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Agenda item [[2]](#footnote-3) 8.4

Technical Domain / Task Number 2 …………………………………

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Project for Supporting the Production of Basic Data for S-201 Transition Assistance of IALA Member States

# Summary

Following the approval of the 2nd IALA Council, S-201 Edition 2.0.0 has been developed. If aids to navigation (AtoN) authorities operate their AtoN information management systems in consideration of the S-201 product specification, the production and service of S-201/S-125/S-124 AtoN information will become possible.

From the perspective of AtoN information management, the application of the S-201 product specification is expected to have significant benefits. Therefore, a basic data production support project is proposed to assist member states interested in transitioning to S-201

## Purpose of the document

A plan to support the production of S-201 basic data to assist IALA member states in transitioning to an information management system based on the S-201 product specification is proposed.

## Related documents

S-201 Aton Information Product Specification (Ed.2.0.0, June 2025)

G1143 Unique Identifiers for Maritime Resources (Ed.3.1, June 2021)

# Background

The IALA ARM Committee has been developing the S-201 AtoN Information Product Specification and produced Edition 2.0 during the ARM20.

# Discussion

## Overview of S-201

The S-201 is a product specification developed based on the S-100 Universal Hydrographic Data Model Standard, designed to support the exchange of aids to navigation (AtoN) information. The S-201 includes details on the data model, quality standards, data format, and metadata in its main text. It is composed of several components:

1. Feature Catalogue, which defines the data model in digital form,
2. Portrayal Catalogue, which specifies the digital standards and representation methods for AtoN symbols,
3. GML Schema for common data formatting, and
4. Data Classification and Encoding Guide (DCEG), which provides classification and input guidelines.

S-201 Edition 2.0 was developed to facilitate the exchange of AtoN information between AtoN authorities and hydrographic offices. It is designed to be compatible with IHO’s S-101 Electronic Navigational Chart (ENC) standard, thereby enabling the creation and production of digital AtoN data that supports seamless digital information exchange.

## Transition Plan for Aids to Navigation (AtoN) Information Management Systems and S-201 Basic Data

The transition plan for AtoN information management systems aims to shift existing national or organizational AtoN databases and management frameworks to an S-100–based structure, specifically adopting the S-201 data model. This transition allows for standardized data exchange and interoperability among IALA member states and between AtoN authorities and hydrographic offices.

Key aspects of the transition plan include:

1. System Compatibility and Framework Alignment – Ensuring that the existing AtoN information systems are aligned with the S-201 data model and can generate, store, and export data in compliance with S-100 standards.
2. Data Conversion and Quality Assurance – Converting existing legacy data into the S-201 format and applying quality control measures to meet the required accuracy and metadata standards.
3. Training and Capacity Building – Providing technical guidance and training to personnel for S-201 data handling, editing, and validation.
4. Integration with Other S-100 Standards – Enabling interoperability with related standards such as S-124 (Navigational Warnings) and S-125 (Marine Aids to Navigation Physical Properties).

The S-201 basic data refers to the foundational dataset required to build and operate an S-201-compliant information management system. It includes:

1. Geospatial reference data (e.g., coastline, base maps, and reference coordinates);
2. AtoN positional and attribute information (e.g., light characteristics, structure type, operational status);
3. Metadata and identifiers necessary for cataloging and maintaining consistency across data products.

Together, the transition plan and S-201 basic data provide the framework and essential resources for IALA member states to modernize their AtoN information management systems in accordance with international standards.

There are three product specifications related to aids to navigation (AtoN): S-201, S-125, and S-124. By improving or transitioning AtoN information management systems in consideration of the S-201 standard, it becomes possible to support IMO maritime services.

The S-201 AtoN data model establishes relationships between equipment features and structure features, and defines the types and detailed attributes of AtoNs. Therefore, existing AtoN information management systems need to be upgraded or adapted to ensure compatibility with the S-201 data model.

During the development of the S-201 standard, implementation guidelines were discussed, and two possible approaches were proposed:

* Option 1: Partially improve the existing AtoN database to align with the S-201 data model.
* Option 2: Build a new AtoN database based on the S-201 data model and migrate the contents of the existing database.

If a country intends to improve its national AtoN database, a preliminary review and evaluation process is required, particularly to establish mapping between existing AtoN information and the S-201 data model.

Once the S-201 basic data are secured, it becomes possible to:

1. Develop a strategy for improving the AtoN database and management system;
2. Establish a foundation for producing S-201 data; and
3. Prepare for future digital maritime services in alignment with IMO’s e-Navigation framework.

## S-201 Basic Data Production Plan

The S-201 data model consists of Equipment features and Structure features, which are linked through a Structure–Equipment relationship. Some attributes of each feature are mandatory, while many are defined as optional.

The S-201 basic data are constructed by including only the mandatory attributes of the Structure and Equipment features that make up an aid to navigation (AtoN). In other words, it can be regarded as S-201 data produced using the information level found in the List of Lights.

