Assessment of the use of electronic documents based on the UN/CEFACT Multimodal Transport Reference Data Model (MMT RDM) in the execution of formalities for the registration of the arrival and departure of ships in the seaports of Ukraine

Project report

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List of abbreviations

UNECE – United Nations Economic Commission for Europe

UN/CEFACT – United Nations Centre for Trade Facilitation and Electronic Business, a subsidiary body of the UNECE

MMT RDM – Multimodal Transport Reference Data Model of UN/CEFACT

IMO – International Maritime Organization

IMO FAL – Committee of the IMO for the Facilitation of the Procedures of the International Maritime Organization

EMSA – European Maritime Safety Agency

EMSWe – European Maritime Single Window environment

ISPC – Information System of Port Community in Ukraine

Project Overview

The current project focuses on reporting formalities in the seaports of Ukraine as a part of global supply chains. The crossing of multimodal transport corridors at seaports leads to the need to use the UN/CEFACT multimodal transport reference data model (MMT RDM) as a core tool for data harmonization and seamless sharing. There is also a need to link this tool with the requirements of the International Maritime Organization (IMO), national and regional regulations. The project will result in practical recommendations for the further development of digitalization of documentary procedures in Ukrainian seaports.

The objective of the project is to assess the present state of the ship-shore interaction, identify customary practices, formulate the concept of positioning of a national maritime Single Window (MSW) in regional and global multimodal transport corridors and supply chains, and then perform practical tests to prove the concept.

More details can be found in the Project Activities and Outputs section below.

Background of the project.

In accordance with the requirements of Annex to the 1965 Convention on Facilitation of International Navigation, approved by resolution FAL.12 (40) of the International Maritime Organization (IMO), Standard 1.3bis establishes that the IMO member States must take all necessary measures to implement electronic information exchange systems.

In the context of Ukraine, there are similar obligations for the implementation of electronic document management in ship-to-shore interaction, which are specified in paragraph 1850 of the Action Plan for the implementation of the Association Agreement between Ukraine, on the one hand, and the European Union, the European Atomic Energy Community, and their member States, on the other hand, approved by Resolution No. 1106 of the Cabinet of Ministers of Ukraine dated 25 Oct. 2017.

Currently, Ukraine has implemented a procedure to provide information in electronic form using a Single Submission Portal, as covered in UN/CEFACT Recommendation No.37[1] using a port community system (PCS). For more details on such a PCS see www.ppl33-35.com[2]. PCS systems were recognized by IMO in 2019 as one of the best examples of electronic information sharing systems for maritime trade[3]). National initiatives for further digitalization of multimodal transportation and development of a regulatory trade single window make it important to follow the UN/CEFACT Recommendation 36 to ensure interoperability between two or more electronic Single Window systems and single submission portals (in the case of the Ukrainian PCS).

[1] https://unece.org/trade/uncefact/tf_recommendations
2 https://www.en.ppl33-35.com/ispc
[3]https://wwwcdn.imo.org/localresources/en/OurWork/Facilitation/FAL%20related%20nonmandatory%20documents/FAL.5-Circ.42-Rev.1.pdf

At the same time, paragraph 4.5 of the decisions of the 45th session of the Committee on the Facilitation of the Procedures of the International Maritime Organization (IMO FAL) established:

1. Delete all data sheets provided for each of the FAL declarations and replace these lists in FAL standard 2.10.5 with a single reference to a table (IMO Compendium) that will summarize all the data required for the various declarations. The new list will be included as Attachment 1 to the FAL Annex.
2. Combine in one standard the existing standards regarding the authentication requirements for each of the declarations contained in the Annex to the FAL Convention (new standard 1.8.2)

In accordance with paragraph 4 of the IMO FAL.5/Circ/43 dated 23 Oct. 2020, Member Governments are requested to communicate to the IMO FAL Committee the results of the application of the Compendium as soon as possible in order to consider what action should be taken by IMO.

The Facilitation Committee approved at its 45th session (1-7 June 2021) a new version of the IMO Compendium on Facilitation and Electronic Business, which mentions data elements that are both FAL and non-FAL related.

The new IMO Compendium, published[4] in Excel and HTML formats, includes an overview of all changes since the last version.

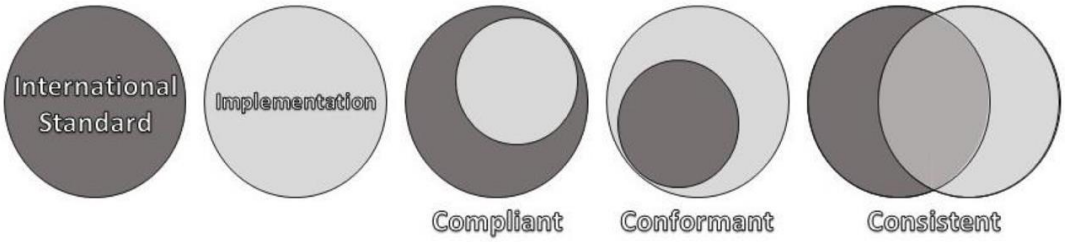
Conditions have thus been created for the governments of IMO member States to stimulate the development of a mechanism for providing information on ship-to-shore interaction in the form of a formalized dataset. At the same time, even if there are regulatory documents of both the International Maritime Organization (IMO) and the European Maritime Safety Agency (EMSA), there are no clear requirements for the format and structure of messages transmitted between the vessel (or its representative) and the coastal services.

This leads to the creation of many unrelated options for the provision of such information both at regional level and at national level by various participants in the process of transporting cargo by sea. In particular, this is the focus of the European Commission's report to the European Parliament and the Council (COM (2014) 320 final[5]) based on the results of the implementation of the requirements of Directive 2010/65 on the Maritime Single Window in the EU member States.

In this context, there is an international standard ISO 28005 "Security management systems for the supply chain - Electronic port clearance (EPC)", which is adopted for use in Ukraine. However, this does not simplify the task. Firstly, participants from many jurisdictions are involved in maritime transportation, namely, within the framework of one vessel voyage, calls are made to the ports of many States with their own requirements for the provision of data. Secondly, the ISO 28005 standard focuses more on compliance than on implementation guidance. From this point of view, the degree of compliance of a specific implementation with a standard should be considered in accordance with the methodology proposed in UN/CEFACT Recommendation No.36.

[4] https://www.imo.org/en/OurWork/Facilitation/Pages/IMOCompendium.aspx
[5] https://ec.europa.eu/transport/sites/default/files/com%282014%29320.pdf

Figure 1: Degrees of compliance with the standard



Source: UN/CEFACT Rec.36 - Single Window Interoperability

Thus, in order to provide a practical solution to the problem of harmonizing the data set, it is necessary to focus on the regulations in force for Ukraine, which would be compliant with the:

- Decisions of the International Maritime Organization
- Decisions of the European Maritime Safety Agency (in the framework of the Association Agreement between the EU and Ukraine)

A key issue in the analysis of data flows during ship-to-shore interaction is the fact that the seaport acts as a transition point between jurisdictions, both in the context of changing national legislation and in the context of changing modes of transport. Thus, ensuring the fundamental possibility for seamless data transfer in multimodal transportation becomes one of the conditions. This necessitates the use of the UN/CEFACT multimodal transport reference data model (MMT RDM) as a functionally complete set of information entities that can act as the basis for such a transformation. Notably, the data set in the Compendium of the International Maritime Organization's Facilitation Committee (IMO FAL) is described as a profile (subset) of the UN/CEFACT MMT RDM. In addition, experts from UN/CEFACT, ISO and EMSA are involved in the work of the relevant IMO expert groups, which ensures the harmonization of requirements with reference to the current international standards.

The EU requirements for the implementation of the European Maritime Single Window environment are set out in EU Regulation No. 2019/1239[6], which takes into account the previously developed Guidelines for the creation of a National Marine Single Window[7].

In this study, we prepared a mapping of documents included in the IMO FAL Compendium, which are used in real business transactions in ship-to-shore interaction in Ukraine, with the UN/CEFACT MMT RDM and the EMSA dataset. We also addressed the issue of transformation between such datasets. Prototypes of electronic documents were prepared, considering the requirements of the described models and the possibility to use them when performing multimodal transportation operations via seaports.

Since at the time of preparing this study there were no publications on the mapping of UN/CEFACT MMT RDM and EMSA data models in the context of documents involved in ship-to-shore interaction, the results of this study should be of interest not only for Ukraine, but also for other countries and organizations. Equally important is the initial focus on the practical application of the results obtained from this study in the framework of further stages of this project focused on the implementation of the UN/CEFACT standards in the IMO/FAL forms in Ukraine as part of the UNDA *Trade and Transport Connectivity in the Age of Pandemic* project[8].

[6] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32019R1239
[7] https://ec.europa.eu/transport/sites/default/files/modes/maritime/doc/2015-06-11-nswguidelines-final.pdf
[8] https://unttc.org/stream/electronic-trade-and-transport-documents-and-data

Project Activities and Outputs

In line with the objectives of this project, the current assessment is structured in two parts. The first part contains a study of the documents involved in real business operations, a mapping of the data in the documents to the UN/CEFACT and EMSA data models and an analysis of the transformation of datasets between models. This allows for the identification of opportunities and barriers, as well as formulating a concept for the application of these data models.

The second part of the assessment aims at proving the concept formulated in the first part through practical tests with parties involved in real-life business transactions.

Based on the results of the practical part, we prepared final conclusions, which stem from the intermediate results of the first (theoretical) part of the assessment and supplemented them.

Part 1. Assessment of the documents and Data models

1. Samples of source documents

In this study, we used paper documents provided by representatives of ship owners (maritime agents) to the port administration, who deal with the completion of formalities for the registration of receipts and waste in the seaports of Ukraine.

In accordance with the terms of reference for this assessment, the following documents were analyzed:

Table 1: List of documents used in the study

	Arrival registration		Departure registration
	Agent №1 - containers	Agent №2 - lorries and wagons on the ferry	Agent №3 - general cargo
General Declaration (FAL form 1)	+	+	+
Cargo Declaration (FAL form 2)	+ Cargo manifest	+ Cargo manifest	+ Cargo manifest
Ship's Stores Declaration (FAL form 3)	+	+	+
Crew's Effects Declaration (FAL form 4)	+	+	
Crew List (FAL form 5)	+	+	+
Passenger List (FAL form 6)		+	
Dangerous Goods (FAL form 7)	+		
Waste report			
Security report			
Maritime Health Declaration	+		

Source: The authors

Examples of documents used for the study are given in Annex 1.

2. Mapping Documents to the UN/CEFACT MMT RDM

2.1. General information

In the framework of this study, we compared datasets from paper documents, used in real business transactions when completing formalities for registration of arrival and departure of ships in the ports of Ukraine, with the UN/CEFACT MMT RDM. For the purposes of this study, between the data model is adopted in the form of XLS Guideline Structure[9] as published on the UN/CEFACT website. For comparison, we used the profile of the IMO FAL Compendium model, considering the changes approved at the 45th session of the IMO FAL Committee. Also for the purposes of this study, we used a structured publication of the IMO UN/CEFACT Compendium[10] as well as the svn.gefeg.com tool[11].

The list of source documents used for the analysis is described in the previous section and is given in Annex 1.

The following describes the discrepancies that we identified as a result of the mapping. The comparison results themselves are given in Annex 2.

2.2. General Declaration (FAL form 1)

1. The **Arrival Departure** field is a sign of registration of the arrival or departure of the vessel, to which documents are submitted to fulfill the formalities.

Figure 2: Original documents used for the mappings: General Declaration (FAL form 1)

Source: Annex I. Original documents, used for the mappings

In the IMO FAL Compendium dataset view, this field is present (code IMO0013) and is displayed in the MessageHeader class. Also, in the reference data model for multimodal transport there is a data item

Logistics_ Transport Movement. Stage. Code (Voyage.Stage)

which can also be used to convey such information.

2. Field **Name of master** field (#5) - captain of the ship. This data element is present in the IMO FAL Compendium dataset representation under the number IMO0083. Considering the comments[12] cited in this publication - this data element is not mapped individually to

[9] https://service.unece.org/trade/uncefact/publication/Transport and Logistics/MMT IMO FAL Guide_UNECE/XLS/GuidelineStructure.xlsx , referenced: 05.08.2021
[10] https://service.unece.org/trade/uncefact/publication/Transport%20and%20Logistics/MMT%20IMO%20FAL%20Guide_UNECE/HTML/001.htm, referenced: 05.08.2021
[11] https://svn.gefeg.com/svn/IMO-Compendium/Current/st1.htm, referenced: 05.08.2021
[12] https://svn.gefeg.com/svn/IMO-Compendium/!svn/ver/44/Current/Readme.pdf, referenced: 05.08.2021

the data model structure, but to the Persons on Board section of the data model structure, which is also used to determine the names of the crew, passengers and stowaways (this data element is not individually mapped to the data model structure but it is mapped to the Persons On Board section of the data model structure, which is also used to define crew, passenger and stowaway names).

Note on the presence in the MMT RDM of a data element suitable for displaying such information:

Main/Masters/BSP Master. Details/BSP Master. Specified. Logistics_ Transport Movement/Logistics_Transport Movement. Master_ Responsible. Transport_ Person

3. Fields **Certificate of registry / PORT / DATE / NUMBER** (# 7) - information about the ship's certificate. Like the previous remarks, the IMO FAL Compendium dataset view contains the following fields:
    - IMO0145 - Certificate issue date
    - IMO0146 - Ship registry number
    - IMO0147 - Ship registry port, coded
    - IMO0148 - Ship registry port name

   in the Ship registry details class, which is included in the Ship class.

4. Field **Brief particulars of voyage (previous and subsequent ports)** (# 12) - information about the previous and next ports of call. In the MMT RDM, this information is mapped to data items:

   *BSP Master. Details / BSP Master. Specified. Logistics_*

   Transport Movement / Logistics_ Transport Movement.

   Itinerary. Transport_ Route / Transport_ Route. Itinerary Stop.

   *Transport_ Event / Transport_ Event. Occurrence. Logistics_*

   Location / Logistics_ Location. Identification. Identifier

   for the port code according to the UN/LOCODE classifier and

   *BSP Master. Details / BSP Master. Specified. Logistics_*

   Transport Movement / Logistics_ Transport Movement.

   Itinerary. Transport_ Route / Transport_ Route. Itinerary Stop.

   *Transport_ Event / Transport_ Event. Occurrence. Logistics_*

   Location / Logistics_ Location. Name. Text

   to name the port in text form.

   Also, these data elements are supposed to display information about the previous, next and subsequent ports of call (in the form of a code and name), as well as ports in epidemic-prone areas (for the International Maritime Medical Declaration).

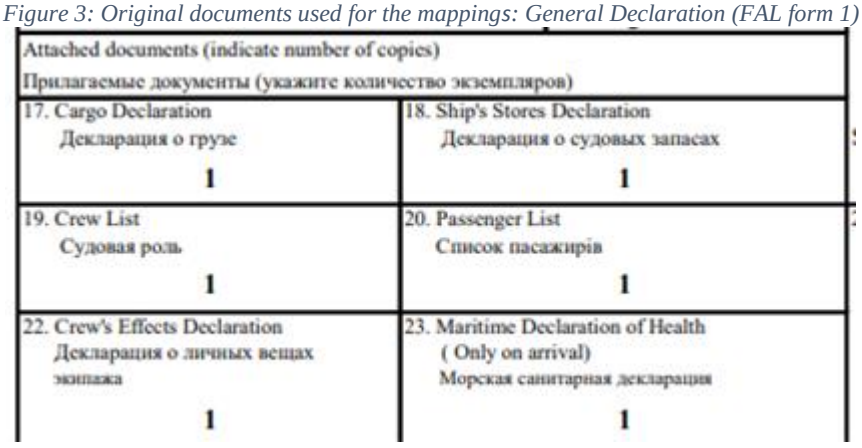
   The IMO FAL Compendium dataset view contains the following fields:

- IMO0075 - Last port of call name, The name and country of the port immediately previous to the port of arrival.
- IMO0076 - Last port of call, coded, The code representing the port immediately previous to the port of arrival.
- IMO0085 - Next port of call name, The name and country of the port immediately subsequent to the port of departure.
- IMO0084 - Next port of call, coded, The port immediately subsequent to the port of departure.
- IMO0126 - Previous port of call name, The name and country of a previous port of call.
- IMO0127 - Previous port of call, coded, A code representing a previous port of call.
- IMO0168 - Subsequent port of call name, The name and country of a scheduled subsequent port of call.
- IMO0169 - Subsequent port of call, coded, A code representing a scheduled subsequent port of call.
- IMO0204 - Port of call in affected area, coded, Port of call in an affected area as identified by the World Health Organization.

5. In the paper form of the General Declaration, there is a section Attached documents (indicate number of copies), which lists the documents accompanying the General Declaration, indicating the number of their (paper) copies:
   - Cargo Declaration - Master Consignment (# 17)
   - Ship Story Declaration - Onboard Inventory (# 18)
   - Crew List - Onboard Person (# 19)
   - Passenger List - Onboard Person (# 20)
   - Crew's Effects Declaration - Onboard Person-Crew Travel Effects (# 22)

   In the case of electronic execution of formalities, there is no need to specify separately in some data elements the presence and quantity of copies of accompanying documents. The fact of the presence of an appropriate accompanying document is confirmed by the completion of the corresponding section in the electronic document equivalent, which is required to complete the formalities. Therefore, such data elements are not mapped to the data model.

Figure 3: Original documents used for the mappings: General Declaration (FAL form 1)



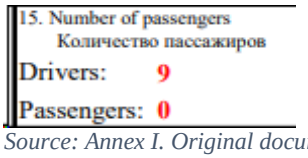
Attached documents (indicate number of copies) Прилагаемые документы (укажите количество экземпляров)	
17. Cargo Declaration Декларация о грузе 1	18. Ship's Stores Declaration Декларация о судовых запасах 1
19. Crew List Судовая роль 1	20. Passenger List Список пасажирів 1
22. Crew's Effects Declaration Декларация о личных вещах экипажа 1	23. Maritime Declaration of Health (Only on arrival) Морская санитарная декларация 1

Source: Annex I. Original documents, used for the mappings

6. Separate remark

a) In the case of a General Declaration for an operation using a ferry, if there are cars with drivers on board, there is a practice of specifically identifying them in the list of ferry passengers, for example:

Figure 4: Original documents used for the mappings: General Declaration (FAL form 1)


15. Number of passengers
Количество пассажиров
Drivers: 9
Passengers: 0

Source: Annex I. Original documents, used for the mappings

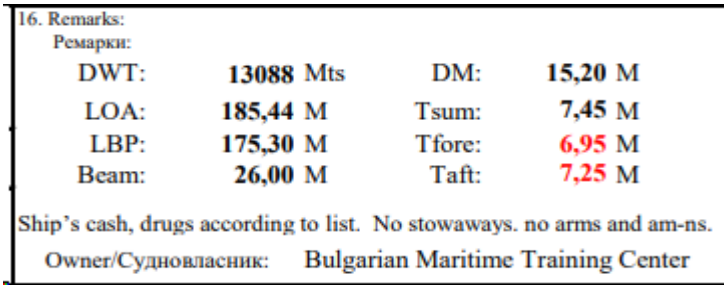
This information refers to the Number of passengers (# 15) field. The reference data model provides a data element for this information

BSP Master / Specified. Logistics_ Transport Movement / Passenger. Quantity

which has cardinality 0..1, so one cannot specify multiple values for this data element. The situation is similar in the IMO FAL Compendium dataset, where the data element IMO0087 is provided for this purpose. As drivers of vehicles accompanying them on a ferry are so-called specialized personnel, if it is necessary to indicate information about them in the General Declaration, an appropriate data element must be provided.

b) Field Remarks (# 16) - in the example considered in the study, information about the dimensions of the vessel and its draft were filled in, among other data.

Figure 5: Original documents used for the mappings: General Declaration (FAL form 1)


16. Remarks:
Ремарки:

DWT:	**13088** Mts	DM:	**15,20** M
LOA:	**185,44** M	Tsum:	**7,45** M
LBP:	**175,30** M	Tfore:	**6,95** M
Beam:	**26,00** M	Taft:	**7,25** M

Ship's cash, drugs according to list. No stowaways. no arms and am-ns.
Owner/Судновласник: Bulgarian Maritime Training Center

Source: Annex I. Original documents, used for the mappings

This information is successfully matched against the corresponding data element in the reference data model as a text note.

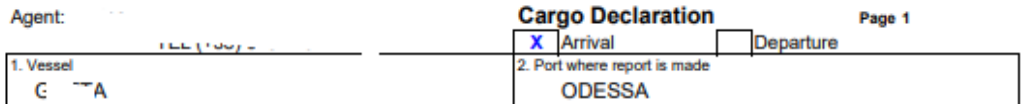
BSP Master. Details / BSP Master. Specified. Logistics_Transport Movement / Logistics_ Transport Movement.Information. Text

7. If it is necessary to reflect this information in a structured form, today there is no such possibility, even though such data elements are present in the original data model. Unlike paper documents, which are processed manually, electronic document management provides for the possibility of automating the processing of such documents, which becomes much more complicated if there is unstructured information in the document. Thus, we propose to explore the possibility to provide such information as part of the formalities for the arrival and departure of ships in a structured form, or to eliminate requirements for the provision of such information by port administrations.

