

## Paper for Consideration by NIPWG

### Data sharing between ATON authorities and HOs in the S-201 world

<b>Submitted by:</b>	R. David Lewald, U.S. Coast Guard
<b>Executive Summary:</b>	This paper is intended to highlight actions necessary for AtoN Authorities to implement the S-201 Product Specification and use it to communicate AtoN data to Hydrographic Offices.
<b>Related Documents:</b>	IALA S-201 Product Specification (draft)
<b>Related Projects:</b>	Efforts by Korean Government to develop S-201 tools and protocols

#### Introduction / Background

The arrival of electronic charting and digitized maritime safety information requires the development of data exchange methods and protocols to be used by Hydrographic Offices and Aids to Navigation Authorities. The International Hydrographic Office (IHO) has adopted the S-100 standard for geo-spatial information. This standard describes the scope, data content and structure, specifies procedures for data maintenance and quality and details the encoding of the data. The IHO S-100 document is underpinned by a Registry and component Registers based on ISO 19135 – Procedures for registration of items of geographic information. The IHO owns and manages the Registry. IALA Council has approved the participation of IALA in the IHO GI Registry as a Submitting Organization, and as a domain owner (i.e. the IALA domains within the Registry).

#### Analysis/Discussion

##### IALA Domains

The ENAV committee has developed several guidelines describing domain management responsibilities and to assist members with development of S-100 Product Specifications. These guidelines are intended to support AtoN Managers as well as provided detailed direction to Information Technology experts.

##### S-201 AtoN Product Specification

The Aids to Navigation (AtoN) Information Product Specification (S-201) provides a common structure for the exchange of information about AtoNs. This includes buoys, beacons, racons, lights sound signals and AIS. The product contains the positions, properties, operational status and general comments related to an AtoN. The Product Specification can be used to exchange AtoN information in a consistent form between AtoN Authorities, Hydrographic Offices and other organizations (to include commercial and professional agencies).

##### Implementation of the S-201 AtoN Product Specification

The implementation of S-201 by an AtoN Authority will require a level of effort to adapt their existing AtoN management databases, but it will not require full replacement or realignment. Most of the information regarding an AtoN required to complete the description of that AtoN in S-201 format already exists in our databases. AtoN Authorities must simply create a Gazetteer or Lexicon to translate the data into an S-201 styled report.

##### Implementation of S-201 in the U.S.

The U.S. Coast Guard is working with U.S. Hydrographic Offices to develop output files designed to support the existing S-57 Electronic Nautical Chart format with the understanding that these output formats can be easily upgraded to support the S-201 Product Specification when completed and adopted.

##### Practical Demonstration of the S-57 AtoN Report

The U.S. Coast Guard maintains approximately 10,500 to 13,500 buoys on the Mississippi and Ohio River systems. The number of buoys and their positions fluctuate weekly because of ever changing water levels in these Inland Rivers. The U.S. Army Corps of Engineers is the Hydrographic Authority responsible for producing navigation products and they currently provide Inland ENC and paper charting products. Prior to 2015, the buoys could not be charted due to human constraints; the cartographers simply could not encode 10,000+ buoys each week spread across their portfolio of several hundred charts. The result was the mariner had no idea of the AtoN disposition until they “rounded the bend in the river”.

Working together, USACE Cartographers and USCG AtoN personnel developed a comma delineated file report which uses S-57 attributes as column headers. These columns are then populated from tables within the USCG's AtoN database. In the table below, the S-57 attribute BOYSHP uses numeric values to describe the type of buoy (nun or can, etc.). Through use of lookup tables, the USCG populates this report with the appropriate S-57 attributes and transfers the report to USACE weekly.

BOYSHP	COLOUR	SYMBOL_NAME	RIVER_NAME
1	3	Red Nun	Upper Mississippi
2	4	Green Can	Upper Mississippi

Table 1 – Sample S-57 AtoN Report

USACE Cartographers simply import this file into their chart development tool which creates a new edition buoy chart (Chart: 3USBUOYS.000) for the week. Electronic Charting Systems (ECS) are widely used aboard vessels operating in the U.S. river system and most have been programmed to automatically download the new edition buoy chart when publicly released each Tuesday.

Continuation of S-201 Implementation in the U.S.

In the U.S. work on development of the AtoN Database – ENC Attribute gazetteer continues and we are currently working on complex lights. We have uncovered instances where a direct connection cannot be made between the AtoN database and an ENC attribute. Most notably this occurred with the Light Characteristic field in the AtoN database. We currently use a text box to capture the entire light characteristic (ex. FL G 4s). The ENC attribute for a light characteristic is individually captured as Rhythm, Colour, and Period. We will create new fields within our database to accommodate the ENC attribution and in other instances where we cannot complete the gazetteer.

It is envisioned that ultimately the transfer of AtoN data to Hydrographic Offices, Mariners, Academia, and other maritime entities will be automated and delivered in S-201. Additionally, The USCG intends to provide AtoN data to other S-100 Product Specifications currently under development and consideration (i.e. List of Lights and Notice to Mariners Product Specifications).

Several Key Challenges and Policy Decisions remain:

- Will S-201 AtoN data sets include ENC portrayal guidance to the HO?
- Will the AtoN Authority assume all Quality Analysis responsibilities of the AtoN Data within an ENC (including portrayal)?
- How much AtoN data do we want to make publicly available?
- What will be the communication protocols (i.e. what type of web services)?
- Will we provide AtoN data in other geospatial formats (i.e. GML)?

## Conclusions

Guideline for Implementation of the S-201 Product Specification

The current draft of the S-201 PS has an Annex entitled Implementation Guidance, but it exists in title only. The USCG desires to participate in the drafting of this guidance and seeks partnerships with other AtoN Authorities and Hydrographic Offices to develop this guideline.

## Action Required of NIPWG

The NIPWG is invited to note.