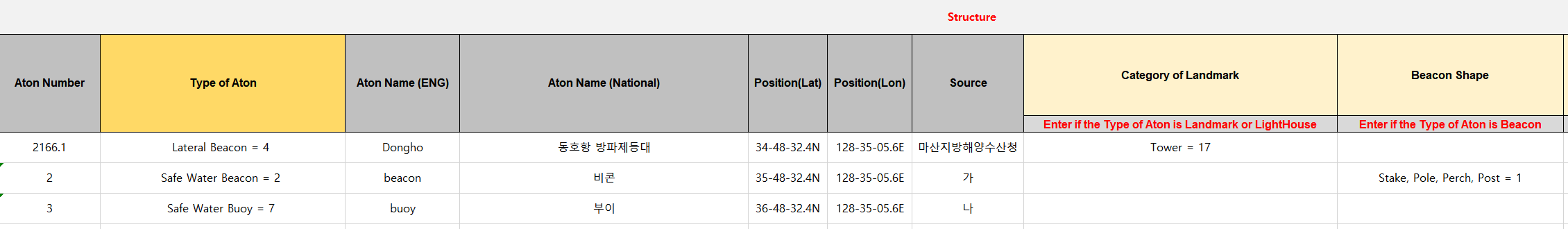
The S-201 basic data consist of the following components:

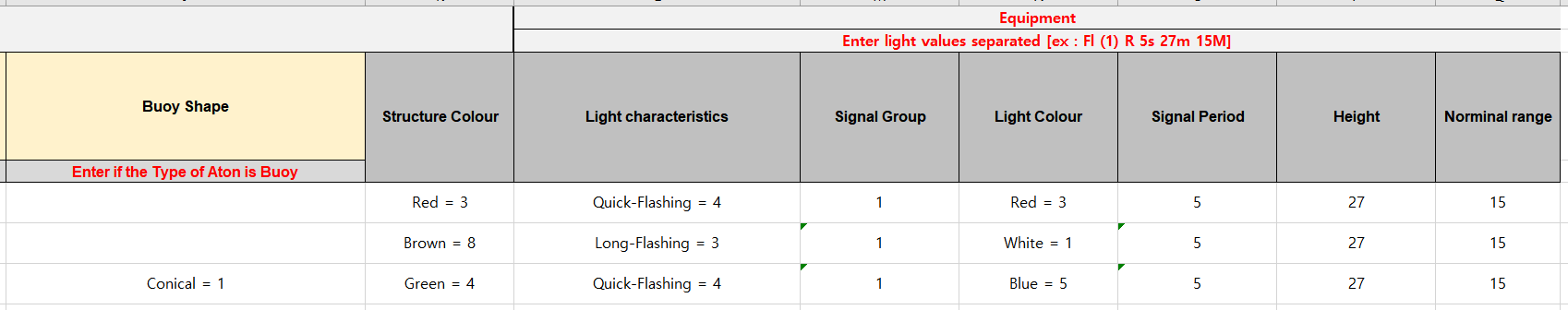
* Aton Number, Type of Aton, Aton Name, Position
* Category of Landmark, Beacon Shape, Buoy Shape, Structure Colour
* Light characteristics, Signal Group, Light Colour, Signal Period, Height, Nominal range

The S-201 basic data production plan has been identified as follows and can be implemented according to the option selected by the requesting member state:

1. Option 1: The requesting member state enters data following the standard CSV template.
2. Option 2: The requesting member state provides the latest official national electronic navigational chart (ENC), from which AtoN data are automatically extracted and collected.
3. Option 3: The requesting member state provides the List of Lights, and the Korean research team inputs the data into the standard CSV template.

When basic AtoN data are secured using the provided standard CSV template, they can be automatically converted into S-201 GML basic data by loading them into the S-201 Test & Validation Tool. Furthermore, the requesting member state can add detailed S-201 attribute information through the input interface of the S-201 Test & Validation Tool, which is based on the Feature Catalogue provided within the system.





## Application by IALA Member States for S-201 Basic Data Production and Cooperation with the IALA Secretariat

A application form will be prepared for IALA member states applying for S-201 basic data production support, and submission to the Korean Ministry of Oceans and Fisheries (MOF) and KRISO will be requested. The application form will include the following items:

* Name of the applying IALA member state
* Selection of S-201 basic data production method (choose one of the three options); if the ENC-based method is selected, prior consultation with the national hydrographic office regarding ENC use and purpose is required
* Design plan for MRN (Maritime Resource Name) syntax, to establish ID systems for equipment, structures, and AtoN numbering
* Agreement on mutual cooperation for the production of S-201 GML basic data

The S-201 basic data production project for IALA member states is expected to greatly support the digital transformation of AtoN information and enhance readiness for maritime service implementation. Therefore, it is requested that the IALA Secretariat promote the use of the S-201 product specification and encourage active participation from member states through targeted outreach and publicity activities.

# Action requested of the Committee

The Committee is requested to consider this input paper, and take actions as appropriate.

1. Input document number, to be assigned by the Committee Secretary [↑](#footnote-ref-2)
2. Leave open if uncertain [↑](#footnote-ref-3)