2.3. Cargo Declaration (FAL form 2)

1. On the fields **Arrival Departure** (look on the illustration), **Name of master** (# 4) and **Previous port, next port** (# 5), **the remarks** are similar to those on the General Declaration (FAL form 1).

Figure 6: Original documents used for the mappings: Cargo Declaration (FAL form 2)



Source: Annex I. Original documents, used for the mappings

2. Regarding the tabular section of the cargo declaration - fields **Marks and Numbers (# 6), Number and kind of packages; description of goods or, if available, the HS Code (# 7), Gross weight (# 8), Measurement (# 9)** - in the real documents reviewed in this study, they are filled with totals with an additional breakdown into specific groupings for each specific case.

Figure 7: Original documents used for the mappings: Cargo Declaration (FAL form 2)

	FOR ODESSA:					
	33 x20' (F)		83 x40' (F)			
	0 x20' (E)		0 x40' (E)			
TOTAL:	**33 x20'**	**+**	**83 x40**	**=**	**116**	**2 642,021**	**MTS**
	TRANSIT:					
TOTAL:	0 x20'		0 x40'			0,000	MTS
	TOTAL ON BOARD:					
TOTAL:	33 x20'		83 x40'			2 642,021	MTS

Source: Annex I. Original documents, used for the mappings

At the same time, there is a second document - Cargo Manifest (see Annex 1), which already contains full information about the cargo, as provided by the FAL Convention in relation to filling out the cargo declaration. The presence of two documents and the principle of filling them out is operationally related to the different needs for the information provided by the coastal administrations, notably the port administration, and Customs. In this case, the cargo declaration is demanded primarily by the port administration, while the detailed cargo manifest is demanded by Customs.

From the point of view of the electronic fulfillment of formalities, when registering the arrival and departure of ships, information should be submitted once, in one place, and, in the future, it will be used by all interested parties without the need to re-request it. In this regard, the original reasons for dividing the information about the cargo into two documents will lose their meaning.

From the point of view of the structure of the data model, the classes are provided for filling in information about the cargo as follows:

BSP Master / Specified. Supply Chain_ Consignment

and

BSP Master / Specified. Supply Chain_ Consignment / Included. Supply Chain_ Consignment Item

the data elements of which make it possible to fully display all the required information.

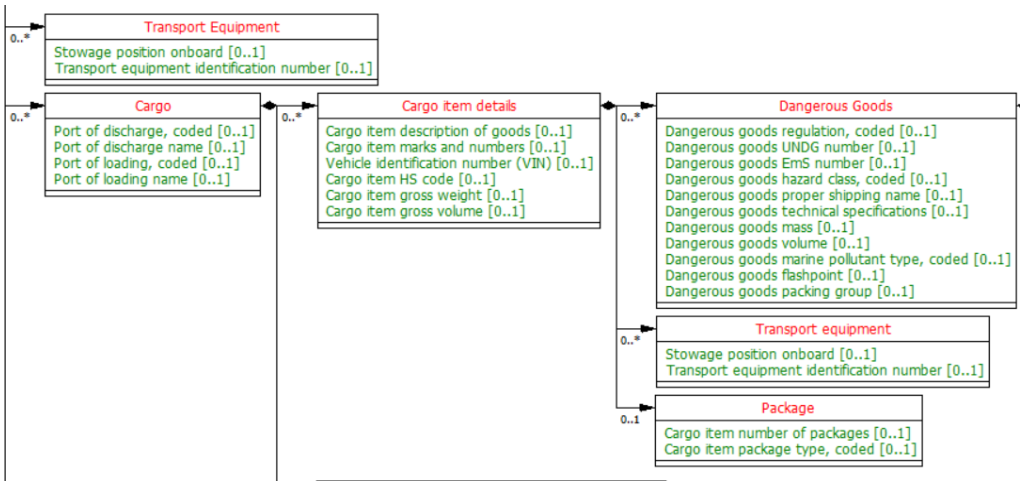
The IMO FAL Compendium dataset view contains the following fields:

- IMO0022 - Cargo item description of goods, A description of the referenced packaged cargo,
- IMO0023 - Cargo item gross volume, A measure of the gross volume, normally calculated by multiplying the maximum length, width and height of the cargo item,
- IMO0024 - Cargo item gross weight, The combined weight or mass of the referenced packaged cargo and its packaging from the shipping data,
- IMO0025 - Cargo item HS code, The standardized, international commodity code from the Harmonized Commodity Description and Coding System (HS) for the packaged cargo being reported,
- IMO0026 - Cargo item marks and numbers, An alphanumeric or symbolic identifier assigned by the shipper as a means to track cargo not carried in bulk,
- IMO0197 - Vehicle identification number (VIN), An alphanumeric identifier assigned by the shipper to identify a vehicle for tracking purposes,

which are linked in a similar class hierarchy.

Moreover, this class structure is necessary to provide a link to the Dangerous Goods class, which describes the dangerous goods information in FAL form 7 (discussed later).

Figure 8: IMO FAL Compendium UML diagram (fragment)



Source:https://service.unece.org/trade/uncefact/publication/Transport%20and%20Logistics/MMT%20IMO%20FAL%20Guide_UNECE/UML/UML-Diagram.zip , referenced: 05.08.2021

3. Separate remark

a) Availability of general total figures in the Cargo Declaration.

In the Cargo Declaration Form[13], approved by the Committee for the Simplification of the Procedures of the International Maritime Organization (IMO FAL), there is no separate field for filling in the total totals for the goods listed in the document. At the same time, it is common practice to include such totals on paper documents. The UN/CEFACT Reference Data Model also does not provide for separate entities to reflect totals across datasets (this does not only apply to the cargo declaration). Since such information can be interactively calculated as the sum of the corresponding data elements of the Consignment_Item entities, such a recalculation by itself does not guarantee the conformity of the document form at the time of its creation and at the time of its processing. In this regard, it is recommended to explore the possibility of introducing a separate entity for totals for datasets in the data model.

b) In the case of a Cargo Declaration for a ferry, there is a similar practice of generalizing cargo in the declaration and the presence of a cargo manifest as a second document, while there is a specific grouping of intermediate totals in the Cargo Declaration:

Figure 9: Original documents used for the mappings: Cargo Declaration (FAL form 2)

	Поти - Черноморск, вагоны :	**107**	**5190,948**	**7929,748**	**mts**
1	минеральная вода „Борджоми”	18	973,498	1421,498	mts
2	битумы нефтяные	70	4217,450	6081,850	mts
3	порожний	19	0,000	426,400	mts
	Поти – Черноморск, автотехника:	**9**	**165,024**	**318,024**	**mts**
1	TIR	9	165,024	318,024	mts
	Поти – Черноморск, палубный груз:	**12**	**0,000**	**18,400**	**mts**
1	джип	2	0,000	3,400	mts
2	легковая машина	10	0,000	15,000	mts
	Варна - Черноморск, палубный груз:	**1**	**0,000**	**1,640**	**mts**
1	джип	1	0,000	1,640	mts
	Всего вагоны на борту:	**107**	**5190,948**	**7929,748**	**mts**
	Всего на борту:	***129***	***5355,972***	***8267,812***	***mts***

Source: Annex I. Original documents, used for the mappings

As one can see from the example shown on the Figure 9, the types of vehicles transported by the ferry (passenger car, SUV, truck) are added to the grouping criteria.

2.4. Ship's Stores Declaration (FAL form 3)

1. Fields **Port arrived from** (#5), **Destination** (#5), **Remarks** are similar to those for the General Declaration (FAL form 1).

[13] https://wwwcdn.imo.org/localresources/en/OurWork/Facilitation/Documents/FAL%20FORM%202.docx, referenced: 05.08.2021

2. Field **Period of stay** (#7) - stay duration. This data item is present in the IMO FAL Compendium dataset representation under number IMO0123. Taking into account the comments[14] cited in this publication, this data element is not mapped individually to the data model structure because it is derived from arrival and departure dates and does not require separate transmission in an electronic data interchange environment (this data element is not individually mapped to the data model structure as it is derivable from the arrival and departure dates and need not be transmitted separately in an electronic data exchange environment).

3. In the tabular part of the ship's stores declaration, the fields **Name of article** (#8), **Quantity** (#9), **Location on board** (#10), **Official use** (#11) in the real documents considered in this study are filled in with an additional breakdown by specific case-by-case basis for grouping.

Figure 10: Original documents used for the mappings: Ship's Store Declaration (FAL form 3)

9.Name of article	10.Quantity	9.Name of article	9.Name of article	10.Quantity
BONDED	№ 1 № 2	**INVENTORY**		
Spirits btl	71 138	Paint	930 ltrs	
Cigarettes x 200 pcs	Nil 131	Thinner	155 ltrs	
Wine pcs	Nil Nil	Ropes fibre	6 coils	
Beer pcs	Nil Nil	Ropes wire	5 coils	
		Video TR	2 pcs	
		Video cassettes	10 pcs	
		TV set	7 pcs	
		Tape recorder	2 pcs	
		Radio	6 pcs	
PROVISIONS		Binoculars	4 pcs	
Meat	420 kg	Sextants	3 pcs	
Poultry	270 kg	Computers	8 pcs	
Dairy	80 kg	Photo camera	2 pcs	
Eggs	1100 pcs	DVD player	3 pcs	
Fish	40 kg	SAT receiver/SAT ant.	2 pcs	
Fruits	80 kg	Refrigerator	14 pcs	
Vegetables	125 kg	Microwave oven	2 pc	
Sugar	15 kg	Washing machine	2 pcs	
Flour	120 kg	Vacuum cleaner	5 pcs	
Butter	7,0 kg	Printers	6 pcs	
Cheese	160 kg	Copier	2 pcs	
Cooking oil	106 ltrs	Dish washing machine	3 pcs	
Coffee	5,0 kg	Drying machine	1 pc	
Tea	1,0 kg	Pyrotechnics	40 pcs	
		Handcuffs	5 pcs	
		El. shock stick	1 pc	
		BUNKER		
		Fuel Oil	0.0 mt	
		Diesel Oil	250.0 mt	
		Lubricating Oil	16.8 mt	
		Fresh Water	210.0 mt	

Source: Annex I. Original documents, used for the mappings

In addition to the groups listed in the example shown on the Figure 10, the following groupings are also found in real documents:

- Paints and varnishes
- Spare parts

[14] https://svn.gefeg.com/svn/IMO-Compendium/!svn/ver/44/Current/Readme.pdf referenced: 05.08.2021

- Medicines
- Chemicals
- Cash
- Pyrotechnics
- Narcotic drugs
- Fuels and lubricants.

In the study, the ship's stores declaration was presented both as a single document (broken down by certain groups) and as separate documents for each of such breakdowns - see the sample documents in Annex 1.

2.5. Crew's Effects Declaration (FAL form 4)

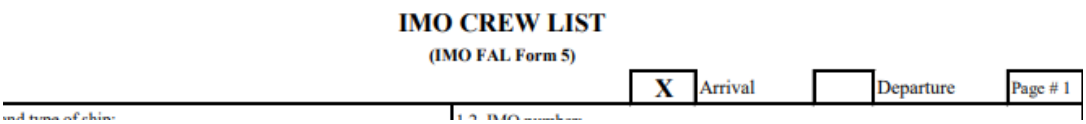
1. Field **Signature** (#8) - signature (crew member). In the paper document of the declaration of personal belongings of the crew, there is a field for the signature of each of the crew members included in the declaration. At the same time, in the reference data model (and in the dataset according to the IMO FAL Compendium) there are no data elements to display such information. Considering the essence of electronic document management and the function performed by this field in a paper document, namely, the authentication of a specific record by an individual who assumes responsibility for the information in this line, we can conclude that the implementation of a similar function in an electronic document requires the implementation of detailed authentication information in a document (dataset). This can be implemented, in particular, by introducing an entity based on the Associated Object Class "Authentication" into the Onboard Person class; jurisdiction (State of port of call and / or State of flag of the ship). It may be necessary for all crew members listed in the declaration to be involved in the creation of such a dataset.

   An alternative approach would be to split the general declaration (dataset) into separate datasets for each of the crew members. This, in general, simplifies the practical process of creating such an electronic document and eliminates the need to add separate fields for detailed authentication (it is enough to use the already existing authentication attributes of the document as a whole at the level of its header). However, this approach is somewhat in conflict with the methodology chosen by the European Maritime Safety Agency (EMSA) for the eManifest project, which will be discussed in more detail in the next section.

2.6. Crew List (FAL form 5)

1. Fields **Arrival, Departure** (look on the illustration) and **Port arrived from country/destination** (#5), **Remarks** are similar to the ones in the General Declaration (FAL form 1).

Figure 11: Original documents used for the mappings: Crew List (FAL form 5)

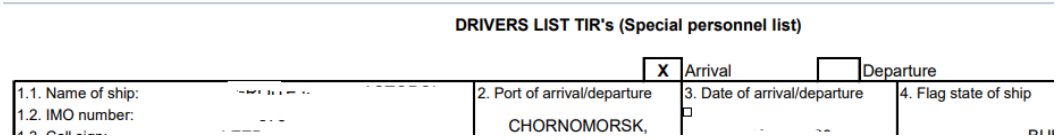

IMO CREW LIST
(IMO FAL Form 5)
X Arrival
Departure
Page # 1

Source: Annex I. Original documents, used for the mappings

2.7. Passenger List (FAL form 6)

1. Fields **Arrival, Departure** (look on the illustration) and **Port arrived from country/destination** (# 5), **Remarks** are similar to the ones in the General Declaration (FAL form 1).

Figure 12: Original documents used for the mappings: Passenger List (FAL form 6)



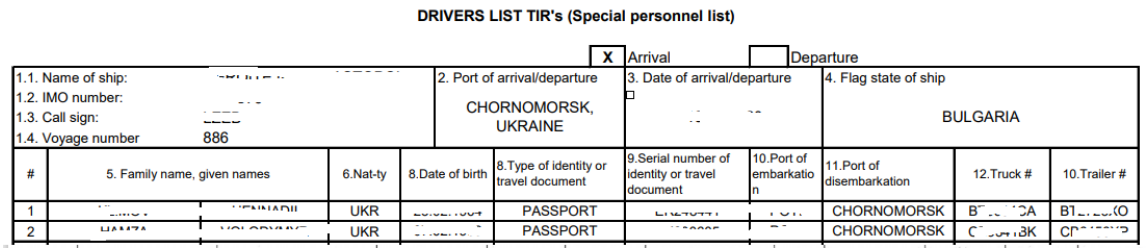
DRIVERS LIST TIR's (Special personnel list)

		X Arrival	Departure
1.1. Name of ship:	2. Port of arrival/departure	3. Date of arrival/departure	4. Flag state of ship
1.2. IMO number:	CHORNOMORSK,		

Source: Annex I. Original documents, used for the mappings

2. In the case of drawing up the List of passengers on the ferry, if there are cars with drivers on board, there is a practice of specifically identifying them in the list of ferry passengers:

Figure 13: Original documents used for the mappings: Passenger List (FAL form 6)



DRIVERS LIST TIR's (Special personnel list)

		X Arrival	Departure
1.1. Name of ship: 1.2. IMO number: 1.3. Call sign: 1.4. Voyage number 886	2. Port of arrival/departure CHORNOMORSK, UKRAINE	3. Date of arrival/departure	4. Flag state of ship BULGARIA

#	5. Family name, given names	6.Nat-ty	8.Date of birth	8.Type of identity or travel document	9.Serial number of identity or travel document	10.Port of embarkation	11.Port of disembarkation	12.Truck #	10.Trailer #
1		UKR		PASSPORT			CHORNOMORSK		
2		UKR		PASSPORT			CHORNOMORSK		

Source: Annex I. Original documents, used for the mappings

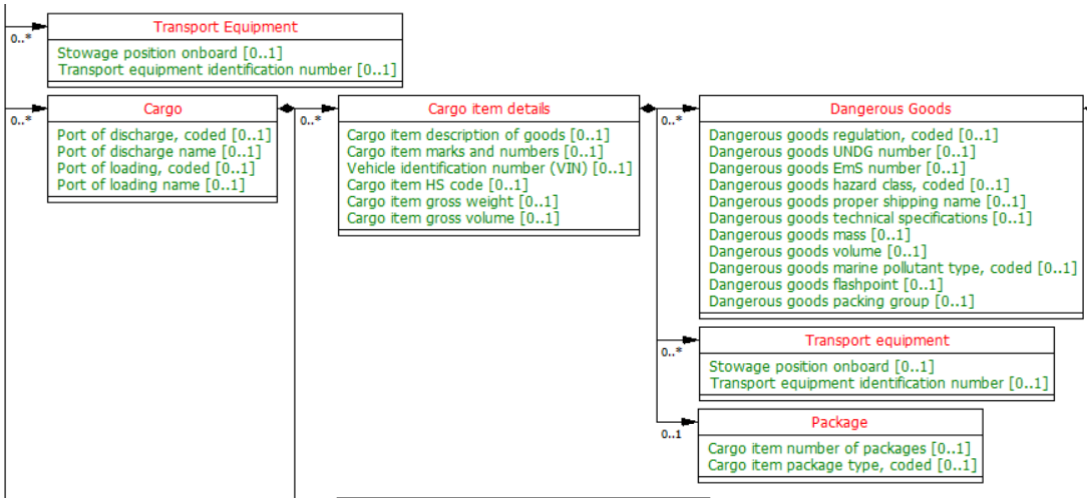
The list of passengers is displayed in the referenced data model in the OnboardPerson class similarly to the crew list. The separation of the two lists is done by using the TypeCode identifier. In the IMO FAL Compendium dataset, this is the responsibility of the IMO0107 dataset - Person type, coded. Thus, it is possible to identify drivers as a separate group within the list of persons on board.

A separate issue concerns the display of the car number associated with such a driver. The reference data model is missing a data item in the OnboardPerson class that can be mapped to this information. Considering that such vehicles are already included in the ConsignmentItem class as cargo on board, we propose to consider the possibility of introducing an optional link between the two classes to display information about drivers when the corresponding document is submitted to the ferry.

2.8. Dangerous Goods Manifest (FAL form 7)

1. As already mentioned above when describing the Cargo Declaration (FAL2), the entities of the classes for describing the consignment and details of the cargo in the data model are associated with entities for describing dangerous goods, as shown in Figure 14:

Figure 14: IMO FAL Compendium UML diagram (fragment)



Source:https://service.unece.org/trade/uncefact/publication/Transport%20and%20Logistics/MMT%20IMO%20FAL%20Guide_UNECE/UML/UML-Diagram.zip, referenced: 05.08.2021

Thus, it is the existing common practice to fill in a (paper) Cargo Declaration only with total figures by type of cargo and to submit a separate document (Cargo Manifest) with a detailed breakdown of consignments. The absence of the consignment items details in the Cargo Declaration from the point of view of mapping with the data model leads to the impossibility of correct submission of the Dangerous Goods Manifest (DGM).

Based on this, we recommend that when completing the formalities for the registration of the arrival and departure of a vessel in electronic format, fill in the information, usually presented in the form of two paper documents (Cargo Declaration and Cargo Manifest), as one data set (Cargo Declaration). Further, we recommend ensuring the distribution of access to such a dataset (Customs, port authorities, terminals) by managing the roles of users of the electronic interaction system (or single window).

2. The dangerous goods manifest is submitted in paper format in some cases as a document with two signatures – of the captain of the vessel and the agent. In the case of the main signature (by default - the captain of the ship) - the reference data model contains the Authentication class, which describes the signer of the document:

BSP Master / Exchanged_ Document / First_ Signatory. Document_ Authentication

At the same time, there is no second signature for the document. In this regard, it is proposed to consider the issue of opening the Second_Signatory entity, available in the original UN/CEFACT data model.

Similarly, in an IMO FAL Compendium data set, there is no possibility to set a second authentication source for the document. At the same time, there is a field IMO0015 - Authenticator location, which is not available in the current representation of the reference data model to indicate the place of signing a document (dataset).

2.9. Waste report

Not applicable at present in Ukraine.

2.10. Security report

Not applicable at present in Ukraine.

2.11. Maritime Health Declaration

No discrepancies found.

2.12. Results

Finally, we can note that the reference data model fully corresponds to the datasets that must be presented in the paper format documents, used in ship-to-shore interaction when completing formalities. The discrepancies identified in the analysis are not critical and can be considered in proposals for updating the model. The information in the IMO Compendium datasets is MMT-based and provides full interoperability between paper documents based on the FAL Convention and the UN/CEFACT reference data model.

3. Mapping Documents to the EMSA Data Model

3.1. General information

In line with the Multi-Year Implementation Plan for the European Maritime Single Window Environment (2021/C299/03)[15], the dataset for the European Maritime Single Window environment (EMSWe) should be prepared and published by the European Maritime Safety Agency (EMSA) as a Delegated Act on 15 August 2021.

As the final document was not yet available at the time of the study, the documents officially published by EMSA in the EMSW - the Documentation section, in particular Appendix C, eManifest-Data Mapping-20180528.xlsx, were used as the basis for comparison[16].

The EMSA dataset is a more extended set of data items in relation to the IMO Compendium profile of the UN/CEFACT reference data model and can be compared to the complete data model for multimodal transport. In addition to the data elements included in the Compendium (Appendix B in EMSA terms), the dataset also includes elements regulated exclusively by European legislation (Appendix A) and local requirements of EU member States (Appendix C), which has expanded the dataset with a number of operational and Customs data element items. This expansion generally corresponds to the objective trend of filing documents in the implementation of formalities when registering the arrival and departure of ships in the ports around the world, including in Ukraine. According to studies carried out jointly with the Ukrainian Sea Ports Authority (in fact, when completing formalities in Ukrainian ports), a set of additional data elements combined from a number of documents is submitted. Such a set was presented by Ukraine as proposals for revising the Compendium at the 43rd session of the International Maritime Organization's Facilitation Committee (FAL 43-7-3 - List of data elements required during ship-shore interaction (Ukraine)).

With this in mind, we can note that the EMSA dataset is more fully matched to documents used in real business transactions. At the same time, there are a number of inconsistencies, which, among other things, were described when comparing with the UN/CEFACT reference data model.

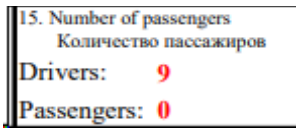
More details can be found below.

3.2. General Declaration (FAL form 1)

1. In the case of a General Declaration for the ferry, if there are cars with drivers on board, there is a practice of highlighting them among the list of ferry passengers:

[15] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52021XC0727%2801%29&qid=1627999663298, referenced: 04.08.2021
[16] http://www.emsa.europa.eu/emsw2/emsw-documentation.html, referenced: 04.08.2021

Figure 15: Original documents used for the mappings: General Declaration (FAL form 1)


15. Number of passengers
Количество пассажиров
Drivers: 9
Passengers: 0

Source: Annex I. Original documents, used for the mappings

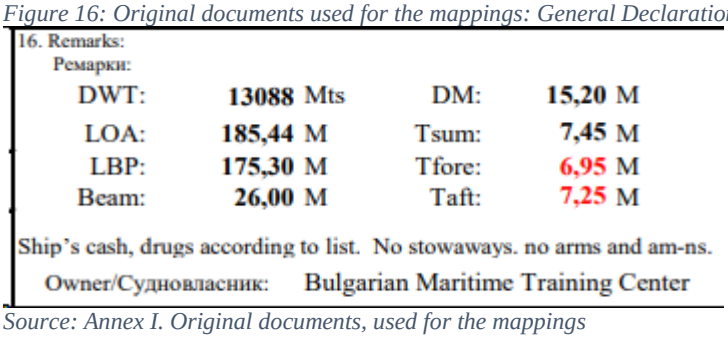
This information refers to the **Number of passengers** field (# 15). The EMSA dataset provides a data element for this information:

EPCRequestBody / PersonsOnBoard / Passengers,

which has cardinality 0..1, so one cannot specify multiple values in this data element. As drivers of vehicles operating them on a ferry are so-called specialized personnel, if it is necessary to indicate information about them in the General Declaration, an appropriate data element must be provided.

2. Field **Remarks** (#16) - in the example considered in the study, it was filled in, among other things, with information about the dimensions of the vessel and its draft.

Figure 16: Original documents used for the mappings: General Declaration (FAL form 1)


16. Remarks:
Ремарки:

DWT:	**13088** Mts	DM:	**15,20** M
LOA:	**185,44** M	Tsum:	**7,45** M
LBP:	**175,30** M	Tfore:	**6,95** M
Beam:	**26,00** M	Taft:	**7,25** M

Ship's cash, drugs according to list. No stowaways. no arms and am-ns.
Owner/Судновласник: Bulgarian Maritime Training Center

Source: Annex I. Original documents, used for the mappings

This information is successfully matched against the corresponding data item in the EMSA dataset as a text note.

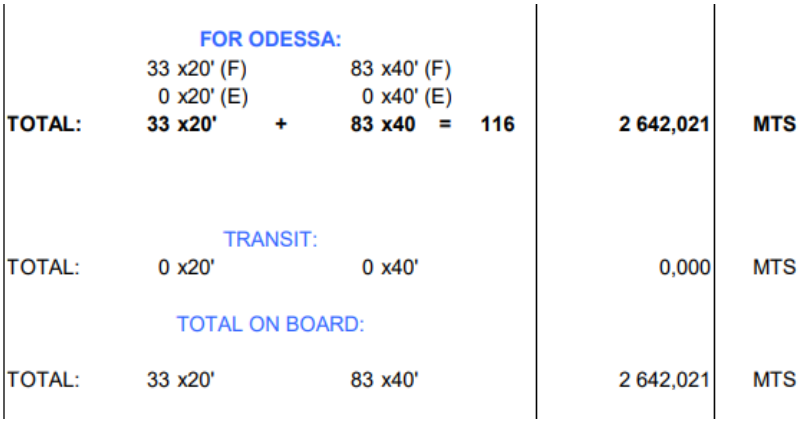
BSP Master. Details / BSP Master. Specified. Logistics_Transport Movement / Logistics_ Transport Movement.Information. Text

At the same time, if it is necessary to reflect this information in a structured form, today there is no such possibility. The situation is similar to that in the IMO profile of the UN/CEFACT MMT RDM.

3.3. Cargo Declaration (FAL form 2)

1. Regarding the tabular section of the cargo declaration - fields **Marks and Numbers** (#6), **Number and kind of packages; description of goods or, if available, the HS Code** (#7), **Gross weight** (#8), **Measurement** (#9). In the real documents reviewed in this study, they are filled with totals with an additional breakdown into specific groupings for each specific case.

Figure 17: Original documents used for the mappings: Cargo Declaration (FAL form 2)



	FOR ODESSA:					
	33 x20' (F)		83 x40' (F)			
	0 x20' (E)		0 x40' (E)			
TOTAL:	**33 x20'**	**+**	**83 x40**	**=**	**116**	**2 642,021**	**MTS**
	TRANSIT:					
TOTAL:	0 x20'		0 x40'			0,000	MTS
	TOTAL ON BOARD:					
TOTAL:	33 x20'		83 x40'			2 642,021	MTS

Source: Annex I. Original documents, used for the mappings

Similar to the case described in the MMT RDM section, there is a second document - Cargo Manifest (see Annex 1), which already contains full information about the cargo, as provided by the FAL Convention in relation to filling in the cargo declaration.

From the point of view of the structure of the data model, a class is provided for filling in information about the cargo:

EPCRequestBody / CargoConsignmentsData / Consignment,

the data elements of which make it possible to fully display all the required information.

Similar to MMT RDM, dangerous goods information is associated at the entity level with a list of goods in the Consignment class:

EPCRequestBody / CargoConsignmentsData / Consignment / CargoItem / DGSafetyDataSheet

2. Separate remark

   a) Availability of general totals in the Cargo Declaration. In the Cargo Declaration Form[17], approved by the Facilitation Committee of the International Maritime Organization (IMO FAL), there is no separate field for filling in the total totals for the goods listed in the document. At the same time, it is common practice to include such totals in paper documents. The EMSA dataset also does not provide separate entities to show totals across datasets (this does not only apply to the cargo declaration). This information can be interactively calculated as the sum of the corresponding data elements of the Consignment entities. Consequently, such a recalculation by itself does not guarantee the conformity of the document form at the time of its creation and at the time of its processing. In this regard, it is recommended to consider the feasibility of introducing a separate entity for totals by datasets in the overall dataset.
   b) In the case of a Cargo Declaration for a ferry, there is a similar practice of generalizing cargo in the declaration and the presence of a cargo manifest as a second document, while there is a specific grouping of intermediate totals in the Cargo Declaration. See for example:

[17] https://wwwcdn.imo.org/localresources/en/OurWork/Facilitation/Documents/FAL%20FORM%202.docx, referenced: 05.08.2021

Figure 18: Original documents used for the mappings: General Declaration (FAL form 1)

	Поти - Черноморск, вагоны :	**107**	**5190,948**	**7929,748**	**mts**
1	минеральная вода „Борджоми”	18	973,498	1421,498	mts
2	битумы нефтяные	70	4217,450	6081,850	mts
3	порожний	19	0,000	426,400	mts
	Поти – Черноморск, автотехника:	**9**	**165,024**	**318,024**	**mts**
1	TIR	9	165,024	318,024	mts
	Поти – Черноморск, палубный груз:	**12**	**0,000**	**18,400**	**mts**
1	джип	2	0,000	3,400	mts
2	легковая машина	10	0,000	15,000	mts
	Варна - Черноморск, палубный груз:	**1**	**0,000**	**1,640**	**mts**
1	джип	1	0,000	1,640	mts
	Всего вагоны на борту:	**107**	**5190,948**	**7929,748**	**mts**
	Всего на борту:	***129***	***5355,972***	***8267,812***	***mts***

Source: Annex I. Original documents, used for the mappings

As one can see from the above example, the types of vehicles transported by the ferry (passenger car, SUV, truck) have been added to the grouping criteria.

3.4. Ship's Stores Declaration (FAL form 3)

1. The tabular part of the ship's stores declaration - the fields **Name of article** (#8), **Quantity** (#9), **Location on board** (#10), **Official use** (#11) - the real documents considered in this study are filled in with additional breakdown on a specific case-by-case basis for the groupings.

Figure 19: Original documents used for the mappings: Ship's Stores Declaration (FAL form 3)

9.Name of article	10.Quantity	9.Name of article	9.Name of article	10.Quantity
BONDED	№ 1 № 2	**INVENTORY**		
Spirits btl	71 138	Paint	930 ltrs	
Cigarettes x 200 pcs	Nil 131	Thinner	155 ltrs	
Wine pcs	Nil Nil	Ropes fibre	6 coils	
Beer pcs	Nil Nil	Ropes wire	5 coils	
		Video TR	2 pcs	
		Video cassettes	10 pcs	
		TV set	7 pcs	
		Tape recorder	2 pcs	
		Radio	6 pcs	
PROVISIONS		Binoculars	4 pcs	
Meat	420 kg	Sextants	3 pcs	
Poultry	270 kg	Computers	8 pcs	
Dairy	80 kg	Photo camera	2 pcs	
Eggs	1100 pcs	DVD player	3 pcs	
Fish	40 kg	SAT receiver/SAT ant.	2 pcs	
Fruits	80 kg	Refrigerator	14 pcs	
Vegetables	125 kg	Microwave oven	2 pc	
Sugar	15 kg	Washing machine	2 pcs	
Flour	120 kg	Vacuum cleaner	5 pcs	
Butter	7,0 kg	Printers	6 pcs	
Cheese	160 kg	Copier	2 pcs	
Cooking oil	106 ltrs	Dish washing machine	3 pcs	
Coffee	5,0 kg	Drying machine	1 pc	
Tea	1,0 kg	Pyrotechnics	40 pcs	
		Handcuffs	5 pcs	
		El. shock stick	1 pc	
		BUNKER		
		Fuel Oil	0.0 mt	
		Diesel Oil	250.0 mt	
		Lubricating Oil	16.8 mt	
		Fresh Water	210.0 mt	

Source: Annex I. Original documents, used for the mappings

In addition to the groups listed in this example, the following groupings are also found in real documents:

- Paints and varnishes
- Spare parts
- Medicines
- Chemicals
- Cash
- Pyrotechnics
- Narcotic drugs
- Fuels and lubricants.

In the study, the ship's stores declaration was presented both as a single document (broken down by certain groups) and as separate documents for each of such breakdowns - see the sample documents in Annex 1.

3.5. Crew's Effects Declaration (FAL form 4)

1. Field **Signature**(#8) - signature (crew member). The paper document of the Crew's Effect Declaration contains a field for the signature of each of the crew members included in the declaration. Similar to the MMT RDM case, the EMSA dataset lacks the data items to display this information. The recommendations for authenticating data by each crew member are similar to those mentioned in section 2.5. Considering the concept of reporting in the EMSWe, on the basis of a single administrative document which

includes all data sets as subordinate entities, the option of dividing the declaration into individual documents with separate signatures seems inappropriate.

3.6. Crew List (FAL form 5)

No discrepancies found.

3.7. Passenger List (FAL form 6)

1. In the case of drawing up the List of passengers on the ferry, if there are cars with drivers on board, there is a practice of highlighting them among the list of ferry passengers:

Figure 20: Original documents used for the mappings: Passenger List (FAL form 6)

DRIVERS LIST TIR's (Special personnel list)

X Arrival ☐ Departure

1.1. Name of ship: 1.2. IMO number: 1.3. Call sign: 1.4. Voyage number 886			2. Port of arrival/departure CHORNOMORSK, UKRAINE		3. Date of arrival/departure		4. Flag state of ship BULGARIA		
#	5. Family name, given names	6.Nat-ty	8.Date of birth	8.Type of identity or travel document	9.Serial number of identity or travel document	10.Port of embarkation	11.Port of disembarkation	12.Truck #	10.Trailer #
1		UKR		PASSPORT			CHORNOMORSK		
2		UKR		PASSPORT			CHORNOMORSK		

Source: Annex I. Original documents, used for the mappings

The passenger list is mapped in the dataset to the EPCRequestBody/PassengerList class, which, unlike the reference data model, is separated from the EPCRequestBody/CrewList class corresponding to the crew list. Unlike the IMO FAL Compendium dataset, there is no field similar to data element IMO0107 - Person type, coded, which would allow drivers to be identified as a separate group within the list of persons on board.

Similar to the MMT RDM case, the EMSA dataset does not have the option to display the vehicle number associated with the driver. Considering that such vehicles are already included in the Consignment class as cargo on board, we suggest introducing an optional link between the two classes to display driver information when the corresponding document is submitted to the ferry.

3.8. Dangerous Goods Manifest (FAL form 7)

1. Similar to the MMT RDM case, dangerous goods information is associated at the entity level with the Cargo Declaration (FAL2) list of goods through the Consignment class:

EPCRequestBody / CargoConsignmentsData / Consignment / CargoItem / DGSafetyDataSheet

In this regard, difficulties also arise when submitting the Dangerous Goods Manifest in electronic form in the case of filling in the Cargo Declaration only with the general information on the goods, as is now normal practice.[18] We also recommend considering

[18] What is meant here is the practice of indicating in the Cargo Declaration general information about the cargo. For example, if several containers are loaded with 50 pieces of cargo, a separate Cargo Manifest is prepared for each container, indicating the goods in accordance with the bill of lading for each container. According to the MMT RDM, this is a single dataset that is then referenced by the dangerous goods data set.

the possibility of submitting cargo information in the form of a single data set, as provided by the model.

Similar to the MMT RDM case, if two signatures are indicated in the document (as in the document reviewed by us in the framework of this study) – of the captain of the vessel and the agent - the data set does not allow for specifying such information.

3.9. Waste report

Not applicable at present in Ukraine.

3.10. Security report

Not applicable at present in Ukraine.

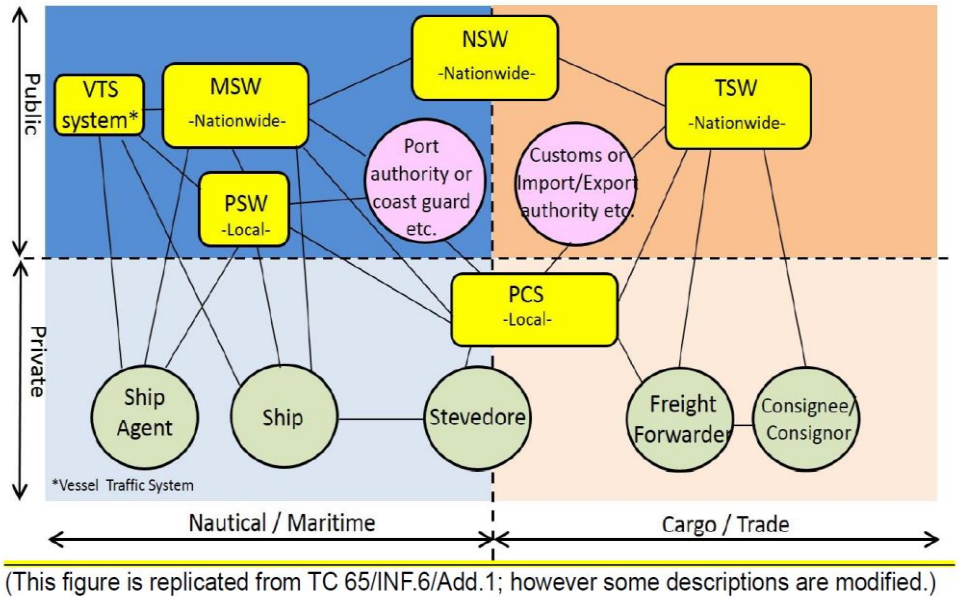
3.11. Maritime Health Declaration

No discrepancies found.

3.12. Results

An intermediate conclusion can be made that filling the EMSA dataset with additional data elements of an operational and Customs nature allows for a fuller comparison with real documents used in business transactions. At the same time, there is objectively a clear relationship at the data modeling level between the EMSA dataset and the UN/CEFACT MMT RDM. This allows us to compare such models and assume the possibility of using them in joint projects for the practical implementation of single window systems. This hypothesis will be considered in more detail at the next stages of this research.

Figure 21: Interaction of maritime and customs windows



Source: IMO FAL.5-Circ.42 - Guidelines for Setting up a Maritime Single Window https://wwwcdn.imo.org/localresources/en/OurWork/Facilitation/FAL%20related%20nonmandatory%20documents/FAL.5-Circ.42.pdf, referenced: 05.08.2021

Notably, the EMSA dataset contains fields with information on Customs clearance. Although such fields are not necessary from the point of view of a "classic" maritime single window, they are welcome, as they are in line with the one-time reporting concept promoted by UN/CEFACT in Recommendations 33, 34, 35 and 36. This will provide an opportunity for business users to perform a one-time submission of all required datasets through a single maritime single window interface with subsequent distribution of information between port and customs administrations (see figure 21).

Also, the presence of these fields will allow for moving on to the next step in ensuring the seamlessness of the clearance process - to the Customs declaration - considering the transfer of part of the information already provided at the stage of formalities for the arrival of the vessel into Customs documents.

The EU legislation suggests the following Customs formalities for ship-to-shore interaction:

Arrival formalities:

— Notification of arrival (Article 133 of Regulation (EU) No 952/2013);
— Presentation of goods to Customs (Article 139 of Regulation (EU) No 952/2013);
— Temporary storage declaration of goods (Article 145 of Regulation (EU) No 952/2013);
— Customs status of goods (Articles 153 to 155 of Regulation (EU) No 952/2013;
— Electronic transport documents used for transit (Article 233(4)(e) of Regulation (EU) No 952/2013).

Departure formalities:

— Customs status of goods (Articles 153 to 155 of Regulation (EU) No 952/2013);
— Electronic transport documents used for transit (Article 233(4)(e) of Regulation (EU) No 952/2013);
— Exit notification (Article 267 of Regulation (EU) No 952/2013);
— Exit summary declaration (Articles 271 and 272 of Regulation (EU) No 952/2013);
— Re-export notification (Articles 274 and 275 of Regulation (EU) No 952/2013).

The key advantage of EMSWe is a clear distribution of roles between the maritime and Customs Single Window by determining the sequence of providing information to a single point – MSW.

