PRINCIPLES AND PROCEDURES FOR DEVELOPING IHO STANDARDS AND SPECIFICATIONS AND TO CONDUCT CHANGES	2/2007 as amended	IHO A-2	A1.21

1. Scope

1.1 These principles and procedures are intended to be applied to all proposals for development of and changes to IHO technical standards and for new technical standardization work items that will require significant resources to resolve or will potentially impact on those who need to apply these standards. The principles and procedures set in place by means of this resolution for IHO technical standards are not intended be applied for IHO GIS services, publications, catalogues or supporting documentation of general or non-technical nature which form a separate group.

1.2 Any reference to "standards" in these principles and procedures follows the ISO/IEC definitions for *standard* and *guide* and may therefore also include some IHO "specifications" and "guidelines" as appropriate[1]. IHO Product Specifications, including test data sets for validation checks, are considered to be standards. The list of IHO standards that must follow the principles and procedures described in this Resolution is provided as Appendix 1. The list of those IHO standards that can be developed and maintained with endorsement of the relevant Committee and approval of Member States, but without the need for the conduction of an impact study or endorsement by Council is provided in Appendix 2.

2. Principles

2.1 Improvements to technical standards can only occur by change. However, significant change can lead to problems such as implementation issues by hydrographic offices, incompatibility between systems, high updating costs, market monopoly, dissatisfied users, or increased risks to safety of navigation. The following guiding principles have been developed to avoid these effects.

2.1.1 Before formal approval is granted when required, normally through Member States vote, any proposed changes to existing standards should be assessed from a technical and commercial perspective by the widest range of stakeholders, not limited to Member States, also taking into account any other relevant factors.

2.1.2 Where possible, assessment of the proposed changes should involve not only IHO Member States, but all relevant parties such as international organisations, maritime administrations, equipment manufacturers, data distributors, users and other professional organisations. These are the stakeholders.

2.1.3 As far as practicable, any change to standards or systems should be "backwards compatible", or the previous edition must enjoy continued support for a specified transition time.

2.1.4 If standard changes are required for functional improvement rather than initiated by a compelling and urgent need to maintain safety of navigation, then the previously approved arrangement must be allowed to continue to be used for a transition phase, taking the limited accessibility of seaborne equipment into account where applicable.

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[1] ISO/IEC Directives, Part 2 - Rules for the Structure and Drafting of International Standards defines a standard as

> *... a document, established by consensus and approved by a recognized body, that provides for common and repeated use, rules, guidelines or characteristics for activities or their results, aimed at the achievement of the optimum degree of order in a given context.*

The ISO defines a guide as

> *... a document giving orientation, advice or recommendations on non-normative matters relating to international standardization.*

2.1.5 If not already specified by an external or higher IHO authority, the transition timeline should be defined as part of the standard change approval process by the proposer.

2.1.6 In exceptional cases (for example, those affecting safety of navigation), it may be necessary to make recommendations for immediate change to standards and systems to the relevant authorities. This may be achieved through shortening the normal time frames for submission and consideration of proposals for changes, including endorsement and approval. However, such a procedure should be understood as the last resort in urgent cases.

2.1.7 The principles of a recognized project management system for all procedural steps of a conducted standard change should be followed.

2.1.8 All interested parties should be encouraged to continuously improve IHO standards. Constructive feedback should therefore be provided for all proposals – even in cases of rejection.

3. Procedures - General

3.1 Standardised procedures help to ensure that any proposed changes to IHO standards are properly developed, assessed, endorsed, approved and implemented. These procedures should remain simple to encourage their use.

3.1.1 Changes to IHO standards are classified at one of three different categories: *new edition*, *revision*, or *clarification* (see paragraph. 4.1). The development, assessment, approval and implementation process differs for each category, ranging from a very comprehensive regime for *new editions*, to approval at the level of a subordinate body for *clarifications*. *New editions* and *revisions* are considered to be "significant changes" for the purposes of assessment, approval and implementation.

3.1.2 The relevant IHO Committee (HSSC or IRCC) should consider all proposals to develop *new editions* and *revisions* to standards before work commences.

- The Committee should always consider the impact on relevant *stakeholders* when assessing a proposal and planning any subsequent work on standard changes; likewise, the Committee should assess the impact on other IHO standards or guidance, especially for interoperability, data/product quality and portrayal. Appendix 3 of this Resolution provides details on the impact study conduction. This assessment should systematically include a risk and feasibility analysis, and an estimate of the resources required for the development and the implementation of a new or revised standard, including but not limited to Member States Hydrographic Services.

