Paper for Consideration by HSSC

Standardised Development, Consultation and Approval Procedures for IHO Technical Standards

Submitted by:	TSMAD
Executive Summary:	This paper invites the HSSC to recommend additions to IHO Resolution A1.21 that clearly define the development, consultation and approval procedures for IHO technical standards and associated documents.
Related Documents:	IHO Resolution A1.21
Related Projects:	None

Introduction / Background

The IHO has an established consultative process for the approval of new editions and major revisions to its technical standards and specifications. It is described in IHO Resolution A1.21. A copy of IHO Resolution A1.21 is at Annex A.

Resolution A1.21 in its current form outlines the processes for the development and adoption of new IHO technical standards and for significant changes to existing standards and product specifications based on those standards. It does not provide specific guidance on how proposed changes and on-going developments should be progressed or subsequently approved.

The imminent introduction of S-100 and the establishment of the IHO geospatial information infrastructure (GII) and the IHO S-100 registry highlight the need to define the approval and versioning procedures for all IHO technical standards, product specifications, and associated documentation.

Analysis/Discussion

Stakeholder Input and Consultation

The CHRIS (now HSSC) took the lead in moving the IHO towards closer cooperation with stakeholders. This has included the invitation of *expert contributors* in technical working groups, encouragement to international organizations to seek accreditation as NGIOs, convening stakeholders' forums and the compilation of various lists of stakeholders by the IHB. This means that the IHO can call upon a wide range of input and opinions on any developments to IHO standards. The IHB will be consolidating its list of stakeholders, and will be establishing a web-based register to which any potential stakeholder can subscribe. This register will be used to circulate notices of any changes or developments to IHO standards and in particular to seek feedback and comment on relevant IHO matters.

Consultation and Approval Processes for IHO Standards

Resolution A1.21 addresses the need to ensure that any changes to IHO technical standards are very carefully considered, especially in relation to the impact on existing users and stakeholders. For this reason, the most important and far reaching changes require consultation with relevant stakeholders both in the IHO and elsewhere and the final approval of Member States before they can enter into force. At the same time, less significant changes to technical standards, for example, to add clarification or to correct errors or omissions have less or no direct impact on existing users. So, in the interests of efficiency and timeliness, the same wide consultation and processes and high-level approval that applies to new technical standards or major revisions

are not followed. However, there is no clear guidance regarding which processes should apply for any particular circumstance. The proposals contained in this paper seek to provide this guidance.

In S-57, S-52 and in S-100 changes to the standards are classified at three different levels: *extension, correction,* or *clarification*. In each case, the development, consultation and approval process is slightly different; ranging from a very comprehensive regime for *extensions*, to working group level approval for *clarifications*.

Extensions, Corrections and Clarifications

Extensions are major revisions to a standard or a dependent product specification. Extensions 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. Extensions are likely to have a significant impact on either existing users or future users of the revised standard or specification. 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. The approval of Member States is required before any *extensions* to a standard or a product specification can enter into force. *Extensions* are, in effect, new versions of a standard.

Corrections are a relatively specific change to a standard or a dependent product specification. They are required to correct errors and omissions, or to introduce necessary changes that have become evident as a result of practical experience. Corrections could have an impact on either existing users or future users of the revised standard or specification. It follows that a full consultative process that provides an opportunity for input from as many stakeholders as possible is required. Proposed changes to the standard should be evaluated and tested wherever practicable. The approval of Member States is required before any *corrections* to a standard or a product specification can enter into force. *Corrections* are, in effect, revisions to a standard.

Clarifications are minor revisions to a standard or a dependent product specification. Clarifications provide an improvement to the wording of the standard or specification that does not result in any substantive change to the intended purpose. Clarifications are intended to ensure that the existing standard or specification is used as intended. Clarifications introduce such things as practical examples of how a standard or specification should be used, or explain and resolve ambiguities that may exist in the existing documentation. Clarifications must not have significant adverse impacts on existing users of the standard. In the interests of efficiency, the working group that maintains a standard or specification is therefore the appropriate authority to issue *clarifications* for that standard or specification. Nevertheless, a limited consultative process, primarily involving stakeholders at the level of working groups - the so-called *Expert Contributors*, is still required before any *clarification* can enter into force.

The associated version control numbering to identify changes (*x*) is as follows:

Extensions denoted as ***x***.0.0

Corrections denoted as n.***x***.0

Clarifications denoted as n.n.***x***

Standardised Development and Approval Processes

Changes to IHO technical standards and product specifications are one of the most critical aspects of the IHO technical programme because they are likely to have a direct impact on stakeholders. For these reasons, proposed changes (*corrections* and *extensions*) to product specifications derived from S-100, for example, the future ENC Product Specification S-101, must undergo a thorough evaluation, consultation and approval process.

It seems logical to extend this standardised approach to other IHO technical standards. A flow diagram showing the development, consultation and approval processes that could be applied to IHO technical standards and to

IHO Product Specifications is shown in Diagram 1 in Annex B. The diagram shows that stakeholder consultation and input is achieved through circulating all proposals to the external stakeholders registered with the IHB. Testing also involves relevant stakeholders as *expert contributors*.

Special Cases

Notwithstanding the generic model shown in Diagram 1 in Annex B, there are two special cases that require consideration:

- changes to IHO S-100
- changes to entries in the S-100 feature concept dictionary (FCD) Register and the S-100 Portrayal Register

Changes to S-100. S-100 is unique among IHO technical standards in that it is not a detailed specification but is actually a framework or over-arching model that sets out the principles under which hydrographic geospatial information is organised and documented. As such, any changes to it will not have a direct impact on product specifications or derived technical standards created under it; hence, will not impact on existing users of hydrographic information.

When product specifications or any other geospatial data elements are created under the S-100 architecture, they are referenced to the version of S-100 that exists at the time. This means that for existing users, there is no need to make any changes to existing specifications unless there is an identified requirement to do so. Furthermore, any shortcomings in S-100 are unlikely to be identified until specific product specifications or other applications are developed and tested under the rigorous regimes described in Diagram 1 in Annex B.

For these reasons, *corrections* to S-100 should follow a modified consultation and approval process using the Hydro Register Control Body with HSSC as the approving authority. A flow diagram showing the development, consultation and approval processes for changes to S-100 is shown in Diagram 2 in Annex B.

Hydro Register Control Body. In the case of the S-100 Hydro register, the register control body will comprise the Chairs, Vice Chairs and selected volunteers from the relevant HSSC Working groups. Currently, the FCD control body is made up of volunteers drawn from TSMAD, and will be expanded to represent all the other IHO technical working groups that are involved in the population and maintenance of information in the Hydro registers.

