**Input Paper**
1. **Sample Production of S-127 dataset by BSH**
2. **Fulfilling NPUB Carriage Requirements by making use of S-127 conform dataset**

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| ***Submitted by:*** | Germany, Federal Maritime and Hydrographic Agency (BSH) |
| ***Executive Summary:*** | Demonstration and explanation on how the BSH is transferring NPUB information (VTS Guide) into S-127 and creating a publication based on the S-127 conform dataset |
| ***Related Documents:*** | S-12x product specifications |
| ***Related Projects:*** | Creation of S-100 based products |

## Introduction / Background

Currently, the content of the German VTS Guide (BSH no. 2011) is maintained in the content management system *docuglobe*[1]. *Docuglobe* uses MS Office products.

Considering the lack of efficient software solutions available, the BSH tried to find a workaround to store relevant nautical publication information in an S-127 conform database.

The vision was to create and make use of an S-127 conform dataset to produce the VTS Guide out of it.

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## Analysis/Discussion

The metadata of the majority of all nautical relevant publications are held and maintained in the content management system *docuglobe*. Docuglobe is not able to store S-1xx conform datasets. Therefore another software solution was used to figure out, if the vision of creating a publication based on a S-127 conform dataset could become reality, daily business or routine.

In a first step the VTS Guide was dismantled into smaller sections – VTS centres, e.g VTS Centre Travemünde. Each VTS centres contains smaller areas, too – Vessel Traffic Services, e.g. Fehmarn Belt Traffic, Kiel Traffic and Trave Traffic. Having a look to this smaller areas, the NPUB structure is identical and does not show major variations from a VTS to another VTS:
1. The name of the VTS
2. A graphical overview of the surveillance area
3. The contact details
4. Necessary Reports
5. Rules

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[1] https://www.gds.eu/en/content-management-solutions/docuglobe
Note: FOR REASONS OF ECONOMY, DELEGATES ARE KINDLY REQUESTED TO BRING THEIR OWN COPIES OF THE DOCUMENTS TO THE MEETING

6. Services
7. Pilot Information

Therefore, BSH raised the question, if all these seven parts of the given example could be transferred into the current S-127 data model. Would it be possible to find a feature for each part of the structure? Will it be possible to create kind of a form, based on these seven subpoints, to insert all relevant information in a concise way other than an extensive MS Word text document? Is further input from other data sources necessary to depict the content of the VTS Guide?

Secondly, due to a lack of other ideas or possibilities, BSH collected the relevant S-127 features and designed an MS Excel based form. This form could contain all required information.

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|---|---|
| S127:ContactDetails_callName | Bremerhaven Weser Traffic |
| S127:ContactDetails_categoryOfComPref | prefered working |
| S127:ContactDetails_communicationChannel | 22, 02, 04, 07 |
| S127:ContactDetails_communicationChannel | 02 |
| S127:ContactDetails_communicationChannel | 04 |
| S127:ContactDetails_communicationChannel | 07 |
| S127:ContactDetails_communicationChannel | 16 |
| S127:ContactDetails_language | eng |
| S127:ContactDetails_telecommunications_categoryOfCommPref | preferred calling |
| S127:ContactDetails_telecommunications_telecommunicationIdentifier | +49 (0) 4 71 4 83 53 33 |
| S127:ContactDetails_telecommunications_telecommunicationService | voice |
| S127:ContactDetails_telecommunications_telecommunicationIdentifier | +49 (0) 4 71 4 83 52 00 |
| S127:ContactDetails_telecommunications_telecommunicationService | facsimile |
| S127:ContactDetails_telecommunications_telecommunicationIdentifier | vts-bremerhaven@wsv.bund.de |
| S127:ContactDetails_telecommunications_telecommunicationService | email |
| | |
| S127:VesselTrafficServiceArea_featureName_name | Bremerhaven Weser Traffic |
| S127:VesselTrafficServiceArea_requirementsForMaintenanceOfListeningWatch | Continuous listening watch when entering on VHF working channels and VHF channel 16 |