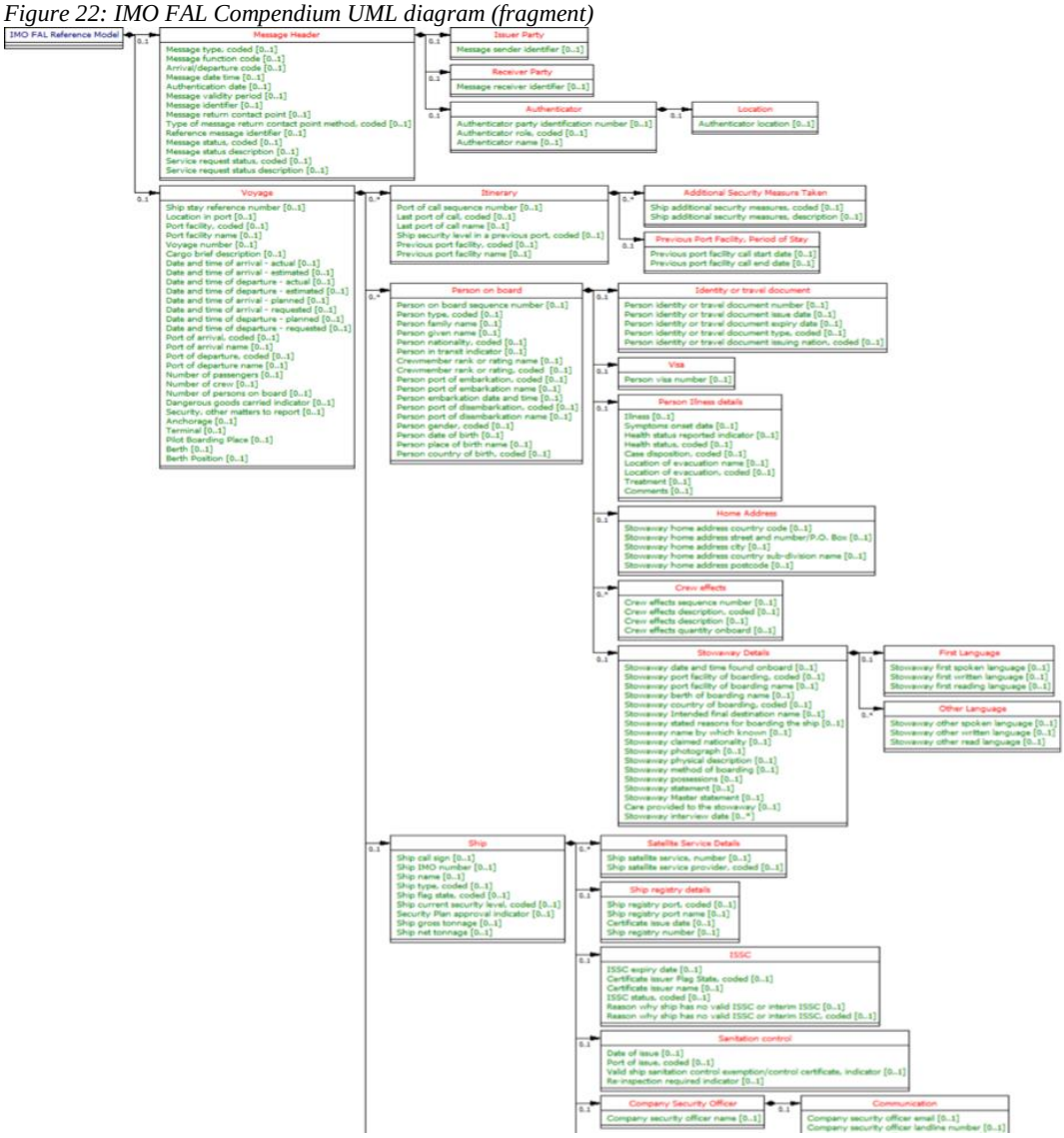
This process is beyond the scope of the current study and can be analyzed further in the framework of individual projects.

4. Assessment of the transformation of datasets between the UN/CEFACT MMT RDM and EMSA models

4.1. General information

The UML diagrams of MMT RDM and EMSA data models show significant differences in the concepts of representing information involved in ship-to-shore interaction. In particular, the MMT RDM data model looks more normalized and represents information in the form of classes (aggregated entities) subordinate to the Voyage class - voyage details, information about the ship, cargo, persons on board, etc. More details can be seen in the following illustration:

Figure 22: IMO FAL Compendium UML diagram (fragment)



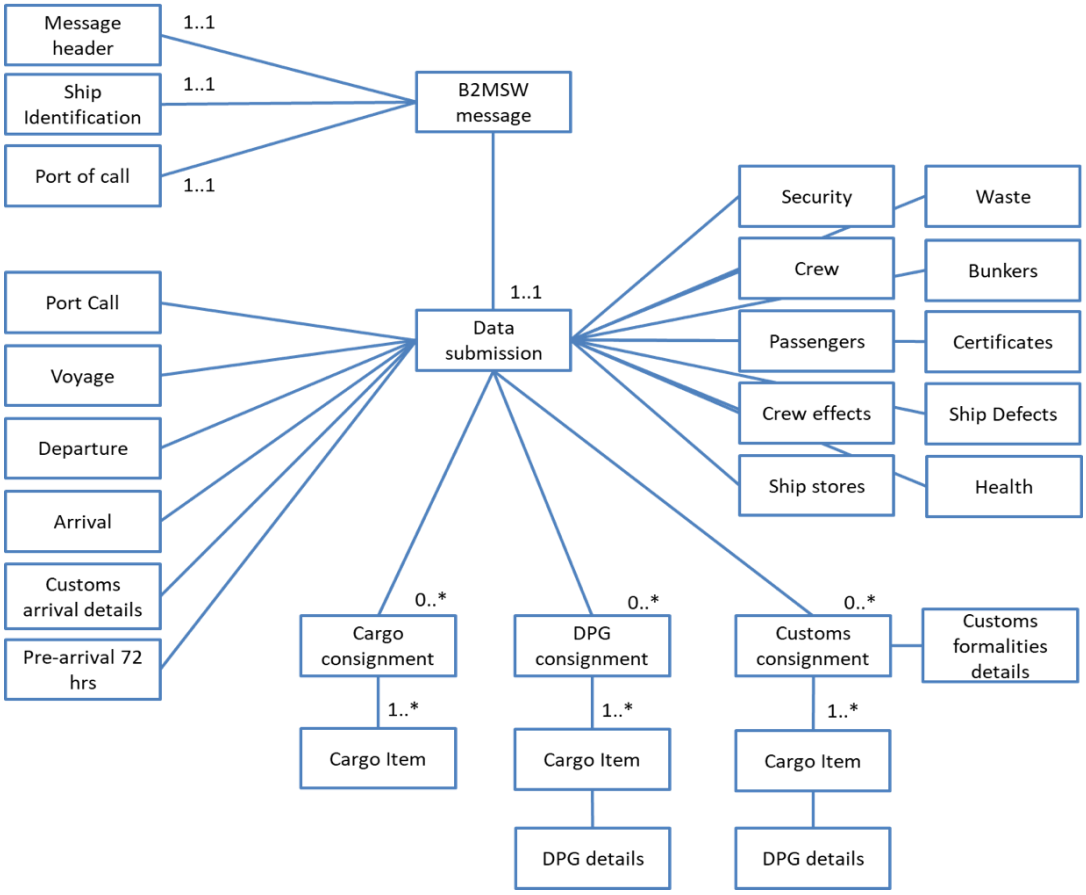
Source:https://service.unece.org/trade/uncefact/publication/Transport%20and%20Logistics/MMT%20IMO%20FAL%20Guide_UNECE/UML/UML-Diagram.zip, referenced 05.08.2021

Since the model diagram is detailed, it cannot be placed as an illustration without formatting. The full version of the diagram is available on the UN/CEFACT website.

As mentioned above, for the purposes of this study, we are considering a generic data model profile for multimodal transport created to display the IMO Compendium.

At the same time, the EMSA data model for the environment of the European Maritime Single Window is built around the formalities shown in Figure 23:

Figure 23 The diagram below provides the Conceptual Data Model of the B2MSW message



Source: http://www.emsa.europa.eu/emsw2/emsw-documentation/download/5748/2834/23.html, referenced: 05.08.2021

A list of the formalities is presented in Table 2 below:

Table 2: List of formalities

Code	Abbreviation	Code in UCC DA Annex B	Context	Description
A1	Port		Arrival	Notification for ships arriving in and departing from ports of the Member States (Article 4 of Directive 2002/59 / EC establishing a Community vessel traffic monitoring and information system)
A2	Border		Arrival and Departure	Border checks on persons (Article 7 of Regulation (EC) No 562/2006 - Schengen Borders Code)
A3	DPG		Arrival and Departure	Notification of dangerous or polluting goods carried on board (Article 13 of Directive 2002/59 / EC establishing a Community

				vessel traffic monitoring and information system)
A4	Waste		Arrival	Notification of waste and residues (Article 6 of Directive 2000/59 / EC on port reception facilities for ship-generated waste and cargo residues)
A5	Security		Arrival	Notification of security information (Article 6 of Regulation (EC) No 725/2004 on enhancing ship and port facility security)
B1	FAL1		Arrival and Departure	FAL form 1: General Declaration
B2	FAL2		Arrival and Departure	FAL form 2: Cargo Declaration
B3	FAL3		Arrival and Departure	FAL form 3: Ship's Stores Declaration
B4	FAL4		Arrival	FAL form 4: Crew's Effects Declaration
B5	FAL5		Arrival and Departure	FAL form 5: Crew List
B6	FAL6		Arrival and Departure	FAL form 6: Passenger List
B7	FAL7		Arrival and Departure	FAL form 7: Dangerous Goods
B8	MDH		Arrival	Maritime Declaration of Health
C1	PSC Arrival		Arrival	Actual arrival notification (article 24 of directive 2009/16 / EC)
C2	PSC Departure		Departure	Actual departure notification (article 24 of directive 2009/16 / EC)
C3	PSC 72h pre-arrival		Arrival	72h pre-arrival notification for ships eligible to expanded inspections (article 9 of directive 2009/16 / EC on Port State Control)
C5	TSD	G4	Arrival	Temporary Storage Declaration (Articles 5 (17) and 145 of the UCC)
C6	PN	G3	Arrival	Presentation Notification (Articles 5 (23) and 139 of the UCC)
C7	CGM	E2	Arrival and Departure	Customs Goods Manifest (Articles 5 (23), 153 (2) and 155 of the UCC): Arrival: data set for authorized users. Departure: for non-authorized users, to be submitted to PoUS.
C8	T2L-F		Arrival	Proof of the customs status of Union goods (T2L / T2LF): MRN

				obtained from the Proof of Union System (for authorized and non-authorized users) (Articles 5 (23) and 153 (2) and 155 of the Code)
C9	ETD	D3	Arrival and Departure	Electronic Transport Document used as transit declaration (Articles 5 (12), 162, 210 and 233 (4) (e) of the UCC)
C10	NA	G2	Arrival	Notification of Arrival (for Customs) (Article 133 of the UCC)
C11	ENS	F1a	Arrival	Entry Summary Declaration (Article 5 (9) and 127 of the UCC) — Maritime and inland waterways — Complete dataset
C13	EXS	A1	Departure	Exit Summary Declaration. (Articles 5 (10) and 271 of the UCC)
C14	RE-EX	A3	Departure	Re-Export Notification (Articles 5 (14) and 274 of the UCC)

Source:http://www.emsa.europa.eu/emsw2/emsw-documentation/download/5748/2834/23.html, referenced 05.08.2021

The list of data submissions and their mapping with the reporting formalities is presented in Table 3:

Table 3: List of data submissions

Submission type	Submission type code	Context	Category	Formalities covered (abbreviations)	Notes
Pre-arrival notification	NOA	Arrival	Ship	Port, FAL1	
Actual arrival notification	ATA	Arrival	Ship	PSC Arrival, NA	
Pre-departure notification	NOD	Departure	Ship	Port, FAL1	
Actual departure notification	ATD	Departure	Ship	PSC Departure	
Pre-arrival notification for ships subject to expanded inspection	EXP	Arrival	Ship	PSC 72h pre-arrival	
Security notification	SEC	Arrival	Ship	Security	
Waste notification	WAS	Arrival	Ship	Waste	
Persons list	PAX	Arrival and Departure	Ship	Border, FAL5, FAL6	
Maritime declaration of health	MDH	Arrival	Ship	MDH	
Crew's effects	EFF	arrival	Ship	FAL4	
Ship's stores	STO	Arrival	Ship	FAL3	

		and Departure			
Waste delivery receipt	WAR	Departure	Ship	-	From former IMP project
Bunkers on board	BKR	Arrival and Departure	Ship	-	From former IMP project
Certificates	CRT	Arrival	Ship	-	From former IMP project
Ship defects	DEF	Arrival and Departure	Ship	-	From former IMP project
General cargo declaration	CGO	Arrival and Departure	Ship	FAL2	
Dangerous and polluting goods at arrival	HZA	Arrival	Ship	DPG, FAL7	
Dangerous and polluting goods at departure	HZD	Departure	Ship	DPG, FAL7	
Temporary Storage Declaration	TSD	Arrival	Customs	DTS	
Presentation Notification	PRN	Arrival	Customs	PN	
Customs Goods Manifest at departure	CGM-D	Departure	Customs	CGM	
Customs Goods Manifest at arrival	CGM-A	Arrival	Customs	CGM	
Proof of the customs status of Union goods	PUS	Arrival	Customs	T2L-F	
Electronic Transport Document used as transit declaration	TRD	Arrival and Departure	Customs	ETD	
Entry Summary Declaration	ENS	Arrival	Customs	ENS	
Exit Summary Declaration	EXS	Departure	Customs	EXS	
Re-Export Notification	RE-EX	Departure	Customs	RE-EX	

Source: http://www.emsa.europa.eu/emsw2/emsw-documentation/download/5748/2834/23.html, referenced 05.08.2021

Another significant conceptual difference that should be considered when comparing models is the different orientation of the models themselves. If the UN/CEFACT data

model addresses the problem of semantic compatibility while performing multimodal transportation, involving all modes of transport around the world, the EMSWe data model addresses operational problems when performing formalities in EU seaports. In this regard, in the latter model there are quite a few data elements that are specifically related to European legislation, operational fields for the processing of a ship in a seaport and Customs information, which must also be provided by the ship to coastal administrations within the framework of the one-time filing concept.

At the time of preparing this study, there was no information on a mapping between the MMT RDM and EMSA data models. At the same time, there are publications on the mapping of the EMSA data model to ISO 28005, as well as the IMO Compendium (not the UN/CEFACT data model profile, but a list of paper forms that comply with the IMO FAL Convention). The UN/CEFACT data model, in turn, fully reflects compliance with the IMO Compendium thanks to the corresponding profile.

Thus, there is initial data that allows for analyzing the mapping of data models to each other.

4.2. Model mapping results

For the purposes of this study, the EPCMessageHeader and EPCRequestBody sections (branches) were used to map the EMSA data model to the MMT RDM. The remaining branches EPCCancelBody, EPCReceiptBody and EPCAcknowledgeBody are used for messaging functions and do not carry semantic load for assessment purposes.

Overall, the mapping results are given in Annex 4. For the task of identifying discrepancies, color coding was also used:

- The discrepancies in the two models which are highlighted in green are of technical nature and can be eliminated by expanding (opening) data elements,
- Comments highlighted in yellow refer to specific data elements in the EMSA data model, in particular Customs information,
- Elements that should be matched semantically, but there are difficulties related to this, are highlighted in red,
- Unmatched elements left in white appear to be outside the scope of the study and do not interfere with further work.

Below are descriptions of several identified discrepancies, which the authors propose to pay attention to.

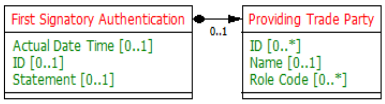
1. Identification of the sender (author) of the message

   The EPCMessageHeader / SenderId data item from the EMSA data set is successfully mapped to the Master / Exchanged_ Document / First_ Signatory BSP data element. Document_ Authentication from MMT RDM dataset. However, First Signatory Authentication is an aggregated entity that includes a number of data elements, as shown in Figure 24:

Figure 24: Aggregated entity description

First Signatory Authentication

ASBIE Exchanged_ Document. First_ Signatory. Document_ Authentication



Documentation

Common term	First Signatory Authentication

CCTS

Type	ASBIE
Dict.EntryName	Exchanged_ Document. First_ Signatory. Document_ Authentication
Definition	The first or primary signature that authenticates this exchanged document.
Obj.ClassQual.	Exchanged
Obj.ClassTerm	Document
Prop.TermQual.	First
Prop.Term	Signatory
Assoc.Obj.ClassQual.	Document
Assoc.Obj.Class	Authentication
Occurrence	0..1

Publication

UN Identifier	UN01003583

Attributes

Attribute name	Status	Description/Data Type
Document_ Authentication. Actual. Date Time	O	Date Time. Type The actual date, time, date time, or other date time value of this document authentication.
Document_ Authentication. Identification. Identifier	O	Identifier. Type A unique identifier for this document authentication.
Document_ Authentication. Statement. Text	O	Text. Type The statement, expressed as text, for this document authentication.

Source:https://service.unece.org/trade/uncefact/publication/Transport%20and%20Logistics/MMT%20IMO%20FAL%20Guide_UNECE/HTML/001.htm, referenced: 05.08.2021

The approach used by UN/CEFACT to authenticate a party in messages is more universal and allows authentication in a manner appropriate for a particular jurisdiction. This, in turn, can cause certain difficulties if interoperability is required, as it requires additional processing to determine the authentication method and ensure compatibility. At the same time, the EMSA approach looks simpler from the point of view of practical application. However, it is fundamentally not workable in the case of differences in authentication methods for different participants in the information interaction.

In addition, the UN/CEFACT approach includes the possibility of using several similar authenticators, indicating the role of each of them - First Signatory, Second Signatory, Third Signatory. This turns out to be useful when transferring a number of real business documents to the data model, in particular the Dangerous Goods Manifest, as discussed in the previous sections.

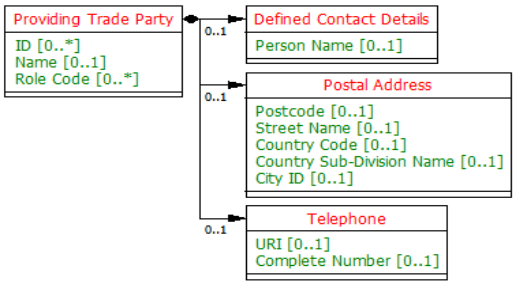
2. Identification of the declarant

In many respects, the situation is similar with the comparison of information about the party to the contract - the declarant. In the EMSA dataset, this information is represented by the EPCMessageHeader/DeclarantEORI dataset, while in the MMT RDM dataset, this information is conveyed using the Provider aggregated entity. Trade_ Party, which is part of the First Signatory Authentication aggregated entity already mentioned above:

Figure 25: Aggregated entity description

Providing Trade Party

ASBIE Document_ Authentication. Provider. Trade_ Party



Documentation

Common term	Providing Trade Party

CCTS

Type	ASBIE
Dict.EntryName	Document_ Authentication. Provider. Trade_ Party
Definition	The trade party providing this document authentication.
Obj.ClassQual.	Document
Obj.ClassTerm	Authentication
Prop.Term	Provider
Assoc.Obj.ClassQual.	Trade
Assoc.Obj.Class	Party
Occurrence	0..1

Publication

UN Identifier	UN01003526

Attributes

Attribute name	Status	Description/Data Type
Trade_ Party. Identification. Identifier	O	Identifier. Type A unique identifier of this trade party.
Trade_ Party. Name. Text	O	Text. Type The name, expressed as text, for this trade party.
Trade_ Party. Role. Code	O	Party Role_ Code. Type A code specifying the role of this trade party.

Source:https://service.unece.org/trade/uncefact/publication/Transport%20and%20Logistics/MMT%20IMO%20FAL%20Guide_UNECE/HTML/001.htm, referenced: 05.08.2021

At the same time, the "laconicism" of the identification of the party to the contract in the EMSA data set is explained by the reference to the register of EU economic operators, which uniquely identifies the party to the transaction and contains comprehensive information about it. In the case of the UN/CEFACT data model, a more generic approach is taken, allowing for differences in identification methods.

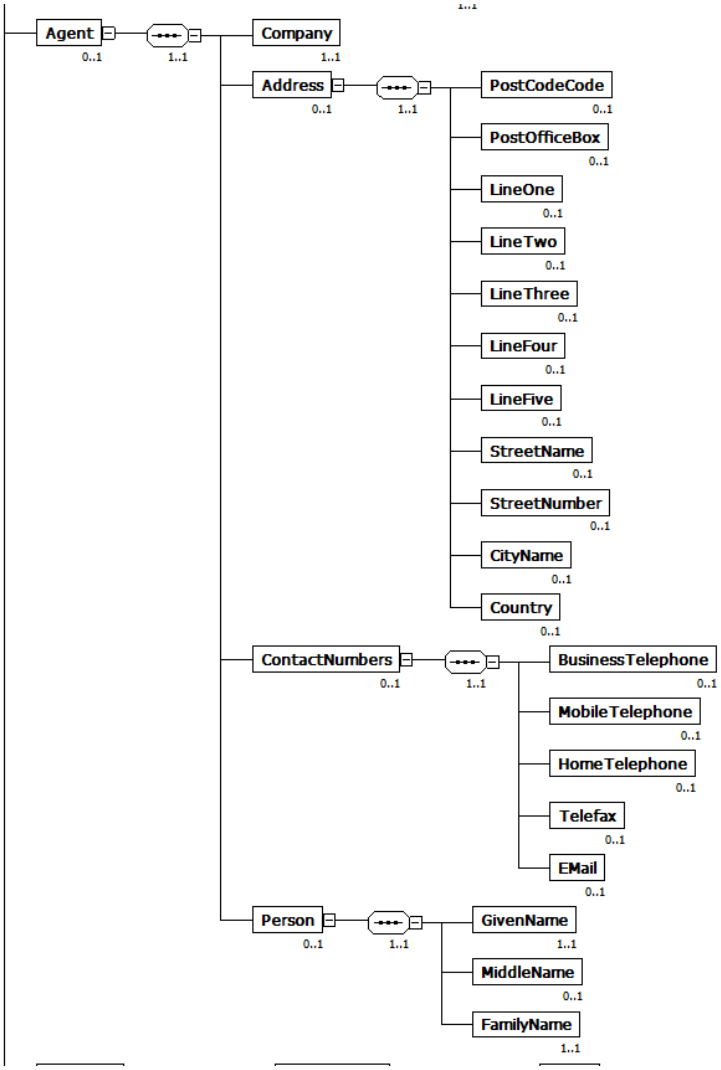
At the same time, the situation is somewhat opposite with the data elements that describe the declarant representative in the EMSA dataset - EPCMessageHeader / RepresentativeEORI and EPCMessageHeader / RepresentativeStatus.

