Minutes of the Third Meeting of the Data Quality Working Group
5 November, 2010
BSH, Rostock, Germany

Attendees:

Chris Howlett, UKHO	Chair
Juha Korhonen, Finnish Transport Agency (left 11:45)	Observer
Jens Schröder-Fürstenberg, BSH (left 10:00)	SNPWG
Leendert Dorst, Dutch HO	Member
Shinichi Kikuchi, Japanese Hydrographic Association	Member
Jyrki Mononen, Finnish Transport Agency (left 11:45)	Observer
Theo Hamburger, Dutch HO	Observer
Bjorn van Vliet, CARIS	Expert Contributor
Ulf Olsson, Swedish HO	Member
Antti Castrén, Finnish Transport Agency	Member
Sam Harper, UKHO	Member
Wilfried Ellmer, BSH (arrived 13:00)	Observer

The meeting started at 09:15

Dr. Matias Jonas (BSH) welcomed the meeting. He highlighted the importance of the work of the DQWG. He also wished that the points of views of hydrographic surveyors, cartographer and mariners will be duly recognised in the future work.

Introductions were made around the room.

It was agreed to follow the Draft Agenda sent to the DQWG Members on 28 October 2010 as far as time allows. The issue raised by Mr. Jens Schröder-Fürstenberg was agreed to be discussed first due his time constraints.

Liaison with SNPWG

Jens Schröder-Fürstenberg presented a brief paper from the IHO's Standardization of Nautical Publications Working Group. In this paper the SNPWG has been investigating the quality of the information contained within nautical publications and ways that this can be presented to the user. He also provided a link to the relevant discussions on the SNPWG's wiki web site:

http://www.fuerstenberg-dhg.de/mediawiki/index.php/SNPWG5

The text of this page is reproduced at Annex F to these minutes.

The DQWG agreed that the work was related to that of the DQWG and that the two WGs should keep each other informed of relevant progress.

Actions: **1a *Chris Howlett* to liaise with SNPWG to ensure developments in these areas are continued in harmony.**

1b *All* to investigate the SNPWG's Wiki page and assess its usefulness for the DQWG.

Jens then left the meeting.

Outcome of the HSSC2 meeting

Juha Korhonen presented his comments from the HSSC2 meeting which was held during the previous week. The HSSC2 had re-endorsed the importance that they place on the work of the DQWG and they recognised that resources have been difficult to obtain to work on it. The meeting did however express concern at the slow rate of advance of the group and attributed this in part to the lack of active members and in part to the lack of formal meetings.

To help remedy both these issues Juha had produced a draft Circular Letter (CL) asking member states to contribute to the group and announcing a DQWG meeting for next year. He had also produced a draft expanded Work Plan including his proposals for a breakdown the tasks and with a proposed time schedule for the group to complete all its tasks by the HSSC4 meeting scheduled for November 2012.

The WG agreed that a CL asking for greater participation was a good thing and also that a meeting, for next year, would be beneficial. The draft CL will be modified based upon the outcomes of this meeting and the date of the meeting will also be defined by this meeting.

Action: 2a *Chris Howlett* to modify draft CL by November 22, 2010 to include request for greater participation, contact details for mariners and details of the DQWG meeting planned for mid 2011.

2b *All* to review modified draft CL and return suggestions etc to Chris Howlett by December 1, 2010.

2c *IHB* to issue CL to member states early December.

Status and further actions of the DQWG Work Plan

Following Juha's presentation the group discussed and amended the draft Work Plan producing a version as set out below.

The draft Work Plan presented by Juha was based on the Work Plan presented to HSSC2 (Doc: HSSC2-05.6A). References below relate to tasks in this Work Plan.

A: Review ISO documentation for S-100.

With S-100 now published the continued relevance of this task was questioned. It was generally considered that it may no longer be required. However before a decision is made a short report will be made of the relevant standards. Antti Castrén volunteered to prepare this by December 1 after which time the WG will decide whether this task can be deleted or, if it remains relevant, on the actions required to take it forward.

Action: 3a *Antti Castrén* to prepare a brief report on relevant standards by November 20, 2010.

B.1: Review what quality indicators are routinely populated in ENCs.

The DQWG report to HSSC2 stated that this task was completed. The WG agreed that this was not so for, although the CL 17/2010 had been issued and results returned, no analysis had been conducted on them. Actions resulting from this task were bundled together with the actions from task B.2 below.

B.2 Review how CATZOCs are populated.

The results from CL 59/2010 were received just prior to the meeting and no analysis had been done on them. Other relevant documents also exist such as e-mail correspondence between WG members and the S-101 Data Quality Proposal provided by Julia Powell on 14 October 2010 (Annex D). It was agreed that a summary of these documents was needed.

Action: 4a *Sam Harper* to prepare a summary of the results from CL 17/2010, CL 59/2010 and other relevant documents including the S-101 Data Quality Proposal by January 3, 2011.

4b *All* to analyse and comment S-101 Data Quality Proposal by December 17, 2010 so results can feed into the summary being prepared at Action 4a.

Concern was expressed that if the main reason why existing data quality indicators are not populated is a lack of resource in HOs then it may not be feasible to develop new quality indicators should these require more resource from HOs. Although it was accepted that this obviously a relevant concern, it was agreed that the primary aim of the DQWG had to be to create a set of quality indicators and a means of portrayal that assisted the mariner in making decisions when route planning or navigating. Although every effort should be taken to minimise any additional attributes, if new attributes were needed then the DQWG must recommend that they are introduced. If the lack of resources at HOs is really a major issue, this should be raised by the DQWG via the HSSC for discussion at the forthcoming IHO Conference in 2012.

C.1 and C.2 Both tasks are complete and require no further action.

D.1 Identify mariners' perception of quality indicators.

A questionnaire is being prepared for supply to mariners asking for their perception of data quality and exploring how they would like to see data quality expressed on the charts. For this to be of greatest use it needs to be seen by the maximum number of mariners and consequently all WG members are asked to provide details of mariners to whom the questionnaire may be sent. It is intended that a complete cross section of mariners, on all continents, is approached.

Action: 5a *Chris Howlett/ Sam Harper* to draft the questionnaire by December 1, 2010.

5b *All* to supply contact details for mariners who can be given the questionnaire by January 3, 2011.

5c *All* to review draft questionnaire and supply modifications / comments to Chris Howlett by January 3, 2011.

5d *Chris Howlett* to supply completed questionnaire to identified mariners by January 17, 2011.

E.1 Investigate ways to portray data quality to mariners

The WG agreed that this task was only possible once the results from the questionnaire were available and that these would not be returned until mid March, 2011. Once available the results would need to be analysed and reported upon. This task will form the core of the MSc thesis being written by Sam Harper.

Action: 6a *Sam Harper* to analyse results of the questionnaire to mariners and report to the WG by May 16, 2011.

E.2 Demonstrate methods to mariners

This task can not begin until the questionnaires seeking input from mariners have been returned and analysed. However, the existing work item under this task: Create a fully quality attributed ENC test data set, can be started and this task is therefore to be moved under task E.1 with a completion date of mid May 2011.

Action: 7a *Sam Harper* to create a fully quality attributed ENC test data set by May 16, 2011.

F.1 Investigate areas of quality concern

This task involves assessing the methods already proposed for showing data quality e.g. FITUSE, MSNSFN etc. These methods will be included in the questionnaire to mariners.

Additional Tasks to DQWG Work Programme

The meeting noted that there are also some issues which are not duly included in the Work Plan.

DQWG ToRs (see Annex C) in Task C refers as:

C Review and revise as needed existing S-57 quality indicators, including the education of both the mariner and the cartographer, and the development of documentation.