- If a proposed standard change is rejected by the Committee, detailed feedback should be provided to the proposal originator giving the reasons for rejection.

3.1.3 After the Committee has endorsed a proposal for standard change and established a work priority, the IHO Secretariat will incorporate the respective task into the relevant work programmes.

3.1.4 Relevant stakeholders should be notified by the appropriate IHO committees, working groups and project teams and/or the IHO Secretariat of the timetable for new standardization work items and be invited to comment and participate as appropriate. The notification should include a summary forecast of:

- the rational of the standard change,

- the potential scope of changes of the standards,

- the standard documentation affected,

- the anticipated effects and the likely resulting actions for relevant stakeholders,

- the planned timetable for implementation, and

- the proposed effective date of the new or revised standard.

3.1.5 The IHO Secretariat should maintain an on-line register of IHO stakeholders. The register should be used to inform and seek input from stakeholders concerning any proposed changes to IHO standards.

3.1.6 The relevant subordinate bodies should provide the Committee with progress reports on a regular basis in accordance with their management plan and after each milestone during the development and testing phases. These should be made available to stakeholders by the IHO Secretariat (and/or relevant working groups and project teams if agreed). The two Committees (HSSC and IRCC) have the authority to approve the Edition 1.0.0 of all new standards requiring a subsequent development phase before implementation (see paragraph 4.1) and to endorse the following Editions before they are submitted for the approval of Member States.

3.1.7 After endorsement by the Committee or the Council, if applicable[2], the new or changed standard should be submitted to Member States by the IHO Secretariat for approval of the content, and confirmation of the "*effective date*". This is not applicable for new standards in the development (implementation and testing) phase (see paragraph 4.1).

3.1.8 At the "*effective date*", the new or changed standard becomes the effective standard. A "*superseded*" standard should normally remain available concurrently with the revised standard for a suitable transition period.

3.1.9 Subject to endorsement by the Committee or the Council, if applicable[2], and the approval of the Member States, a superseded standard must be withdrawn from the list of standards in force.

3.1.10 Subordinate bodies may assess and request the IHO Secretariat to publish *clarifications* to standards and associated references, subject to seeking input from relevant stakeholders if appropriate. These clarifications are reported to the relevant committees at their annual meeting.

4. Procedures - Specific

4.1 First Editions, New Editions, Revisions and Clarifications

First Edition (WG/PT Development Phase)

A Working Group must make a submission to the Committee if the standard was developed by a subordinate Project Team – if the Project Team (PT) was established directly under the Committee then the PT would submit directly to the Committee for approval of Edition 1.0.0 to be released and published for initial implementation, testing and evaluation and further stakeholder review. Such Edition 1.0.0 is not designed for regular use in approved arrangements or for regular provision of services by purpose.

The first Edition aiming to be released and published for regular use in approved arrangements or for provision of operational services is Edition 2.0.0. For the maturation process from Edition 1.0.0 to Edition 2.0.0 the Working Group (WG) has the authority to issue iterative Edition(s) 1.n.n[3] – for clarifications and revisions that may have arisen during the implementation phase. The changes should be traceable either via a formal comment procedure or through an official proposal mechanism.

When the WG/PT has completed an impact assessment and obtained stakeholder feedback and considers that the standard is mature to become an Edition 2.0.0, it must submit the standard to the Committee for endorsement. The Committee may submit the standard to the Council for endorsement, if applicable[2], before the New Edition is submitted to Member States by the IHO Secretariat for approval of the content, and confirmation of the "*effective date*" of implementation.

New Edition

New Editions of standards introduce significant changes. *New Editions* enable new concepts, such as the ability to support new functions or applications, or the introduction of new constructs or data types, to be introduced. *New Editions* are likely to have a significant impact on either existing users or future users of the revised standard. It

[2] See HSSC and IRCC Terms of Reference and Rules of Procedure.
[3] "n » is not limited to 9.

follows that a full consultative process that provides an opportunity for input from as many stakeholders as possible is required. Proposed changes to a standard should be evaluated and tested wherever practicable. The approval of Member States is required before any *New Edition* of a standard can enter into force. All cumulative *clarifications* and *revisions* must be included with the release of an approved *New Edition* of a standard.

