Vertical and horizontal clearances: New complex attributes appear to be messy. Similar to the situation that was discussed regarding fixed and periodic dates, vertical clearances in particular result in illogical types of clearance (vertical open, vertical closed, vertical safe) being available for features. Suggest reverting back to dedicated attributes (complex consisting of value and accuracy sub-attributes) be investigated.

VERTICAL CLEARANCE CLOSED COMPLEX ATTRIBUTE

Vertical clearance closed			C	0,1
Clearance value vertical	(VERCCL)		(S) RE	1,1
Vertical uncertainty	(VERACC)		(S) RE	0,1

VERTICAL CLEARANCE FIXED COMPLEX ATTRIBUTE

Vertical clearance fixed			C	0,1
Clearance value vertical	(VERCLR)		(S) RE	1,1
Vertical uncertainty	(VERACC)		(S) RE	0,1

VERTICAL CLEARANCE OPEN COMPLEX ATTRIBUTE

Vertical clearance open			C	0,1
Clearance value vertical	(VERCOP)		(S) RE	1,1
Vertical uncertainty	(VERACC)		(S) RE	0,1

VERTICAL CLEARANCE SAFE COMPLEX ATTRIBUTE

Vertical clearance safe			C	0,1
Clearance value vertical	(VERCSA)		(S) RE	1,1
Vertical uncertainty	(VERACC)		(S) RE	0,1

COMPLEX ATTRIBUTE DESCRIPTIONS

Vertical clearance open

Vertical clearance closed: IHO Definition: The vertical clearance of a feature in closed condition (e.g. a closed lifting bridge) measured from the horizontal plane towards the feature overhead. (Adapted from S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.235, November 2000).

Indication: The complex attribute encodes the vertical distance from a defined vertical datum to the underside of a an opening overhead feature when it is in the closed position.

Sub-attributes: **Clearance value vertical**   see clause X.X
               Vertical uncertainty   see clause X.X

Remarks:
- No remarks.

Vertical clearance fixed

Vertical clearance fixed: IHO Definition: The vertical clearance measured from the horizontal plane towards a fixed (non-opening) feature overhead. (Adapted from S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.234, November 2000).

Indication: The complex attribute encodes the vertical distance from a defined vertical datum to the underside of a fixed overhead feature.

Sub-attributes: **Clearance value vertical**   see clause X.X
Vertical uncertainty   see clause X.X

Remarks:
- In the case of cables carrying high voltages an additional clearance of from 2 to 5 metres may be needed to avoid an electrical discharge. When known, the authorised safe clearance (known in the UK as the Safe Overhead Clearance) which is the physical clearance minus a safety margin shall be stated, using the attribute **vertical clearance safe** (see clause X.X). **vertical clearance fixed** must not be used to populate authorized safe clearances.

Vertical clearance open

Vertical clearance open: IHO Definition: The vertical clearance of a feature in opened condition (e.g. an open lifting bridge) measured from the horizontal plane towards the feature overhead. (Adapted from S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.236, November 2000).

Indication: The complex attribute encodes the vertical distance from a defined vertical datum to the underside of a an opening overhead feature when it is in the open position.

Sub-attributes: **Clearance value vertical**   see clause X.X
Vertical uncertainty   see clause X.X

Remarks:
- No remarks.

Vertical clearance safe

Vertical clearance safe: IHO Definition: The safe vertical clearance of a feature measured from the horizontal plane towards the feature overhead. (Adapted from S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.237, November 2000).

Indication: The complex attribute encodes the safe vertical distance from a defined vertical datum to the lowest point of an electrical cable over navigable water.

Sub-attributes: **Clearance value vertical**   see clause X.X
Vertical uncertainty   see clause X.X

Remarks:
- No remarks.

SUB-ATTRIBUTES

Clearance value vertical

Clearance value vertical: IHO Definition: The vertical clearance measured from the horizontal plane towards the object overhead. (S-57 Edition 3.1, Appendix A – Chapter 2, Page 2.234, November 2000).

Unit: Defined in the HUNI subfield of the CRSH record or the HUNITS attribute of the M_UNIT meta feature: metre (m)

Resolution: 0·1m

Format: xx.x

Example: **7.6** for a vertical clearance of 7·6 metres

Remarks:
- No remarks.

Vertical uncertainty

Vertical uncertainty: IHO Definition: The best estimate of the vertical accuracy of heights, vertical distances and vertical clearances, excluding sounding measurements.

Unit: Defined in the HUNI subfield of the CRSH record or the HUNITS attribute of the M_UNIT meta feature: metre (m).

Resolution: 0·1m

Format: xx.x

Example: **1.2** for an error of 1·2 metres

Remarks:
- The maximum of the one-dimensional error. The error is assumed to be positive and negative. The plus/minus character must not be encoded.

ADDITIONAL COMMENTS

- The attribute **vertical datum** has not been included as a sub-attribute of these complexes as there will be only one applicable value for this attribute for any vertical feature populated for the feature. It is considered that as such only a single instance of **vertical datum** is required for each feature instance.