending:

- to update and standardize the title for chart coordinating bodies from Regional Charting Group to International Charting Coordination Working Group (ICCWG); and
- to make available recommended Terms of Reference and Rules of Procedure for existing or new ICCWG to act as a template in order to unify objectives and practices, and to support coordinators.

Recommended Terms of Reference and Rules of Procedure for existing or new ICCWG are set out below. The directing RHC may apply, clarify or amend these as appropriate, taking into account the particular regional circumstances.

**TERMS OF REFERENCE AND RULES OF PROCEDURE
FOR THE [insert REGION name] INTERNATIONAL CHARTING COORDINATION
WORKING GROUP ([REGION name] ICCWG)**

1. Background

1.1 The [Region name] Hydrographic Commission recognizes the need to actively develop and maintain official nautical charts, in both paper and digital formats, that support ships engaged on international voyages in its region. Accordingly, it appoints and directs a working group to undertake this task. The working group shall be named the [Region] International Charting Coordination Working Group (ICCWG).

[The Working Group's name is to appropriately reflect the designated area of responsibility and region, as described in S-11.]

1.2 The ICCWG is a subsidiary body of the [Region name] Hydrographic Commission. It shall conduct its work in accordance with these Terms of Reference and Rules of Procedure. The [Region] Hydrographic Commission may clarify or amend these generic Terms of Reference and Rules of Procedure for the ICCWG in order for these to be made specifically relevant and applicable to its region. Its work is subject to the Hydrographic Commission's approval.

2. Terms of Reference

2.1 To study issues related to nautical charting of the region, in particular to coordinate the allocation of production responsibilities for paper and electronic charts (INT charts and ENC), that support ships engaged on international voyages.

2.2 To develop and maintain an integrated international chart scheme for the region.

2.3 To reach decisions on the maintenance and updating of the documents for which it is responsible.

2.4 To provide advice on chart schemes to individual Member States, in order to encourage adherence to IHO charting regulations, specifications and standards, and to promote and coordinate the production of international (INT) charts and ENC.

2.5 To develop proposals for new or amended INT chart schemes to meet evolving user needs (for example, the introduction of new or amended routeing measures, the confirmed developments of international ports).

2.6 To coordinate the development and maintenance of ENC schemes, by regional agreement, to ensure consistent parameters are used in the compilation of ENC.

2.7 To act as the custodian and maintainer of official, version-controlled catalogues, depicting the status of published and planned charts, subject to formal review and approval by Member States of the [Region] Hydrographic Commission. However, the ENC catalogues may be maintained by RENCs subject to [Region] Hydrographic Commission's approval.

2.8 To provide advice to the IHO Secretariat on any amendments required to maintain S-11 Part B: International Chart Web Catalogue (for example, scale, limits, numbering) and, as appropriate, any corresponding ENC catalogue.

2.9 To provide advice to Chair NCWG and IHO Secretariat on any amendments required to maintain S-11.

2.10 To undertake professional consideration of new information of interest to the ICCWG which may impact its business and responsibilities.

3. Rules of Procedure

3.1 Membership is open to all members and associate members (Member States) of the [Region] Hydrographic Commission wishing to be represented. Each Member State shall be represented through a single point of contact. Noting the technical nature of the Group's work, participation should be limited to representatives of Hydrographic Offices concerned with nautical charting.

3.2 The Coordinator will monitor membership to encourage active participation by all chart-producing Member States within the Region.

3.3 Non-Governmental International Organizations recognized by the IHO may participate as observers in ICCWG activities, where matters of special interest to the NGIO concerned are being considered (IHO Resolution 5/1957 as amended, rule 6.c refers).

3.4 The Coordinator role shall be held by a Member State participating in the ICCWG. The election of the Coordinator, or the reconfirmation of the existing Coordinator, shall be decided by the [Region] Hydrographic Commission at an ordinary meeting or, where a meeting is not convened, by correspondence. Election shall be determined by a simple majority of Member States present and voting (or responding, where determined by correspondence).

3.5 Normally, a Vice-Coordinator is not required to be appointed. However, if a Vice-Coordinator is appointed by the [Region] Hydrographic Commission:

- Election to the post will be by the same method as for the Coordinator;
- The Vice-Coordinator shall act as the Coordinator, with the same powers and duties, in the event that the Coordinator is unable to carry out the duties;
- The Coordinator and Vice-Coordinator will decide between them the organization of the work entailed in these posts, or these may be defined by the [Region] Hydrographic Commission.

3.6 Conduct of business will be primarily by correspondence. If meetings are required, these should be planned with due regard to efficiency and obtaining the fullest membership support (for example, by holding meetings in association with meetings of the [Region] Hydrographic Commission). All members shall inform the Coordinator in advance of their intention to attend meetings of the ICCWG. The working language shall be English.

3.7 Draft proposals will be circulated for review and comment to:

- All members of the ICCWG and, where appropriate, all members of the [Region] Hydrographic Commission;
- Coordinators of adjoining regional ICCWG, if the scheme impacts on those regions (for example, to ensure consistency and coherence of coverage across regional boundaries, for the allocation of chart numbers);
- Hydrographic Offices producing or printing charts of the Region;
- Chair NCWG, if independent advice is required.

3.8 Decisions shall be made by consensus.

3.9 Where required, a Work Plan should be developed and maintained. This should include task priorities and the expected time frames for progressing tasks. The [Region] Hydrographic Commission may delegate tasks to the ICCWG as it sees fit; it is also available to provide guidance on request (for example, in respect of priorities).