Revision

Revisions are defined as substantive changes to a standard. Typically, *revisions* change existing specifications to correct factual errors; introduce necessary changes that have become evident as a result of practical experience or changing circumstances; or add new specifications within an existing section. *Revisions* could have an impact on either existing users or future users of a revised standard. It follows that a full consultative process that provides an opportunity for input from as many stakeholders as possible is required. Proposed changes to a standard should be evaluated and tested wherever practicable. From Edition 2.0.0 of a standard, the approval of Member States is required before any *revisions* to a standard can enter into force. All cumulative *clarifications* must be included with the release of approved corrections revisions.

However, there may be instances where more urgent action is required, especially where there are serious implications to safety of navigation. In such cases, a "fast-track" approval by correspondence and rapid implementation process may be needed. This should only occur in exceptional circumstances, but any such fast-tracked *revisions* will still require the approval of Member States before they can enter into force.

A *revision* shall not be classified as a *clarification* in order to bypass the appropriate consultation processes.

Clarification

Clarifications are non-substantive changes to a standard. Typically, *clarifications*: remove ambiguity; correct grammatical and spelling errors; amend or update cross references; insert improved graphics in spelling, punctuation and grammar. A clarification must not cause any substantive semantic change to a standard. *Clarifications* are the responsibility of the relevant subordinate body and may be delegated to the responsible editor.

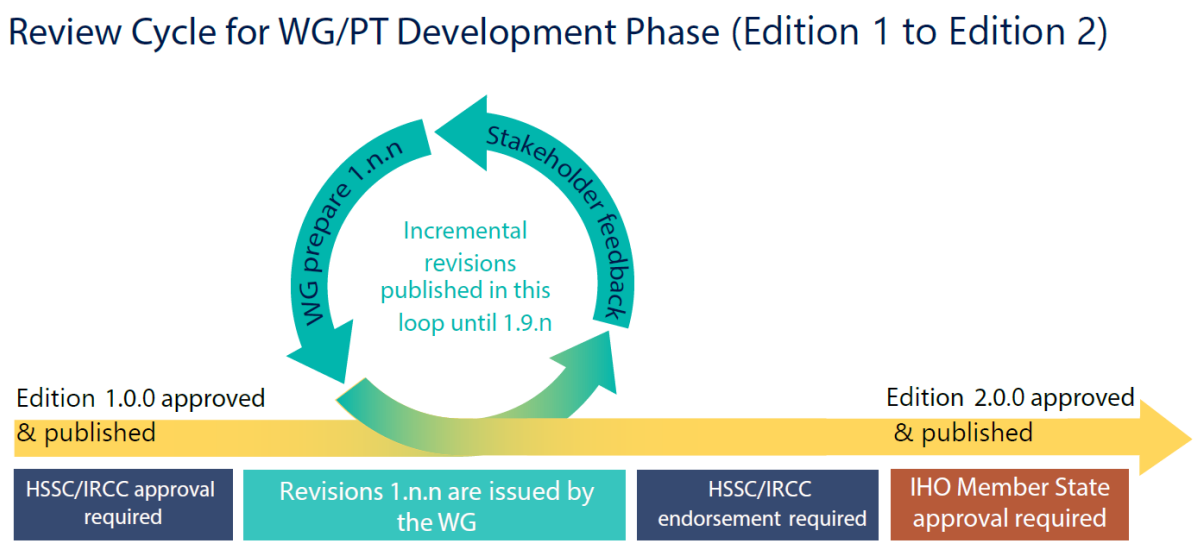
4.2 The associated version control numbering to identify changes (n) to all IHO standards should be as follows:

New Editions denoted as *n*.0.0

Revisions denoted as n.*n*.0

Clarifications denoted as n.n.*n*

4.3 The following diagrams illustrates the development, consultation and approval processes for IHO standards:



The typical life cycle of an IHO standard incorporating a Development Phase:

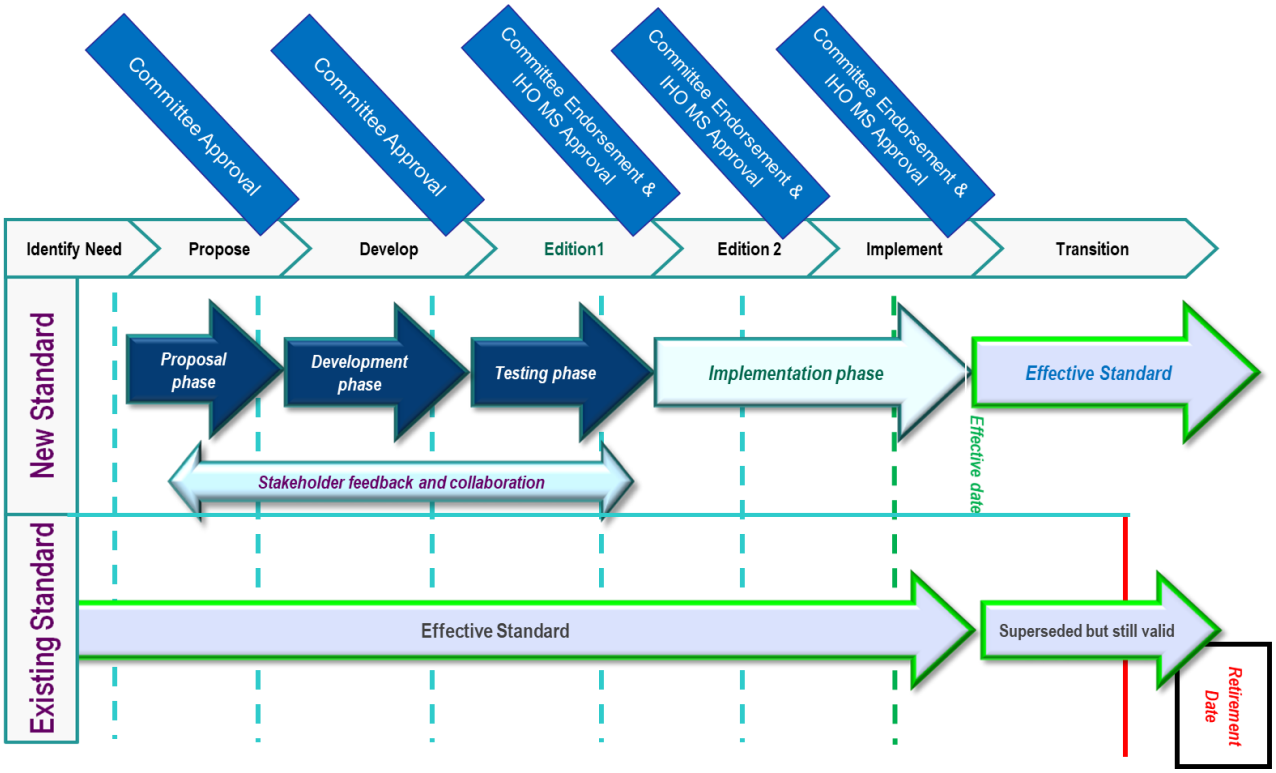


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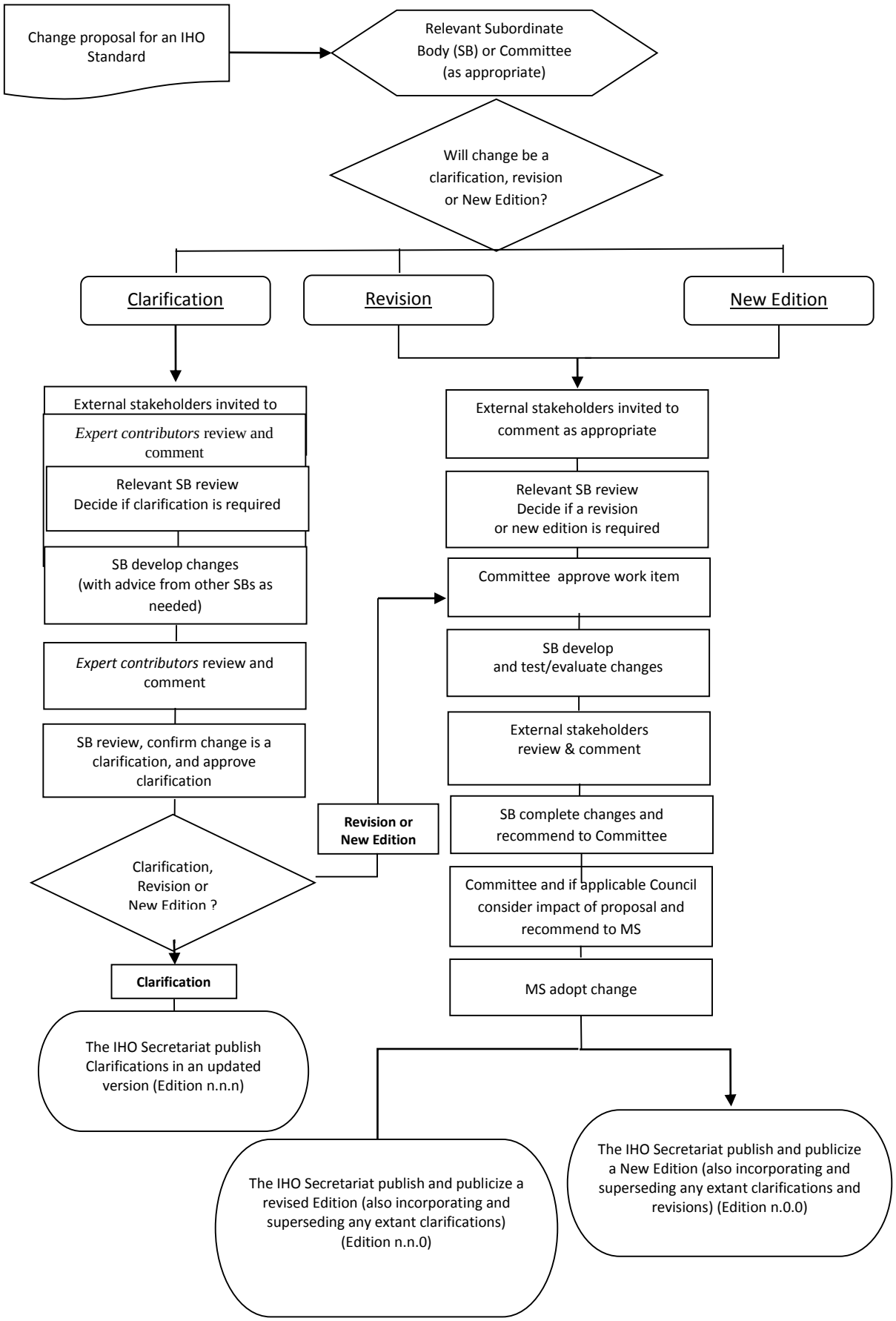
Diagram – Changes to IHO Standards – General Case



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APPENDIX 1

IHO standards and guidelines that must be subject to the full approval process (impact study, Committee endorsement and if applicable Council endorsement and Member State approval for revisions and new editions) as described in the terms of IHO Resolution 2/2007 as amended.

Number	Name	Relevant maintenance body
B-12	Guidance on Crowdsourced Bathymetry	CSBWG
S-5A	Standards of Competence for Category "A" Hydrographic Surveyors	IBSC
S-5B	Standards of Competence for Category "B" Hydrographic Surveyors	IBSC
S-8A	Standards of Competence for Category "A" Nautical Cartographers	IBSC
S-8B	Standards of Competence for Category "B" Nautical Cartographers	IBSC
S-11 Part A	Guidance for the Preparation and Maintenance of INT Chart and ENC schemes	NCWG
S-23	Limits of Oceans and Seas	Informal Consultation when/if required
S-44	IHO Standards for Hydrographic Surveys	WG/PT when/if required
S-52	Specifications for Chart Content and Display Aspects of ECDIS	ENCWG
S-52 Annex A	IHO ECDIS Presentation Library	ENCWG
