The United States S-100 Testbed Software Development Project

NOAA Open House on Nautical Cartography
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Outline

- Introduction
- S-100 Viewer Design V1.3
- Viewer Functionality
- Alternative “Lua” portrayal method
- Next steps
- Conclusion
- Acknowledgements
SPAWAR Atlantic is developing an S-100 Viewer application
Sponsored by National Geospatial-Intelligence Agency (NGA) Maritime Safety Office
Work is being coordinated with the IHO S-100WG and S-101PT

Korean Hydrographic & Oceanographic Agency (KHOA) is also developing a viewer application
V1.3 Design Goals

- Verify the consistency in content and language between S-100 and the various geospatial product standards that spawn from S-100; initially focusing on S-101 ENC

- To better understand the portrayal requirements of S-100 and S-101, as well as verify that those requirements are properly partitioned and implemented

- Verify the current XML, XSD, and XSLT files represent information taken from the feature registry and the portrayal registry

- Verify that the specifications define a clear, unambiguous process for translating from a products dataset to a valid portrayal via automated generation of portrayal instructions

- Verifying that all aspects of S-100 and the associated portrayal are **100% machine readable**
Start up Screen

- Help
- Calibrate Monitor
- Open Dataset
- Open Feature Catalogue
- Import Portrayal Catalogue
- Import Feature Catalogue
Catalogs / Inputs

- Feature Catalog 0.8.9
- Portrayal Catalog 1.0 Dec 2016
- S-57 to S-101 Converter 0.8.19
Data Loading Validation
ISO 8211 Encoding View
Data Model View
Feature Catalog View
Portrayal Catalog View
XSLT Rendering Process

Feature Data (XML) → Portrayal Engine (XSLT Processor) → Display List (XML Draw instructions) → Rendering Engine (Custom Code) →

- Mariner Settings (XSLT Arg List)
- Color Profiles (XML)
- Symbols (SVG)
- Color Palette (CSS)
- Portrayal Rules (XSLT)
- Portrayal Catalog
- Manufacturer developed
Lua for Portrayal

Why Lua?

- S-52 Conditional Symbolization Procedures (CSPs) are implemented as currently specified
  - Leverages well known CSPs without revalidation of rules
- Rules are implemented procedurally and well understood
- More concise than XSLT (avg. 50% smaller)
- Lua is easier to write and validate
- Will run on a wider variety of platforms (hardware and software)
- Portrayal Input Schema is no longer needed within S-100

Remove Input Schema

- Implement XSLT rules as Lua scripts
- Support files are unchanged
- Output is (optionally) unchanged

Diagram:

- Lua Portrayal Rules
- Pixmaps (XML)
- Color Profiles (XML)
- Display Modes (XML)
- Symbols (SVG)
- Line Styles (XML)
- Fonts (XML)
- Area Fills (XML)
- Viewing Groups (XML)
Lua for Portrayal

More Lua S-100 Opportunities

- Alarms and Indications
- Product Intraoperability/Interoperability
- Extended Dataset Validation

**Recommendations**

- Replace the use of XSLT within the S-100 portrayal with Lua as described
- Update S-100 Part 9, including removal of the portrayal input schema
- Add a new part for S-100 Lua Scripting support, supporting development of Alarms and Indications, Interoperability, and other script based extensions to the main functionality described in S-100
Next steps...

Work Ongoing...

• Masked Edges
• Refined validity testing for catalogs
• Extend portrayal for GML and HDF5 encoded products
• Waiting for updates to the S-100 Exchange Set so we can implement import functions, decryption and digital signature verification
• Design and coding of Phase 6 Shore Based “ECDIS”
Conclusions

- S-100 is maturing as the Universal Hydrographic Data Standard
- Ed. 4 in 2019 will offer XSLT and Lua portrayal mechanisms
- The goal is for feature and portrayal catalogs to be machine readable
- S-100 Viewer V1.3.0.0 is available at basecamp, and we welcome review and comment
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- S-100WG Chairperson: Julia Powell (NOAA)