

**2nd NCWG MEETING
IHB, Monaco 26-29 April 2016**

**Paper for Consideration by NCWG
NCWG1 Action 8**

Submitted by:	UK
Executive Summary:	To correct the Hydrographic Dictionary definitions of Elevation and Height
Related Documents:	IHO CLs 11/2012 and 76/2012
Related Projects:	None

Introduction / Background:

1. NCWG1 Action 8 required IHB to research and progress the action about definitions of Height and Elevation with HDWG. This related to a long standing issue caused by the change to these definitions promulgated by IHO CL76/2012 and summarized by UK's response to the earlier letter CL11/2012; see Annex A.

Analysis / Discussion:

2. The letter at Annex B is the result of progressing this action.

Recommendation:

3. NCWG to endorse the proposal by Chair HDWG that the English definitions agreed in Taunton are definitely accepted and should be submitted to the HSSC 8. If approved, they will in future become the IHO unique reference from which all translations should be derived.

Justification and Impacts:

4. This should remove the confusion caused by changing the definitions to make them relevant to only one form of hydrographic chart (ENC) and perhaps related digital products, without regard to the long-standing usage in nautical products and paper charts in particular. The revised definitions proposed in Annex B allow some categories of users (for example: ENC producers, MSDI subject matter experts) to set up their own implementing/application rules.

Action required of NCWG:

5. The NCWG is invited to:
endorse the above recommendation.

Extract from IHO CL76/2012

Comments by UK (contributed by Chairman CSPCWG)

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.

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.

Letter from Chair HDWG

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Plymouth, 6th of April 2016

No 02 HDWG

Chairman HDWG

Yves Guillam Esq.
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Dear Yves,

1. At my 4 March 2014 Taunton meeting with the Chairmen of the then CSPC and TSMAD Working Groups, a number of new definitions were agreed for the terms **Elevation, Height** and **Altitude**. It was further agreed that these definitions should be made known to both the CSPC and TSMAD Workings Groups to alleviate any possible objections. Unfortunately, the question was never raised and the subject disappeared in the ensuing reshuffles of Working Groups and HDWG struggle for survival.

2. To close this very old issue whilst remaining on the same page as our internal discussions on the evolution of the HDWG Terms of Reference, I suggest proceeding as follows:

2.1 The English definitions agreed in Taunton are definitely accepted and should be submitted to the HSSC 8. If approved, they will in future become the IHO unique reference from which all translations should be derived.

2.2 Should these definitions be objected by the S-100 Working Group, an additional S 100 unequivocal definition will be entered, with no further consequences on the other HD definitions.

3. The final definitions to be submitted to HSSC 8 should then be as follows:

Elevation:

- i. The vertical distance of a point or a level, on the surface of the earth, measured from a specified vertical datum. See also height.

- ii. For navigational lights, the vertical distance of the focal plane of the light measured from a specified vertical datum.
- iii. An area higher than its surroundings, for example a hill.
- iv. S 100 unequivocal definition: (to be completed by the Chairman S 100 WG)

Height:

- i. The vertical distance of a point, a level or the top of an object measured from a specified vertical datum. See also elevation.
- ii. The vertical dimension of an object. Also called vertical length. [unchanged]
- iii. On ENC, height refers to the top of an object affixed to the surface of the earth, measured from a specified vertical datum. See also drying heights. [new]
- iv. S 100 unequivocal definition: (to be completed by the Chairman S 100 WG)

Altitude:

[after deletion of the former definition 1; deemed irrelevant to hydrography.]

- i. In astronomy, the vertical angle between the plane of the horizon and the line to a celestial body. See also angle of depression and angle of elevation.
- ii. S 100 unequivocal definition: (to be completed by the Chairman S 100 WG)

with apologies for my shocking tardiness,

and with my best regards



Sent by email

To: Yves Guillam (adcs@iho.int)

Cc: David Wyatt (david.wyatt@iho.int)

Cc : julia.powell@noaa.gov

Cc: Coleman Andrew (Andrew.Coleman@UKHO.gov.uk)

Annex : Notes from the 4th of March 2014 meeting at Taunton

Annex

Notes from meeting to discuss the IHO Hydrographic Dictionary (S-32) definitions of
Elevation, Height and Altitude
4 March 2014 at Taunton, UK

CSPCWG10 had noted that HSSC endorsed HDWG's decision to ask CSPCWG and TSMAD to resolve their differences [concerning the S-32 definitions of Elevation, Height and Altitude], after which whatever is agreed would be subjected to HDWG, HSSC and finally MS approval processes.

Jean Laporte (Chairman HDWG); Peter Jones (Current Chairman CSPCWG); Barrie Greenslade (Chairman TSMWDWG) met 4 March in Taunton to discuss these definitions.

Also in attendance: Andrew Heath-Coleman (Secretary CSPCWG); Mrs Jane Empsall (Geodetic Support Manager UKHO). Prior advice had also been sought from Chairman and Vice-Chairman TWLWG.

Copy of decisions provided to Jeff Wootton (Chairman designate CSPCWG – from 1 April 2014) for information.

The following are the existing definitions in S-32, followed by agreed replacements (in red).

Elevation:

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](#).

1. The vertical distance of a point or a level, on the surface of the earth, measured from a specified vertical datum. See also height.

2. For navigational lights, such as [lighthouses](#), the vertical distance of the focal point of the light measured from a specified vertical [datum](#).

2. For navigational lights, the vertical distance of the focal plane of the light measured from a specified vertical datum.

3. An area higher than its surroundings, as a hill.

3. An area higher than its surroundings, for example a hill.

Height:

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.

1. The vertical distance of a point, a level or the top of an object measured from a specified vertical datum. See also elevation.

2. The vertical dimension of an object. Also called vertical length.

2. The vertical dimension of an object. Also called vertical length. [unchanged]

3. On ENC, height refers to the top of an object affixed to the surface of the earth, measured from a specified vertical datum. See also drying heights. [new]

Altitude:

1. The vertical distance of a [level](#), a [point](#) or an object considered as a [point](#) (but not affixed to the surface of the [earth](#)), measured from a given [datum](#), usually [mean sea level](#). See also [elevation](#) and [height](#).

[Delete definition 1; not relevant to hydrography.]

2. In [astronomy](#), the vertical angle between the plane of the [horizon](#) and the line to a [celestial body](#). See also [angle of depression](#) and [angle of elevation](#).

[Unchanged, apart from being renumbered '1.']

Spot elevation:

A point on a [map](#) or [chart](#) whose [elevation](#) is noted. It is usually indicated by a dot accompanied by a number indicating the vertical distance of the point from the reference [datum](#). Spot elevations are used principally to indicate points higher than their surroundings. Also called spot height.

Spot height:

See [spot elevation](#).

[These two definitions can be left unchanged; it was noted that these are examples of synonyms in the Hydrographic Dictionary].

Also TSMAD to consider whether 'Drying height' should have a separate attribute in S101.