S-52 Appendix 1	Guidance on Updating the ENC	WG/PT when/if required
S-57	IHO Transfer Standard for Digital Hydrographic Data	ENCWG
S-57 Appendix B.1	ENC Product Specification	ENCWG
S-57 Appendix B.1 Annex A	Use of the Object Catalogue for ENC	ENCWG
S-57 Supplementary Information N°3	Supplementary Information for the encoding of S-57 Edition 3.1 ENC Data	ENCWG
S-58	Recommended ENC Validation Checks	ENCWG
S-61	Product Specifications for Raster Navigational Charts (RNC)	ENCWG
S-63	IHO Data Protection Scheme	ENCWG/S-100WG
S-98	Interoperability Specification for Navigation Systems	S-100WG

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Number	Name	Relevant maintenance body
S-99	Operational Procedures for the Organization and Management of the S-100 IHO Geospatial Information Registry	S-100WG
S-100	IHO Universal Hydrographic Data Model Section 9 and other Portrayal related elements of S-100 Quality related elements of S-100	S-100WG
S-1*nn* (when adopted)	S-100 based IHO Product Specifications	Ad hoc WGs and PTs

APPENDIX 2

IHO standards that can be developed and maintained without following the full process of Resolution 2/2007 as amended. (The new Revisions and Editions of these standards do not need an impact study, but must be endorsed by the responsible Committee and then approved by Member States.)