They do not have a direct match in the MMT RDM. At the same time, opening the data item (aggregated entity) Second Signatory, available in the full model, will solve this problem.

3. Information about the agent

Agent information is represented in both datasets as aggregated entities. In the EMSA dataset, these are as represented on Figure 26:

Figure 26: EMSA EMSW UML diagram



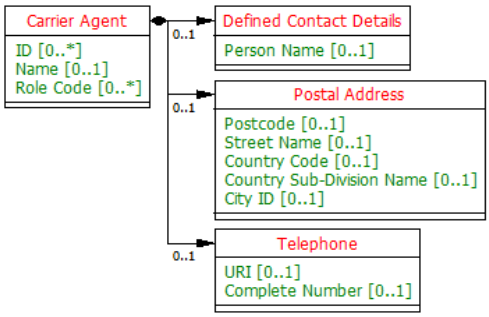
Source: The authors, based on the EMSA EMSW documentation http://www.emsa.europa.eu/emsw2/emsw-documentation.html, referenced: 05.08.2021

At the same time, in the MMT RDM dataset, the same information is presented in the form represented in Figure 27:

Figure 27: Aggregated entity description

Carrier Agent

ASBIE — Logistics_ Transport Movement. Carrier Agent. Trade_ Party



Documentation

Common term	Carrier Agent

CCTS

Type	ASBIE
Dict.EntryName	Logistics_ Transport Movement. Carrier Agent. Trade_ Party
Definition	The carrier agent trade party for this logistics transport movement.
Obj.ClassQual.	Logistics
Obj.ClassTerm	Transport Movement
Prop.Term	Carrier Agent
Assoc.Obj.ClassQual.	Trade
Assoc.Obj.Class	Party
Occurrence	0..1

Publication

UN Identifier	UN01010130

Attributes

Attribute name	Status	Description/Data Type
Trade_ Party. Identification. Identifier	O	Identifier. Type A unique identifier of this trade party.
Trade_ Party. Name. Text	O	Text. Type The name, expressed as text, for this trade party.
Trade_ Party. Role. Code	O	Party Role_ Code. Type A code specifying the role of this trade party.

Source:https://service.unece.org/trade/uncefact/publication/Transport%20and%20Logistics/MMT%20IMO%20FAL%20Guide_UNECE/HTML/001.htm, referenced: 05.08.2021

Despite several differences between the composition of data items in these two classes (in particular, the structure of the company's address), contact information and even data elements for the name and surname of the agent's representative at the port, this discrepancy is not decisive in terms of the application of documents in real business transactions. The point to be noted concerns the BSP Master / Specified Data Item. Logistics_ Transport Movement / Carrier Agent. Trade_ Party / Identification. Identifier that is present in the MMT RDM dataset and is not present in the EMSA dataset. The use of the agent's identification number in combination with the method of such identification makes it possible to automate the process of identifying this participant in the contract and to simplify the document circulation process.

4. Information about the vessel

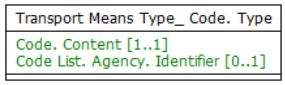
Ship information is represented by aggregated entities in both datasets. For EMSA it is EPCRequestBody/ShipID, for MMT RDM it is BSP Master / Specified. Logistics_ Transport Movement/ Used. Logistics_ Transport Means. In terms of differences affecting data mapping, the data element

BSP Master / Specified. Logistics_ Transport Movement /
Used. Logistics_ Transport Means / Type. Code

from the UN/CEFACT dataset is missing in the EMSA dataset. This element details the type of vehicle (in this case, the vessel) and refers to the classifier defined by UNECE Recommendation 28.

The structure of this data element refers to a more general class from the UN/CEFACT Core Components Library, which allows for the description not only of the actual code of an entity from the physical world using a specific classifier, but also of the classifier itself, in which this entity is defined.

Figure 28: Aggregated entity description



Documentation

TDED	[8179]

CCTS

Type	DT
Dict.EntryName	Transport Means Type_ Code. Type
Definition	A character string used to represent the transport means type.
Repr.TermQual.	Transport Means Type
Repr.Term	Code

Publication

UN Identifier	UN02000098

Attributes

Attribute name	Status	Description/Data Type
Code. Content	M	A character string used to represent the transport means type.
Code List. Agency. Identifier	O	An agency that maintains one or more code lists.

Source:https://service.unece.org/trade/uncefact/publication/Transport%20and%20Logistics/MMT%20IMO%20FAL%20Guide_UNECE/HTML/001.htm, referenced: 05.08.2021

As mentioned above, in this case, a limited classifier of vehicle types is used as a classifier in accordance with UN/CEFACT Recommendation 28.[19]

It is possible to map such information in the EMSA dataset, using the EPCRequestBody / ShipTypeContent data item.

5. Information on dangerous goods

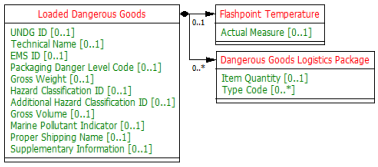
Information on dangerous goods carried on board of ships is more completely presented in the UN/CEFACT dataset.

[19] https://unece.org/DAM/cefact/recommendations/rec28/Rec28_Rev4.2e_2018.xls

Figure 29: Aggregated entity description

Loaded Dangerous Goods

ASBIE — Logistics_ Transport Equipment. Loaded. Transport_ Dangerous Goods



Documentation

Common term	Loaded Dangerous Goods

CCTS

Type	ASBIE
Dict.EntryName	Logistics_ Transport Equipment. Loaded. Transport_ Dangerous Goods
Definition	Dangerous goods loaded into this piece of logistics transport equipment.
Obj.ClassQual.	Logistics
Obj.ClassTerm	Transport Equipment
Prop.Term	Loaded
Assoc.Obj.ClassQual.	Transport
Assoc.Obj.Class	Dangerous Goods
Occurrence	0..n

Publication

UN Identifier	UN01003794

Attributes

Attribute name	Status	Description/Data Type
Transport_ Dangerous Goods. UNDG Identification. Code	O	Code. Type The code specifying the unique United Nations Dangerous Goods (UNDG) number assigned to these transported dangerous goods.
Transport_ Dangerous Goods. Technical Name. Text	O	Text. Type A technical name, expressed as text, for these transported dangerous goods.
Transport_ Dangerous Goods. EMS. Identifier	O	Identifier. Type The unique transport emergency procedure (EMS) identifier applicable for these transported dangerous goods.
Transport_ Dangerous Goods. Packaging Danger Level. Code	O	Dangerous Goods Packaging Level _Code. Type The code specifying the level of danger that the packaging of these dangerous goods must cover for transport purposes.
Transport_ Dangerous Goods. Gross Weight. Measure	O	Weight _Unit _Measure. Type The measure of the weight (mass) of these transported dangerous goods including packaging but excluding the transport equipment.
Transport_ Dangerous Goods. Hazard Classification. Identifier	O	Identifier. Type The unique identifier of a hazard class applicable to these transported dangerous goods as defined by the relevant governing regulation authority.
Transport_ Dangerous Goods. Additional_ Hazard Classification. Identifier	O	Identifier. Type The unique identifier of an additional hazard class applicable to these transported dangerous goods.
Transport_ Dangerous Goods. Gross Volume. Measure	O	Volume _Unit _Measure. Type The measure of the gross volume, normally calculated by multiplying the maximum length, width and height dimensions of these transported dangerous goods.
Transport_ Dangerous Goods. Marine_ Pollutant. Indicator	O	Indicator. Type The indication of whether or not these transported dangerous goods have a marine pollutant content.
Transport_ Dangerous Goods. Proper Shipping Name. Text	O	Text. Type The proper shipping name, expressed as text, for these transported dangerous goods.
Transport_ Dangerous Goods. Supplementary_ Information. Text	O	Text. Type Supplementary information, expressed as text, concerning the transport of these dangerous goods.

Source:https://service.unece.org/trade/uncefact/publication/Transport%20and%20Logistics/MMT%20IMO%20FAL%20Guide_UNECE/HTML/001.htm, referenced: 05.08.2021

The EMSA dataset uses the aggregated entity EPCRequestBody / DGSafetyDataSheet for this purpose.

The EMSA dataset does not contain several data elements that are present in the MMT RDM dataset. In particular, the technical name of dangerous goods is as follows:

BSP Master / Specified. Logistics_ Transport Equipment / Loaded. Transport_ Dangerous Goods / Technical Name. Text

Information on the results of temperature measurements for goods with a fire hazard is identified as follows:

BSP Master / Specified. Logistics_ Transport Equipment / Loaded. Transport_ Dangerous Goods / Flashpoint Temperature. Measurement / Actual. Measure

Both datasets contain data elements for dangerous goods cargo items that are linked to the corresponding entity in the cargo items list. This entity contains information about gross mass of the cargo item and package details. In addition, there are extra data elements in the MMT RDM dataset to describe the information on the gross weight of dangerous goods and their packaging:

BSP Master / Specified. Logistics_ Transport Equipment / Loaded. Transport_ Dangerous Goods / Gross Volume. Measure

BSP Master / Specified. Logistics_ Transport Equipment / Loaded. Transport_ Dangerous Goods / Specified. Logistics_ Package

In its turn, the EMSA dataset contains data elements that could not be unambiguously associated with the MMT RDM dataset:

EPCRequestBody / DGSafetyDataSheet / SegregationInformation

EPCRequestBody / DGSafetyDataSheet / OnBoardLocation

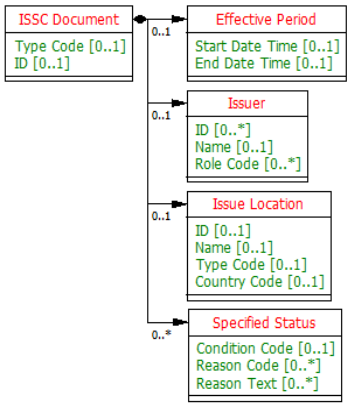
6. International Ship Security Certificate (ISSC) Information

In the case of an international ship security certificate (ISSC), the information is presented as an aggregated entity ISSC. Referenced_ Document:

Figure 30: Aggregated entity description

ISSC Document

ASBIE Logistics_ Transport Means. ISSC. Referenced_ Document



Documentation

Common term	ISSC Document

CCTS

Type	ASBIE
Dict.EntryName	Logistics_ Transport Means. ISSC. Referenced_ Document
Definition	The referenced ISSC (International Ship Security Certificate) document for this logistics transport means.
Obj.ClassQual.	Logistics
Obj.ClassTerm	Transport Means
Prop.Term	ISSC
Assoc.Obj.ClassQual.	Referenced
Assoc.Obj.Class	Document
Occurrence	0..1

Publication

UN Identifier	UN01013170

Attributes

Attribute name	Status	Description/Data Type
Referenced_ Document. Type. Code	O	Document _Code. Type The code specifying the type of referenced document.
Referenced_ Document. Identification. Identifier	O	Identifier. Type A unique identifier for this referenced document.

Source:https://service.unece.org/trade/uncefact/publication/Transport%20and%20Logistics/MMT%20IMO%20FAL%20Guide_UNECE/HTML/001.htm, referenced: 05.08.2021

In the EMSA dataset, this entity corresponds to the aggregated entity EPCRequestBody / ISSCertificate

It is important to note the absence in the EMSA dataset of data elements that describe, in formal and textual form, the reason for the absence of a valid ISSC on board:

BSP Master / Specified. Logistics_ Transport Movement / Used. Logistics_ Transport Means / ISSC. Referenced_ Document / Specified. Document_ Status / Reason. Code

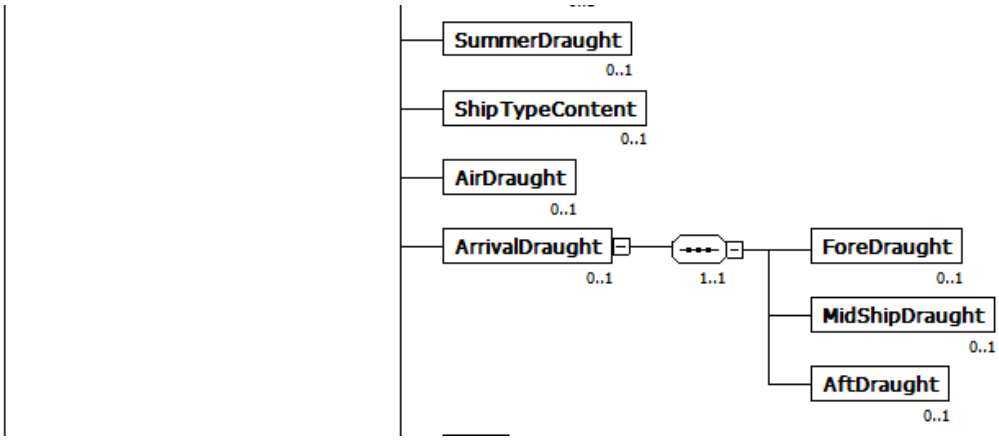
BSP Master / Specified. Logistics_ Transport Movement / Used. Logistics_ Transport Means / ISSC. Referenced_ Document / Specified. Document_ Status / Reason. Text

7. Vessel's draught information

The EMSA dataset provides information on the ship's draught:

Arrival draughts

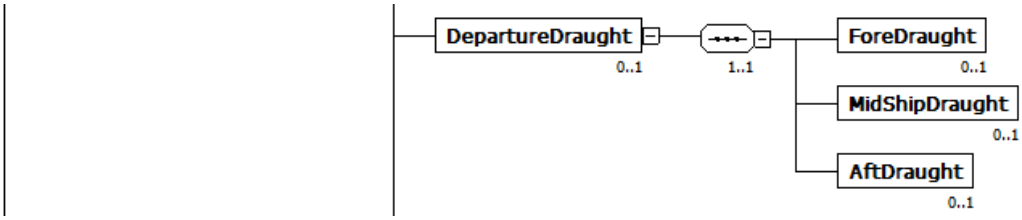
Figure 31: IMO FAL Compendium UML diagram (fragment)



Source: http://www.emsa.europa.eu/emsw2/emsw-documentation.html, referenced: 05.08.2021

Departure draughts

Figure 32: IMO FAL Compendium UML diagram (fragment)



Source: http://www.emsa.europa.eu/emsw2/emsw-documentation.html, referenced: 05.08.2021

This information is not available in the MMT RDM dataset. It is also missing from the IMO FAL Compendium. At the same time, in some cases such information can be useful for operational activities.

5. Obstacles identified and rationale for the use of the EMSA dataset in Ukraine

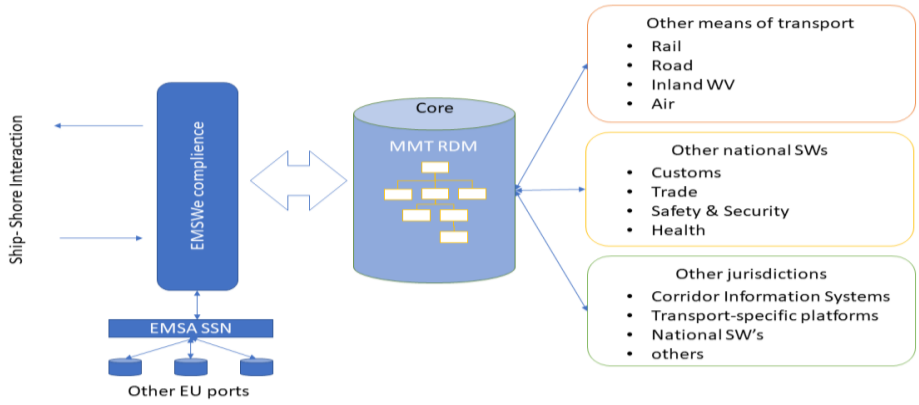
The results of the study on data conversion between the UN/CEFACT RDM MMT model and the EMSA dataset show that despite the presence of certain discrepancies in the details (see Annex 4), information from the documents presented in both models is successfully matched with each other. The discrepancies identified, at the same time, are mostly due to the fact that the UN/CEFACT MMT RDM is a semantic model, while the EMSA dataset is part of the guidance on the implementation of the maritime single window environment. This leads to a greater detail in the EMSA model in terms of operational (commercial) tasks while ensuring ship-to-shore interaction. Another factor influencing the presence of certain discrepancies is the scope of the models: the UN/CEFACT MMT RDM implements the requirements of the International Maritime Organization (in the form of the IMO FAL Compendium), while the EMSA model is in the regulatory area of European legislation. Taking these factors into account, most of the identified discrepancies can be resolved by running Data Model Update Requests (DMRs).

We can conclude that there is a methodological similarity between the data models examined in this study and it is possible to convert information between them, considering the requirements of each of the models.

At the same time, a key factor in data modeling in ship-to-shore interaction is to ensure multimodality requirements because the seaport acts as a transition point of different legal regimes both in the context of changing national jurisdictions and in the context of changing modes of transport. Thus, a project of electronic document management for ship-to-shore interaction (marine single window) should be considered in the context of the semantic compatibility of datasets with other information systems both within a particular State and at the regional and international levels.

Based on this, and taking into account the geographical and political position of Ukraine as an associated member of the European Union, it seems appropriate to use the EMSA data model as the external interface of the ship-to-shore interaction system, while observing the principle developed in the process of previous studies on the use of the UN/CEFACT MMT RDM, namely, building the core of the system based on the MMT RDM as a basis for performing seamless transformations of datasets when changing modes of transport and jurisdictions.

Figure 34: MMT RDM as a core for MEO systems and national logistics platforms



Source: The authors

The proposed approach ensures the versatility of the solution, taking into account the transformation point of jurisdictions in the seaport - both national and of the different modes of transport.

6. Considerations

Based on the results of the first stage of the study, the following intermediate conclusions can be drawn:

- The UN/CEFACT MMT RDM is currently the only functional complete data model that allows, within a single ontology, to interconnect both different modes of transport and different jurisdictions. The data model is constantly re-negotiated, updated and improved by experts from all over the world and reflects actual business operations in trade and transport as closely as possible to reality.

- The complexities associated with the practical implementation of IT solutions based on the MMT RDM data model, in the context of ship-to-shore formalities, can be mitigated by using the EMSA dataset, e.g., in the European Maritime Single Window, as an implementation guide. The study showed the relevance and applicability of this approach for the seaports of Ukraine. Also, this approach can be applied to other regions that have close economic contacts with EU seaports.

- If there are objective differences between the datasets in the UN/CEFACT and EMSA models, at least in the amount of information presented in paper forms of documents submitted to the coastal administrations as part of the formalities for registration of arrival and departure, information in both models is successfully matched. Discrepancies identified in the study can be eliminated with further requests to change (update) the data models.

- Using the EMSA dataset as an interface for providing profile information looks reasonable both from the point of view of structuring the information in it and from the point of view of Ukraine's geopolitical position. Also, a positive role is played by the availability of templates for documents prepared by EMSA in MS Excel format, which makes it possible to simplify the process of transition to a formalized presentation of data for participants in Ukraine that are part of the network of global international carriers.

- It seems expedient to implement a mapping between EMSA and UN/CEFACT datasets in the form of XSLT transformation, which will simplify the transition between the provisioning interface and the information storage and processing interface in logistics platforms (including national ones) and provide the possibility of seamless data transformation between maritime and other types of transport.

The second part of the assessment is aimed to prove this concept through practical tests with parties involved in real-life business transactions.

Part 2. Practical assessment of providing information on ship-to-shore interaction in the form of a formalized dataset

The second stage of the assessment was aimed at proving in practice the concept formulated in the first part. The key points of this concept are:

- Using the UN/CEFACT RDM as a core for implementing IMO Compendium requirements;
- Using the EMSA dataset as an interface for providing the information;
- Using of templates for documents prepared by EMSA in MS Excel format;
- Creating the electronic equivalents of the required documents.

7. Assessment methodology

The State Enterprise "Ukrainian Sea Ports Authority" (SE “USPA”), as the responsible agency, has invited maritime agents that operate in the ports of Ukraine to take part in the study.

