

**Joint 18th TSMAD & 1st DIPWG Meeting
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Paper for Consideration by TSMADWG/DIPWG**

**IHO S-101 ENC Product Specification
ENC Support File Formatting and Management**

1 Introduction

The purpose of this paper is to propose a potential solution for the effective management of ENC support files. It seeks to provide Data Servers (ENC Service Providers) with the necessary tools to encode meta data relevant to these files. This in turn will give the OEMs the means to manage these more effectively and efficiently in the ECDIS. This paper aims to provide a "straw man proposal" to provoke discussion. For clarification purposes the term "Support File" in S-101 is used in the context of "External" or "Ancillary" files as described in the S-57 Product Specification and other publications.

2 Background

The current S-57 Product Specification states that Text and picture files may also be included in the ENC exchange set. These files may be included in an exchange set by a data producer to provide additional information such as that normally contained in sailing directions or coastal pilots. It further defines the file naming conventions and formats that can be included in an S-57 Exchange Set.

Data Servers were unable to provide any additional information pertaining to these files and there was no guidance given as to how these should be managed in an ECDIS. Manufacturers were very much left to decide for themselves how this was done. Experience has shown that these methods are wide and varied and range from the use of complex algorithms to just copying all external files to disc. As a consequence of this, and with the advent of integrated encrypted ENC services, has resulted in the same files being stored multiple times in an exchange set (and sometimes the ECDIS). The original specifications were also open to a degree of misinterpretation.

3 Definition

A support file offers supplementary information that can be included in an ENC exchange set and referenced by single or multiple data files. Text, picture, audio and video files are all permissible in an ENC exchange set. The content of each support file and any subsequent version(s) is unique to any particular ENC cell or cells.

4 Support File Meta Data

The current product specification does not provide a mechanism for managing the status of a support file. For instance there is no method that can instruct the ECDIS to remove redundant/cancelled files. Also there is no method that allows Data Servers to manage different versions of the same file. The S-101 ENC Product Specification now provides an opportunity to address this issue using the "Support File Discovery Metadata" file.

Assumption: all discovery meta data relating to support files will be contained in the one file. If this is true then each producer nation would maintain this file, up to date, for their full collection of support files.

5 Naming Convention

Support files may or may not be of fixed length formatted as follows:

Commentaire [JLP1]: There appears to be no constraint on number of characters here. If you are not going to constrain here you should probably not constrain the ENC file name.

File Name	Type	Char	Remarks
Producer Code	CharacterString	[2]	Two character national producer code as defined in ISO 3166 or other registered company/organisation user codes
Support File Name	CharacterString	Variable	Any upper case alpha characters A to Z and digits 0 to 9.
Delimiter	CharacterString	[1]	A single underscore
Support File Version	CharacterString	[3]	1 - 999
File Extension	CharacterString	[3]	As defined in the SupportFileDiscoveryMetadata "dataType"

Example of formatting:

PPNNNNNNNN_VVV.EEE

Where P is the Producer Code [fixed length]
 N is the File Name [may or may not be of fixed length]
 _ is the version delimiter
 V is the file version (1 – 999) [fixed length]
 . is the extension delimiter
 E is the File Extension

6 The "SupportFileDiscoveryMetadata" File (Name to be defined)

The "SupportFileDiscoveryMetadata" file will be issued with each Base Exchange set and will only contain records for support files contained within that exchange set. The Update Exchange set however will contain records for all support files where it applies to multiple Base Exchange sets. This file will be recorded in the catalogue file (Catalogue.xsd) indicating the destination path where the file can be found.

The "metadataDateStamp" (see Annex A) contained in the "Catalogue.xsd" file will allow the ECDIS to manage the import and reading of this file. ECDIS must not read a file that has an earlier date than the already installed file.

In instances where new base files are being installed, and in the absence of an update, systems should concatenate these files to build a complete set of records¹.