Number	Name	Relevant maintenance body
B-6	Standardization of Undersea Feature Names (Guidelines Proposal Form Terminology)	SCUFN
S-4	Regulations for INT Charts and IHO Chart Specifications	NCWG
S-12	Standardization of List of Lights and Fog Signals	NIPWG
S-32	Hydrographic Dictionary	HDWG
S-32 Appendix 1	Glossary of ECDIS-Related Terms	HDWG
S-49	Standardization of Mariners' Routeing Guides	NIPWG
S-60	Users Handbook on Datum Transformations involving WGS 84	WG when/if required
S-61	Product Specifications for Raster Navigational Charts (RNC)	ENCWG
S-66	Facts about Electronic Charting and Carriage Requirements	ENCWG
S-67	MARINERS' GUIDE TO ACCURACY OF DEPTH INFORMATION IN ELECTRONIC NAVIGATIONAL CHARTS (ENC)	DQWG
S-97	Product Specification Guide Book	S-100WG
S-99	Operational Procedures for the Organization and Management of the S-100 IHO Geospatial Information Registry	S-100WG
C-17	Spatial Data Infrastructures: "The Marine Dimension" - Guidance For Hydrographic Offices	MSDIWG
C-51	A Manual on Technical Aspects of The United Nations Convention on the Law of The Sea - 1982	ABLOS

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APPENDIX 3

Guidance on Conduction of an Impact Study

Description of the purpose of the study (testable hypotheses)

An impact study plan should include the general description of the impact assessment and a plan to conduct the study. The general description should specify a set of hypotheses about the outcomes and impacts of the study. The impact should consider all the outcomes, also the updating process of existing data.

There are three distinct levels of potential impact that a change to the standard might have:

- Does the new version of a standard impact on the market and business procedures?
- Does the new version of a standard impact on producing offices/agencies?
- Does the new version of a standard impact on the stakeholders?

Specification of the result assessment methods

The intended assessment method should be proposed by the WG for HSSC endorsement before the survey is initiated. This ensures that the assessed results are transparent and that misinterpretations will be prevented.

Identification of a minimum of measurable indicators

Measurable indicators should be defined that can be used to determine potential impacts to the community. The results of the survey questionnaire will populate the indicators. The impact study shall take into consideration the following minimum set of subject items:

- Impact on software development;
- Impact on equipment development;
- Impact on data distributors;
- Cost/effectiveness of the implementation;
- Readiness of implementation.

Suitability of impact study questions

The success of a survey depends on the questions asked. Thus, the set of the survey questions has to be checked to determine whether they are useful for this purpose. This check should be conducted by professional survey experts.

Identification of potential stakeholders

An impact study should be done in two parts. The first part should be the feasibility study and conducted before the development starts. This study should address the feasibility of the intended Product Specification. The second part is an impact study should be initiated before the release and should address the potential users. The audience of both studies can be different. The first study should approach the interested parties, whereas the latter should approach software developers, OEMs and Member States.

A list of potential stakeholders is being maintained by the IHO Secretariat and should be available. The initiator of the impact study should select those stakeholders on which the intended new Standard has significant impact. It is recommended to approach the following stakeholders:

- IHO Member States,
- International organizations,
- Software developers,
- Equipment manufacturers,
- RENCs,
- Product/data distributers,
- End users (hydrographic community),
- End users (marine community).

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Identification of appropriate survey tools and methods

Professional online tools should be used for the survey. Stakeholders should be approached by e-mail. The survey should be conducted under the supervision of the initiating Organisation or IHO Working Group. To assist stakeholders who are uncertain about specific survey questions, the initiating Organisation should provide point of contact information for the survey duration.

Specification of the survey duration

The survey time should be limited to 3 months as the maximum duration.

Specification of requested actions and dissemination of the findings

The findings of the impact study should be summarized and the findings should be made public on the IHO website. The in-depth analyses should be conducted by the initiating Organisation and be supervised by the IHO Secretariat. This ensures that the analytic capacity is available and that the results will be compiled correctly. The raw data should be stored for backward research and for transparency in a repository hosted by the IHO Secretariat. The cleaned data should be provided in tables, diagrams or other appropriate formats. The final report and the outcome of the study should be forwarded to the IHO Secretariat and should be publicly available on the IHO website at an appropriate place. This will ensure the further use of the study results.