*Figure 1: Extract of S-127 form (MS Excel based)*

Besides that, supporting and appropriate nautical and geographical data were extracted from HPD. By making use of QGIS the data could be sorted, displayed and evaluated.
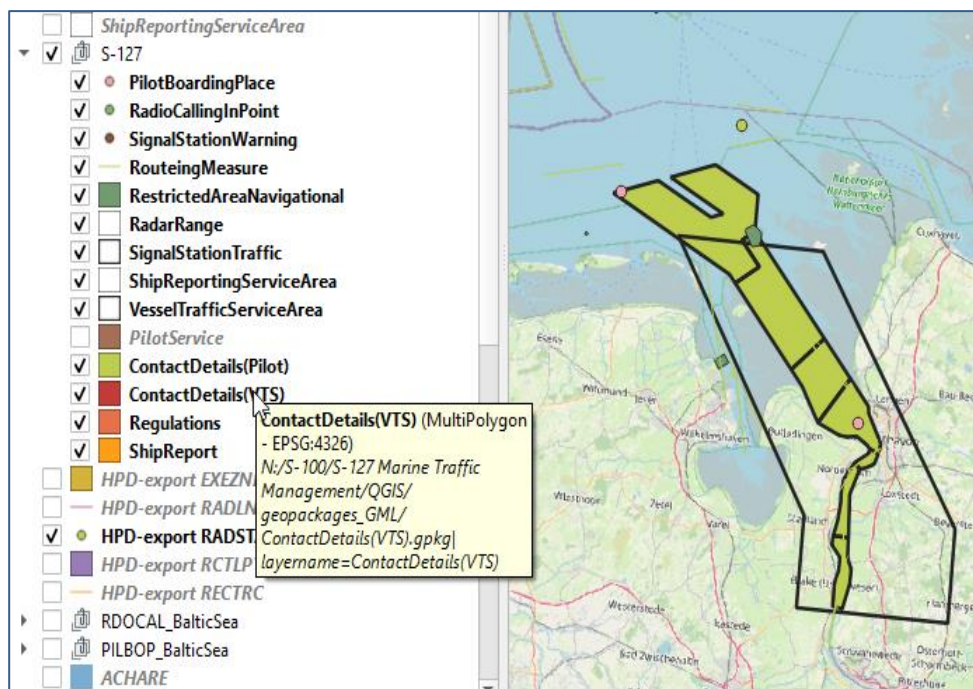


*Figure 2: Display of intermediate results (QGIS)*

Brainstorming further, a mechanism to convert these sorted data into an S-127 conform gml dataset was necessary.

In a third step, a Python-script was developed to satisfy the demand of such mechanism. This script uses the input of QGIS geopackage (the form and the HPD export) and reverts an S-127 gml dataset.

```xml
<S127:ShipReportingServiceArea gml:id="DE.BSH.ShipReportingServiceArea.BremerhavenWeserTraffic">
    <featureName>
        <name>Bremerhaven Weser Traffic</name>
    </featureName>
    <requirementsForMaintenanceOfListeningWatch>Continuous listening watch
when entering on VHF working channels and VHF channel 16</requirementsForMaintenanceOfListeningWatch>
    <geometry>
        <S100:surfaceProperty>
            <gml:Polygon gml:id="DE.BSH.ShipReportingServiceArea.2.1" srsDimension="2" srsName=
            "urn:ogc:def:crs:EPSG:4326">
                <gml:exterior>
                    <gml:LinearRing>
                        <gml:posList>53.2804663654414 8.37913034669872 53.4213931033307
                        8.37913034669872 53.8225840525264 7.95238257281511 53.8225840525264
                        8.37116688659334 53.4236262766788 8.81149938653911 53.2801882995237
                        8.8114993870247 53.2804663654414 8.37913034669872</gml:posList>
                    </gml:LinearRing>
                </gml:exterior>
            </gml:Polygon>
        </S100:surfaceProperty>
    </geometry>
</S127:ShipReportingServiceArea>
</member>
```

*Figure 3: Output (extract of S-127 conform dataset)*

Having now a gml dataset for the exemplary VTS area, which was successfully validated against the latest version of the schema file S-127 xsd, the ongoing considerations focus on how to come closer to the primary vision. Therefore, the question of how to produce the S-127 based VTS Guide was raised.

