

S-111 Edition 2

TWCWG 8

20-22 February 2024



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OVERVIEW

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- S-111 in S-100 Phase 1 implementation plan
- S-111 Ed. 2.0.0 - Updates
- Next steps



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ROADMAP FOR S-100 IMPLEMENTATION

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Table A – IHO list of S-100 products with special focus	
Phase 1 / Route monitoring	
S-101	Electronic Navigational Chart (ENC)
S-102	Bathymetric Surface
S-104	Water Level Information for Surface Navigation
S-111	Surface Currents
S-124	Navigational Warnings
S-129	Under Keel Clearance Management
Critical Framework	
	IHO Geospatial Information Registry
S-98	Interoperability Specification
S-100	Universal Hydrographic Data Model
S-128	Catalogue of Nautical Products
S-164	Test Data Set for S-100 and ECDIS Type Approval
Phase 2 / Route planning	
S-122	Marine Protected Areas
S-123	Marine Radio Services
S-125	Marine Aids to Navigational (AtoN)
S-126	Marine Physical Environment
S-127	Marine Traffic Management
S-131	Marine Harbour Infrastructure
S-411 (WMO)	Ice Information
S-412 (WMO)	Weather and Wave Hazards

Phase 1 / Route Monitoring

Phase 1 Route Monitoring Mode

S-101 ENC
S-102 Bathymetry
S-104 Water Level
S-111 Surface Currents
S-124 Navigational Warnings
S-129 UKC Management

Critical Framework

IHO Geospatial Information Registry
S-98 Interoperability Specification
S-100 Universal Hydrographic Data Model
S-128 Catalogue of Nautical Products
S-164 Test Data Set for S-100 and ECDIS
Type Approval

Phase 2 / Route Planning

Phase 2 Route Planning Mode

S-122 Marine Protected Areas
S-123 Marine Radio Services
S-125 Marine Aids to Navigation (AtoN)
S-126 Marine Physical Environment
S-127 Marine Traffic Management
S-131 Marine Harbour Infrastructure
S-411 Ice Information (WMO)
S-412 Weather and Wave Hazards (WMO)

+ S-100 Products used in
Monitoring Mode

S-98 Annex C Water Level Adjustment does not apply to S-111

Roadmap for the S-100 Implementation Decade v. 3.0.0



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S-100 ACTIVITY

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- S-100 WG8 revised S-100 Edition 5.1.0. Edition 5.2.0 is now going through the approval process.
 - Change of digital signature algorithm from DSA to ECDSA. [Part 15]
 - All Phase 1 products must use the ECDSA algorithm. Product specifications must therefore be aligned to Ed. 5.2.0.
 - Updated Feature Catalogue model to indicate attributes to be suppressed in pick reports. [Part 5]
 - Prescribes use of new attribute “interoperabilityIdentifier” to identify instances of the same thing in different data products (e.g., the same Restricted Area in ENC and Marine Protected Area datasets). [Parts 3 and 11]
 - Part 4a revised to say product specifications cannot extend the S-100 exchange catalogue model
 - Cannot define new metadata attributes in dataset discovery metadata blocks (or elsewhere in the exchange catalogue).
 - Revised schema for SVG symbols (Part 9 - Portrayal); minor corrections and clarifications in Part 9 and 9a (Lua portrayal).
 - Approved residual corrections and clarifications to Part 8 (imagery and gridded data conceptual model)
 - Minor corrections and clarifications to Part 10a (ISO 8211 encoding), Part 10c (HDF5 encoding).
 - Specification of requirements for fileless cancellation; restriction for bounding polygon for data coverage in discovery metadata. [Part 17]



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S-111 TRANSITION FROM EDITION 1.2.0 TO 2.0.0

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- Historical observations and hindcasts retained.
 - Since S-111 is also intended for ECDIS, recommend their removal from Edition 2.0.0.
- Added provision for non-uniform time series with moving platforms (DCF4).
 - Values record for DCF 4 includes attribute surfaceCurrentTime
 - Time interval metadata attributes from DCF 8 now also applies to DCF 4.
 - Since S-100 does not provide them for DCF 4 they are S-111 extensions in Edition 2.
- Node-wise “uncertainty” as optional real attribute in the data values record not yet added, pending input from S-111 team.
 - Does S-111 need two uncertainty attributes (speed and direction)?
- Alignment with latest draft of S-100 5.2.0:
 - Digital signatures are now mandatory. Clarifications have been added about use of digital signatures in discovery blocks in the exchange catalogue.
 - Updated metadata to S-100 Edition 5.2.0 metadata.
 - Adoption of requirements for fileless cancellation.
 - Adopted restriction on bounding polygon for data coverage in discovery metadata.
- Added new EPSG codes to list of allowed codes for horizontal CRS
 - Recent realizations of WGS 84
 - Added EPSG codes for UTM zones.