3.10 The Coordinator will report progress to meetings of the [Region] Hydrographic Commission and at other reasonable times, on request. Reports shall include but are not limited to:

- An updated Regional INT Chart Catalogue;
- An update of the ENC Catalogue relevant to the Region (if not undertaken by RENCs);
- Changes made to the scheme of INT Charts for the Region, approved by the ICCWG since the last report, together with a summary of reasons;

- Changes made to the small / medium scale ENC scheme for the Region, approved by the ICCWG since the last report, together with a summary of reasons;
- An updated Work Plan (if used).

3.11 All participants, including *[Region]* Hydrographic Commission members and associate members where not directly represented in the ICCWG, shall keep the Coordinator informed of any information relevant to the ICCWG. This may include:

- Submitting proposals for new INT Charts, or amendments (for example, to limits, scale of portrayal) to existing INT Charts, in the Region;
- Requesting new INT Chart numbers for new charts that are planned;
- Reporting the status of production of international charts (INT Charts and ENC).

3.12 ICCWG members shall respond in a timely manner to all reasonable requests for advice from the Coordinator (for example, requests for updating the Catalogue of the INT Charts of the Region, change in points of contact), abiding by all reasonable stated deadlines.

3.13 The work shall be done in accordance with:

- IHO Resolution 1/1997 as amended: 'Principles of the Worldwide Electronic Navigational Chart Database (WEND)', to ensure a world-wide consistent level of high-quality, updated ENCs;
- S-57: 'IHO Transfer Standard for Digital Hydrographic Data';
- S-11 Part A: 'Guidance for the Preparation and Maintenance of International (INT) Charts and ENC Schemes';
- S-4: 'Chart Specifications of the IHO and Regulations for International (INT) Charts', which provides the internationally-agreed product specification for both national and international (INT) charts;
- S-65 : 'Electronic Navigational Charts (ENCs) "Production, Maintenance and Distribution Guidance"'.

Reference: HSSC1 Meeting (Singapore, 22-24 October 2009)

ANNEX II

BASIC CHECK-LIST FOR INT CHART COORDINATORS WHEN REVIEWING NEW INT CHARTS

References: A. S-4 and INT-1,2,3, Editions in force

B. S-11 Part A, Edition in force

C. Digital Reference Tool for Cartographers

D. IHO CL 64/2015 - *Revised Management, Review and Monitoring of New INT Charts.*

Extract of S-4, Edition 4.7.0:

A-104.1 An 'INTERNATIONAL (INT) CHART' is a chart which:

- a. Is produced with limits and scale in conformity with an internationally agreed scheme of such charts;
- b. Carries the INT number of that sheet;
- c. Conforms to the Chart Specifications of the IHO (S-4 Parts B and C);
- d. Conforms to the Regulations of the IHO for International Charts (S-4 Part A).

Note: It is up to the Producer Nation to consider if the new INT chart should be sent to the Regional INT Area Coordinator BEFORE publication allowing enough time for any subsequent corrections to be incorporated by the Producer Nation.

Topic	Possible Useful References S-4 S-11 Part A (Section 100)	Compliant with RHC's decisions and/or IHO standards (yes / no)	Comments by INT Chart Co-ordinator
<i>Step 1 – Compliance with the agreed regional INT chart scheme (S-11 Part A 100.3.10)</i>			
INT Chart Number ¹	A-204, 100.3.8		New numbers allocated by INT Chart Coordinators
Limits ¹	100.3.7		
Scale, latitude of reference	B-211, 100.3.4		
Projection, Horizontal Datum and Vertical References	B-203, B-202, B-302, B-405, 100.3.5		
Dimensions (printable on A0?)	B-222, 100.3.6		
Any other relevant observation			

¹ Optional, as it is assumed that INT Chart Number and Limits have already been agreed by the Regional INT Chart Coordinator when the Producer Nation submitted their INT chart proposal at the beginning of the process.

Topic	Possible Useful References S-4 S-11 Part A (Section 100)	Compliant with RHC's decisions and/or IHO standards (yes / no)	Comments by INT Chart Co-ordinator
<i>Step 2 – Maintenance regime – Consistency and Impact with ENC coverage</i>			
Maintenance regime in place by the producer nation (new Editions, NtMs...)	A-401, A-402, B-600, 100.3.13		
Consistency with ENC coverage in the area (transition plan, updates by the same producer or established agreement for data exchange, etc.)	B-104		
Any other relevant observation			
<i>Step 3 – Content (Reminder: 'must' indicates a mandatory requirement - S-4, B-120.4 refers)</i>			
INT symbols and INT abbreviations	Refer to INT1, INT3 A-302.5, B-122, B-125,		
Chart construction: Border detail, graduation, grids, linear scales	B-210 to B-215, INT2		
Title, crests, notes	B-240 to B-242		
Chart numbering, Marginal information	B-250		
Use of colours	B-140 to B-146		
References, including plans, adjacent charts and sources	B-243 to B-255, B-290 to B-296		
Topography: Port facilities, landmarks	B-320 to B-340		
Bathymetry, dangers and associated tints	B-400 to B-429		
Superimposed information: Routeing, limits and areas, ESSA, boundaries, cables, off-shore production	B-430 to B-449		
Aids to navigation, IALA maritime buoyage region, marine services	B-450 to B-497		
Language, names	B-510, B-552		
Consistency with overlaps and other scale charts (<i>if possible</i>)	B-100.5, 100.3.7		