



CHART STANDARDIZATION & PAPER CHART WORKING GROUP (CSPCWG)

[A Working Group of the Hydrographic Services and Standards Committee (HSSC)]

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To CSPCWG Members

Date 13 February 2012

Dear Colleagues,

IHO Hydrographic Dictionary (S-32) definitions: elevation, height, altitude

References: A. IHO CL 11/2012 Hydrographic Dictionary (S-32)
B. Meeting CSPCWG8: paper CSPCWG8-04.4A Report on HDWG activities;
record – agenda item 4.4; actions 5 & 6.

Reference A has been issued by IHB, requiring a response from Member States on the proposed revised definitions for S-32 by 13 March 2012. In respect of the proposed definitions for “elevation”, “height” and “altitude”, paragraph 1 bullet 2 of Ref A refers.

At CSPCWG8 (Finland, Nov-Dec 2011), these definitions were discussed at agenda item 4.4. Extracts from the meeting record and the resultant actions are provided at Annex A. Further, the two papers mentioned at Action 5 are provided at Annexes B and C. These papers have been seen by the relevant WG chairmen and Secretary HDWG. However, IHB decided not to include these ‘position papers’ in the CL (Ref A). Therefore, I provide them now to assist you in responding to the CL in accordance with Action 6.

The work of HDWG is important in maintaining the IHO’s Hydrographic Dictionary (S-32) as a core IHO community standard. Therefore, I encourage you to make your technical views known in responding to the CL through your Member State’s reply. This invitation is for consideration by the entire CSPCWG, not only those who attended meeting CSPCWG8.

Yours sincerely,

Peter G.B. Jones,
Chairman

- Annex A: Report of 8th IHO-CSPCWG Meeting – extract
- Annex B: CSPCWG8 Action 5: Chairman/Secretary paper on HDWG Proposed Definitions of Elevation, Height and Altitude
- Annex C: CSPCWG8 Action 5: Vice-Chairman Paper on HDWG Proposed Definitions of Elevation, Height and Altitude

Report of 8th IHO-CSPCWG Meeting – extract

Agenda Item 4.4. Report from HDWG

Docs: CSPCWG8-04.4A Report to CSPCWG8 on HDWG activities

J Wootton briefed the meeting on the activities of the HDWG, in accordance with his report (the first HDWG report to CSPCWG). ...

The new and revised definitions proposed to HSSC3 (document HSSC3-05.9A) would now be circulated to IHO MS for approval; a CL is expected soon. There followed significant debate about the proposed definitions for Elevation, Height and Altitude, which are proposed to be amended to provide a clear distinction. This has been done mainly to provide a clear distinction between the terms as defined in the IHO S-100 Geospatial Information Registry in order to remove ambiguity, but it was suggested that such a distinction may not be valid for paper charts and in general usage. UK and AU agreed to write separate papers outlining the two sides of the debate, in consultation with chairmen HDWG and TWLWG; these would be forwarded to IHB to consider for inclusion as an annex from CSPCWG to the planned CL. Some of the other proposed definitions were also discussed, with points raised that WG members might consider relaying to their home offices for consideration in responding to the CL. The meeting also decided that the HDWG should be asked to consider updating the first (unchanged) definition of Nautical Chart. Thanks were expressed to Jeff Wootton for his three reports and the excellent work he does in liaising between these various technical WG.

ACTION 5: AU & UK to produce papers explaining the pros and cons of the definitions for Elevation, Height and Altitude proposed by HDWG (not more than one side A4 each, by end 2011). To include graphic derived from UOC. HDWG & TWLWG Chairs to be consulted. Ideally to be included as Annex to IHO CL (delayed if necessary).

ACTION 6: WG members to advise their respective HOs on response to HDWG proposed definitions CL.

CSPCWG8 Action 5: Chairman/Secretary paper on HDWG Proposed Definitions of 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.

It does not seem appropriate to redefine words to accommodate the needs of one particular product (ENC), when the words have been used synonymously for centuries on paper charts and in common English usage. 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.

CSPCWG8 Action 5: Vice-Chairman Paper on HDWG Proposed Definitions of Elevation, Height and Altitude

In revising the current S-32 definitions for the terms “altitude”, “elevation” and “height”, the IHO Hydrographic Dictionary Working Group (HDWG) is attempting to provide a clear distinction between the terms as related to hydrography, while recognising the fact that the terms have been used interchangeably in some applications for many, many years.

In January 2011, the IHO introduced the S-100 Geospatial Information Registry. S-100 is a framework geospatial standard for hydrographic and related data, underpinned by a Registry and component Registers based on ISO standards. The IHO owns and manages the Registry. One of the component Registers is the Feature Concept Dictionary Register, which comprises managed lists or dictionaries of items used to define Feature and Portrayal Catalogues which are in turn used in individual Product Specifications related to hydrography. These managed lists or dictionaries comprise features, attributes and enumerates that are used to model themes or individual instances of features that exist in the real world. One of the core principles followed when defining items within a Register is the concept that no two items in a Register can be used interchangeably, i.e. no two items in a Register can be interpreted as meaning the same thing. This principle is important in terms of enhancing standardisation; promoting more consistent data modelling; and providing improved scope for interoperability between Data Transfer Standards and Product Specifications derived from S-100.

Within the Feature Concept Dictionary Register, the terms “elevation” and “height” currently exist as attributes, and are defined as they appear in S-57 Appendix A, Chapter 2 – Attributes. This has been done as a first pass for all features, attributes and enumerates in the Register in order to define a baseline from which future enhancements to the Register can take place, including the refinement of definitions where required. As the S-100 Geospatial Information Registry is dedicated to hydrographic and related data, it would be appropriate for definitions within the Registry (and by extension derived Product Specifications and Transfer Standards) to use the IHO Hydrographic Dictionary as the authoritative source for its definitions of terms where appropriate. For this reason the HDWG was asked to review the definition of the term “elevation” as the current Hydrographic Dictionary definition of the term is virtually synonymous with the terms “height” and “altitude”, which is inconsistent with the principle stated above. The HDWG, when subsequently reviewing the terms “elevation”, “height” and “altitude”, made the decision to make a clear distinction between the terms in the interests of standardisation, and as a starting point decided to evaluate the accepted existing S-57 definitions for the terms “elevation”, “height” and “vertical length”. As currently defined in S-57, there is a clear distinction between these terms (refer S-57 Appendix B.1, Annex A (Edition 3.0.0) clause 4.2.2, Figure 1 for a diagrammatic representation), which could not be found in the existing Hydrographic Dictionary definitions or in other sources such as the Oxford English Dictionary. Further discussion within the HDWG related to the general use of these terms across hydrographic applications, including the vertical datums generally acknowledged to be associated with these terms. Finally, the HDWG discussed the synonymous use of these terms in specific applications such as paper nautical charting, and in resolutions such as IHO Technical Resolution 3/1919 (as amended). The resultant revised definitions are considered to provide a clear generic distinction between the three terms, while acknowledging the historic synonymous use of the terms in some applications (so as to avoid adverse impact of these revised definitions on the way the terms are used by related Product Specifications and users).

It is hoped that, over time, instances where the terms “altitude”, “height” and “elevation” have been used synonymously may be re-evaluated, thus resulting in a greater degree of standardisation within the hydrographic and related communities. This will not be achieved while the authoritative IHO document for the definitions of hydrographic terms contains ambiguity resulting in terms being used interchangeably. This conforms with the IHO ambition to enhance standardisation, and is in agreement with one of the core principles of the S-100 Geospatial Information Registry.