Paper for Consideration by TSMAD 29
Update Proposal for S-101 Section 5 Coordinate Reference Systems (CRS)

Submitted by:	United States(SPAWAR Atlantic)
Executive Summary:	Rewrite of S-101 Section 5 on Coordinate Reference Systems (CRS)
Related Documents:	None
Related Projects:	None

Type of Change Requested:

This proposed change attempts to improve the consistency of the terminology used in Section 5 regarding Coordinate Reference Systems. These changes do not impact the implementation of the specification.

Proposed Change:

5 Coordinate Reference Systems (CRS)

5.1 CRS in Datasets

An ENC dataset must define at least one compound CRS, which must be composed of one geodetic CRS and one vertical CRS. All compound CRSs within the same dataset must use the same geodetic CRS.

5.2 Horizontal Coordinate Reference System

For ENC the geodetic CRS must be EPSG:4326 (WGS84). The full reference to EPSG: 4326 can be found at www.epsg-registry.org.

5.3 Vertical Coordinate Reference System

For ENC the vertical CRS must be in metres. Depths are represented by positive values, while negative values indicated intertidal soundings (drying heights).

Although all coordinates in a data set must refer to the same geodetic CRS, different Vertical Datums can be used for the depth component of a coordinate tuple. Therefore the vertical CRS can be repeated. For each vertical CRS a unique identifier is defined. Those identifiers will be used to indicate which Vertical CRS is used.

The encoding of the Coordinate Reference System record will be demonstrated with the following example that specifies a compound CRS. The first component is a 2D Geographic CRS (WGS84) and the second component is a Vertical CRS for depth using the Vertical Datum: Mean High Water.

Field	Subfield	Value	Description
CSID			**Coordinate Reference System Record Identifier**
	RCNM	15	Record Name (15 = Coordinate Reference System Identifier)
	RCID	1	Record Identification Number
	NCRC	2	Number of CRS Components
CRSH			**Coordinate Reference System Header**
	CRIX	1	CRS Index
	CRST	1	CRS Type (1 = 2D Geographic)
	CSTY	1	Coordinate System Type (1 = Ellipsoidal CS)
	CRNM	WGS84	CRS Name
	CRSI	4326	CRS Identifier
	CRSS	3	CRS Source (2 = EPSG)
	SCRI		CRS Source Information (omitted)
CRSH			**Coordinate Reference System Header**
	CRIX	2	CRS Index
	CRST	5	CRS Type (5 = Vertical)
	CSTY	3	Coordinate System Type (3 = Vertical)
	CRNM	Depth - mean lower low water	CRS Name

	CRSI		CRS Identifier (omitted)
	CRSS	255	CRS Source (2 = EPSG)
	SCRI		CRS Source Information (omitted)
CSAX			**Coordinate System Axes**
	AXTY	12	Axis Type (12 = Gravity Related Depth)
	AXUM	4	Axis Unit of Measure (4 = Metres)
VDAT			**Vertical Datum**
	DTNM	mean high water	Datum Name
	DTID	16	Datum Identifier (16 = Mean High Water)
	DTSR	2	Datum Source (2 = Feature Catalogue)
	SCRI		Datum Source Information (omitted)

Justification for proposed change:

The proposed change will improve the consistency of the terminology used in Section 5 regarding the Coordinate Reference Systems(CRS), and will make the example compound CRS provided easier to understand.

The TSMAD is invited to endorse and accept the proposed new version of S-101 Section 5 regarding Coordinate Reference Systems(CRS).