6.1 The "SupportFileDiscoveryMetadata" Record

Each "SupportFileDiscoveryMetadata" record will be formatted as defined below:

Name	Crdnlty	Type	Value	Remarks
S-101 SupportFileDiscoveryMetadata	-	-	-	-
fileName	1	CharacterString	variable	As defined at 5 above
dataType	1	S-101_SupportFileType	TXT, XML, JPG PNG, MP3, MP4	Depends on formats defined in S-100
filePath	1	CharacterString	variable	Identifies the destination folder where the file is stored
issueDate	1	Date	[8]	The date the file was created, modified or cancelled - YYYYMMDD
expireDate*	1	Date	[8]	The date at which a file is known to expire. YYYYMMDD
fileStatus	1	enumerated	1 = New 2 = Modified 3 = Cancelled	Identifies the file status ²

Commentaire [T2]: Need to update S-100 to allow for these new file types.

¹ In the case of encrypted ENC's this may be a subset of records based on the user's ENC permits if this is the preferred method.

² It has been suggested that there should be a "Current" flag as well. My concern is that not all ECDIS are updated on a weekly basis and this may cause the ECDIS problems managing these and new cells.

filePurpose	1	enumerated	1 = T Notice 2 = P Notice 3 = Standard Chart Note 4 = Others?	Could be used by ECDIS to bring certain files to user's attention.
safetyIndex	1	enumerated	1 = High 2 = Medium 3 = Low	High is considered safety critical. Low is considered information only (for discussion)
enclink	1	CharacterString	Filename (no extension)	Comma separated string of ENCs accessing the support file.
crc	1	CharacterString	[8] [4 bytes]	e.g. A1B2C3D4
Comment*	0..1	CharacterString	[300]	Maximum 300 characters

* Non mandatory fields

Example of "SupportFileDiscoveryMetadata" Record:
(Note: XML not confirmed as format)

```
<fileName>GBFILENAME_003</fileName>
<dataType>TXT</dataType>
<filePath>GB\SupportFiles\TXT\GBFILENAME_003.TXT</filePath>
<issueDate>20090401</issueDate>
<expireDate></expireDate>
<fileStatus>1</fileStatus>
<filePurpose>2</filePurpose>
<safetyIndex>1</safetyIndex>
<enclink>GB100001,GB100002</enclink>
<crc>4B793A55</crc>
<comment>BA Weekly NtoM 17/09, 1002(P)/09</comment>
```

6.2 File Management

When a support file is created or a subsequent version issued it will carry an issue date and a CRC value calculated on the content. These values will held in the relevant fields within the "SupportFileDiscoveryMetadata" record and must not change while the file is still current³.

The type of a support file is indicated in the "status" field, i.e. new file, new version of an existing file or cancelled. Support files carrying the "Cancelled" flag can be removed from the ECDIS. Data Servers must ensure that the support file record is retained in the "SupportFileDiscoveryMetadata" file for a sufficient period⁴. This is to ensure that the cancellation message is available to an ECDIS that is not subject weekly updating, e.g. vessels at sea, in refit, etc.

The "filePurpose" field has been included to flag up support files of particular interest, e.g. support files that directly refer to T&P (Temporary and Preliminary) NMs. This field is included as this may be a method that can be utilised to highlight T&P notice information to the Mariner via the ECDIS. A link is provided, "enclink", so ENCs in the ECDIS viewer can highlight the fact there is T or P information available.

Some data producers already attach a textual note (TXTDSC) or a pictorial representation (PICREP) to encoded T&P information. This usually takes the form of a sanitised version of the paper T&P weekly notice tailored for ENCs.

³ That is the file still references an ENC an exchange set or data server's service.

⁴ What is a sufficient period?

NOTE: T&P information encoded as an ER could be similarly flagged at the object level, Theme Feature Types, etc. If accepted this will have to be addressed in S-101 Product Specification in the appropriate section.