With each marine agent who expressed desire to participate, the assessment was carried out according to the methodology:

1. Presentation of the overall information about the project;
2. Interview with the participants on the practices in the ports of Ukraine and in the ports of the neighbor countries (if applicable);
3. Presentation of the IMO - UN/CEFACT data model and the EMSA dataset. Explanation the methodology of data providing;
4. Execution of the proof-of-concept tests based on real vessel call documents;
5. Creation of the electronic documents;
6. Preparation of a report on the results of the assessment.

To accomplish the tasks of this assessment on the practical application of electronic documents by the parties involved in the ship-to-shore interaction, the authors used specialized software - the Prototype of the Ukrainian Marine Single Window[20]. This software made it possible to visually demonstrate the concept of presenting information, the methodology for its provision, as well as to receive feedback from end users on the completeness, convenience and efficiency of using electronic documents and the compliance of new business processes with existing ones. Also, the software allows generating electronic documents based on data actually available to maritime agents. Further is a more detailed description of the prototype.

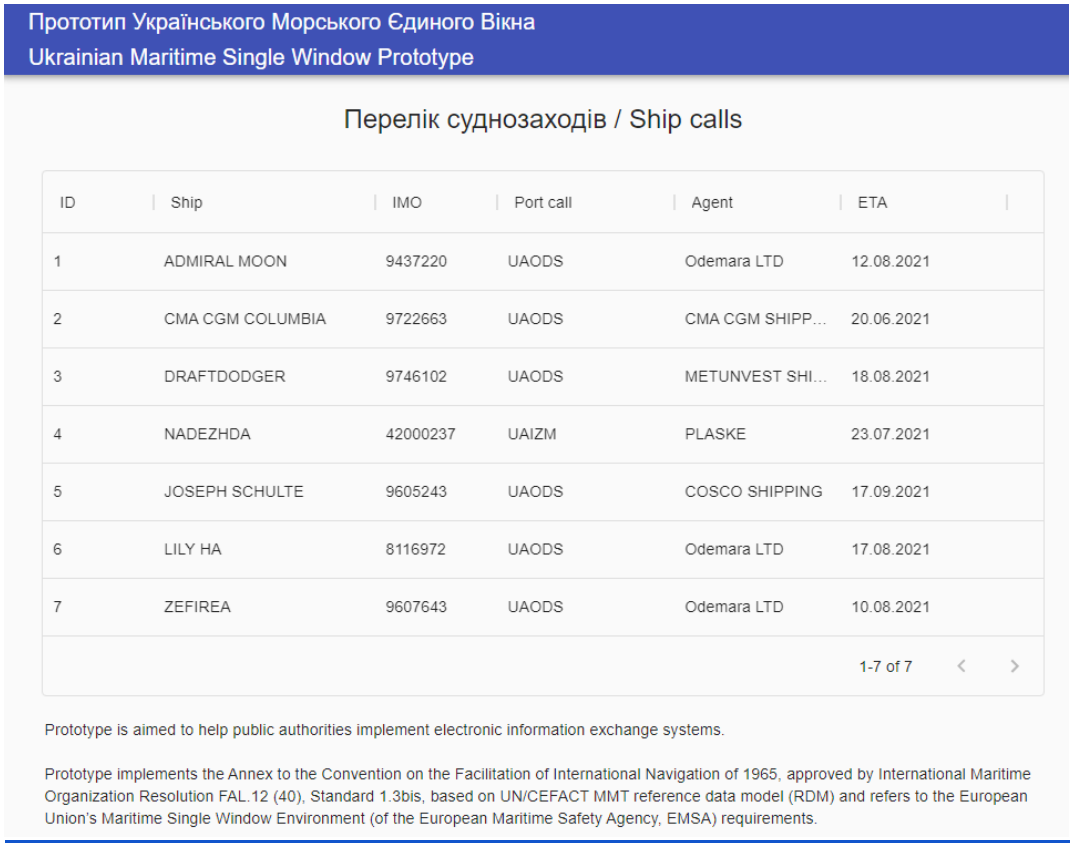
[20] Prototype of the Ukrainian Marine Single Window - authors Dmytro Iakymenkov and Galyna Roizina

8. Description of the Ukrainian Maritime Single Window Prototype

8.1. Vessel calls

Unified registry of vessel calls is operated by the SE "USPA" for all seaports of Ukraine.[21]

Figure 35: Ukrainian MSW Prototype - Ship Calls



Source: The authors

For each vessel call the information is represented by the following blocks. The list and structure of the blocks are similar to the EMSA prototype logic:

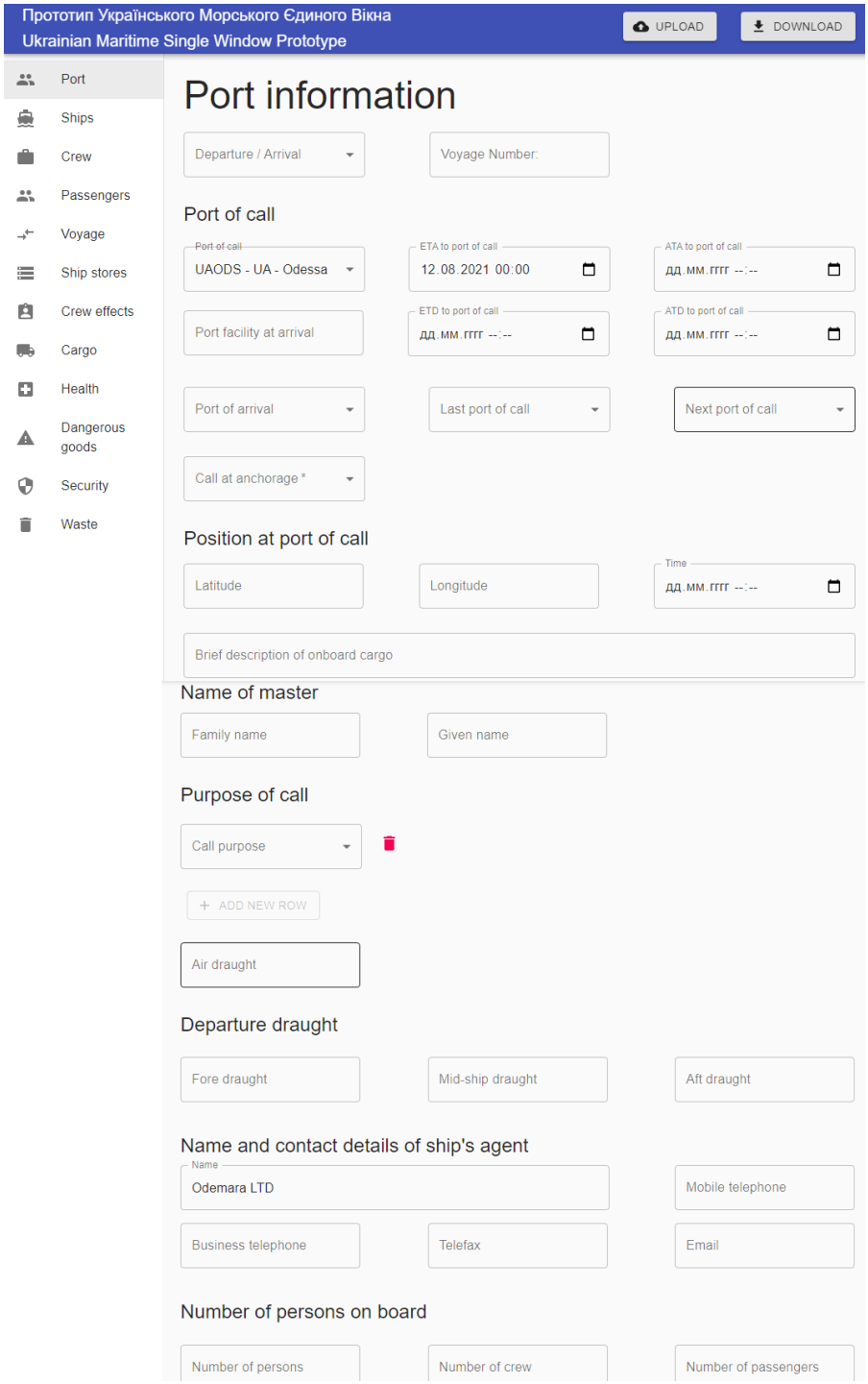
- Port - Port information
- Ships - Ship information
- Crew - Crew list
- Passengers - Passenger list
- Voyage - Voyage information
- Ship stores - Ship stores declaration
- Crew effects - Crew effects
- Cargo - Cargo declaration
- Health - Maritime Declaration of Health
- Dangerous goods - Dangerous goods declaration
- Security - Security information
- Waste - Waste information

[21] http://uspa.gov.ua/en/port-community-system/technical-information/registries/ship-calls-register

Each block contains the necessary fields for providing the information. More details about each block are presented in the next section below.

8.2. Port

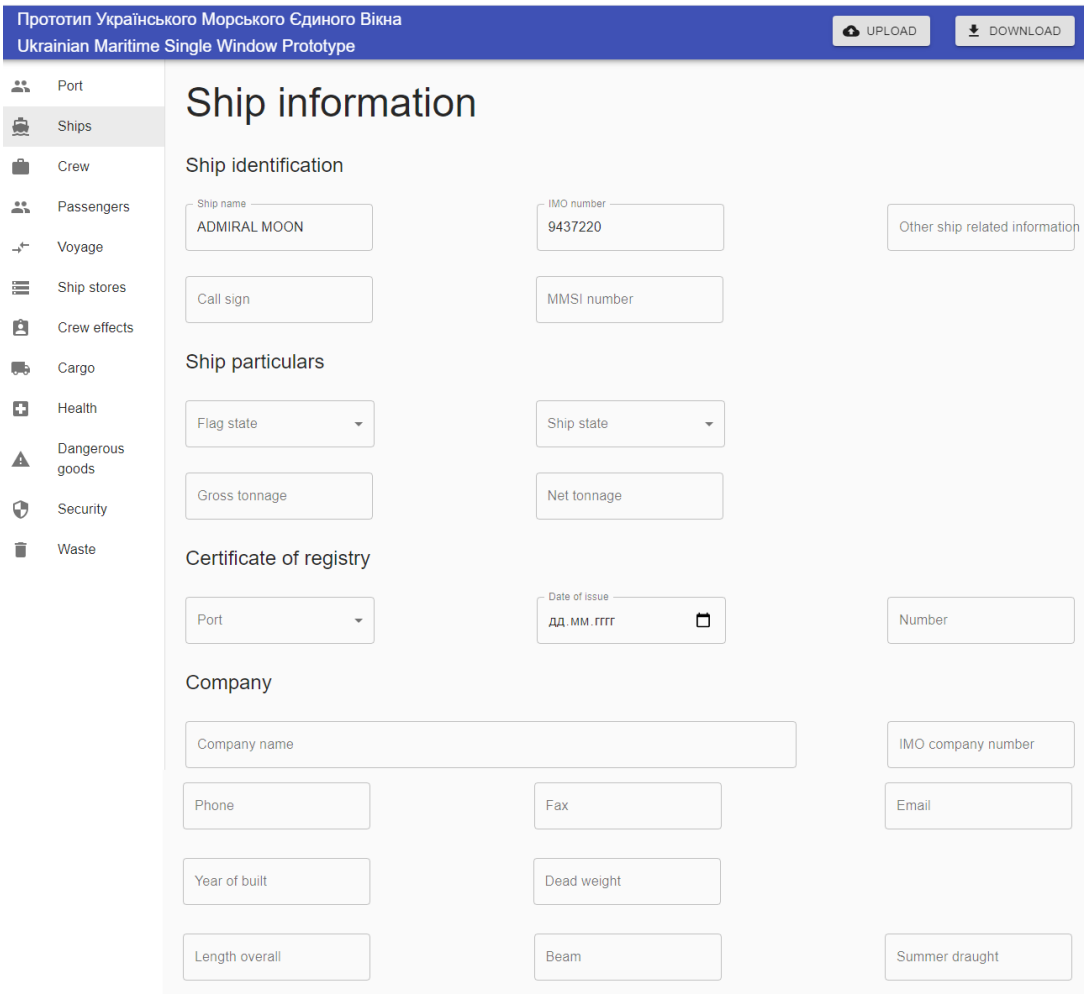
Figure 36: Ukrainian MSW Prototype - Port



Source: The authors

8.3. Ship

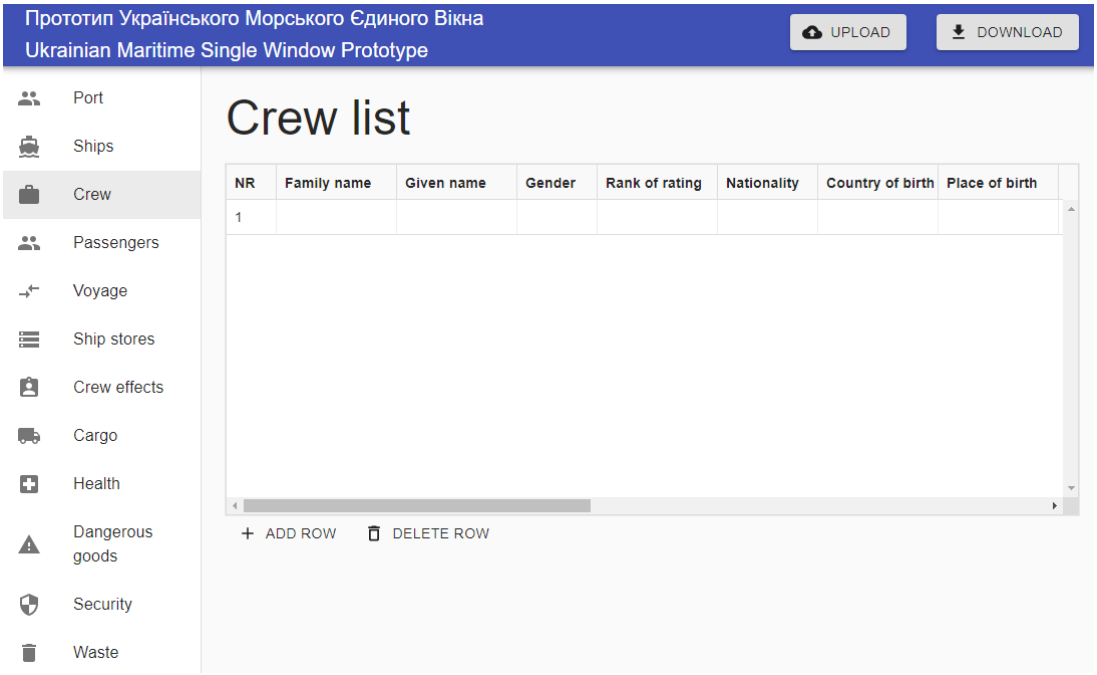
Figure 37: Ukrainian MSW Prototype - Ships



Source: The authors

8.4. Crew

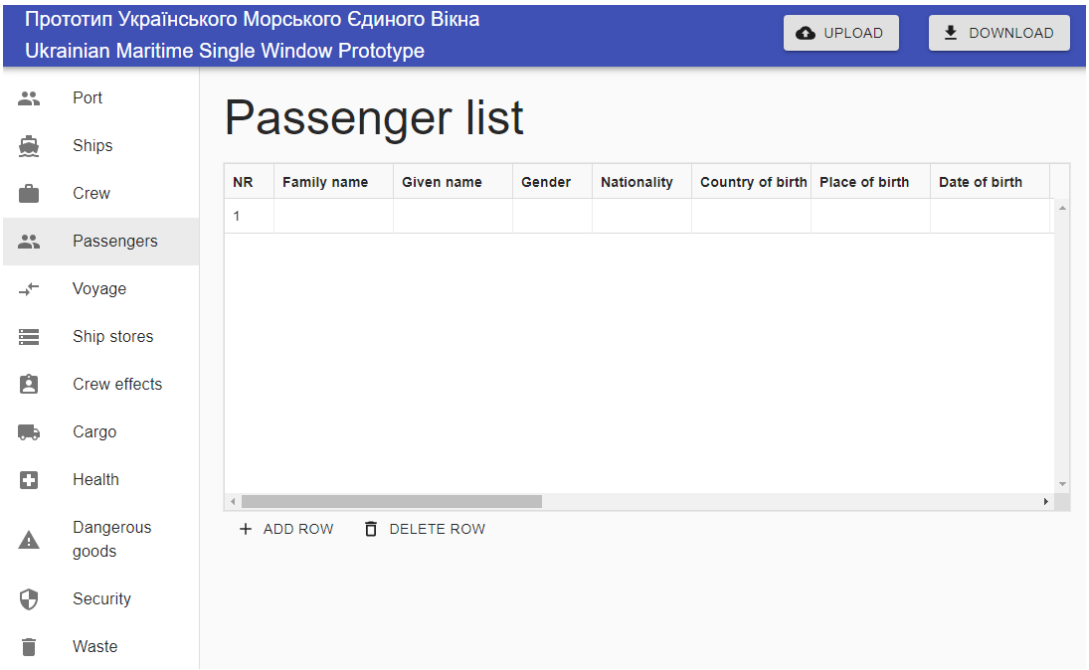
Figure 38: Ukrainian MSW Prototype - Crew



Source: The authors

8.5. Passengers

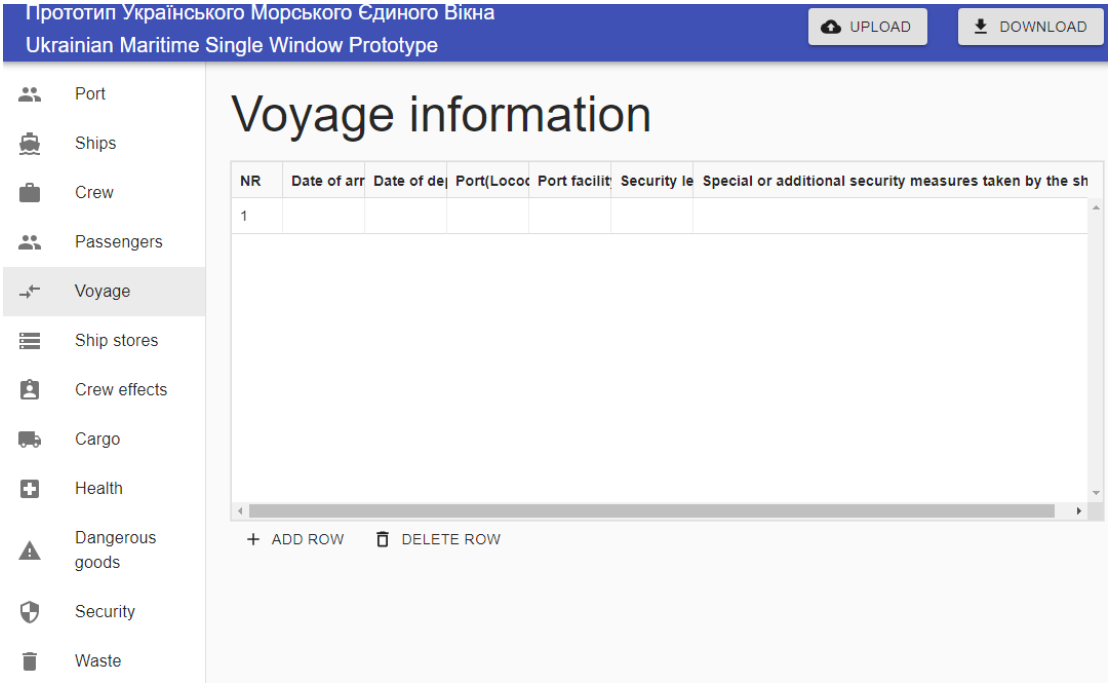
Figure 39: Ukrainian MSW Prototype - Passengers



Source: The authors

8.6. Voyage

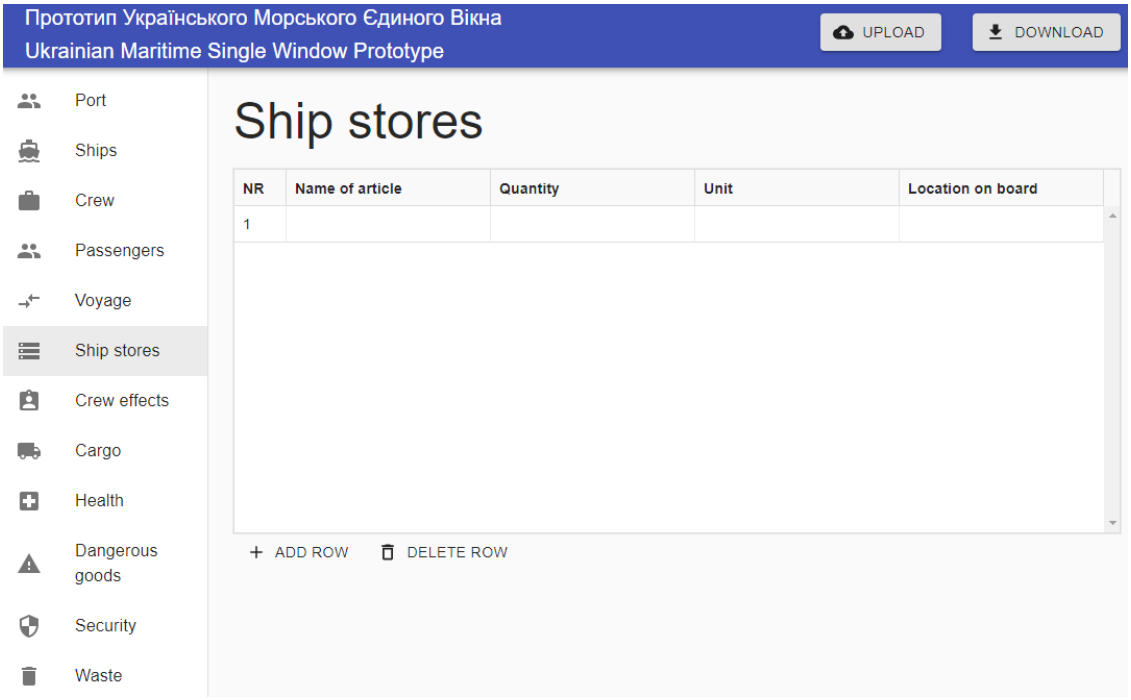
Figure 40: Ukrainian MSW Prototype - Voyage



Source: The authors

8.7. Ship Stores

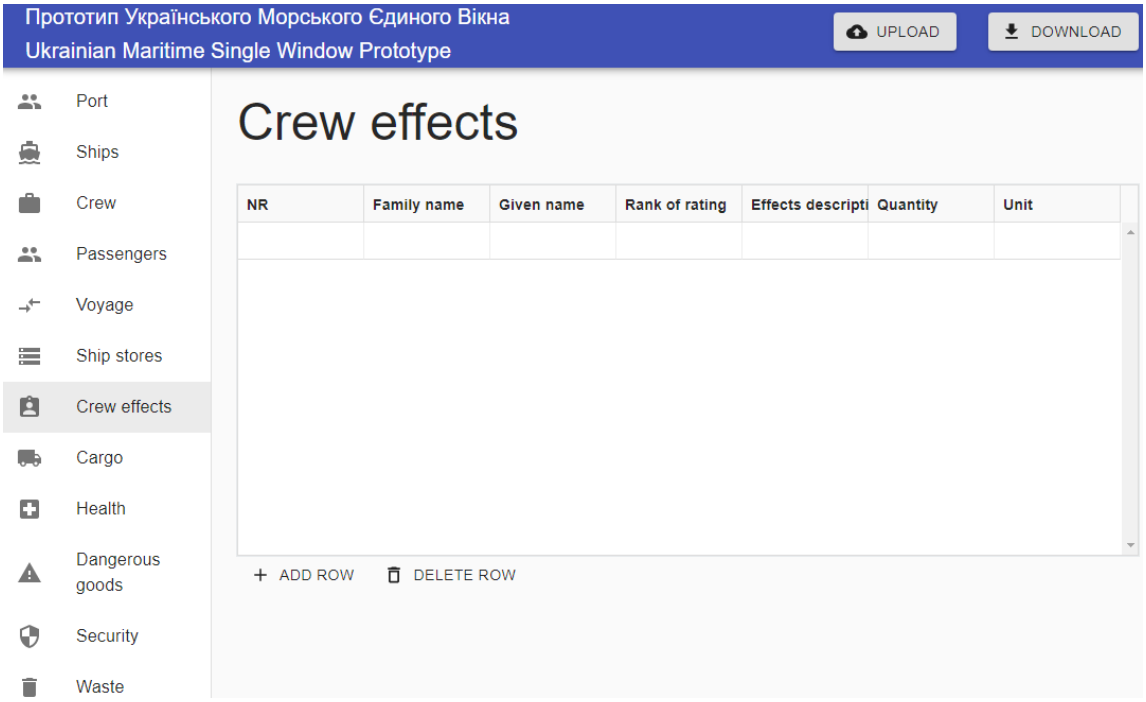
Figure 41: Ukrainian MSW Prototype - Ship Stores



Source: The authors

8.8. Crew effects

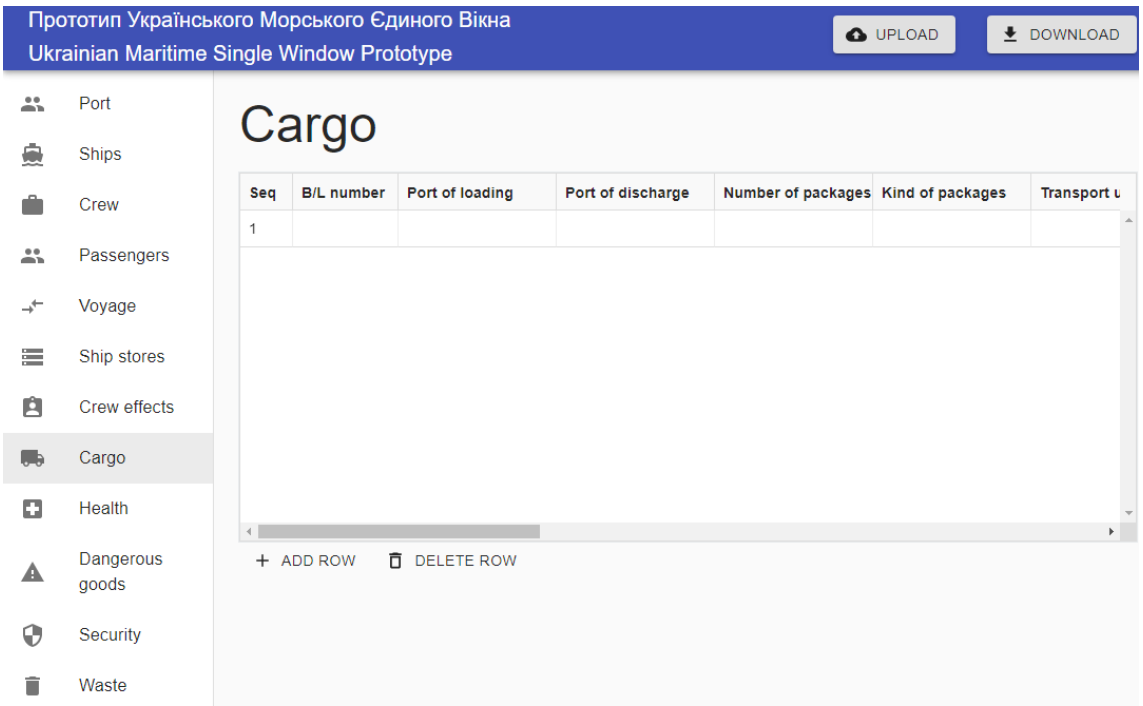
Figure 42: Ukrainian MSW Prototype - Crew effects



Source: The authors

8.9. Cargo

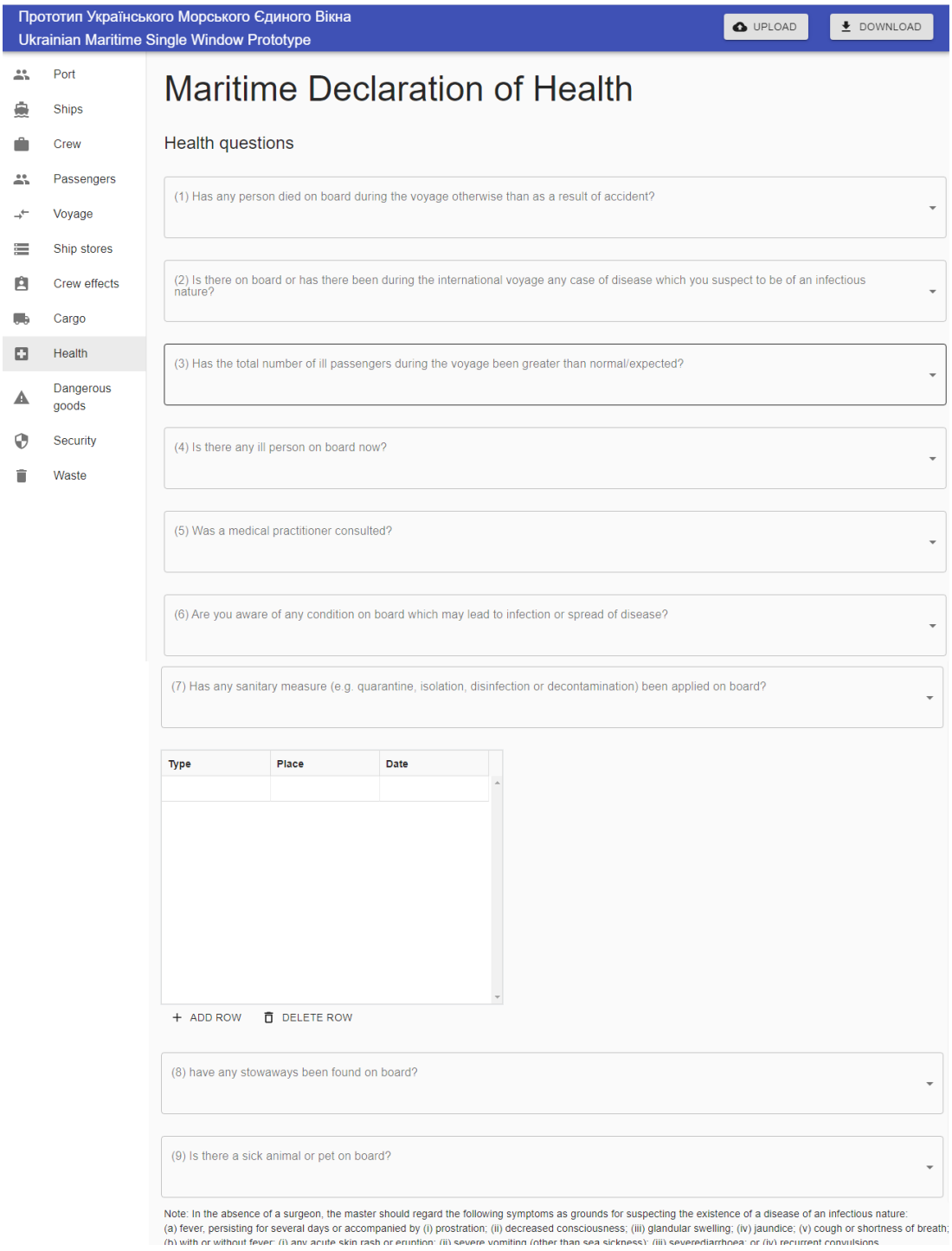
Figure 43: Ukrainian MSW Prototype - Cargo



Source: The authors

8.10. Health

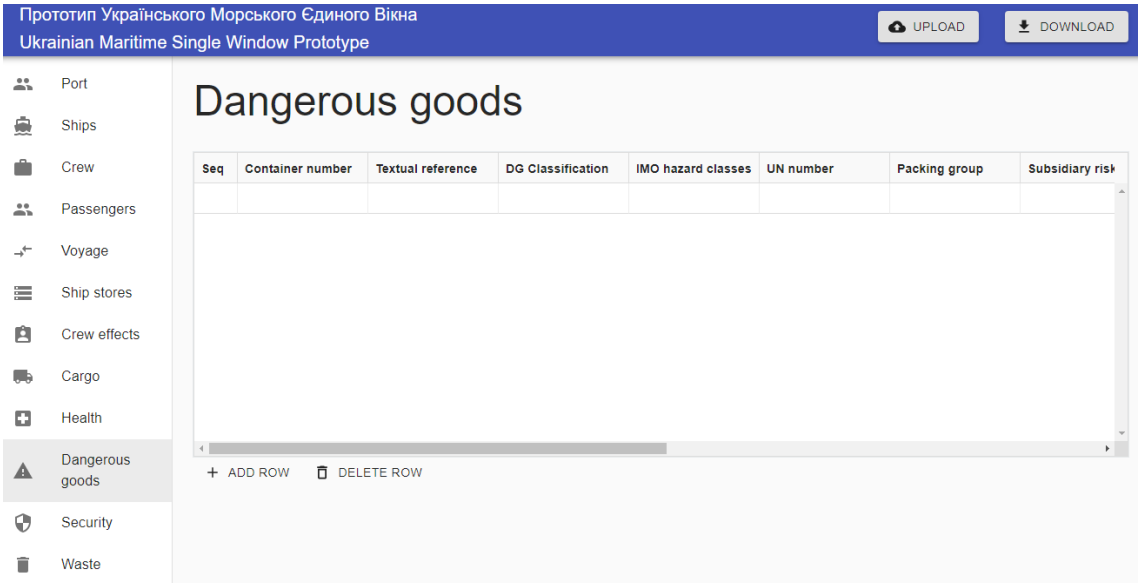
Figure 43: Ukrainian MSW Prototype - Health



Source: The authors

8.11. Dangerous goods

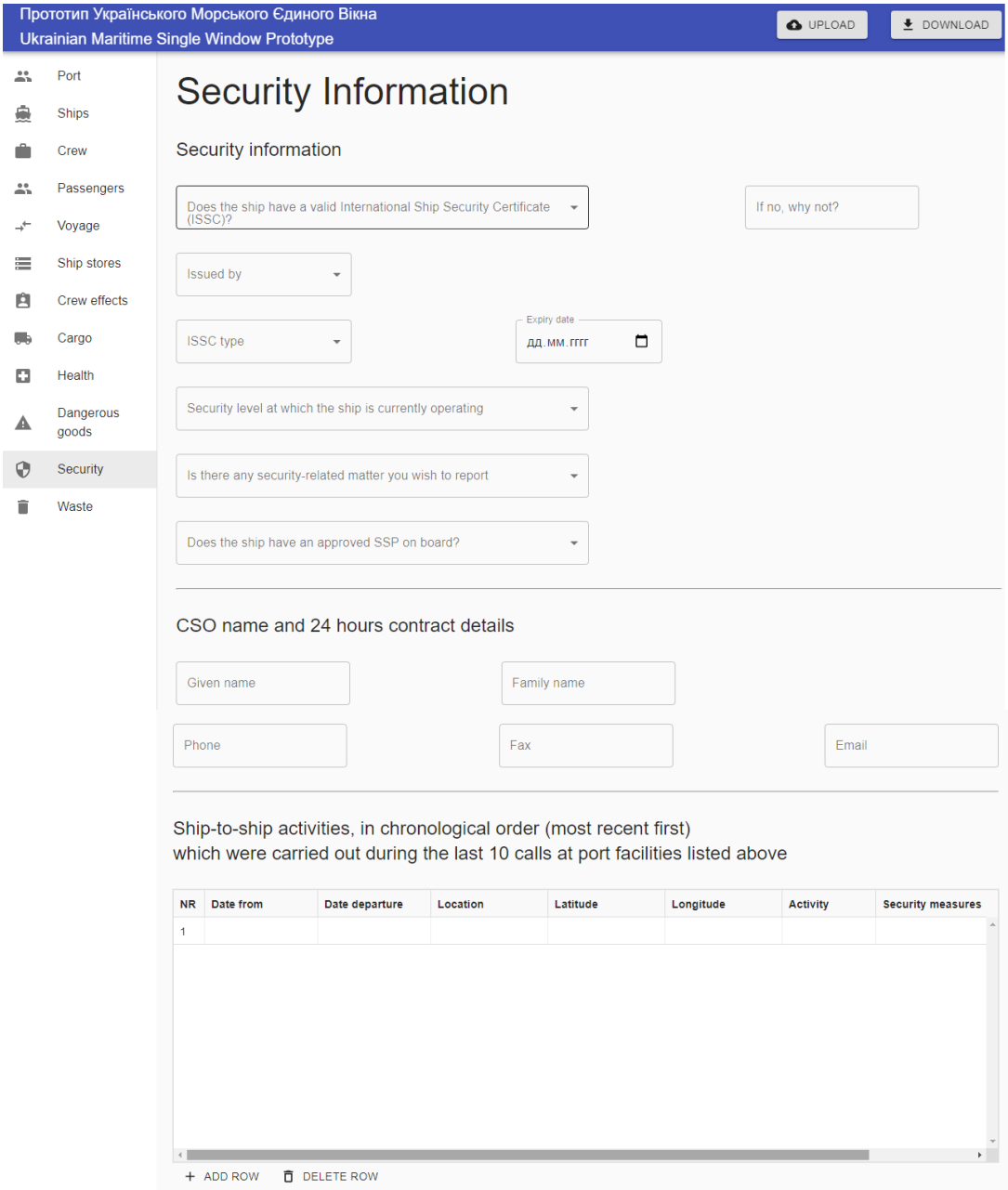
Figure 44: Ukrainian MSW Prototype - Dangerous Goods



Source: The authors

8.12. Security

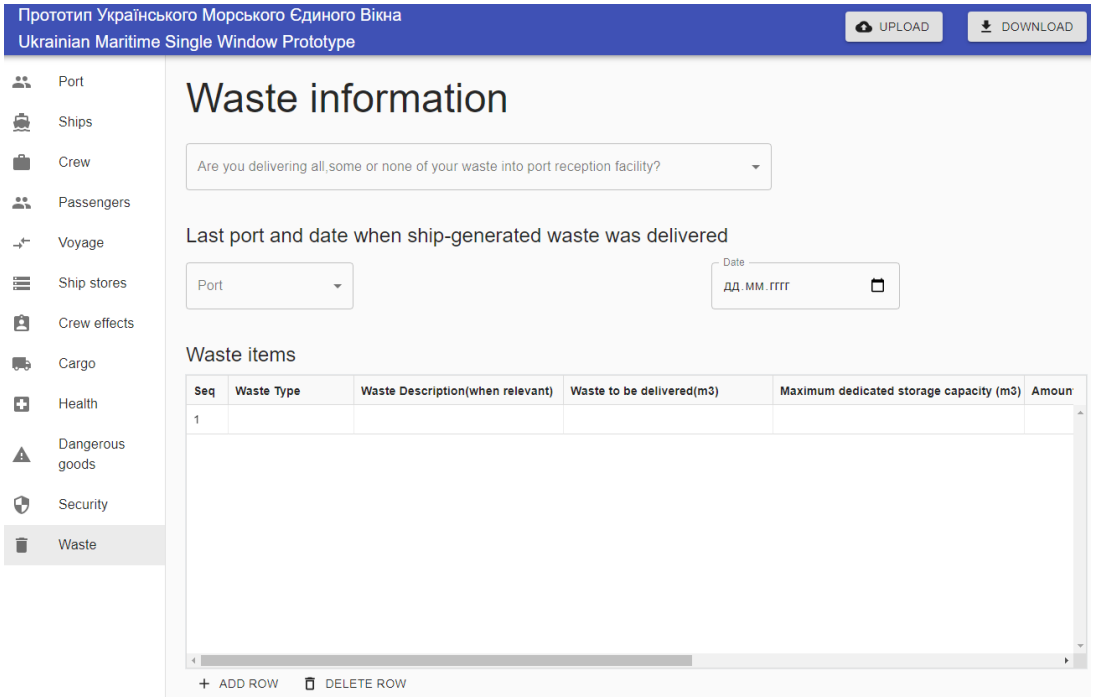
Figure 45: Ukrainian MSW Prototype - Security



Source: The authors

8.13. Waste

Figure 46: Ukrainian MSW Prototype - Waste



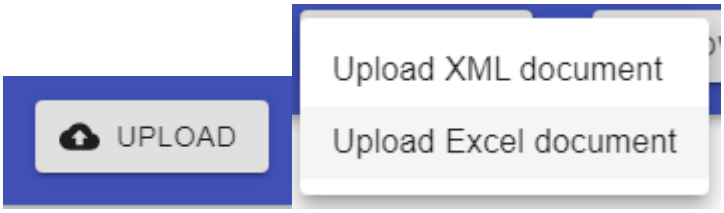
Source: The authors

8.14. Information integration

Uploading documents

In addition to the possibility of directly entering information into the Prototype in an interactive mode, two integration possibilities were tested, as shown on Figure 47.

Figure 47: Ukrainian MSW Prototype - Upload



Source: The authors

- Upload Excel document
  This option allows users to upload information into the prototype from the spreadsheets, based on the EMSA templates[22].

- Upload XML document
  This option allows users to upload information into the prototype from the XML files, created in the prototype earlier or in the external system for integration.

[22] http://www.emsa.europa.eu/emsw2/emsw-manuals.html

Creation of XML document

There is an option to generate XML documents from the information provided to the prototype. For the purposes of this study, we tested the possibility to generate electronic documents in both data models - UN/CEFACT and EMSA.

8.15. Participants

The assessment involved marine agents with information on ship calls to various ports of Ukraine with various types of cargo (Table 4).

