

Paper for Consideration by NIPWG

Status update on S-126

Submitted by:	University of New Hampshire
Executive Summary:	S-126 status report
Related Documents:	Annex A NIPWG 3-33.1 NIPWG 4-15.1
Related Projects:	S-101, S411 and S-412

Introduction / Background

At NIPWG4 in 2017 the development of the S-126 (physical environment) Product Specification was put on hold due to lack of resources and the fact that the S-126 dataset is not a SOLAS carriage requirement. However, there were a few outstanding items from previous meetings (NIPWG3, ice related info and NIPWG4, gaps in listed S-126 items) that were completed as well as other S-126 related work. The status of that work will be discussed in this paper along with recommendations on how best to continue.

Analysis/Discussion**NIPWG3 task**

At NIPWG 3 the paper [3-33.1 Polar Regions Ice Information Sources](#) was presented to the group with the recommendation to determine if any or all of the information contained in [Annex A \(historical ice information\)](#) and [Annex B \(real-time ice information\)](#) would be suitable for inclusion in the Physical Environment (S-126) Test Data Set.

After review of the Annex's and seeing that they were tables of about 20 web links and about 30 documents containing various information for both real-time and historical ice information it brought up the question, what publications are the NIPWGs main focus? With limited resources, the need to focus on only a few main publications is critical to start this process. And without being experts in the ice domain related to navigation this task became very daunting.

In the assessment of including any physical environment information we need to answer the following questions

- How is the specific information going to be used by the mariner?
- What are use case scenarios for this type of information?
- What information is expected to be shown and how will this help the mariner make better situational decisions?
- Will this be used mostly for planning, underway, or both?
- Are there other data that is related to the specific physical environment information in order to make decisions? (What other factors are involved?)
- How are notifications for this physical data typically sent out? (If any)
- What other groups are modelling data related to this information and what type of information is it exactly?
 - How can any of our physical environment information supplement that other domain's information?

NIPWG4 options for moving forward

In [NIPWG 4-15.1](#) there were 2 ways identified to proceed with the development of the S-126 Product Specification:

1. Expand the other appropriate product specifications with attributes that would cover descriptive elements for the data.
2. Develop the S-126 product specification with an eye to correlating it with the associated product from other domains but filling the gaps in their data models.

However, before either of these tasks can be selected there needs to be a discussion on what data related to the S-126 is most relevant to the marine community and how it will be used. This discussion should also take into account how static vs. dynamic the data is and in what capacity it will be used to support related data in other domains. It is important to maintain a paper trail of this process so future participants will be aware of the decision being made and why they were made as the process moves forward.

S-126 list of items

At NIPWG4 a list of items was presented in the document [15.1A](#) in the form of an excel spreadsheet that listed all elements from the various groups that were related to the physical environment (including all relevant items on the NIPWG wiki). This list has been updated and submitted along with this paper to include all chapter headers from the US Coast Pilot (in green text), as well as INT Chart 1 associations for each topic. It was updated against the newest S-412 model as well as a previous NIPWG S-126 data model document. This document is to be used as a guide on where the greatest overlap occurs between the various products and where to first focus our energies in finding the top ten items to work with.

Working with other Data Models

Previously, in NIPWG4 a list of features were compiled that were the result of a comparison between the S-126 and elements in the S-101 (ENC)/S-111 (surface currents)/S-112 (tides)/S-411 (ice information)/S-412 (weather overlay). It is the assumption that, when the development of the S-126 Product Specification is resumed, this list will be the foundation for moving forward.

Since the last meeting preliminary work on the S-412 data model was sent to various members of their group. UNH is a member of both the S-412 group and the S-126 project team and so looked into how its data model could work in conjunction with the S-126.

The current idea for the direction of the S-126 would be to categorize all the elements from the list to match INT Chart 1. This will allow simple matching of ENC elements with the S-101 and is something that the US Coast Pilot branch has taken the lead on pursuing with their own incremental updates to be S-100 ready. The S-412 data model will be beneficial in understanding how weather elements impact the mariner and what supplementary historical data would support those elements. We are currently lacking information on the S-411 ice information data model and would need that to understand how supplementing historical data could be useful.

Aside from the obvious weather related data, the S-126 is also meant to contain physical descriptions of the shoreline and features of interest. These need to be associated with the S-101 and so correspondence with that group is necessary to figure out how we will be able to make the data interoperable.

Use-case scenarios

Collecting use-case scenarios for specific items, starting with data models already available or in the works provides insights into how useful that data will be to the mariner. Asking how the data will be used and when for each item can help to cull from the list any items deemed unnecessary, or at least give them a lower level of importance so the most important can be focused on. Also, having an image in mind about how S-126 data could be used with other data helps to determine what elements to focus on. For example, the S-412 would overlay weather data and work with S-124 (nav warnings) to send out messages according to S-123 (radio signals) specifications and S-126 would be available in the background of those areas for historical / planning purposes.

Also, use-case scenarios could be developed by asking how else historical weather data and physical descriptions of the environment could be used other than planning for navigation and will help to keep an eye to possible uses outside of the domain. (For example, would it be useful for Autonomous Vehicles to use the physical descriptions to navigate? If so, how would those descriptions be translated into machine readable format?)

Recommendations

The project team would like to recommend starting first with the Coast Pilot and Sailing Directions only for relevant ice information especially when it comes to historical information as this is the knowledge base that has been put together in an organized format for the mariner's safe navigation. If, in the future, after the base work is done it is agreed upon to expand the list of publications to include more historical information, the project team

would be willing to accept the extra work. The team feels that the real-time ice information is the responsibility of the S-411 so [NIPWG3-33.1B Annex B](#) seems irrelevant.

The project team needs to liaise with the S-411 group to be aware of their data model and see how historical ice information from the NIPWG publications could be a positive supplement to the mariners.

We need to maintain contact with the S-412 group to be aware of any data model changes and to share information on how we would plan to supplement the real-time data with historical weather data.

Reach out to the S-101 group and find out how we would be able to link physical characteristics with their ENC features.

As far as further development of the S-126, the project team would like to recommend moving forward with developing the product specification to make sure it is data that not only supplements the associated data from other working groups, but that it is available in a format for other non-navigational domains.

We recommend keeping a paper trail of changes, additions and deletions with supporting reasons as the data model develops so the process maintains transparency and can be followed by interested parties.

Action Required of NIPWG5

The NIPWG is invited to:

- a. Note this letter
- b. Accept the recommendations from the project team
- c. Carry out the discussion outlined in the paper, answering the many questions posed.
- d. Help to determine the top ten items on the compiled referencing the attached Appendix.
- e. Help start a use-case scenario listing for the top ten items on the compiled list.