With step 4 another Python-script was developed to transform the S-127 conform dataset into a pdf document that could be a "real" part of the valid VTS Guide. Parallel to that further developments made use of the HPD exports to create the graphical overview of the VTS centre based on database data instead of graphical skills.
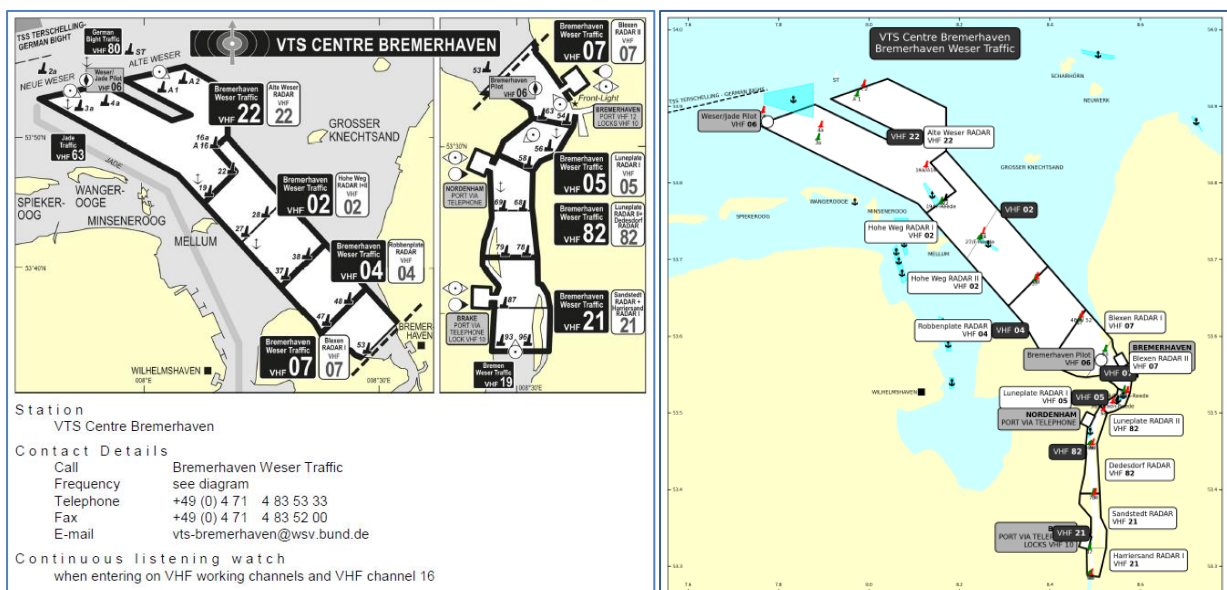


*Figure 4: Comparison of VTS overview (left: "old" overview, right: data based graphic)*

**Further steps**

The export document looks quite similar to the original. Nevertheless, at the moment a lot of manual work is necessary. The result needs to run through a nautical check against the VTS Guide. Based on the prototype experience, an investigation on n how to automate the identification of VTS Guide text content and to assign it automatically to the S-127 data model will be challenging. Furthermore, questions like how to enable an update process will be of outmost importance.

Taking into account that different features of other S-100 compliant products may share the same area, especially with the S-101 ENC, a definition of unique identifiers for each individual feature will be crucial. This ensures future cross product interoperability between affected features. Due to the lack of final approval on how to proceed with this feature in various S-100 based products, the function has not been implemented yet.

**Conclusions**

To generate test datasets manual workarounds are currently still necessary. This might lead to an integration of human error.

A Python script converts the QGIS content to an S-127 compliant data set. A further Python script translates this S-127 data set to the content and layout used by the printed VTS-Guide. The big advantage of this approach is that redundant data storage, one for the S-127 data sets and one for the NPUB content, might not be necessary, soon.

**Action Required of BSHC**
The BSHC is invited to:
    a.    note this paper
    b.    is encouraged to present further national developments

**Annex**

Annex 1 Extract of VTS Guide Germany

Annex 2 Result of VTS Guide generation based on S-127 dataset: