

10th CSPWG MEETING
Wellington, New Zealand, 21-24 January, 2014

Paper for Consideration by CSPCWG
Definitions of elevation, height and altitude

Submitted by:	Chairman
Executive Summary:	HSSC5 instructed HDWG to invite TSMAD and CSPCWG to jointly agree acceptable definitions of elevation, height and altitude for S-32
Related Documents:	CSPCWG Letter 04/2012; CSPCWG09-04.5B; HSSC5-05.9A rev2; IHO CL 11 and 76/2012
Related Projects:	

Introduction / Background.

- The following paragraphs (in *italic*) are extracted from CSPCWG9-4.5B, to provide a brief history of this subject. For more detailed background, the related documents listed above should be consulted. Note from IHO CL11/2012 that, according to its annex, the 'new' definitions for elevation, height and altitude proposed for S-32 were all derived from S-57 without reference to S-4 or any other IHO standard.

After lengthy preparatory work, HDWG's report to HSSC3 (HSSC3-09.5A) listed a very large number of revised definitions for S-32 (Hydrographic Dictionary). HSSC was not the appropriate forum to discuss the technical detail and this was not done. However, HSSC3 did endorse the proposal to put all the revised draft definitions to MS by CL (Action HSSC3/16 refers). Accordingly, CL11/2012 was issued to MS, with the outcome announced by CL76/2012.

Throughout the development process, CSPCWG had raised concerns with HDWG regarding the proposed changes to the existing definitions of 'Altitude', 'Elevation' and 'Height'. CL76/2012 reports that the proposal to change these definitions had been discussed with the chairmen of CSPCWG and TWLWG; it did not make clear that they had not been agreed by CSPCWG. However, the subsequent HDWG report (HSSC4-05.9A) does acknowledge that 'there may be a requirement for further consideration of these definitions in the light of the comments received'.

CSPCWG considered these draft definitions in detail at its meeting in November 2011. An action resulted to produce papers explaining the issues (pros and cons) of the revised draft definitions for Elevation, Height and Altitude; ideally to be included as annexes to the CL [CSPCWG8 Action 5: this would have been CL11/2012]. An alternative course was proposed by Secretary HDWG, to remove these 3 definitions from the list submitted to MS in the CL [ie CL11/2012] and to include an explanation that further discussion would be undertaken.

In the event, neither course was adopted: the CSPCWG papers were not included in CL11/2012; and the 3 definitions were retained in CL11/2012. So the issues were not brought to the attention of MS during the voting process.

UK and some other MS submitted their reservations individually in response to CL11/2012 (summary annex to CL refers) but, of course, these were not visible to voting MS until CL76/2012 was published. CL76/2012 further states that MS' comments which were editorial – rather than substantive – had been taken into account in the final published versions. However, no response or changes were made regarding the substantive comments regarding the proposed definitions of Altitude, Elevation and Height. With respect to the particular comments by UK (and other MS), the response was merely that 'HDWG did not fully agree'; no explanation

is provided.

2. Subsequently, Chairman CSPCWG and new Chairman HDWG (Jean Laporte - FR) have exchanged correspondence on the subject. Most recently, by email (November 2013) from Chairman HDWG as follows:

As you might remember, the definitions of "Altitude", "Elevation" and "Height" have not been agreed yet. In order to reach a compromise, it has been proposed and further endorsed by HSSC5 that the HDWG should stand back and leave the matter to be resolved jointly by TSMAD and CSPCWG. Please find attached a letter requesting some action from your incoming Working Group meetings.

(The reference letter is attached at Annex to this paper.)

3. Chairman TSMAD has advised that it was too late to include this issue at TSMAD27 2-6 December. He is content that CSPCWG make proposals to take this forward at CSPCWG10 and TSMAD would then examine the CSPCWG proposals at next TSMAD meeting (April 2-14) with a view to endorsing them and asking HDWG Chairman to submit them to HSSC6 (10-14 November 2014) for approval.

Analysis / Discussion.

4. CSPCWG's suggested definitions (from CSPCWG Letter 04/2012) were:

Elevation (1): see HEIGHT. On ENC, elevation excludes the vertical distance of the top of an object measured from a specified datum.

Height (1): The vertical distance of a LEVEL, a point or the top of an object measured from a specified datum. On ENC, height only refers to drying heights and the top of an object affixed to the surface of the EARTH.

Altitude (1): see HEIGHT.

5. On further consideration, it may be better to amend the 'ENC part' of the 1st definition for 'elevation' to a more positive statement (similarly to the proposed 1st definition of height). It also makes sense to add 'vertical' before 'datum' in both definitions and remove any named datums, in accordance with Sweden's response to CL11/2012, ie:

[Sweden] considers it unfortunate to mention, in the definition, specific vertical datums: Mean Sea Level and High Water datum. We propose to remove the term Mean Sea Level in the first definition of **elevation** and **altitude** and remove the term High Water datum in the first definition of **height** and consistently only refer to specified vertical datum.

6. This would result in 1st definitions for elevation, height and altitude as follows:

Elevation (1): see HEIGHT. (Note: On ENC, elevation only refers to the vertical distance of a POINT or a LEVEL, on the surface of the EARTH, measured from a specified vertical DATUM).

Height (1): The vertical distance of a LEVEL, a POINT or the top of an object measured from a specified vertical DATUM. (Note: On ENC, height only refers to drying heights and the top of an object affixed to the surface of the EARTH - see ELEVATION).

Altitude (1): see HEIGHT.

7. No changes are proposed for the other S-32 definitions for these words.

Conclusions.

8. The existing definitions in S-32 were changed as a result of an inadequate consultation process. As agreed by HSSC, they need to be reviewed. They should be amended to be product neutral. The definitions as applied to a particular product (in this case ENC) should be secondary to the main definition, if it is appropriate to include them at all.

These have therefore been inserted in parenthesis, to make this aspect clear.

Recommendations.

9. The slightly revised (from CSPCWG Letter 04/2012) definitions above should be recommended to TSMAD for agreement, pending submission to HSSC6.
10. It is further recommended that the definitions of 'spot height' and 'spot elevation' in S-32 should be reversed, as the former is the more common English usage by chart producers.

Justification and Impacts.

11. Improved standardization applicable to the IHO community through S-32 allowing, exceptionally, for product-specific definitions.

Action required of CSPCWG.

12. CSPCWG is invited to endorse the above recommendation.

**Text of letter from Chairman HDWG
to Chairmen of CSPCWG and TSMAD**

25 November 2013
N° 001 SHOM/HDWG/NP

Dear Colleagues

At HSSC5, the HDWG delegate reported that the amendments generated by the definitions of Altitude, Elevation and Height had given rise to *“a requirement for further consideration in spite of a comprehensive report presented by UK at the 4th HSSC Meeting”*

After several unsuccessful attempts to reach a compromise, it was finally decided not to accept the terms until an alternative proposal *“agreed both by TSMAD and CSPCWG has been established, in time for consideration at HSSC6 and further member state approval.”*

Seen from the HDWG, the crux lies in the fact that the digital world represented by TSMAD, DIPWG, SNPWG, etc. is unable to handle ambiguities such as *“is often synonymous with”* or *“sometimes confused with”*, or *“usually”*, etc. let alone two different definitions for paper charts and ENCs.

The HDWG is aware on the other hand that new definitions accepted long before the age of steam must be applied with sufficient restraint so as not to upset too radically the member states' existing chart portfolios and chart production programmes.

I leave it to you to find an acceptable compromise that can be circulated later amongst HOs.



Jean Laporte
HDWG Chairman

Some useful excerpts

Annex A to IHB CL 76/2012 (Excerpt)

COMMENTS BY MEMBER STATES

FINLAND

Does not support the proposed definitions for “elevation”, “height” and “altitude”. Further work is needed for harmonising these definitions and their uses within S-32, S-4 and S-57. Also the work ongoing with TWLWG should be consulted.

Remarks by Chairman of HDWG and the IHB: See comments under the UK proposal.

FRANCE

The amendments to the definitions are reported in the French version of this CL.

(HDWG Note: the French comment is of editorial nature. After consulting SHOM cartographers, it appears that France supports by and large the UKHO approach).

LATVIA

Definitions of elevation, height and altitude – generally agree but could be some refinements.

Remarks by Chairman of HDWG and the IHB: See comments under the UK proposal.

SOUTH AFRICA

Elevation, height & altitude: Concur with recommendation by CSPCWG 8 Action 5 Comments. (CSPCWG Letter 04/2012, dated 13 February 2012).

SWEDEN

Sweden does in principle agree with the definitions for **elevation**, **height** and **altitude**, but considers it unfortunate to mention, in the definition, specific vertical datums: Mean Sea Level and High Water datum. We propose to remove the term Mean Sea Level in the first definition of **elevation** and **altitude** and remove the term High Water datum in the first definition of **height** and consistently only refer to specified vertical datum.

Remarks by Chairman of HDWG and the IHB: See comments under the UK proposal.

UK

Revised definitions for ‘elevation’, ‘height’ and ‘altitude’:

Although the HDWG report to HSSC3 (HSSC3-05.9A) states that the Chairman CSPCWG was consulted on the definitions of elevation, height and altitude, in fact he did not agree with the proposed first definitions. (There is no disagreement with the 2nd and 3rd definitions). The distinct definitions proposed by the HDWG were not considered in detail by HSSC3, but were considered in detail at the 8th CSPCWG meeting on 29 November 2011.

Annex A to IHB CL 76/2012

Note by HDWG: This paper is almost identical with the annex B to CSPCWG Letter 04/2012

It does not seem appropriate to redefine words to accommodate the needs of one particular product (ENC); where possible, definitions should be product neutral. These words have been used synonymously for centuries on paper charts and in common English usage. (See similar situation with coastline and shoreline). The Oxford English Dictionary (OED) is the accepted authority for the English language and has the following definitions:

elevation (OED definition 2): height above a given level, especially sea level.

height (OED definition 2): elevation above ground or a recognized level (typically sea level).

altitude: the height of an object or point in relation to sea level or ground level.