The WG was unclear whether the educational requirement related to the revised quality indicators or the existing ones. It was concluded that both were needed and this work will be started once the replies to the questionnaire are available.

Actions: **8a *Chris Howlett* to initiate the issues related to education of mariners and cartographers and the development of relevant documentation [at the next DQWG meeting].**

F Propose new data quality topics and other applications for consideration by HSSC.

Again, what new data quality topics may be relevant will become clearer once the replies to the questionnaire are available.

Next DQWG meeting

Based on the times stated in the actions above it is proposed that the DQWG hold a meeting in June of 2011 where the results of all actions will be reviewed and the work plan for late 2011 / 2012 devised. The meeting will be held in the office of the Finnish Transport Agency between Tuesday June 14 and Friday June 17, 2011.

Action: 9a *All* to confirm that the proposed dates for the meeting are acceptable by December, 1 2010.

Juha Korhonen and Jyrki Mononen left the meeting at 11:45.

The meeting broke for lunch.

Presentation of other proposals

Mr Shinichi Kikuchi presented a paper from Japan on a concept of displaying data quality in ENCs which resulted in the concept of 'No Go area' on the charts. The presentation is attached at Annex A.

The concept presented was well received by those present and will form part of the questionnaire being prepared for mariners.

Following the presentation on 'No Go area' Dr Wilfried Ellmer presented his thoughts on how mobile sea floors could be represented in ENCs. Dr Ellmer's presentation is attached at Annex B.

Again, the concepts were well received and will be included as a part of the questionnaire to mariners.

After the two presentations the WG discussed the Mariners' Questionnaire. It was decided that as wide a cross section of mariners as possible should be included with representatives from all continents and shipping sectors. All members are to provide details of mariners to whom the questionnaire can be sent (see action 5b).

Also, the above mentioned IHO CL is to contain a request for member states to supply similar details – even if they are unable to provide a member for the WG.

There was short discussion on the liaison with other HSSC Working Groups and with Stakeholders. Chairman coordinates the co-operation with other WGs. Stakeholders will be kept informed about DQWG work's general progress and issues.

The meeting noted that there has been presentation on PortENC both at the HSSC2 and Hydro2010.

Finally the draft CL provided by Juha was reviewed although time prevented a final version being created during the meeting. (See action 2a).

The meeting concluded at 15:15.

List of Annexes:

Annex A	Presentation by Mr Shinichi Kikuchi on 'No Go area'
Annex B	Presentation by Dr Wilfried Ellmer on depiction of mobile sea floors
Annex C	DQWG ToRs
Annex D	S-101 quality indicators; paper by Julia Powell
Annex E	Revised time schedule for DQWG activities
Annex F	SNPWG wiki page on data quality issues within publications

Annex A to DQWG3 Minutes

Presentation by Mr Shinichi Kikuchi on ‘No Go area’

Supplied as a separate Power Point presentation.

Annex B to DQWG3 Minutes

Presentation by Dr Wilfried Ellmer on depiction of mobile sea floors

Supplied as a separate Power Point presentation.

Annex C to DQWG3 Minutes

DATA QUALITY WORKING GROUP (DQWG)

Terms of Reference

Ref: 1st HSSC Meeting (Singapore, October 2009)

1. Objective
To develop appropriate methods of classifying and depicting the quality of digital hydrographic data.

2. Authority
This WG is a subsidiary of the Hydrographic Services and Standards Committee (HSSC). Its work is subject to HSSC approval.

3. Procedures

a) The WG should:

i. Review ISO 19113 *Geographic Information-Quality Principles,* ISO 19114 *Geographic Information-Quality Evaluation Procedures, and ISO 19115 Geographic Information - Metadata* and propose relevant enhancements and amendments for incorporation in S-100;

ii. Monitor and further develop quality indicators for hydrographic data;

iii. Review and revise as needed existing S-57 quality indicators, including the education of both the mariner and the cartographer, and the development of documentation;

iv. Review and revise as needed the presentation of data quality, as provided in S-52 and its Presentation Library;

v. Investigate ways of ensuring that ECDIS displays provide a clear warning or indication to the mariner on the quality of the underlying survey data, through appropriate use of the attribute CATZOC and/or improvement of the existing display capabilities, and;

vi. Propose new data quality topics and other applications for consideration by HSSC.

b) The WG should work by correspondence, group meetings, workshops or symposia. Permanent or temporary sub-working groups may be created by the WG to undertake detailed work on specific topics such as: quality indicators for hydrographic data, tidal information, etc. The WG should meet as necessary. When meetings are scheduled, and in order to allow any WG submissions and reports to be submitted to HSSC on time, WG meetings should not normally occur later than nine weeks before a meeting of the HSSC.

c) The WG should liaise with other relevant HSSC WG's and other IHO bodies, such as S-44 WG, and international bodies as appropriate and as instructed by HSSC.

4. Composition and Chairmanship

a) The WG shall comprise representatives of IHO Member States (M/S), Expert Contributors and Accredited NGIO Observers.

b) Decisions should generally be made by consensus. If votes are required on issues or to endorse proposals presented to the WG, only M/S may cast a vote. Votes shall be on the basis of one vote per M/S represented.

c) Expert Contributor membership is open to entities and organisations that can provide a relevant and constructive contribution to the work of the WG.

d) The Chair and Vice-Chair shall be a representative of a Member State. The election of the Chair and Vice-Chair shall be decided at the first meeting after each ordinary session of the Conference (Conference to be replaced by Assembly when the revised IHO Convention enters force) and shall be determined by vote of the Member States present and voting.

e) If the Chair is unable to carry out the duties of the office, the Vice-Chair shall act as the Chair with the same powers and duties.

f) Expert Contributors shall seek approval of membership from the Chairman.

g) Expert Contributor membership may be withdrawn in the event that a majority of the M/S represented in the WG agree that an Expert Contributor’s continued participation is irrelevant or unconstructive to the work of the WG.

h) All members shall inform the Chairman in advance of their intention to attend meetings of the WG.

i) In the event that a large number of Expert Contributor members seek to attend a meeting, the Chairman may restrict attendance by inviting Expert Contributors to act through one or more collective representatives.

Annex D to DQWG3 Minutes

DQWG

Paper for Consideration by DQWG

S-101 Data Quality

Submitted by:	S-101 Work Item Leader
Executive Summary:	This Paper is to set the stage for improving how Data Quality is handled in S-101 using S-100 metadata principles
Related Documents:	S-100 Metadata and Data Quality
Related Projects:	None

Introduction / Background

One of the sections of S-101 is on Data Quality. In S-57, data quality is handled via the metadata attributes of M_QUAL and M_SREL. Currently, M_QUAL is not used correctly and M_SREL is not used at all. TSMAD respectfully asks that the Data Quality Working group look at how the portrayal and encoding of data quality can be improved in S-101.

Analysis/Discussion

The current draft of S-101 just has a placeholder based on the work done by DQWG. The content of the placeholder is what was contained within the S-57 use of the object catalogue.

NOTE: As many of the same features that are in S-57 will still be used within the S-101 feature catalogue and that HO's would like minimal impact to what has already been encoded means that for one of the main data quality features we would like to maintain is M_QUAL (CATZOC). However, even if the base feature and attributes are retained, it does not preclude adding additional information and making the portrayal of this information more intuitive to the mariner.

The following clause is excerpted from S-100 on what goes into the data quality section for an S-100 based product specification.

From S-100:

Data Quality

The data product specification shall identify the data quality requirements for each scope within the data product in accordance with S-100 Part 3.

For every data quality scope it is necessary to list all the data quality elements and data quality sub-elements defined in S-100 Part 3, even if only to state that a specific data quality element or data quality sub-element is not applicable for this data quality scope.