«FeatureType» SurfaceCurrent	
+	surfaceCurrentSpeed: Real
+	surfaceCurrentDirection: Real
+	surfaceCurrentTime: DateTime [0..1]



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S-111 1.2.0/2.0.0 TRANSITION – 2

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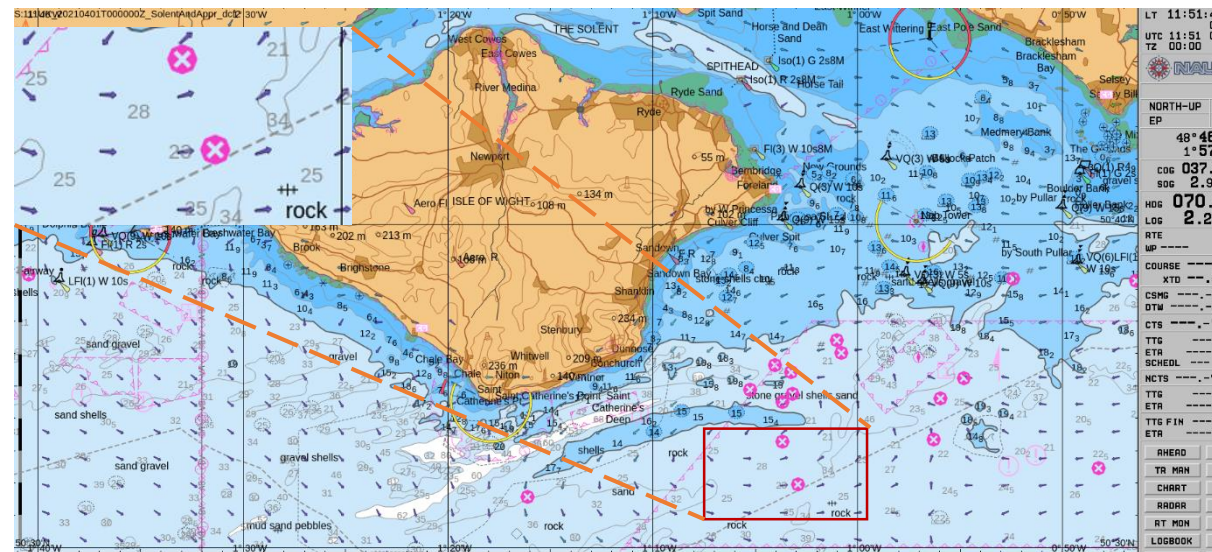
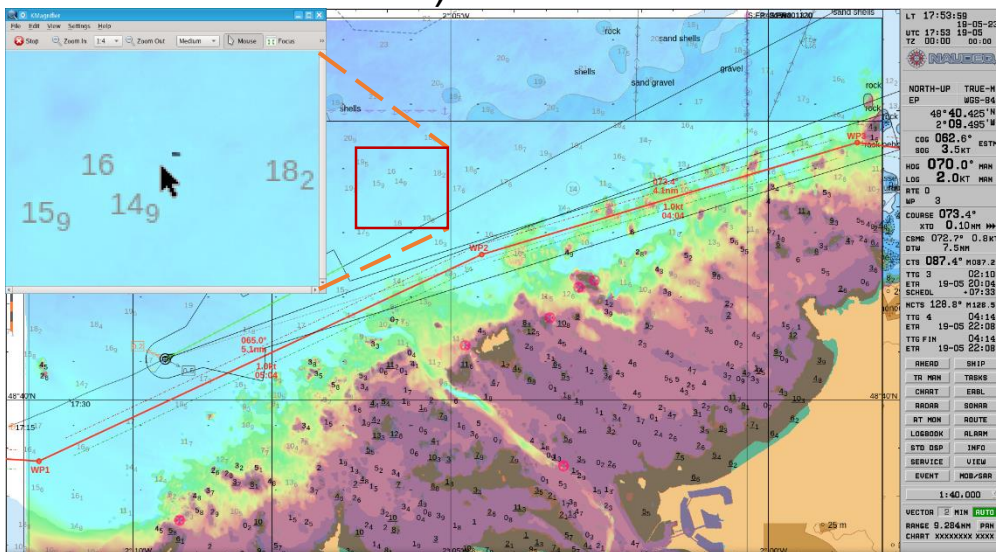
- Added material regarding requirements for visual interoperability.
 - Same CRS as underlying S-101.
 - Must be consistent with water levels (dry points or points on land must be populated with fill values for current speed and direction).
 - No spatial overlap between S-111 datasets from the same producer.
 - Cross-compatibility checks in S-158 (validation checks) or S-98 (Interoperability) must be satisfied.
- Water level adjustment algorithms in S-98 do not apply to S-111 datasets.
- Removed old Annex B (Additional terms), moving selected terms to Clause 1.4.1
- ISO metadata files are no longer allowed. (S-100 WG recommends not using them for Phase 1 products).
- Validation checks being updated
 - Added known checks for cross-product compatibility with S-104/S-101.
 - Check ID format is now as decided by the S-100 validation checks sub-group.
 - Clarifications relating to dataset production (clause 7) including requirements pertaining to metadata and S-102/S-101 compatibility for S-98 WLA purposes.
- Updated UML and exchange set structure diagrams
- Hypothetical use case (Annex F) – use of S-111 to reduce fuel consumption and emissions. (S100WG8-32)



IHO S-104 1.1.0/2.0.0 TRANSITION – PORTRAYAL I

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- All portrayal is now symbol-based (the arrow symbol will be displayed either at grid points or single point or points).
- Floor for arrow size calculation increased to 1.50 knots to improve arrow visibility (feedback from NAUDEQ). Color bands remain the same.



Screen captures courtesy NAUDEQ

- No plots specified in S-111 Ed. 2 because S-100 Edition 5.2.0 portrayal does not define a way to implement them on ECDIS.



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S-104 1.1.0/2.0.0 TRANSITION – PORTRAYAL II

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- Cursor pick may produce additional information as a “pick report”.
 - New clause in Annex J describes notional tabular structure for time series data, derived from tidal stream tables in S-4 and S-98.
 - Applications allowed to improvise on the notional pick report structure.

Tidal Station: <i>(station name)</i>			
Tidal Station Identifier: <i>(station identifier)</i>		Data From: SURF CUR (S-111)	
	Hours	Direction of stream (degrees)	Rates (knots)
Before	-6		
	-5		
	-4		
	-3		
	-2		
	-1		
YYYY-MM-DD HH:MM:SS Z		0	
After	+1		
	+2		
	+3		
	+4		
	+5		
	+6		

Figure J-3 – Notional pick report structure for data at multiple times

- SVG symbols need to be updated to conform to the new S-100 5.2.0 SVG schema



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OPEN ISSUES

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- Node-wise uncertainty?
- Include historical observations and hindcasts?
- Finalization of dataset cancellation.
 - Pending determination regarding fileless cancellation for all S-100 datasets (Security Scheme PT / S-100 WG)
- Portrayal catalogue
 - Update Ed. 1.0 PC (XSLT) or develop new Lua PC?
 - Update SVG symbols to conform to new S-100 Ed. 5.2.0 SVG schema.
- Finalization of validation checks depends on developments in the S-100 Validation Checks and S-98 sub-groups.
 - “S-100 level” checks
 - Cross-product checks to verify compatibility for the purpose of water level adjustment as described in S-98
 - “Product-specific” checks cannot be finalized until “S-100 level” and “interoperability” checks are finalized
 - Redundancies, Conflicts, Gaps?



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S-111 NODE-WISE UNCERTAINTY

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Domain	ALL	Status	Valid	Attribute type	ALL	Category	Name	uncertainty	
Item ID	Name	Camelcase	Definition	Domain	Status	Date Accepted			
811	Direction Uncertainty	directionUn...	The best estimate of the accuracy ...	IHO Hydro	Valid	2020-10-26			
837	Horizontal Distance Uncertainty	horizontalDi...	The best estimate of the horizont...	IHO Hydro	Valid	2020-10-26			
859	Orientation Uncertainty	orientation...	The best estimate of the accuracy ...	IHO Hydro	Valid	2020-10-26			
884	Uncertainty	uncertainty	Estimate characterising the range ...	IHO Hydro	Valid	2020-10-26			
885	Uncertainty Fixed	uncertainty...	The best estimate of the fixed hori...	IHO Hydro	Valid	2020-10-26			
886	Uncertainty Variable Factor	uncertainty...	The factor to be applied to the var...	IHO Hydro	Valid	2020-10-26			

Showing 1 to 6 of 6 rows

- Potential node-wise uncertainty attributes:
 - Uncertainty for speed – attribute “uncertainty” from GI registry
 - *Definition:* Estimate characterising the range of values within which the true value of a measurement is expected to lie as defined within a particular confidence level. It is expressed as a positive value.
 - *Unit:* Metre; *Resolution:* 0.01
 - Uncertainty attributes for direction – either “directionUncertainty” or “orientationUncertainty”
 - Definition of “directionUncertainty”: The best estimate of the accuracy of a bearing. Range 0.0 – 360.0. Precision 0.1.
 - Definition of “orientationUncertainty”: The best estimate of the accuracy of a bearing. Range 0 – 360. Precision 0.001



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NEXT STEPS

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- Review by S-111 project team and TWCWG and resolution of issues identified during review.
 - Dataset cancellation – fileless by preference
 - Requires resolution of security issue identified by PRIMAR
 - Finalization of “product-specific” validation checks?
- Check by DQWG
- Sample datasets
- HSSC approval
- Member State vote
- Validation
- Clarify production and distribution requirements and issues
- Test datasets for ECDIS
- Others?