These are virtual synonyms in the geographic context (although the definition of height adds ‘above ground’, which is covered by the second S-32 definition). Suggesting that ‘elevation’ should always be used for the surface of the earth, ‘height’ for the top of objects and ‘altitude’ for above the surface of the earth has no basis in common usage and causes particular problems. For example:

- A ‘spot height’ always refers to the earth’s surface measured from sea level.
- The ‘elevation’ of a light refers to the focal plane of a man made object.
- Although ‘altitude’ is not generally used on English language charts, in French ‘altitude’ is used with exactly the same meaning as ‘height’ and ‘elevation’.

An assessment of many national charts shows that the English language notes below the title almost always refer to ‘Heights’ and cover all heights on the chart including: drying heights above CD; heights above a sea level datum including heights of hills and the tops of objects; heights of the tops of objects above the ground.

Additionally, the official language versions of INT1 (and most national equivalents) refer to: heights of cliffs and islands in the introduction and K10; in relation to relief at C10-14; to heights of objects in sections D and E; to drying heights at H20 and I15. Elevation is only used in relation to lights, at P13. It is true, however, that a minority of countries use ‘elevations’ in exactly the same context and meaning as the majority use ‘heights’.

There seems no good reason why, in the proposed definitions, elevations are considered to be ‘usually referred to Mean Sea Level’, whereas heights are ‘usually referred to a High Water datum’. Both should state ‘a sea level datum’ as the actual datum will vary according to tidal/water level range and national practice, which should be stated on the chart.

In conclusion, there has never been a distinction between ‘elevation’ and ‘height’ in normal English usage or on most paper charts. Any distinction only applies to ENC and has been invented for the particular needs of that product. Attempting to apply the distinction more widely will either require major changes to most paper charts and INT1 equivalents, which may confuse the chart user, or S-32 will differ from reality. Rather than try to introduce an arbitrary and belated hydrographic distinction, we should accept that there is none, and indicate in S-32 that they are usually synonymous (as far as the first definitions apply).

Recommended alternative definitions (based on the fact that ‘height’ is by far the commonest word used in this context):

Elevation (1): see HEIGHT. On ENC, elevation excludes the vertical distance of the top of an object measured from a specified datum.

Height (1): The vertical distance of a LEVEL, a point or the top of an object measured from a specified datum. On ENC, height only refers to drying heights and the top of

an object affixed to the surface of the EARTH.

Altitude (1): see HEIGHT.

It is further recommended that the definitions of ‘spot height’ and ‘spot elevation’ in S-32 should be reversed, as the former is the more common English usage by chart producers.

Remarks by Chairman of HDWG and the IHB: The HDWG considered comments and proposals from the CSPCWG when revising the definitions of “altitude”, “elevation” and “height”. Nevertheless, HDWG did not fully agree. CSPCWG did not comment when the HDWG proposals were submitted to HSSC-3 for endorsement. Any Member State or the CSPCWG may propose a new work item for HDWG to further revise the definitions if this is still considered necessary.

REVIEW of DEFINITIONS

1. Elevation

Online S-32	Proposed definition (IHB CL 76/2012)	UK alternative (HSSC4-05.9B)
<p>1. The vertical distance of a point or a level, on the surface of the earth, measured from a specified vertical datum usually mean sea level. The term elevation is sometimes confused with altitude. For paper nautical charts, this term is often synonymous with height.</p>	<p>1. The vertical distance of a POINT or a LEVEL, on the surface of the EARTH, measured from <i>a specified vertical DATUM usually MEAN SEA LEVEL</i>. The term elevation is sometimes <i>confused</i> with ALTITUDE. <i>For paper NAUTICAL CHARTS, this term is often synonymous with HEIGHT.</i></p> <p>2 For navigational lights, such as lighthouses, the vertical distance of the focal point of the light measured from a specified vertical DATUM.</p> <p>3 An area higher than its surroundings, as a hill.</p>	<p>Elevation (1): see HEIGHT. On ENC, elevation excludes the vertical distance of the top of an object measured from a specified datum.</p>

2. Height

Online S-32	Proposed definition (IHB CL 76/2012)	UK alternative (HSSC4-05.9B)
<p>1. The vertical distance of the top of an object affixed to the surface of the earth, measured from a specified datum usually a High Water datum.</p>	<p>1 The vertical distance of the top of an object affixed to the surface of the EARTH, measured from a specified DATUM usually a High Water datum.</p> <p>2 The vertical dimension of an</p>	<p>Height (1): The vertical distance of a LEVEL, a point or the top of an object measured from a specified datum. On ENC, height only refers to drying heights and the top of an object affixed to the surface of the EARTH.</p>

	object. Also called vertical length.	
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Comments by HDWG:

As a matter of curiosity, it has been noted that the ever practical Chinese use the same characters for altitude and height (标高), completed whenever necessary with the terms absolute (絕對) when they mean altitude, or relative (對) when they mean height. In other words, they prefer lifting ambiguities by adding attributes to entries, thus creating new words, rather than changing accepted definitions.