Changes to FCD and Portrayal Registers. The FCD and Portrayal registers contain the "building blocks" for the creation of Product Specifications. Entries and versions of entries in the registers are never removed. Maintenance and development of the registers is dynamic and follows ISO 19135 principles. Multiple versions of similar entries are kept in the registers using unique identification and classification attributes. In this way, every entry is either:

- *valid* (latest version)
- *superseded* (previous version/s)
- *retired* (no longer recommended for use)
- *non valid* (proposed but not accepted or no longer acceptable)

This means that product feature catalogues (which are part of product specifications) can refer to items (in the registers) that are always legitimate. For example, the feature catalogue for a legacy product specification can continue to reference a *superseded* feature class in the FCD, rather than the current *valid* version of the feature class. When a new feature is registered or an existing feature is upgraded in an FCD, it is not necessary to upgrade an existing product specification unless there is a need to incorporate that new feature. As a result, there is no requirement to maintain the same strict versioning and approval regime in the FCDs that must apply to base standards and dependant product specifications.

The IHO Registry provides the mechanism for the dynamic maintenance of the content of FCD and Portrayal registers. The maintenance and management of the registers is undertaken by volunteer register managers, who operate under the overall supervision of the register control body. The register control body is the authority that approves any new or revised entries in the FCD and portrayal registers.

A flow diagram showing the development, consultation and approval processes for changes to entries in the FCD and Portrayal registers is shown in Diagram 3 in Annex B.

Urgent Amendments

The introduction of *extensions* and *corrections* to existing standards and specifications is intentionally a thorough process, in order to allow for appropriate levels of development, testing and consultation. However, there will 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 and implementation process may be needed. This should only occur in exceptional circumstances under the authority of the HSSC. Any such fast-tracked *extensions* or *corrections* still require the approval of Member States before they can enter into force.

Recommendations

In order to provide consistency in the administration of IHO standards, the arrangements that are already in place to control changes to S-57, S-52 and S-100 and their subordinate Product Specifications should be acknowledged and documented. Similar development, consultation and approval procedures that apply to S-57, S-52 and S-100 should also be applied to all other IHO technical standards. Accordingly, it is recommended that IHO Resolution A1.21 be expanded as shown in Annexes B and C.

A table showing how the three flowcharts might apply to existing IHO technical standards and guidelines is contained at Annex D.

Impact Statement

This proposal will ensure that changes to IHO technical standards all include appropriate consultation processes as envisaged in existing IHO Resolution A1.21.

The detailed process diagrams are based on established practices; therefore, there should be no adverse impacts.

In the case of S-100, which has been designed to be flexible and extensible a proliferation of uncontrolled changes will be avoided as the pace of development of digital specifications increases.

Action required of HSSC

HSSC is requested to:

> **agree** the overall framework for the development, consultation and approval procedures described in this proposal
>
> **recommend** to MS the proposed amendments to IHO Resolution A1.21 as set out in Annexes B and C.

Existing IHO Resolution A1.21 – (introduced via CL106/07)

A1.21 PRINCIPLES AND PROCEDURES FOR MAKING CHANGES TO IHO TECHNICAL STANDARDS AND SPECIFICATIONS

History

These principles and procedures are derived from those agreed at the 18th meeting of CHRIS in Cairns, Australia 26-29 September 2006. The latter superseded those developed at the 13th meeting of CHRIS in Athens, September 2001 and revised at the 15th meeting of CHRIS in Monaco in June 2003.

Scope

These principles and procedures are intended to be applied to all proposals for changes to IHO technical standards and specifications and for new work items that will require significant resources to resolve or will potentially impact on those who need to apply the standards and specifications.

These procedures are not intended to be applied to minor or technical issues that arise from the work of HSSC and its subordinate bodies, or for the correction of identified problems or for clarification of elements of the standards themselves.

Any reference to “standards” in these principles and procedures also includes specifications and guidelines as appropriate.

Principles

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

1. Before approval is granted, any proposed changes to existing standards should be assessed from a technical and commercial perspective, also taking into account any other relevant factors.

2. Where possible, assessment should involve all relevant parties such as international organisations, maritime administrations, equipment manufacturers, data distributors, users and other professional organisations.

3. As far as practicable, any change to standards or systems should be "backwards compatible", or the existing version must be supported for a specified time.

4. If changes are required for the basis of product enhancement rather than for safety of navigation, then the previously approved system must be allowed to continue to be used at sea for a sufficient time to allow changes to be implemented on board.

5. If not already specified by external or higher IHO authority, the timeline for making changes should be defined.

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.

7. The principles of a recognised project management system should be followed.

8. All interested parties should be encouraged to continuously improve IHO technical standards. Constructive feedback should therefore be provided for all rejected proposals.

Procedures

These procedures are recommended to ensure that any proposed changes are properly assessed and implemented. These procedures should remain simple to encourage their use.

The life cycle of a typical standard is illustrated in Annex A.

1. The HSSC will consider proposals at its meetings.

- The HSSC will consider the impact on relevant stakeholders in assessing the proposal and planning any subsequent work. Relevant stakeholders may include representation from international organisations, maritime administrations, non governmental international organisations, equipment manufacturers, data distributors and other users of the standard.

- If rejected, feedback will be provided to the proposal originator giving the reasons for rejection.

2. After endorsing proposals, and establishing a work priority, the HSSC will forward proposals to the IHB for necessary action including incorporation into the relevant IHO work programs.

3. Relevant stakeholders should be notified by the IHB of the timetable for new work items and be invited to comment and participate as appropriate. The notification should include a summary forecast of:

- the potential changes,

- the documents affected,

- the likely action list for relevant stakeholders,

- the timetable for implementation, and

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

4. The HSSC should provide progress reports on a regular basis and after each milestone during the development and testing phases. These should be made available to stakeholders by the IHB.

5. At the end of the development and testing phases the HSSC will review the standard. If endorsed, a "*change note*" should be forwarded to relevant stakeholders. The "*change note*" will provide:

- a summary of changes,

- the documents affected,

- a recommended action list ,

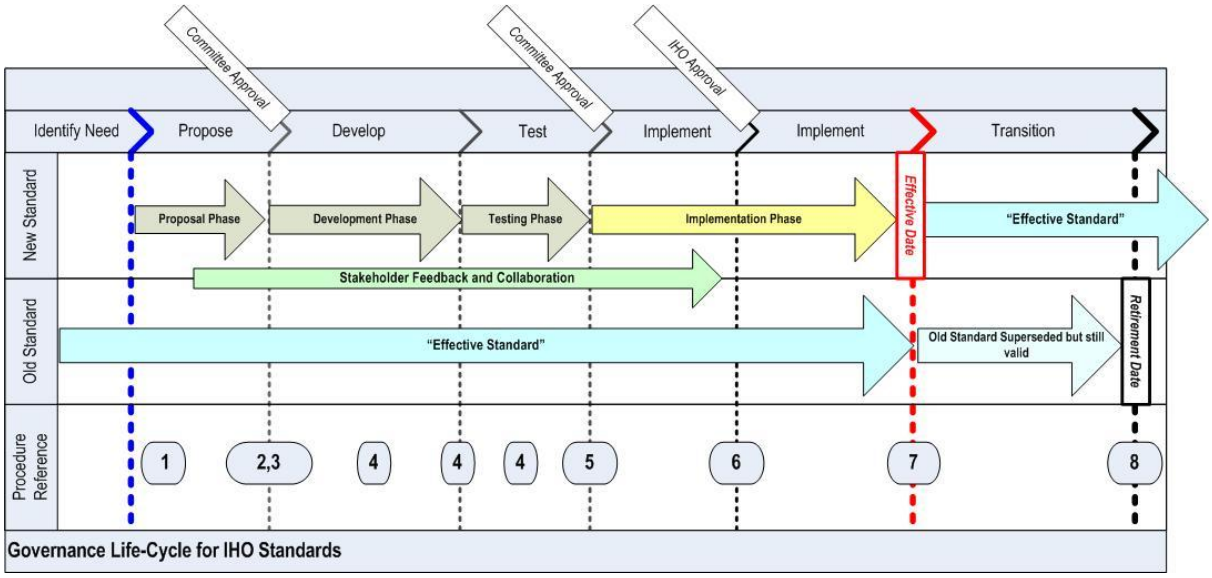
- the timetable for implementation, and

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

6. Following an adequate period for comment on the "*change note*", and incorporation of any relevant feedback, the revised standards should be submitted to Member States by the IHB for approval of the content, and confirmation of the "*effective date*".

7. At the "*effective date*", the revised standard becomes the effective standard. The "*superseded*" standard will usually remain available concurrently with the revised standard for a suitable transition period.

8. A "*superseded*" standard may be "*retired*" as an available standard when it is no longer appropriate for use, subject to Member State approval.


Committee Approval
Committee Approval
IHO Approval
Identify Need
Propose
Develop
Test
Implement
Implement
Transition
New Standard
Proposal Phase
Development Phase
Testing Phase
Implementation Phase
Effective Date
"Effective Standard"
Stakeholder Feedback and Collaboration
Old Standard
"Effective Standard"
Old Standard Superseded but still valid
Retirement Date
Procedure Reference
1
2,3
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8
Governance Life-Cycle for IHO Standards

Proposed Amendment to IHO Resolution A1.21

(deletions are shown in ~~strikethrough~~; additions are shown in red typescript)

A1.21 PRINCIPLES AND PROCEDURES FOR MAKING CHANGES TO IHO TECHNICAL STANDARDS AND SPECIFICATIONS

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1. Scope

1.1 These principles and procedures are intended to be applied to all proposals for changes to IHO technical standards and specifications and for new work items that will require significant resources to resolve or will potentially impact on those who need to apply the standards and specifications. They are not intended for IHO publications, catalogues or supporting documentation of a general or non-technical nature.

~~These procedures are not intended to be applied to minor or technical issues that arise from the work of HSSC, or for the correction of identified problems or for clarification of elements of the standards themselves.~~

1.2 Any reference to “standards” in these principles and procedures also includes specifications and guidelines as appropriate.

2. Principles

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

2.1.1. Before approval is granted, any proposed changes to existing standards should be assessed from a technical and commercial perspective, also taking into account any other relevant factors.

2.1.2. Where possible, assessment should involve not only IHO members but all relevant parties such as international organisations, maritime administrations, equipment manufacturers, data distributors, users and other professional organisations.

2.1.3. As far as practicable, any change to standards or systems should be "backwards compatible", or the existing version must be supported for a specified time.

2.1.4. If changes are required for the basis of product enhancement rather than for safety of navigation, then the previously approved system must be allowed to continue to be used at sea for a sufficient time to allow changes to be implemented on board.

2.1.5. If not already specified by an external or higher IHO authority, the timeline for making changes should be defined.

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.

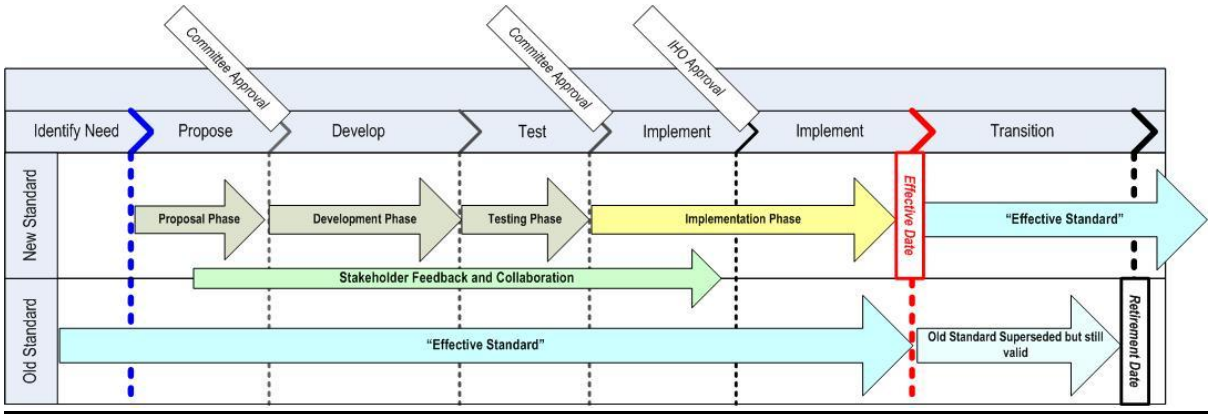
2.1.7. The principles of a recognised project management system should be followed.

2.1.8. All interested parties should be encouraged to continuously improve IHO technical standards. Constructive feedback should therefore be provided for all rejected proposals.

3. Procedures - General

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

3.2 The following diagram illustrates the typical life cycle of an IHO ~~typical~~ standard ~~is illustrated in Annex A.~~:



3.2.1 Changes to IHO standards are classified at one of three different levels: *extension, correction,* or *clarification*. In each case, the development, consultation and approval process will be slightly different; ranging from a very comprehensive regime for *extensions*, to working group level approval for *clarifications*. *Extensions* and *corrections* are considered to be "significant changes" for the purposes of review, consultation and approval.

3.2.2 The HSSC, through the Hydro Register Control Body comprising the Chairs, Vice Chairs and selected volunteers from relevant HSSC Working Groups, must consider all new proposals for changes to standards.

- The HSSC ~~will~~ should consider the impact on relevant stakeholders in assessing a proposal and planning any subsequent work. Relevant stakeholders may include representation from international organisations, maritime administrations, non governmental international organisations, equipment manufacturers, data distributors and other users of the standard.

- If rejected, feedback ~~will~~ must be provided to the proposal originator giving the reasons for rejection.

3.2.3 The HSSC must assess and authorise all proposals for significant changes to standards and associated references, subject to seeking input from relevant stakeholders.

3.2.4 The Hydro Register Control Body may assess and authorise less significant proposed changes to standards and associated references, subject to seeking input from relevant stakeholders.

3.2.5 HSSC Working Groups may assess and authorise clarifications to standards and associated references, subject to seeking input from relevant stakeholders.

3.2.6 The IHB 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.

3.2.7 After endorsing proposals, and establishing a work priority, the HSSC ~~will~~ should forward proposals to the IHB for necessary action including incorporation into the relevant IHO work programs.

3.2.8 Relevant stakeholders should be notified by the IHB of the timetable for new work items and be invited to comment and participate as appropriate. The notification should include a summary forecast of:

- the potential changes,

- the documents affected,

- the likely action list for relevant stakeholders,

- the timetable for implementation, and

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

~~4.~~3.2.9The HSSC should provide progress reports on a regular basis and after each milestone during the development and testing phases. These should be made available to stakeholders by the IHB.

~~5.~~3.2.10 At the end of the development and testing phases the HSSC ~~will~~ should review the standard. If endorsed, a "*change note*" should be forwarded to relevant stakeholders. The "*change note*" ~~will~~ should provide:

- a summary of changes,
- the documents affected,
- a recommended action list ,
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- the proposed effective date of the new or revised standard.

~~6.~~3.2.11 Following an adequate period for comment on the "*change note*", and incorporation of any relevant feedback, the revised standards should be submitted to Member States by the IHB for approval of the content, and confirmation of the "*effective date*".

~~7.~~3.2.12 At the "*effective date*", the revised standard becomes the effective standard. The "*superseded*" standard ~~will~~ should ~~usually~~ remain available concurrently with the revised standard for a suitable transition period.

~~8.~~3.2.13 A "*superseded*" standard may be "*retired*" as an available standard when it is no longer appropriate for use, subject to Member State approval.

4. Urgent Amendments

4.1 The introduction of amendments to existing standards and specifications is intentionally a thorough process, in order to allow for appropriate levels of development, testing and consultation. However, there will 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 and implementation process may be needed. This should only occur in exceptional circumstances under the authority of the HSSC. Any such fast-tracked amendments still require the approval of Member States before they can enter into force.

5. Procedures - Specific

5.1 Extensions, Corrections and Clarifications

Extensions are major revisions to a standard. Extensions 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. Extensions are likely to have a significant impact on either existing users or future users of the 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. The approval of Member States is required before any *extensions* to a standard can enter into force. *Extensions* are, in effect, new versions of a standard.

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are unlikely to have significant adverse impacts on existing users of the standard. In the interests of efficiency, the Working Group that maintains a standard is therefore the appropriate authority to issue *clarifications* for that standard. Nevertheless, a limited consultative process, primarily involving stakeholders at the level of Working Groups - the so-called *Expert Contributors*, is still required before any *clarification* can enter into force.

5.2 The associated version control numbering to identify changes (*x*) to IHO standards should be as follows:

Extensions denoted as ***x***.0.0

Corrections denoted as n.***x***.0

Clarifications denoted as n.n.***x***

5.3 The following diagrams illustrate the development, consultation and approval processes for IHO standards:

Diagram 1 - Changes to IHO Standards and Specifications

Diagram 2 - Changes to S-100 – the over-arching model for hydrographic geospatial information

Diagram 3 - Changes to the contents of the S-100 Feature Concept Dictionary (FCD) register and the Portrayal register

Diagram 1 - **Changes to IHO Standards and Specifications**

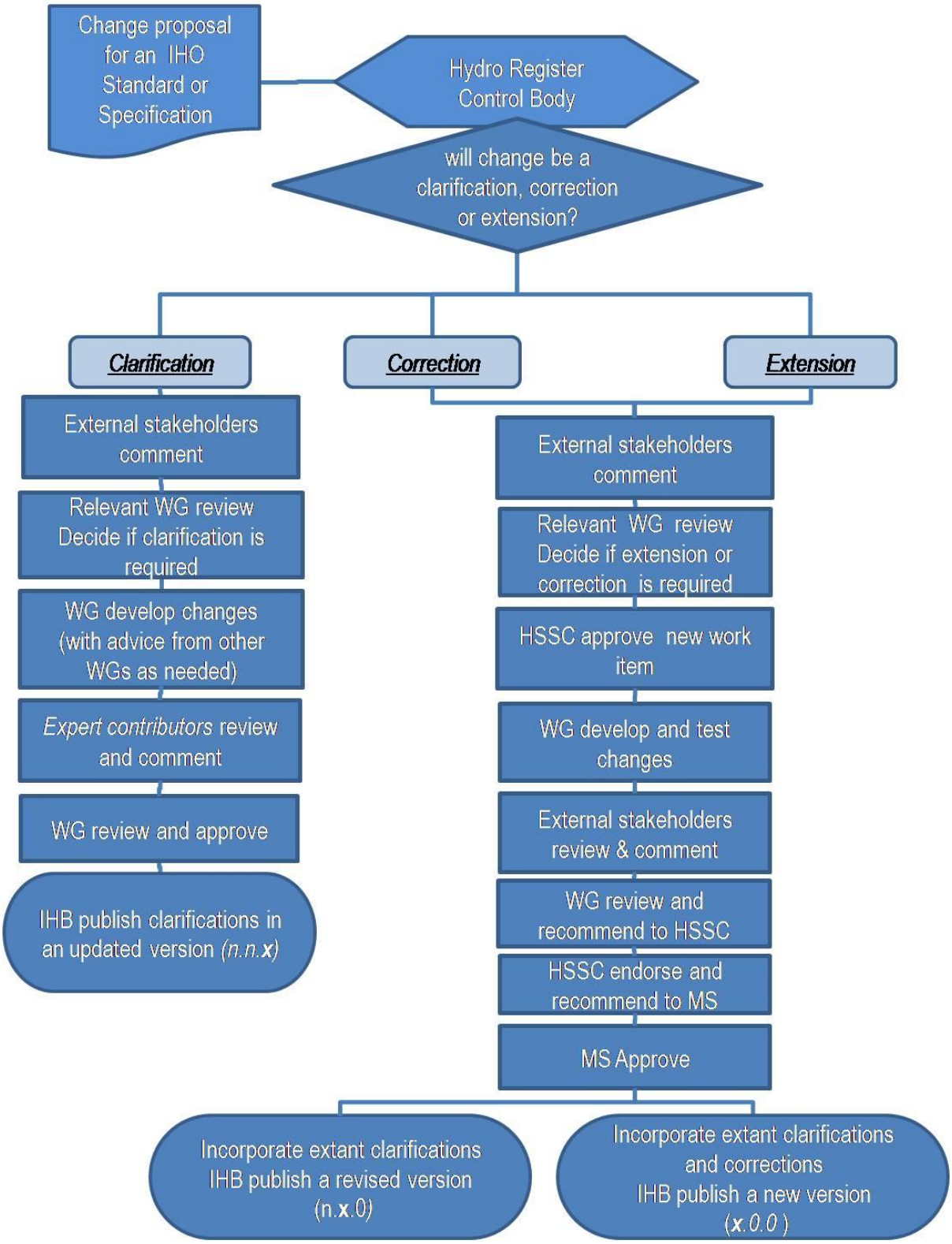


Diagram 2 - **Changes to S-100**

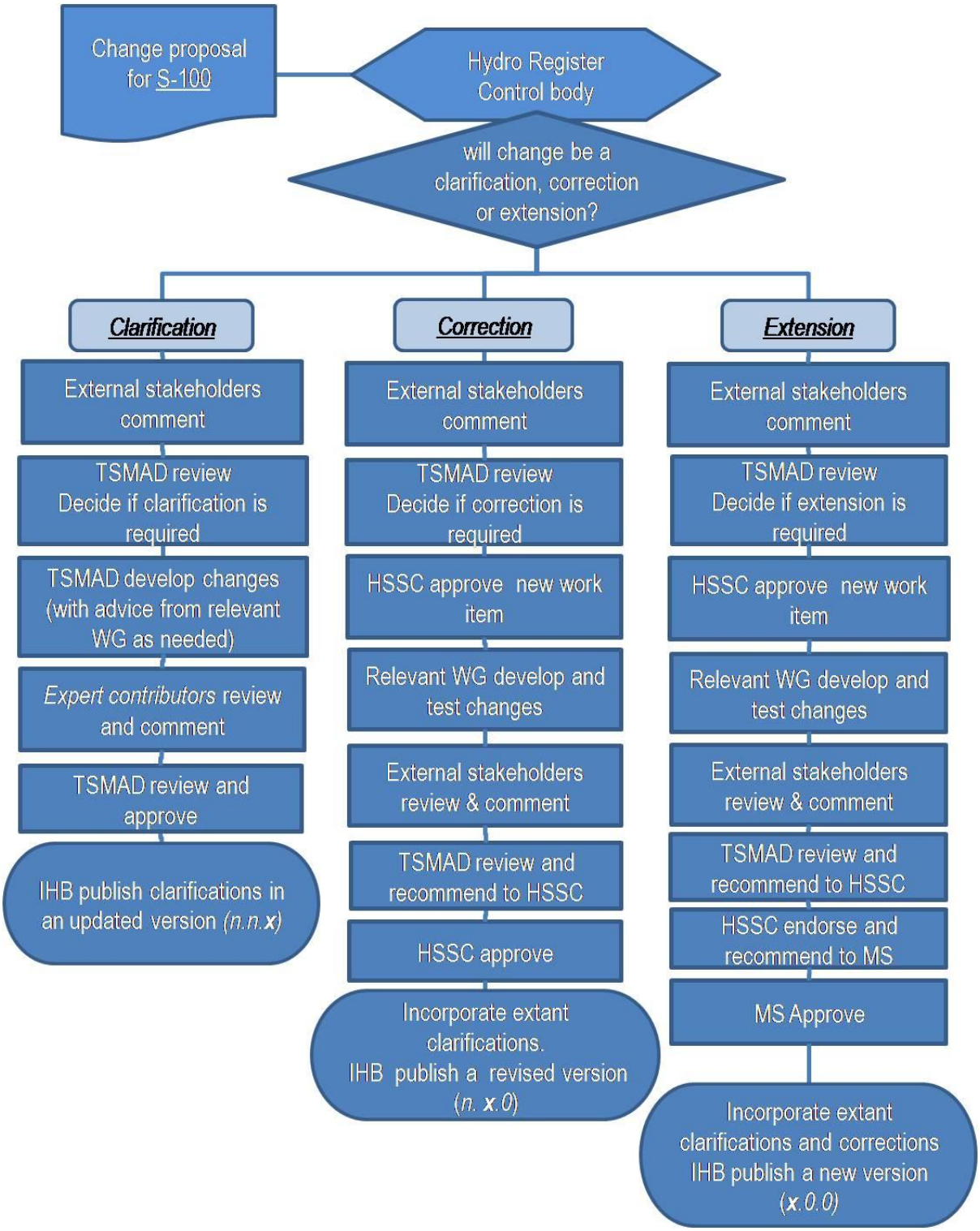
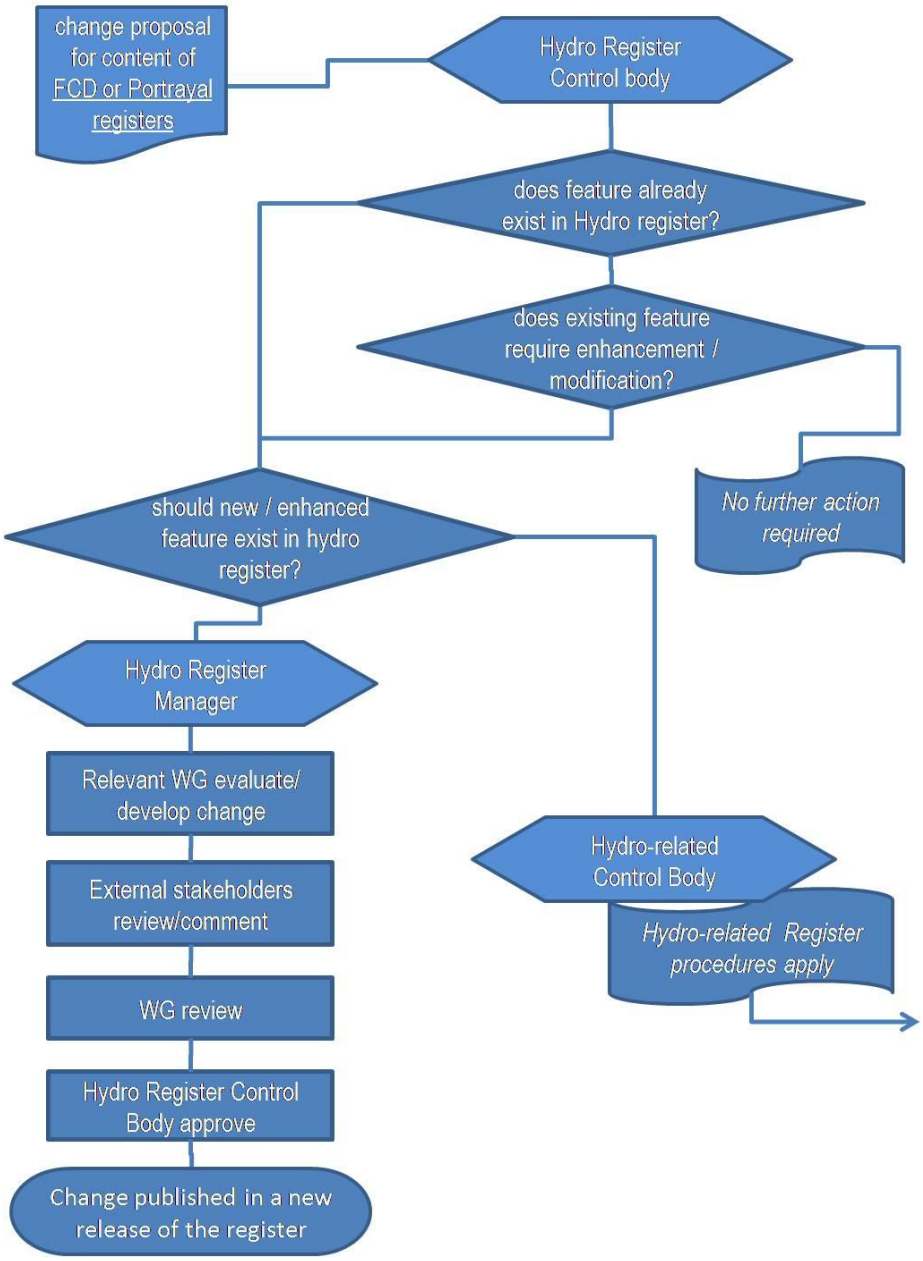


Diagram 3 - **Changes to the Contents of FCD and Portrayal Registers**



Proposed Amendment to IHO Resolution A1.21 (clean copy)

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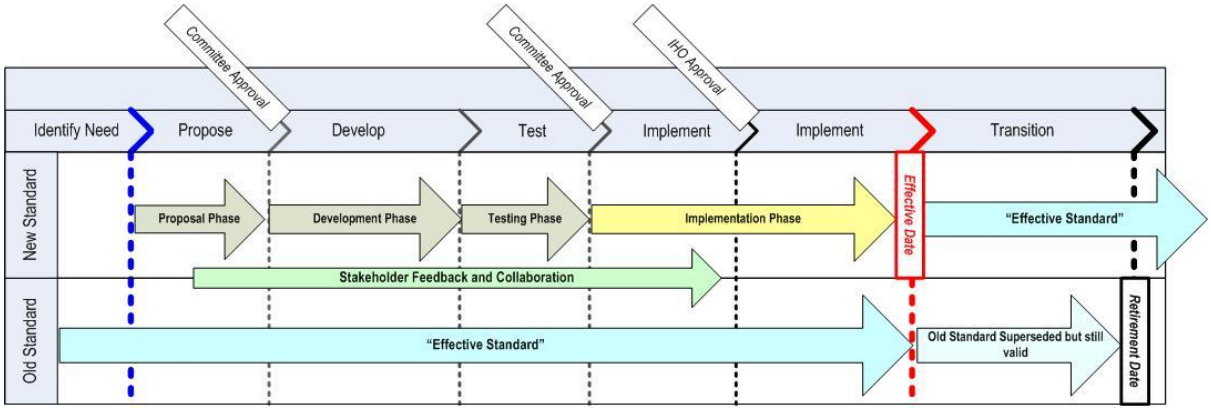

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- the timetable for implementation, and

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

3.2.9 The relevant HSSC subordinate bodies should provide progress reports to the HSSC on a regular basis and after each milestone during the development and testing phases. These should be made available to stakeholders by the IHB.

3.2.10 At the end of the development and testing phases the HSSC should review the standard. If endorsed, a "*change note*" should be forwarded to relevant stakeholders. The "*change note*" should provide:

- a summary of changes,

- the documents affected,

- a recommended action list ,

- the timetable for implementation, and

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

3.2.11 Following an adequate period for comment on the "*change note*", and incorporation of any relevant feedback, the revised standards should be submitted to Member States by the IHB for approval of the content, and confirmation of the "*effective date*".

3.2.12 At the "*effective date*", the revised standard becomes the effective standard. The "*superseded*" standard should remain available concurrently with the revised standard for a suitable transition period.

3.2.13 A "*superseded*" standard may be "*retired*" as an available standard when it is no longer appropriate for use, subject to Member State approval.

4. Urgent Amendments

4.1 The introduction of amendments to existing standards and specifications is intentionally a thorough process, in order to allow for appropriate levels of development, testing and consultation. However, there will 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 and implementation process may be needed. This should only occur in exceptional circumstances under the authority of the HSSC. Any such fast-tracked amendments still require the approval of Member States before they can enter into force.

5. Procedures - Specific

5.1 Extensions, Corrections and Clarifications

Extensions are major revisions to a standard. Extensions 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. Extensions are likely to have a significant impact on either existing users or future users of the 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. The approval of Member States is required before any *extensions* to a standard can enter into force. *Extensions* are, in effect, new versions of a standard.

Corrections are a relatively specific change to a standard. They are required to correct errors and omissions, or to introduce necessary changes that have become evident as a result of practical experience. Corrections could have an impact on either existing users or future users of the 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 the standard should be evaluated and tested wherever practicable. The approval of Member States is required before any *corrections* to a standard can enter into force. *Corrections* are, in effect, revisions to a standard.

Clarifications are minor revisions to a standard. Clarifications provide an improvement to the wording of the standard or a product specification that does not result in any substantive change to the intended purpose. Clarifications are intended to ensure that the existing standard is used as intended. Clarifications introduce such things as practical examples of how a standard should be used, or explain and resolve ambiguities that may exist in the existing documentation. Clarifications are unlikely to have significant adverse impacts on existing users of the standard. In the interests of efficiency, the Working Group that maintains a standard is therefore the appropriate authority to issue *clarifications* for that standard. Nevertheless, a limited consultative process, primarily involving stakeholders at the level of Working Groups - the so-called *Expert Contributors*, is still required before any *clarification* can enter into force.