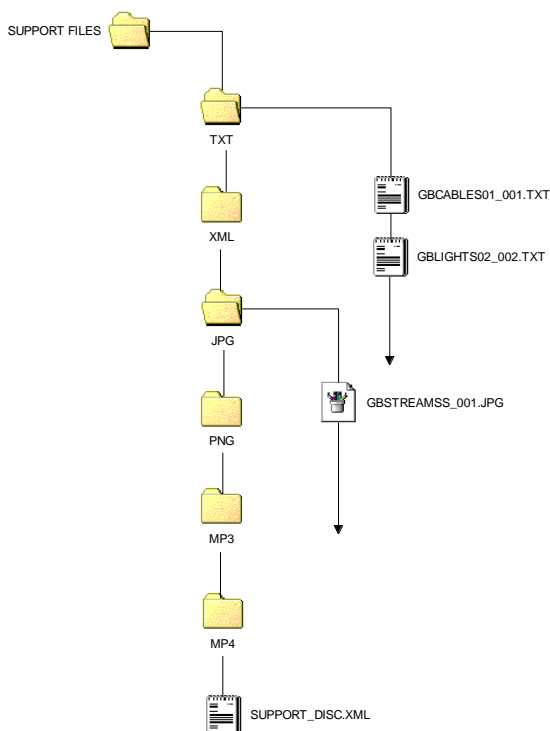
If the method identified above is accepted then a further, non mandatory, field could be included that encodes the expiry date of a T&P related support file. When the expiry date is reached the ECDIS could automatically remove the file from the system.

Another point for possible discussion is whether it is necessary to provide an additional link between the support files and the ENC(s) that refer to them. This is not really an issue with unencrypted exchange sets but could be for encrypted ones. Creating a link between these files and the ENC(s) could reduce the number of files that are stored on the system, i.e. only importing support files that relate to licenced cells. However this may be considered unnecessary due to the increased processing speeds of computers and the larger hard disc being used.

If it is agreed to use the method described above for flagging T&P notices then it would be desirable to have a direct link to the ENC(s) affected.

The field "safetyIndex" is also included for discussion. This may be another method of filtering support files in the ECDIS so that either all can be displayed or only those that are classed as navigationally significant or safety critical.

7 Support File Locations



Example of a possible Folder/File Structure

The "SupportFileDiscoveryMetadata" files will be stored in a location specified by the pathname field [filePath] defined in the Catalogue.xsd file. The "filePath" field in the "SupportFileDiscoveryMetadata" record identifies the actual location of the support file on the exchange set.

In instances where the exchange set is formatted with a hierarchal folder structure it would be preferable to have dedicated directory for support files. There would then be sub directories for the specific types of support file. The diagram across seeks to illustrate this.

For the purposes of integrated ENC services where the exchange set may include ENC(s) from a number of different countries, the "Support File" directory could be located at the country level. This would mean that each country's support files would be held separately.

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ANNEX A
Extract from the First Draft of S-101

S-101 Catalogue File (Catalogue.xsd)

Commentaire [j3]: This table looks similar to the table in section 7.8. However, here horizontalGeodetic datum is substituted for horizontalDatum. The same comment about encoding a definition of CRS applies here.

Name	Crdblty	Value	Type	Remarks
metadataFileIdentifier	1		CharacterString	Should this be changed from a mandatory in S-100 part 3
metadataPointOfContact	1		CI_ResponsibleParty	
metadataDateStamp	1		Date	YYYYMMDD
metadataLanguage	1	English	CharacterString	All data sets conforming to S-101 PS must use English language
fileName	1		CharacterString	
filePath			CharacterString	
abstract	1		CharacterString	E.g. a harbour or port name, between two named locations etc.
purpose	1	{1} to {5}	CharacterString	1. New, 2. New Edition, 3. Re-issue, 4. Update, 5. Cancelled
specificUsage	1	{1} to {3}	CharacterString	Navigation purpose 1. Ocean Passage, 2. Coastal, 3. Port Entry
editionNumber	1		CharacterString	when a data set is initially created, the edition number 1 is assigned to it. The edition number is increased by 1 at each new edition. Edition number remains the same for a re-issue.
updateNumber	1		CharacterString	Update number 0 is assigned to a new data set.
updateApplicationDate	0..1		Date	
issueDate	1		Date	
productSpecificationEditionNumber	1			
editionNumberS-100	1			
producingAgency	1		CI_ResponsibleParty	
displayScale	1	{1} to {12}	double	Display scale must be one of the 12 predefined scales detailed in Clause 4.1
horizontalGeodeticDatum	1		CharacterString	
verticalDatum	1		CharacterString	
soundingDatum	1		CharacterString	
boundingBox	1		EX_GeographicBoundingBox	
boundingPolygon	1		EX_BoundingPolygon	
comment	0..1		CharacterString	
cyclicRedundancyCheck	1		NonNegativeInteger	
layerId	1..*		Double	Identifies the relationship to other layers that are required to view the complete data set.