Each product specification shall describe the data quality requirements. One aspect is the "data quality overview element" which should allow a user to decide whether this dataset is the one they want. The other aspect is the metadata allowed for specific feature collections, features and attributes within the dataset.

The data quality overview element should include at least the intended purpose and statement of quality or lineage.

Other data quality elements cover: completeness, logical consistency, positional accuracy, temporal accuracy, thematic accuracy, and anything specifically required for the product being specified. The product specification should comment on which of these are to be used and how, including a description of (or reference to) conformance tests. For example, should

data only be published if it passes a particular test, or is it allowable to publish the data with a quality statement which indicates non-conformance?

The product specification shall describe how each quality element is to be populated, for example, stating the mechanism to reference the quality evaluation procedure, and allowable values for the quality results.

The application schema shall indicate how the data quality elements will be related to the data items, for example whether a particular dataset should have homogeneous quality, or whether quality elements can be related to feature collections, individual feature objects or attributes. Finally, the encoding description (clause 15) shall indicate how the quality elements will be encoded.

From S-57:

Data Quality

Data quality comprises the following:

- source of data;
- accuracy of data;
- Up-to-datedness of data.

Data quality is considered to be meta information. As such, it can be encoded at three different levels
Data quality information is considered to be application specific. Therefore, rules for encoding data quality must be defined by the relevant product specification.

Quality, Reliability and Accuracy of Bathymetric Data

Information about quality, reliability and accuracy of bathymetric data is given using:

- the meta feature M_QUAL for an assessment of the quality of bathymetric data,
- the meta feature M_SREL for additional information about the survey,
- the attributes QUASOU, SOUACC and TECSOU on groups of soundings or individual features,
- the attributes POSACC and QUAPOS on the spatial features.

For the mariner, M_QUAL provides the most useful information. Therefore, the use of M_QUAL is mandatory for areas containing depth data or bathymetry.
More detailed information about a survey may be given using M_SREL. For example, in incompletely surveyed areas, lines of passage soundings may be indicated as such using a linear M_SREL feature. This information is more difficult for the mariner to interpret. Therefore, the use of M_SREL is optional.
For individual objects (wrecks, obstructions etc), or small groups of soundings, QUASOU, SOUACC and TECSOU may be used to provide additional information about quality and accuracy.

Quality of bathymetric data

The meta feature M_QUAL defines areas within which uniform assessment exists for the quality of bathymetric data, and must be used to provide an assessment of the overall quality of bathymetric data to the mariner. Areas of a cell containing depth data or bathymetry must be covered by one or more M_QUAL, which must not overlap.

Survey reliability

The survey reliability may be encoded using the meta feature M_SREL.

Quality of sounding

If it is required to encode the quality of sounding, it must be done using the attribute QUASOU on either the meta feature M_SREL or on individual geo features (e.g. SOUNDG).
The quality of sounding must not be encoded using QUASOU on the depth geo feature, unless it is different to the value of QUASOU encoded on M_SREL

Sounding accuracy

Sounding accuracy is encoded using the attribute CATZOC on the meta feature M_QUAL. If it is required to encode additional sounding accuracy information, it must be done using the attribute SOUACC on either the meta feature M_QUAL or on individual geo features (e.g. SOUNDG).
The accuracy of sounding must not be encoded using SOUACC on the depth geo feature, unless it is different to the value of SOUACC encoded on M_QUAL.

Technique of sounding measurement

If it is required to encode the technique of sounding measurement, it must be done using the attribute TECSOU on either the meta feature M_QUAL or on individual geo features (e.g. SOUNDG).
The technique of sounding measurement must not be encoded using TECSOU on the depth geo feature, unless it is different to the value of TECSOU encoded on M_QUAL.

Accuracy of non-bathymetric data

Quality of positions

The meta feature M_ACCY may be used to provide an overall accuracy of position for all non-bathymetric features. It must not be used to provide the accuracy of bathymetric information.
The attributes QUAPOS and POSACC may be applied to any spatial object, in order to qualify the location of an feature.
QUAPOS and POSACC must not be applied to the spatial object of any geo feature if they are identical to the QUAPOS and POSACC values of the underlying meta feature.
QUAPOS gives qualitative information, whereas POSACC gives quantitative information. POSACC on the M_ACCY applies to non bathymetric data situated within the area, while QUAPOS or POSACC on the associated spatial objects, qualifies the location of the M_ACCY object itself. Meta objects M_ACCY and M_QUAL should not overlap.

Horizontal accuracy

If it is required to encode the accuracy of a horizontal clearance (attribute HORCLR), it must be done using the attribute HORACC.

HORACC applies only to HORCLR. There is no attribute to express the accuracy of the attributes HORLEN and HORWID.

Vertical accuracy

If it is required to encode the accuracy of a vertical clearance (attributes VERCLR, VERCOP, VERCSA, VERCCL), it must be done using the attribute VERACC.
If several vertical clearances are given for one object, the accuracy given must be that of the least accurate.

Source of bathymetric data

Details of the source surveys used in compilation may be encoded using the meta object **M_SREL**, as described in clause 2.2.3.2.

Source of other data

The source of non-bathymetric information should be encoded using both the attributes SORIND and SORDAT on the individual objects, but only if this information is considered to be useful to the mariner.

Object Class: **Quality of data**

Acronym: **M_QUAL** Code: **308**

Set Attribute_A: CATQUA; CATZOC; DRVAL1; DRVAL2; POSACC; SOUACC; SUREND; SURSTA; TECSOU; VERDAT;

Set Attribute_B: INFORM; NINFOM; NTXTDS; TXTDSC;

Set Attribute_C: RECDAT; RECIND; SORDAT; SORIND;

Definition:

An area within which a uniform assessment of the quality of the data exists.

References:

INT 1: not specified;

M-4: not specified;

Remarks:

Distinction: accuracy of data; survey reliability;

Attribute: **Category of quality of data**

Acronym: **CATQUA** Code: **50**

Attribute type: E

Expected input:

ID Meaning

1 : data quality A
2 : data quality B
3 : data quality C
4 : data quality D
5 : data quality E
6 : quality not evaluated

Definitions:

Category	Positional Accuracy [1]	Sounding Technique	Coverage	Datum
A	± 5m	echo sounder/ sweep	full [2]	WGS84
B	± 20m	echo sounder/ laser/sweep	full [2]	transformed to WGS84[4]
C	± 50m	echo sounder/ lead line	systematic [3]	transformed to WGS84[4]
D	± 500m	lead line	not systematic	other datum
E	Unknown	unknown	not systematic	unknown datum

Remarks:

Footnote numbers quoted in the table have the following meanings:

[1] accuracy specified at 2 drms. Accuracy is quoted with respect to the given datum of the data. The quoted accuracy is the maximum value of the cumulative error in the production of the data. It should take account of survey errors, transformation errors, digitising errors, etc.

[2] full coverage is defined as 100% coverage using systematic controlled surveys providing full sea floor coverage or full coverage to a defined depth and an investigation of all contacts.

[3] systematic is defined as a controlled survey but full coverage may not have been achieved.

[4] parameters for the transformation of various datums to or from WGS84 can be found in IHO publication S-60 (User's Handbook on Datum Transformations involving WGS-84).

Attribute: **Technique of sounding measurement**

Acronym: **TECSOU** Code: **156**

Attribute type: L

INT 1 Reference: II 24; IK 2, 27, 42;

Chart Specification: 415; 415.1-2; 422.3-4; 422.9;

Expected input:

ID	Meaning	INT 1	M-4
1	found by echo-sounder		
2	found by side scan sonar		
3	found by multi-beam		
4	found by diver		
5	found by lead-line		
6	swept by wire-drag	II 24;IK 2,27,42;	415; 422.3; 422.9;
7	found by laser		
8	swept by vertical acoustic system		
9	found by electromagnetic sensor		
10	photogrammetry		
11	satellite imagery		
12	found by levelling		
13	swept by side-scan sonar		
14	computer generated		

Definitions:

found by echo-sounder: the depth was determined by using an instrument that determines depth of water by measuring the time interval between emission of a sonic or ultrasonic signal and return of its echo from the bottom. (adapted from IHO Dictionary, S-32, 1547)

found by side-scan-sonar: the depth was computed from a record produced by active sonar in which fixed acoustic beams are directed into the water perpendicularly to the direction of travel to scan the bottom and generate a record of the bottom configuration. (adapted from IHO Dictionary, S-32, 4710)

found by multi-beam: the depth was determined by using a wide swath echo sounder that uses multiple beams to measure depths directly below and transverse to the ship's track. (adapted from IHO Dictionary, S-32, 3339)

found by diver: the depth was determined by a person skilled in the practice of diving. (adapted from IHO Dictionary, S-32, 1422)

found by lead-line: the depth was determined by using a line, graduated with attached marks and fastened to a sounding lead. (adapted from IHO Dictionary, S-32, 2698)

swept by wire-drag: the given area was determined to be free from navigational dangers to a certain depth by towing a buoyed wire at the desired depth by two launches, or a least

depth was identified using the same technique. (adapted from IHO Dictionary, S-32, 5248, 6013)

found by laser: the depth was determined by using an instrument that measures distance by emitting timed pulses of laser light and measuring the time between emission and reception of the reflected pulses. (adapted from IHO Dictionary, S-32, 2763)

swept by vertical acoustic system:
the given area has been swept using a system comprised of multiple echo sounder transducers attached to booms deployed from the survey vessel.

found by electromagnetic sensor:
the depth was determined by using an instrument that compares electromagnetic signals. (adapted from IHO Dictionary, S-32, 1571)

photogrammetry: the depth was determined by applying mathematical techniques to photographs. (adapted from IHO Dictionary, S-32, 3791)

satellite imagery: the depth was determined by using instruments placed aboard an artificial satellite. (adapted from IHO Dictionary, S-32, 4509)

found by levelling: the depth was determined by using levelling techniques to find the elevation of the point relative to a datum. (adapted from IHO Dictionary, S-32, 2741)

swept by side-scan-sonar:
the given area was determined to be free from navigational dangers to a certain depth by towing a side-scan-sonar. (adapted from IHO Dictionary, S-32, 5248, 4710) [415.2]

computer generated: the sounding was determined from a bottom model constructed using a computer.

Remarks:

No remarks.

Object Class: **Survey reliability**

Acronym: **M_SREL** Code: **310**

Set Attribute_A: QUAPOS; QUASOU; SCVAL1; SCVAL2; SDISMN; SDISMX; SURATH; SUREND; SURSTA; SURTYP; TECSOU;

Set Attribute_B: INFORM; NINFOM; NTXTDS; TXTDSC;

Set Attribute_C: RECDAT; RECIND; SORDAT; SORIND;

Definition:

An area within which a uniform assessment of the reliability of source survey information exists.

References:

INT 1: not specified;

M-4: 170.2; 178;

Remarks:

Distinction: accuracy of data; quality of data;

Attribute: **Scale value one**

Acronym: **SCVAL1** Code: **134**

Attribute type: I

Definition:

The largest scale for the range of survey scale as used in source diagram information.

Minimum Value: 1

Indication:

the modulus of the scale is indicated, that is 1:25 000 is encoded as 25000.

Unit: none
Resolution: 1

Format:

xxxxxxxx

Example:

25000 for a scale of 1:25 000.

Remarks.

No remarks.

Attribute: **Scale value two**

Acronym: **SCVAL2** Code: **135**

Attribute type: I

Definition:

The smallest scale for the range of survey scale as used in source diagram information.

Minimum Value: 1

Indication:

The modulus of the scale is indicated, that is 1:250 000 is encoded as 250000.

Unit: none
Resolution: 1

Format:

xxxxxxxx

Example:

250000 for a scale of 1:250 000.

Remarks:

No remarks.

Attribute: **Survey type**

Acronym: **SURTYP** Code: **153**

Attribute type: L

Expected input:

ID		Meaning
1	:	reconnaissance/sketch survey
2	:	controlled survey
3	:	~~unsurveyed~~
4	:	examination survey
5	:	passage survey
6	:	remotely sensed

Definitions:

reconnaissance/sketch survey: a survey made to a lower degree of accuracy and detail than the chosen scale would normally indicate. (IHO Dictionary, S-32, 5th Edition, 5219)

controlled survey: a thorough survey usually conducted with reference to guidelines.

examination survey: a survey principally aimed at the investigation of underwater obstructions and dangers.

passage survey: a survey where soundings are acquired by vessels on passage.

remotely sensed: a survey where features have been positioned and delimited using remote sensing techniques.

Remarks:

No remarks.

Value number 3 (unsurveyed) should now be encoded using the object unsurveyed area (UNSARE).

Attribute: **Quality of sounding measurement**

Acronym: **QUASOU** Code: **125**

Attribute type: L

Expected input:

ID		Meaning	INT 1	M-4
1	:	depth known		
2	:	depth unknown	IK 40;	422.9;
3	:	doubtful sounding	II 2;	417; 424.4;
4	:	unreliable sounding	II 14;	412.4;
5	:	no bottom found at value shown	II 13;	412.3;
6	:	least depth known	IK 26-27;	422.3-4;
7	:	least depth unknown, safe clearance at value shown	IK 30;	422.7;
8	:	value reported (not surveyed)	II 3.1;	417, 424.5;
9	:	value reported (not confirmed)	II 4;	
10	:	maintained depth	II 23;	414.2;
11	:	not regularly maintained		

Definitions:

depth known: the depth from chart datum to the bottom is a known value.

depth unknown: the depth from chart datum to the bottom is unknown.

doubtful sounding: a depth that may be less than indicated. (adapted from IHO Dictionary, S-32, 5th Edition, 4840)

unreliable sounding: a depth that is considered to be an unreliable value.

no bottom found at value shown:
upon investigation the bottom was not found at this depth. (adapted from IHO Dictionary, S-32, 5th Edition, 4848)

least depth known: the shoalest depth over a feature is of known value. (adapted from IHO Dictionary, S-32, 5th Edition, 2705)

least depth unknown, safe clearance at depth shown:
the least depth over a feature is unknown, but there is considered to be safe clearance at this depth.

value reported (not surveyed):
depth value obtained from a report, but not fully surveyed.

value reported (not confirmed):
depth value obtained from a report, which it has not been possible to confirm.

maintained depth: the depth at which a channel is kept by human influence, usually by dredging. (IHO Dictionary, S-32, 5th Edition, 3057)

not regularly maintained:

depths may be altered by human influence, but will not be routinely maintained.

Remarks:

The attribute 'quality of sounding measurement' indicates the reliability of the value of sounding.

Annex E to DQWG3 Minutes

Draft Scheduling of the future DQWG Work:

IHO CL: to be sent early December 2010

- HSS2 outcome, outlines for DQWG future work, DQWG membership, announce the next DQWG meeting

DQWG4: 14 - 17 June 2011

- Elect Vice-Chair
- Review the analysis of the **B.1** and **B.2**
- Agree on the consequences of these analysis
- Foster Tasks **D.1**, **E.1, E.2, …**
- Review the status of the Tasks in Work Program
- Prepare the Progress Report to the HSSC3

HSSC3: 31 October – 4 November 2011

- Present DQWG Report and proposals
- Prepare Progress Report to XVIII I. H. Conference

DQWG5: Early 2012

- Review the outcome of HSSC3
- Finalise Tasks **D.1, E.1, E.2**
- Consider proposals to **F.1**
- Draft DQWG Final Report to HSSC

DQWG6: August 2012

- Finalise DQWG Final Report to HSSC
- Proposals to IMO (if any)
- Future Tasks?

HSSC4: 5 – 9 November 2012

- Present DQWG Final Report and proposals
- **Disband DQWG (?)**

Annex F to DQWG3 Minutes

SNPWG wiki page on data quality issues within publications

jens 08:45, 30 August 2010 (UTC) One given task was to evaluate the necessity of having different levels of confidence of nautical information. This site is made to discuss this issue and to share different views on that. The discussion should be focused on the problem not on different portrayal options. The results will be presented for consideration to the DQWG meeting in Rostock Oct 2010. So we don't have much time.

The outcome of various BSH internal discussions is that we have developed two approaches:

1. Source related
2. Time related

1. If we consider different sources for Nautical Information and try to generalize as much as possible we come up with following different levels of confidence. The provided items base on German source confidence. Other HOs can add various others to complete the list.

1. authoritative (Legal bodies)
2. official (international organizations (e.g. ITU), other federal organizations)
3. not verified or not verifiable (e.g. reported, websites)

2. Discussing the same problem and taking time dependency into account. We might evaluate several options all with several pros and cons. One can follow the life cycle of the relevant publication. That can be very different from one HO to another and nobody is checking all information in a pub every time when a new edition is scheduled. Only changes are recorded. The other can be a time line indicating when the source was recorded or revised. The latter makes sense if we refer to very old sources in particular and it separates the information from the publication. That is our preference. The SORDAT approach can be adapted. Using the chart-chart datum is source datum, using the HPD source datum is source datum. For an initial upload SORDAT of printed information and database can by similar. That will change afterwards.

1. 0-5 years old
2. 5-10 years old
3. older than 10 years.

It is unlikely that it will be necessary to track information older than 10 years more detailed.

DavidAcland 15:30, 3 September 2010 (UTC)

I agree that quality of information can be generalised to the source. I would not argue with the first two classes mentioned above. The third clearly exists. I think there are others which are probably worth considering.

I would take the word of a Master Mariner, who bothered to make a report about something, in which his or her vessel was not involved. If it had been, like a grounding or an accident, there could be reasons to treat the information with some care. Similarly, Ports can generally be relied upon and probably deserve a status a bit higher than "not verified", even though there may not be any other supporting evidence beyond the report from them that a lock is out of operation or a berth or basin is no longer in use.

As discussed at SNPWGs, time or date is vexed. A single old report of a quiet sheltered anchor berth, might be invaluable to Masters. I accept that date is interesting but I would not make the decision in the HO to remove the information just because it was old. Conversely recent information does not necessarily make it right.

I think we want to keep clear of the "wisdom of crowds". I would not support an approach commonly seen in websites where users are invited to rate the information provided. "Was this information useful? Answer 1-5".

jens 18:43, 3 September 2010 (UTC) It was clear to me and expected that we have to discuss that.
I agree with not introducing a rate of information provided.
Can we confirm that we need a statement of the time line? That would be one indication. We can extend the discussion about the quality for a while.

It is worth discussing the items 1.1 and 1.2 in combination with time line. Assuming information provided by an official authority (state or county) was recorded 10 years ago and nobody has ever checked it again. How reliable is that? Similar to your update status discussion I remember some nice discussions about planned harbour extensions at the Hebrides recorded 10 years ago as "planned" and not been updated. It is only a fact not a discussion who is responsible for the update. So pls be not disappointed.

Actually it is planned to visit SMM and several shipping companies and ECDIS manufactures at Hamburg next week. I hope to come back wiser.

following is off topic, only to record my mind:
"However, one solution can be to state "SNPWG does not need any confidence status of their information". But is that what is really requested?"
keep in mind that CATZOC is also dealing with both vertical and horizontal accuracy; parallel to time and liability.

DavidAcland 11:34, 14 September 2010 (UTC)

HSSC2-03C paper [1] has some interesting factors which we might like to consider. An extract, which may help our thinking, follows:

"The DSCC (Data Supply Chain Certication) Standard proposes to use these seven (7) characteristics to express integrity and quality of data: accuracy, resolution, assurance level, traceability, timeliness, completeness and format. These are the same characteristics used in RTCA /DO-200A Standards for Processing Aeronautical Data, from which DSCC standard has been based.

- Accuracy – The degree of conformance between the estimated or measured value and its true value.
- Resolution – The smallest difference between two adjacent values that can be represented in a data storage, display, or transfer system.
- Assurance Level – Quantifiable value that communicates clearly what level of trust a user can place on the assessed data.
- Traceability – The degree to which a system or a data product can provide a record of the changes made to that product and thereby enable an audit trail to be followed from the end-user to the data originator.
- Timeliness – The degree of confidence that the data is applicable to the period of its intended use.
- Completeness – The degree of confidence that all of the data, needed to support the intended use, has been provided.
- Format – The process of translating, arranging, packaging, and compressing a selected set of data for distribution to a specific target system. A result of this process is a data structure that fulfils the characteristics of data quality."

I think what we have discussed above is the "Assurance Level" characteristic.

jens 07:02, 26 October 2010 (UTC) ok, I see the point. If I interpret the HSSC2-03C paper correctly and their transition between current hydro and aviation standards I assume we have our problem solver without the need to introduce new ideas.
SORDAT and SORIND can be used to describe from when and from whom the information came from.
M_COVR can be used to describe if NPUB information exists for the particular area.
ja, I think using existing features and attributes is a good idea.

jens 07:39, 27 October 2010 (UTC) further attribute values which can be used are QUAPOS (reported, not confirmed) and (unreliable); further values have to be considered depends on source

DQWG3
Nov. 5, 2010
BSH, Rostock

Annex A to DQWG3 Minutes

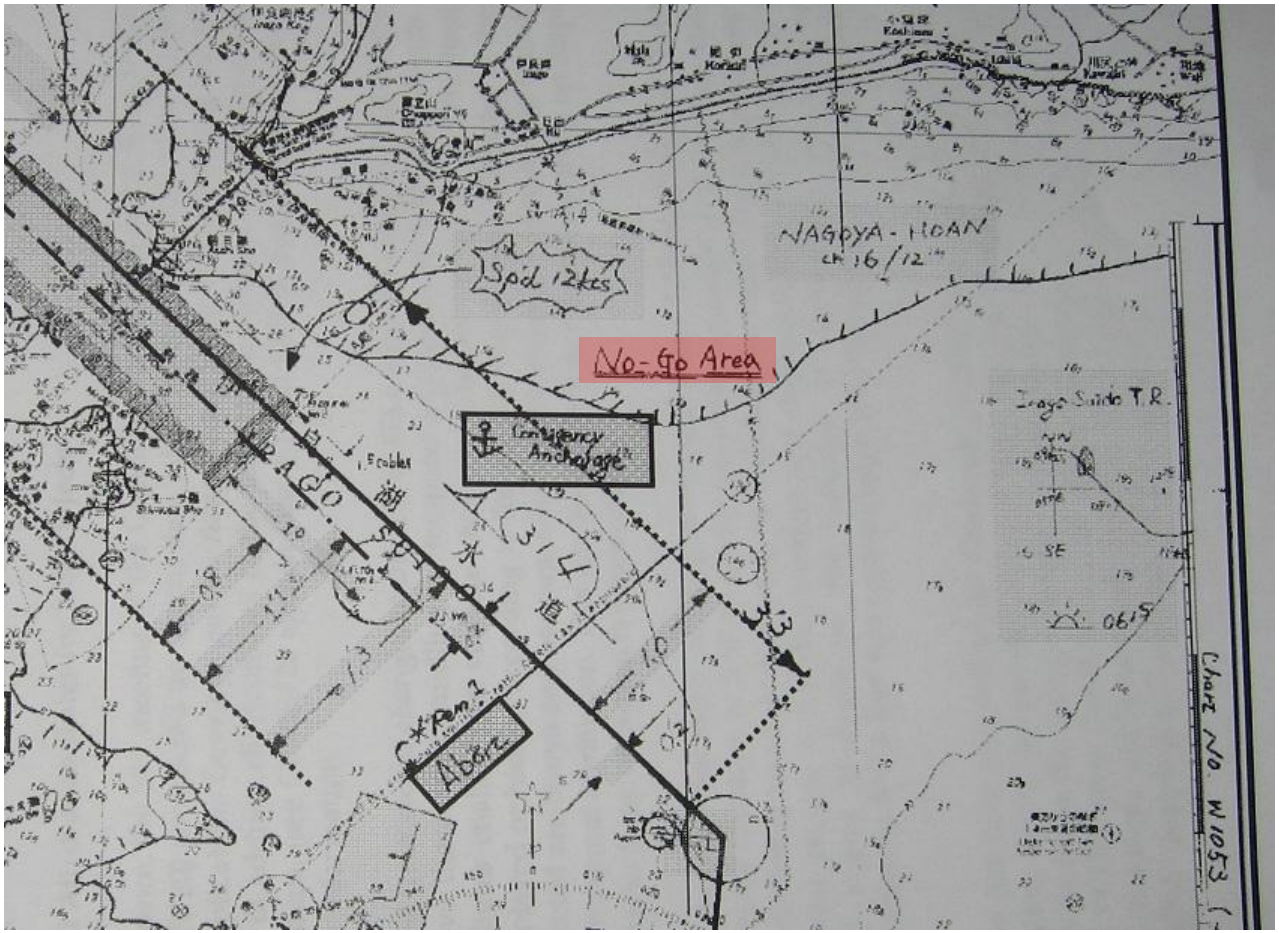
A Quality Indicator “No-Go Area”

for consideration by DQWG

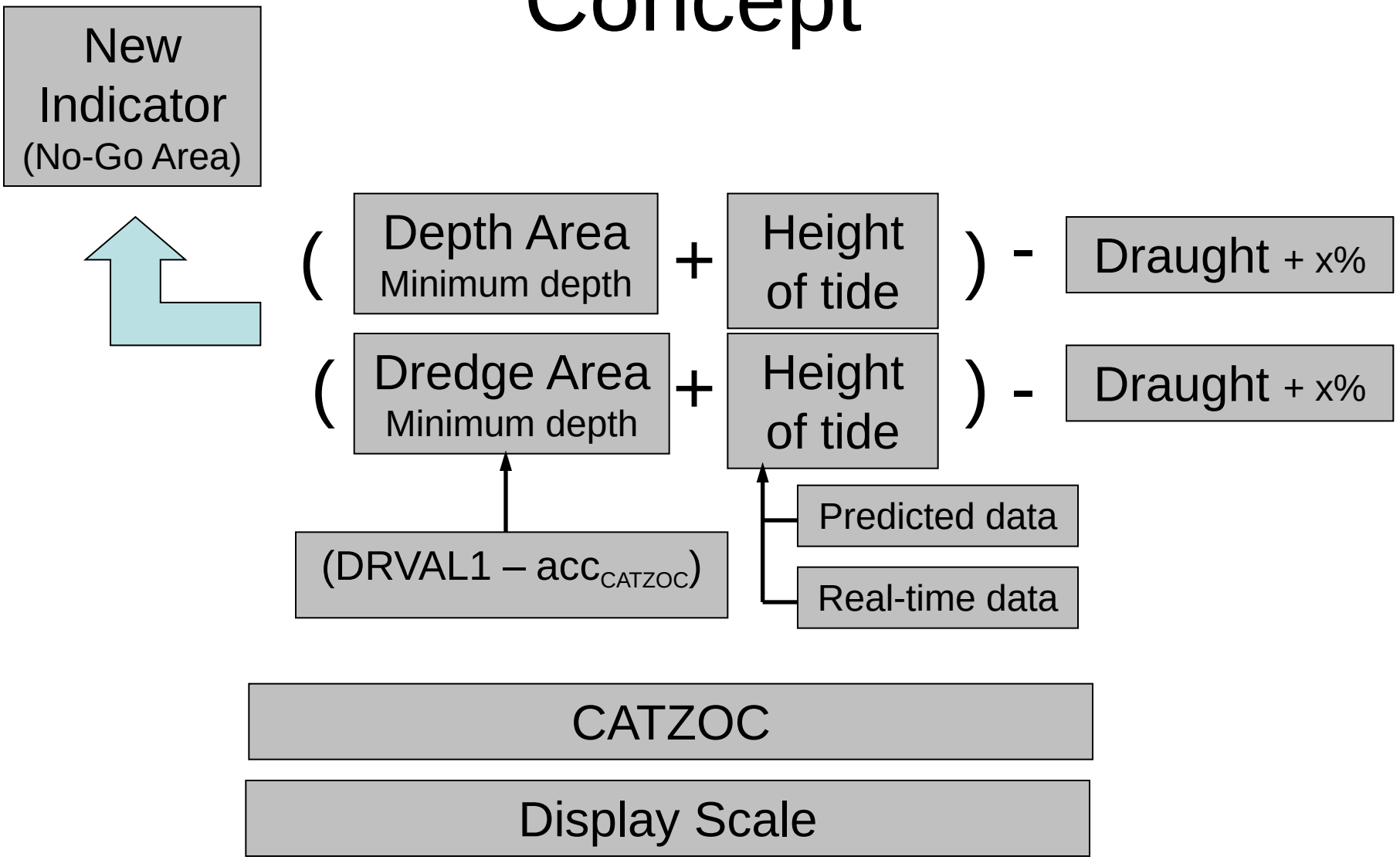
- Mariner’s Data quality indicator derived from CATZOC -

Shuji Murakami - JHOD
Shinichi Kikuchi - JHA

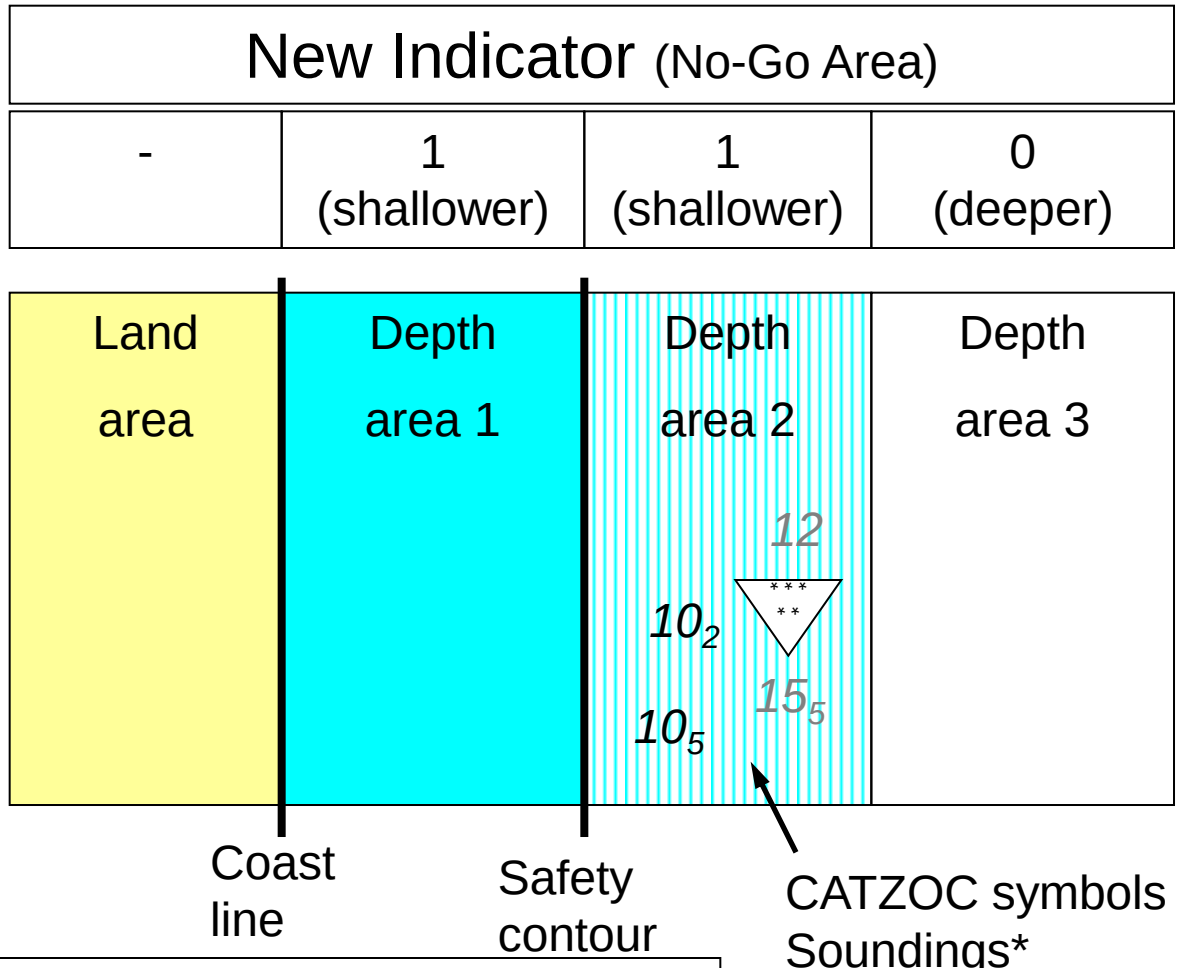
“No-Go Area” indicated on paper chart



Concept


New Indicator (No-Go Area)
(Depth Area Minimum depth + Height of tide) - Draught + x%
(Dredge Area Minimum depth + Height of tide) - Draught + x%
(DRVAL1 – acc$_{CATZOC}$)
Predicted data
Real-time data
CATZOC
Display Scale

No-Go area indicated on Standard display

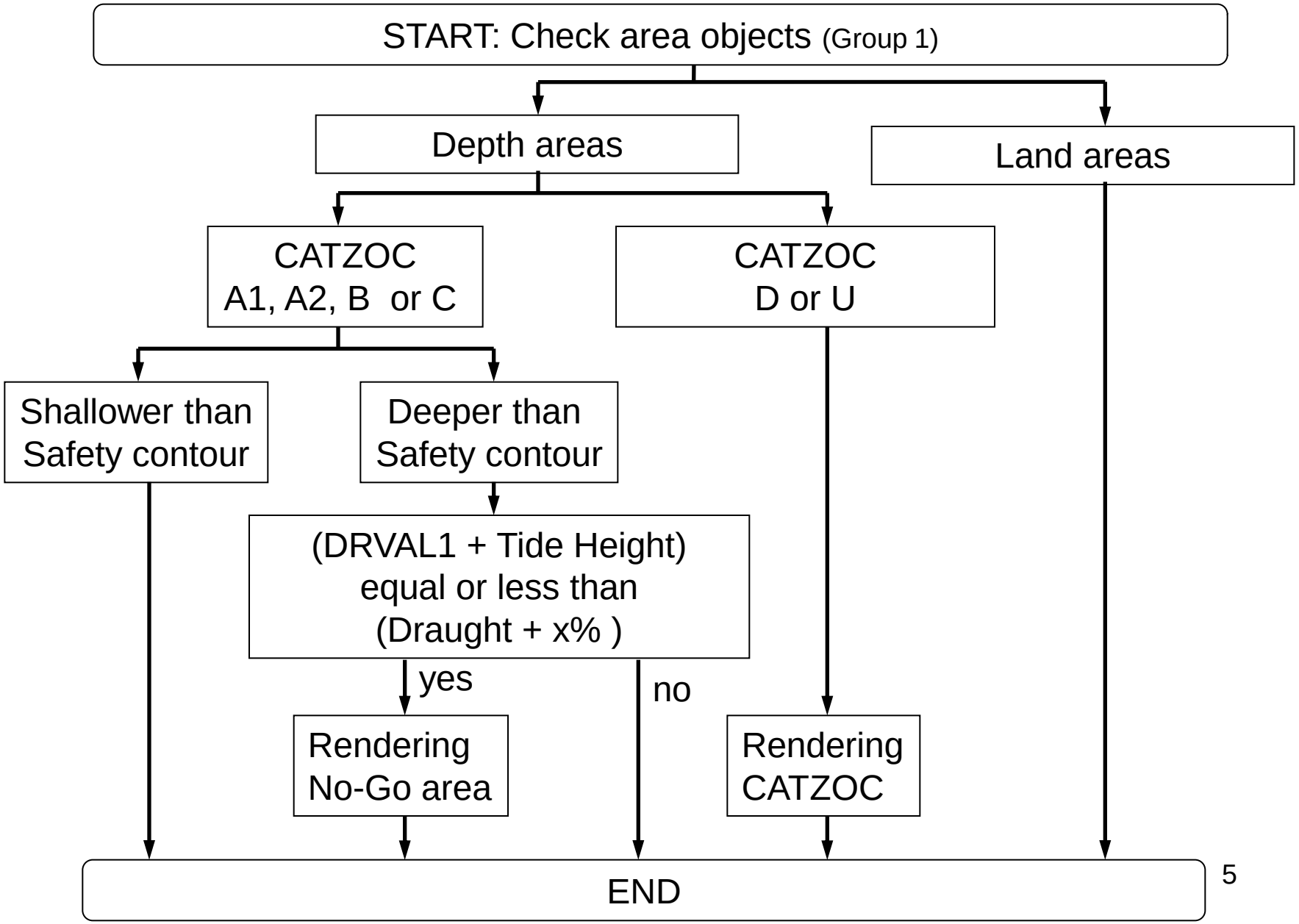


Example:
Draught = 9 meters
X = 20%
Minimum depth = 10.8 m

Depth area 2 includes “No-Go area”. Mariner may describe boundary on the display between soundings.

* black: Equal or less than Draught + x%
grey: Greater than Draught + x%

Portrayal flow for “No-Go area”



Conclusion

Consider followings:

- Chart information or Mariner's navigational information?
- What is accuracy of tidal data for the indicator?
- Colors & symbols for "No-Go area"?
- "No-Go Area" indicator suitable for mariner's requirements?

Proposal: To consider "No-Go area" into IHO Object Catalogue
To develop minimum standards for "No-Go area"
To develop "Use of No-Go area" for mariners and cartographers

Appendix 1

Position error on screen at display scale

Display scale	ZOC				
	A1	A2	B	C	D
	± 5 m + 5% depth	± 20 m	± 50 m	± 500 m	Worse than ZOC C
1:3,000,000	-	-	-	0.2	>0.2
1:1,500,000	-	-	-	0.3	>0.3
1:700,000	-	-	0.1	0.7	>0.7
1:350,000	-	0.1	0.1	1.4	>1.4
1:180,000	-	0.1	0.3	2.8	>2.8
1:90,000	0.1	0.2	0.6	5.6	>5.6
1:45,000	0.1	0.4	1.1	11.0	>11.0
1:22,000	0.2	0.9	2.3	22.7	>25.0
1:12,000	0.4	1.6	4.2	41.7	>41.7
1:8,000	0.6	2.5	6.3	62.5	>62.5
1:4,000	0.8	5.0	7.5	75.0	>75.0

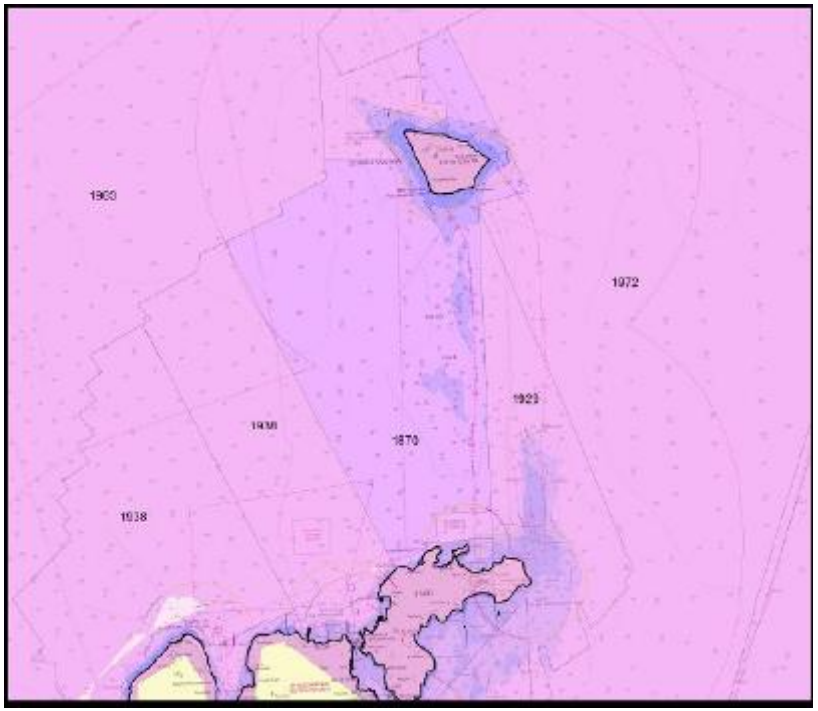
unit: mm

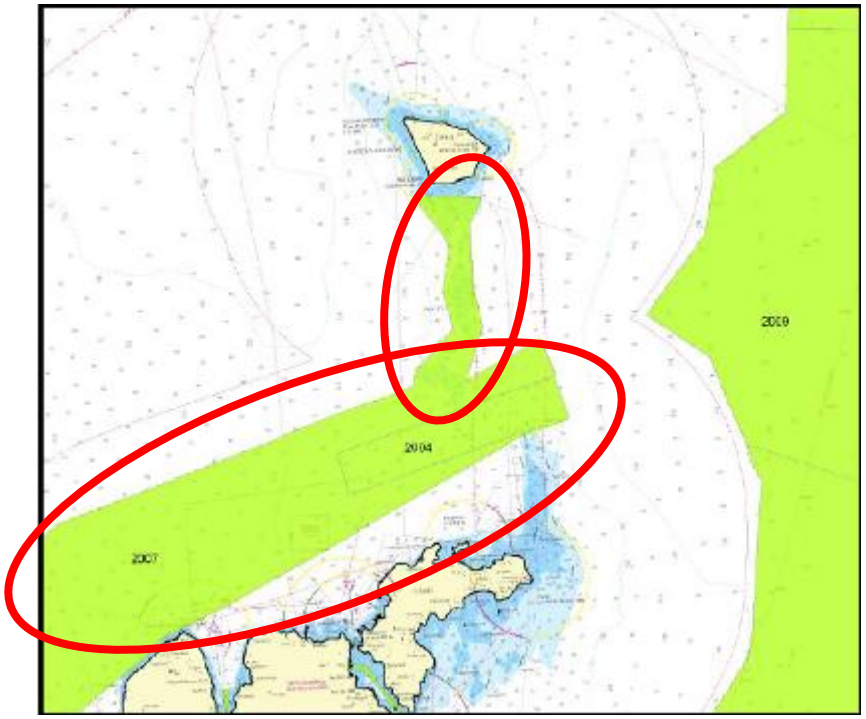
Appendix 2

Effects of new surveys on “No-Go area”

Depth areas surveyed in high level are covered by small “No-GO area” and a blue tint to emphasize shallow water.

Example: Area surveyed in 2004 and 2007 in HSSC2 document
Although CATZOC symbols cover all areas including new survey areas, new indicator clearly shows safety zone in the new surveyed areas.





BUNDESAMT FÜR SEESCHIFFFAHRT UND HYDROGRAPHIE

Annex B to DQWG3 Minutes

Data Quality

5. November 2010

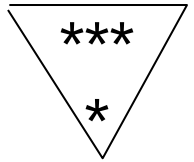
Data Quality

2 questions:

- How to model?
- How to visualize?

3 informations necessary

- accuracy of survey data (at the time of survey): standard deviation modelled by SOUACC or a relevant metaobject, visualized by
- time of survey: modelled by SURSTA, SUREND or a relevant metaobject, visualized by **???**
- Variability of the bottom: how to model, how to visualize?



Variability of the Sea bottom

BUNDESAMT FÜR SEESCHIFFFAHRT UND HYDROGRAPHIE

a) How to model?

a1) per data point

- Each data point of the actual survey
- difference (in depth) to the DTM (interpolated) of the last survey (Δd)
- difference in time between the actual and the last survey (Δt)

  => velocity (Δd/Δt) [dm/a] for each data point

a2) per area -> page 5

Variability of the Sea bottom

BUNDESAMT FÜR SEESCHIFFFAHRT UND HYDROGRAPHIE

b) How to visualize?

- The mariner certainly will not have a scientific number, which is hard to interprete
- He certainly will not have a value for each depth
- It must be simple
  - 90% of the navigable area without warning (“stable”/”no information”)
  - 8% with a warning (“survey data may be inadequate within 10 years after survey”
  - 2% with a warning “Attention! Survey data will be inadequate after one or two years”

It should be investigated whether the 8%/2% make sense or the 10years/1year

Variability of the Sea bottom

BUNDESAMT FÜR SEESCHIFFFAHRT UND HYDROGRAPHIE

a) How to model?

a2) per area

- Define a certain area
  - following morphological criteria
  - or just a survey project
  - or where I have a M_QUAL or M_SREL metaobject (sorry, I have to look into S-57)
- Calculate the largest velocity in the upward direction
- Put it into one of three categories:

Categories: c.f. page 4

0 no information

I stable over long time

II survey data may be inadequate after a longer time (e.g. 10years)

III survey data will be inadequate shortly

Variability of the Sea bottom

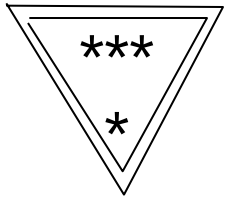
BUNDESAMT FÜR SEESCHIFFFAHRT UND HYDROGRAPHIE

b2) How to visualize in ECDIS?

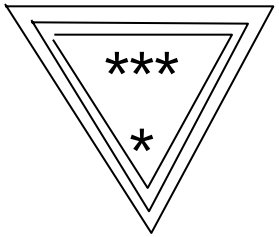
Categories:

I or 0: no special sign

II:

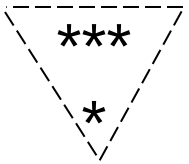


III:



If necessary:

0 may be visualized by



By the way:

I personally think it may be a good idea:

Good to ask cartographers, they are specialist in symbolization