5.2 The associated version control numbering to identify changes (*x*) to IHO standards should be as follows:

Extensions denoted as ***x***.0.0

Corrections denoted as n.***x***.0

Clarifications denoted as n.n.***x***

5.3 The following diagrams illustrate the development, consultation and approval processes for IHO standards:

Diagram 1 - Changes to IHO Standards and Specifications

Diagram 2 - Changes to S-100 – the over-arching model for hydrographic geospatial information

Diagram 3 - Changes to the contents of the S-100 Feature Concept Dictionary (FCD) register and the Portrayal register

Diagram 1 - **Changes to IHO Standards and Specifications**

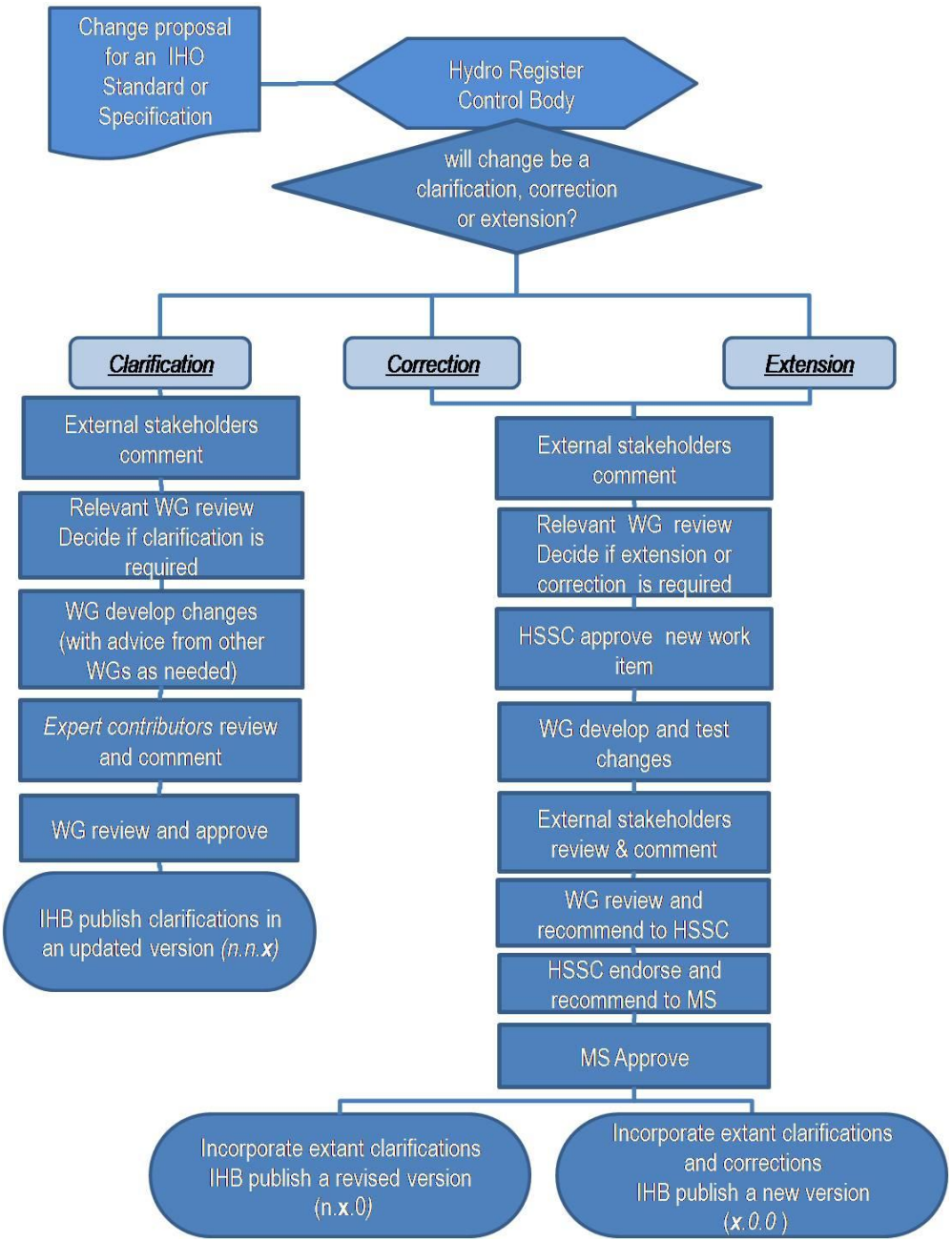


Diagram 2 - **Changes to S-100**

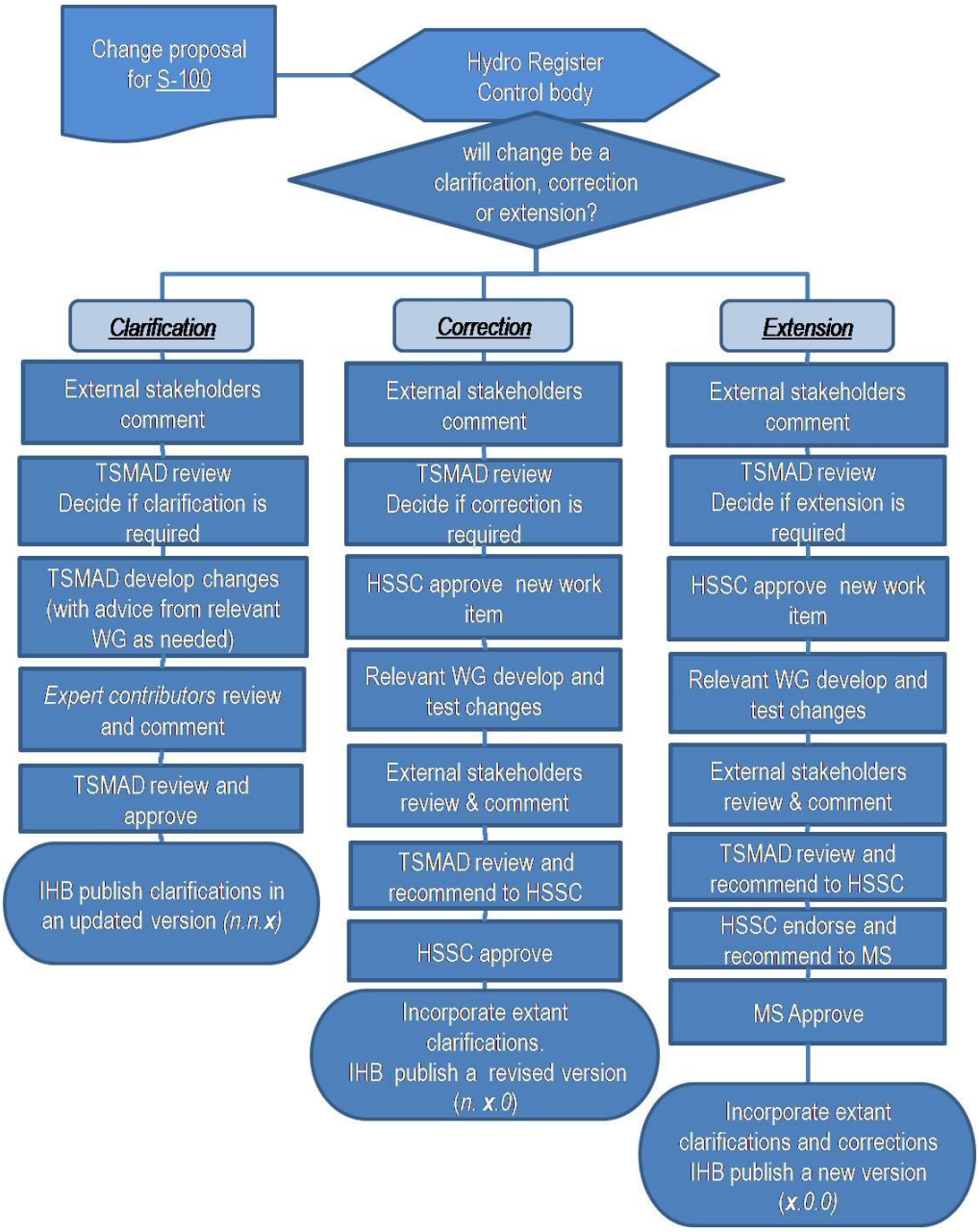
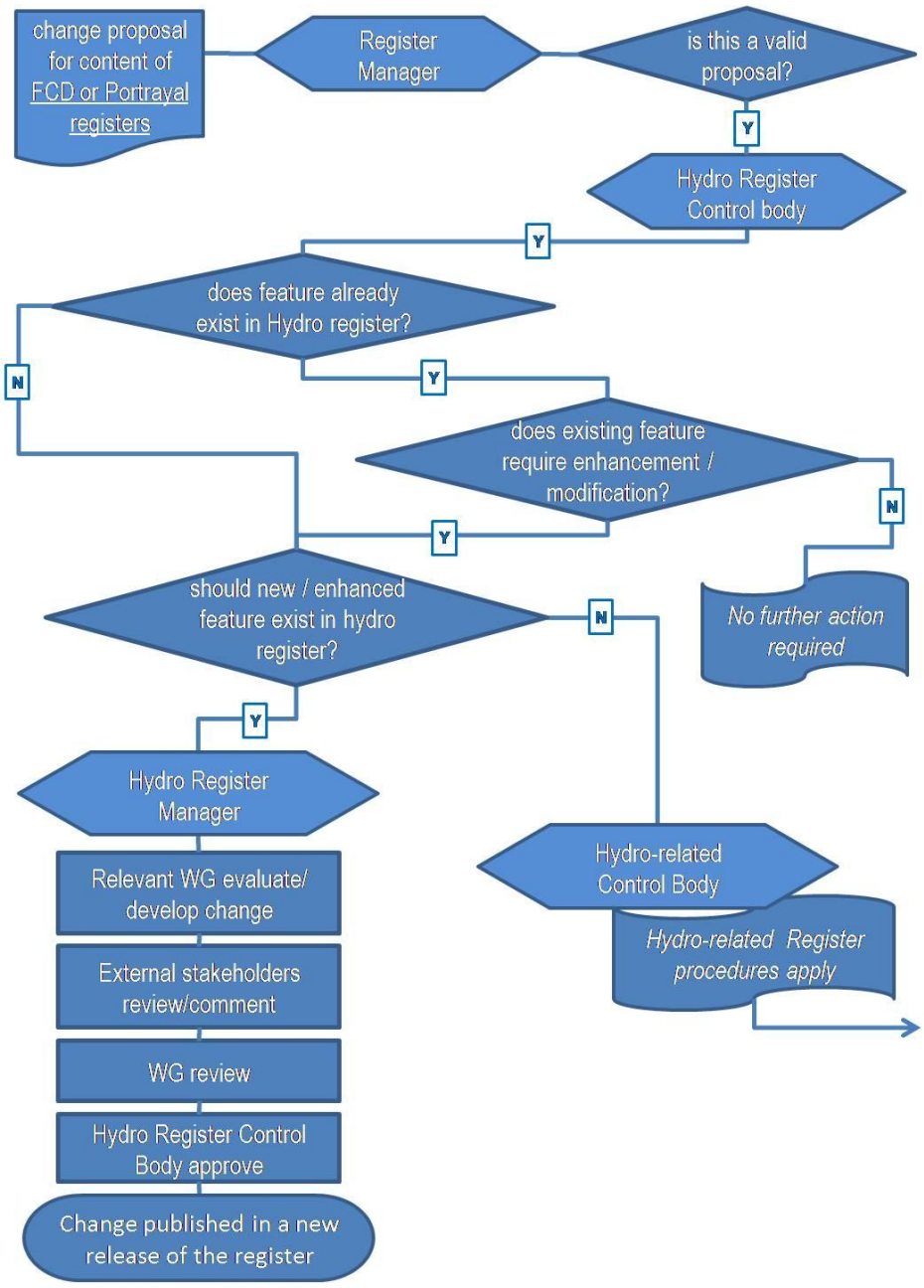


Diagram 3 - **Changes to the Contents of FCD and Portrayal Registers**



Development, consultation and approval procedures applicable to existing IHO technical standards, specifications and guidelines

	Title or Description	Applicable schema (see diagrams in Annexes B and C)	Relevant maintenance body
S-4	Regulations of The IHO for International (INT) Charts and Chart Specifications of the IHO (Plus INT 1, INT 2, INT 3)	1 the special maintenance regime, as described in Spec. M-4 B-160 and CSPCWG ToRs to remain in force until current major revision of S-4 is completed (~2011)	CSPCWG
S-11 Part A	Guidance for the Preparation and Maintenance of INT Chart schemes	1	CSPCWG
S-12	Standardization of List of Lights and Fog Signals	1	WG when/if required
S-32	Hydrographic Dictionary	1	HDWG
S-44	IHO Standards for Hydrographic Surveys	1	S44 WG when required
S-52	Specifications for Chart Content and Display Aspects of ECDIS	1	DIPWG
S-57	IHO Transfer Standard for Digital Hydrographic Data	1	TSMAD
S-58	Recommended ENC Validation Checks	1	TSMAD
S-60	User´s Handbook on Datum Transformations involving WGS 84	1	WG when/if required
S-61	Product Specifications for Raster Navigational Charts (RNC)	1	WG when/if required
S-63	IHO Data Protection Scheme	1	DPSWG
S-64	Test Data Sets for ECDIS	1	TSMAD, DPSWG, DIPWG
S-65	ENC Production Guidance	1	TSMAD
S-100	IHO Hydrographic Geospatial Standard for Marine Data and Information	2	TSMAD
S-100 Hydro FCD & Portrayal Registers	individual entries in S-100 Hydro FCD and Portrayal registers	3	Hydro register control body