Table 4 Participants of the research

Maritime agent	Port of clearance	Operation	Type of cargo
ODEMARA	UAODS – Odesa, Ukraine	Arrival	Containers
	UAODS – Odesa, Ukraine	Departure	Containers
	UAODS – Odesa, Ukraine	Arrival	Corn
	UAODS – Odesa, Ukraine	Arrival	Oil
CMA CGM SHIPPING AGENCY	UAODS – Odesa, Ukraine	Arrival	Containers
PLASKE	UAIZM - Izmail, Ukraine	Arrival	Ballast
METINVEST	UAILK - Chornomorsk, Ukraine	Arrival	Ballast
	UAILK - Chornomorsk, Ukraine	Departure	Steel
COSCO SHIPPING AGENCY	UAILK - Chornomorsk, Ukraine	Arrival	Containers

Source: The authors

8.16. Samples of Electronic Document Equivalents via prototype

Electronic documents generated on the basis of the research results are demonstrated in Annex V. Samples of electronic document equivalents were created using the prototype.

9. Results of the assessments

To date, the ship's documents used in the execution of formalities in the ports of Ukraine are provided to the maritime agent in the form of scanned copies. In this regard, it is very difficult to manually enter such voluminous documents as the cargo declaration, the crew list and the passengers list, and also the ship's stores declaration.

In the course of the study, the most convenient way for the participants to provide information was analyzed. The authors have proposed several alternative methods: manual entry into the portal, use of Excel templates, use of XML, integration via API. The most optimal option for most participants was to use Excel templates.

Based on the results of the analysis, we reached the following conclusions:

- In general, the structure and form of electronic documents in the prototype correspond to the accepted practice.
- To correctly fill in the data from Excel templates, it is necessary to pay more attention to the compliance with the regulatory requirements. For example, specify all ports via UN/LOCODE; use the code list for job title in the Crew List, etc.
  If the information is provided via the MSW portal, it can be additionally checked by the MSW software, but not all checks can be added to the Excel template.

Using the XML as an option for integration seems to be feasible both for those who work with MSW portal as for those who work in their own systems and then upload the information to MSW portal from XML file. In addition, it is necessary to assess the availability of all the information required for reporting in the agent’s systems.

Regarding the possibility of providing information in the proposed volumes, it was noted that there is some gap in the volume of information in the IMO (EMSA) dataset and the legal requirements in Ukraine. We propose to extend the data sets with additional information needed by the authorities, or to propose changes to the relevant legal requirements. Further details:

- Crew list.
  - It is proposed to add to the Code List the Seaman's Book as another type of document for crew members. Notably, there is a practice of registration of border crossing by the Border Guard Service of Ukraine on the passports of crew members, although this is not required by the regulations.
  - We propose to add fields for entering information about the place and time of boarding of a crew member
- Passenger list
  - In practice, the Transit field is not used
- Port of arrival.
  - It is not possible to specify a berth in the port. The port facility in Ukrainian ports is usually a maritime terminal and may contain several berths. Specifying coordinates (latitude and longitude) does not look useful.
- Cargo declaration / Dangerous Goods
  - The cargo declaration is filled in either in full or in the form of final data with the addition of the cargo manifest, depending on the specific

requirements of Customs. Filling in all the information on consignments in the form of a Cargo declaration seems to be feasible.
    - The Customs Status field is not used in Ukraine today.
- Dangerous Goods
    - During the completion of the cargo declaration and the associated declaration of dangerous goods, we found that in some cases the weight indicated for a consignment item (container) in the cargo declaration did not match the weight of the same container in the declaration of dangerous goods. This was explained by the fact that the container contains groupage cargoes and only some of them were included in the declaration of dangerous goods.
    - It is proposed to add details to be able to indicate the fact that this cargo is a potential marine pollutant.
- Health declaration
    - We propose to highlight the possibility of indicating the fact of visiting places with unfavorable epidemiological conditions.
    - The form of the Maritime Declaration of Health currently in use in Ukraine contains some differences in design. In this regard, it is suggested to pay attention to the need to agree and approve the amount of information to be provided and the form of such a document.
- Ship's store declaration
    - It is necessary to introduce a group (sections) for information in accordance with accepted practice;
    - It is necessary to define the requirements for the level of detail of information.
- Crew effects declaration
    - It is necessary to introduce a group (sections) for information in accordance with accepted practice;
    - It is necessary to define the requirements for the level of detail of information.
- Waste Declaration
    - To date, there is no practice of filling in (and requirements from the authorities to fill in) a Waste Declaration in Ukraine. From the point of view of the practice of application in ports of other countries, we suggest to introduce groupings (sections) for types of waste which can be handed over in the port.
    - In addition, we propose to study the possibility of informing the authorities about the presence of a Green Certificate on board (vessels equipped with an incinerator and do not hand over any waste) in case this information will be used by the State.

It was also suggested to consider the possibility of supplementing the details with data for the calculation of port dues in accordance with the Order of the Ministry of Infrastructure of Ukraine №316, in particular - the height of the ship and its width.

In general, it is noted that the available paper forms of ship documents contain a large amount of duplicate data, in particular, information about the ship, ports of call, captain, etc. The advantage of the proposed model of electronic document interchange is a significant reduction of such duplication. It is also proposed to continue the analysis and optimization of information details that may be deduplicated.

10. Findings and conclusion

Based on the results of the second stage of the study, the previously made intermediate conclusions can be amended and finalized as follows:

- The UN/CEFACT MMT RDM is currently the only functional complete data model that allows, within a single ontology, to interconnect both different modes of transport and different jurisdictions. The data model is constantly re-negotiated, updated and improved by experts from all over the world and reflects actual business operations in trade and transport as closely as possible to reality.

- The complexities associated with the practical implementation of IT solutions based on the MMT RDM data model, in the context of ship-to-shore formalities, can be mitigated by using the EMSA dataset, e.g., in the European Maritime Single Window, as an implementation guide. The study showed the relevance and applicability of this approach for the seaports of Ukraine. Also, this approach can be applied to other regions that have close economic contacts with EU seaports.

- If there are objective differences between the datasets in the UN/CEFACT and EMSA models, at least in the amount of information presented in paper forms of documents submitted to the coastal administrations as part of the formalities for registration of arrival and departure, information in both models is successfully matched. Discrepancies identified in the study can be eliminated with further requests to change (update) the data models.

- Moreover, mapping to real-business documents and processes shows mismatches in both datasets to be discussed in the next requests for changes.

- The practical assessment with real-business documents and parties involved in the port clearance process showed the feasibility of the approach proposed and can prove the concept.

- The practical assessment proved the hypothesis about using the EMSA dataset as an interface for providing profile information to the MSW. It is reasonable both from the point of view of structuring the information in it and from the point of view of Ukraine's geopolitical position.

- Most of the participants in the assessment noted significant difficulty in filling out electronic documents manually in accordance with their existing business processes. Taking into account that MSW implementation necessitates the optimization of the business processes of all parties, the study showed the feasibility of using document templates in MS Excel format at the early stages of the adaptation of the MSW. Given that many global international carriers do business in the Ukrainian ports, it is reasonable to utilize the templates from EMSA as they are already accepted in the EU.

- The use of the UN/CEFACT data model as the core of the maritime single window system opens up the possibility of integrating such a system into logistics platforms (both national and international) and will enable seamless data conversion between maritime and other modes of transport due to the fundamental simplification of the integration task.

Annexes

Annex I. Original documents, used for the mappings

1. General Declaration

Загальна декларація
General declaration

		X Прихід / Arrival	Вихід / Departure
1. Назва і тип судна / Name and description of the ship	CONTAINER CARRIER	2. Порт приходу/виходу / Port of arrival/departure: ODESSA	3. Дата, час приходу/виходу / Date/Time of arrival/dep: 0…21
4. Національна належність судна / Nationality of the ship: BELIZE	5. Прізвище капітана / Name of the master: IG…	6. Попередній порт заходу / Порт призначення / Port arrived from / Port of destination: E… / …	
7. Реєстраційне свідоцтво (порт, дата, номер реєстрації) / Certificate of registry / PORT / DATE / NUMBER: BE… 11859		8. Найменування та адреса агента / name and address of the ship's agent	
9. Брутто тоннаж / Gross tonnage: 2 936	10. Нетто тоннаж / Net register tons: 1 444		
11. Місце стоянки судна в порту (причал та місцезнаходження) / Position of vessel in port: BERTH 2			
12. Короткі відомості рейсу (попередні та наступні порти заходу; підкреслити де буде завантажено, вантаж, що залишається) / Brief particulars of the voyage(previous and subsequent ports of call: underline where the remaining cargo will be discharged): - ODESSA -			
13. Короткий опис вантажу / Brief description of the cargo: FOR ODESSA: 33x20' + 83x40' = 116 — 2642,021 MTS; TRANSIT: 0x20' + 0x40' = 0 — 0,000 MTS; TOTAL: 33x20' + 83x40' = 116 — 2642,021 MTS			
14. Кількість екіпажу (вкл. капітана) / Number of crew (incl. master): 10	15. Кількість пасажирів / Number of passenger: NIL	16. Примітки / Remarks: DWT 3700; L max, M 100,80; LBP, M 93,05; B max, M 15,85; Dmd, M 6,18; T sum, M 4,88; T fore, M 4,50; T aft, M 4,50; T mid, M 4,50	
Документи, що додаються (указати кількість екземплярів) / Attached documents (indicate number of copies)			
Декларація про вантаж / Cargo declaration: 7	18. Декларація про суднові запаси / Ship's stores declaration: 3		
19. Суднова роль / Crew list: 8	20. Список пасажирів / Passenger list: NIL	21 Дата і підпис капітана, уповноваженого агента чи офіцера судна / Date and signature of master, authorized agent or officer	
22. Декларація про особисті речі екіпажа * / Crew effects declaration *: 2	23. Морська санітарна декларація / Maritime declaration of health *: 1		

Для службового користання / For official use

* Тільки на прихід судна / Only on arrival

ODESSA

Помітки капітана / Master's remarks: **Ship's money: as per ship's cash declaration**

Судновласник / Owners	BENAR CONSULT LTD	Залишок бункеру на борту, т / Bunker remained on board, t		
Позивний судна / Call sign	J8B5386	Важке паливо / Fuel oil	as per store list	mts
IMO / IMO No.	9234422	Дизельне паливо / Diesel oil	as per store list	mts
Баласт на борту / Ballast on board, MT	346 MTS	Мастило / Lubrictaion oil	as per store list	ltrs
Дата останньої перевірки / Date of last PSC inspection	ODESSA/UKRAINE 01.12.2020	Прісна вода / Fresh water	as per store list	mts

GENERAL DECLARATION
ЗАГАЛЬНА ДЕКЛАРАЦІЯ
(IMO FAL Form 1)

X Arrival Приход | Departure Отход

1. Name and description of ship Название и описание судна		1.2. IMO No. № IMO	1.3. Call Sign Позывной судна	1.4. Voyage # Номер рейса
Gl	Train ferry, Ro-Ro MMSI		L	886

2. Port of arrival/departure Порт прихода / отхода	3. Date and time of arrival/departure Дата, время прихода / отхода
CHORNOMORSK, UKRAINE	1(

4. Flag State of ship Нац-ая принадлежность судна	5. Name of master Фамилия капитана	Порт отправления / порт назначения
BULGARIA	ZI DV	POTI, GEORGIA

7. Certificate of registry (Port, date, number) Свидетельство о регистрации (порт, дата, номер)	8. Name and address of the ship's agent Наименование и адреса судового агента
VARNA, 06.07.2019; No.0059	

9. Gross tonnage Валовая вместимость	10. Net tonnage Чистая вместимость
19518 MT	5856 MT

11. Position of the ship in the port (berth and station) Место стоянки судна в порту
№ 26 / 27

12. Brief particulars of voyage (previous and subsequent ports of call; underline where remaining cargo will be discharged)
Краткие сведения о рейсе (предыдущие и последующие порты захода; подчеркнуть, где будет выгружен остающийся на борту груз)

V CHORNOMORSK

13. Brief description of the cargo / Краткое описание груза

waggons: 107 = 7929.748 TIR's: 9 = 318.024 deck cargo(3 jeeps + 10 cars): 13 = 20.040

TOTAL: GT - 8267.812 mts NT - 5355.972 mts

14. Number of crew (incl. master) Количество членов экипажа судна (вкл капитана)	15. Number of passengers Количество пассажиров	16. Remarks: Ремарки:
27	Drivers: 9 Passengers: 0	DWT: 13088 Mts DM: 15,20 M LOA: 185,44 M Tsum: 7,45 M LBP: 175,30 M Tfore: 6,95 M Beam: 26,00 M Taft: 7,25 M Ship's cash, drugs according to list. No stowaways. no arms and am-ns. Owner/Судновласник: Bulgarian Maritime Training Center

Attached documents (indicate number of copies)
Прилагаемые документы (укажите количество экземпляров)

17. Cargo Declaration Декларация о грузе	18. Ship's Stores Declaration Декларация о судовых запасах
1	1

19. Crew List Судовая роль	20. Passenger List Список пасажирів	21. The ship's requirements in terms of waste and residue reception facilities Требования судна в отношении приема отходов/остатков
1	1	

22. Crew's Effects Declaration Декларация о личных вещах экипажа	23. Maritime Declaration of Health (Only on arrival) Морская санитарная декларация
1	1

24. Date and signature by master, authorized agent or officer / Дата и подпись капитана, уполномоченного агента или лица командного состава

Баласт на борту Ballast on board		Мастило Lubrictaion oil	ltrs
Дата останньої перевірки Date of last PSC inspection		Прісна вода Fresh water	mts

Загальна декларація
General declaration

		☐ Прихід / Arrival	☒ Вихід / Departure
1. Назва і тип судна / Name and description of the ship		2. Порт приходу/виходу / Port of arrival/departure	3. Дата, час приходу/виходу / Date/Time of arrival/dep
[illegible]U	BULK CARRIER	ODESA	[illegible]21
4. Національна належність судна / Nationality of the ship	5. Прізвище капітана / Name of the master	6. Попередній порт заходу / Порт призначення / Port arrived from / Port of destination	
BELGIUM	[illegible]H	NE[illegible] / (Рю Нодна) TO ORDER	
7. Реєстраційне свідоцтво (порт, дата, номер реєстрації) / Certificate of registry / PORT / DATE / NUMBER		8. Найменування та адреса агента / name and address of the ship's agent	
ANT[illegible]1		"Me[illegible]anch [illegible] St. 65[illegible] 2-70/71 72 e[illegible]com	
9. Бруто тоннаж / Gross tonnage	10. Нето тоннаж / Net register tons		
34 810	20 209		
11. Місце стоянки судна в порту (причал та місцезнаходження) / Position of vessel in port			
26			

12. Коротко відомості рейсу (попередні та наступні порти заходу; підкреслити де буде завантажено, вантаж, що залишається) / Brief particulars of the voyage(previous and subsequent ports of call: underline where the remaining cargo will be discharged)

NE[illegible] - ODESA, UKRAINE - TO ORDER (Рю Нодна)

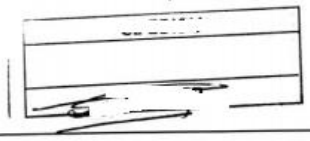
13. Короткий опис вантажу / Brief description of the cargo

STEEL PRODUCTS 44 041,663 MT

14. Кількість екіпажу (вкл. капітана) / Number of crew (incl. master)	15. Кількість пасажирів / Number of passenger	16. Примітки / Remarks			
20	NIL	DWT	61 330	Dmd, M	18,60
Документи, що додаються (указати кількість екземплярів) / Attached documents (indicate number of copies)		L max, M	199,98	T sum, M	13,010
		LBP, M	195,00	T fore, M	
		B max, M	32,24	T aft, M	
				T mid, M	
17. Декларація про вантаж / Cargo declaration	18. Декларація про суднові запаси / Ship's stores declaration				
7	3				
19. Суднова роль / Crew list	20. Список пасажирів / Passenger list	21 Дата і підпис капітана, уповноваженого агента чи офіцера суд☐ / Date and signature of master, authorized agent or officer			
8	NIL				
22. Декларація про особисті речі екіпажа * / Crew effects declaration *	23. Морська санітарна декларація / Maritime declaration of health *				
2	1				

Для службового користання / For official use

* Тільки на прихід судна / Only on arrival



Помітки капітана / Master's remarks

Судновласник / Owners	CONTI-LINES NV	Залишок бункеру на борту, т / Bunker remained on board, t	
Позивний судна / Call sign	ONMM	Важке паливо / Fuel oil	mts
IMO / IMO No.	9713478	Дизельне паливо / Diesel oil	mts
Баласт на борту / Ballast on board		Мастило / Lubrictaion oil	ltrs
Дата останньої перевірки / Date of last PSC inspection		Прісна вода / Fresh water	mts

2. Cargo Declaration, Cargo Manifest

Agent:

Cargo Declaration Page 1

X Arrival ☐ Departure

1. Vessel	2. Port where report is made		
G TA	ODESSA		
3. Nationality/Flag	4. Master	5. Previous port	E P
BELIZE	IG LEV	Next port	N
6. Marks and Numbers	7. Number and kind of packages, description of goods	8.Gross Weight	9.Measurement
	FOR ODESSA:		
	33 x20' (F) 83 x40' (F)		
	0 x20' (E) 0 x40' (E)		
	TOTAL: 33 x20' + 83 x40 = 116	**2 642,021**	**MTS**
	TRANSIT:		
	TOTAL: 0 x20' 0 x40'	0,000	MTS
	TOTAL ON BOARD:		
	TOTAL: 33 x20' 83 x40'	2 642,021	MTS

CARGO MANIFEST

#	Container	CNTR SIZE	CNTR TYPE	B/L	SEAL	NET	TARE	GROSS	PCS	CARGO	IMO CLASS	PORT OF LOADING
1		40	RH	AD2101602244	814687	24557,540	4780,000	29337,540	21 PALLETS	SUNRISE GRAPEFRUIT, ORRI MANDARIN		ASHDOD
2		40	RH	AD2101602224	14660853	12813,000	4700,000	17513,000	21 PALLETS	FRESH PEPPER		ASHDOD
3		40	RH	AD2101602205	833296	12773,000	4700,000	17473,000	21 PALLETS	FRESH PEPPER		ASHDOD
4		40	RH	AD2101602201	833334	12773,000	4530,000	17303,000	21 PALLETS	FRESH PEPPER		ASHDOD
5		20	DV	AD2101602143	1605561	24408,000	2240,000	26648,000	20 PALLETS	MULTI-K GG 13.5-0-46.2	5.1	ASHDOD
6		20	DV	AD2101602143	1605560	24408,000	2230,000	26638,000	20 PALLETS	MULTI-K GG 13.5-0-46.2	5.1	ASHDOD
7		40	DV	AD2101102717	884475	5836,400	3700,000	9536,400	561 PACKAGES	PLASTIC HOUSE WARE ARTICLES		Istanbul
8		40	DV	AD2101102717	877470	5007,520	3700,000	8707,520	584 PACKAGES	PLASTIC HOUSE WARE ARTICLES		Istanbul
9		40	DV	AD2101102717	884370	5000,780	3700,000	8700,780	604 PACKAGES	PLASTIC HOUSE WARE ARTICLES		Istanbul
10		40	DV	AD2101102717	884374	5065,160	3700,000	8765,160	496 PACKAGES	PLASTIC HOUSE WARE ARTICLES		Istanbul

CARGO DECLARATION

(IMO FAL Form 2)

[X] Arrival [ ] Departure

1.1. Name and type of ship: **GL[illegible] OL**	1.2. IMO number: **7[illegible]6**
1.3. Call sign: **L[illegible]3**	1.4. Voyage number **886**
2. Port where report is made **CHORNOMORSK, UKRAINE**	3. Flag State of the ship: **BULGARIA**
4. Name of Master **Zla[illegible]nov**	5. Port of loading / Port of discharge **VARNA, POTI / CHORNOMORSK**

6. Marks and Numbers	7. Number and kind of packages, description of goods or HS code		8. Net weight	8.1. Gross weight	9. Measurement
	Поти - Черноморск, вагоны :	**107**	**5190,948**	**7929,748**	**mts**
1	минеральная вода „Борджоми”	18	973,498	1421,498	mts
2	битумы нефтяные	70	4217,450	6081,850	mts
3	порожний	19	0,000	426,400	mts
	Поти – Черноморск, автотехника:	**9**	**165,024**	**318,024**	**mts**
1	TIR	9	165,024	318,024	mts
	Поти – Черноморск, палубный груз:	**12**	**0,000**	**18,400**	**mts**
1	джип	2	0,000	3,400	mts
2	легковая машина	10	0,000	15,000	mts
	Варна - Черноморск, палубный груз:	**1**	**0,000**	**1,640**	**mts**
1	джип	1	0,000	1,640	mts
	Всего вагоны на борту:	**107**	**5190,948**	**7929,748**	**mts**
	Всего на борту:	***129***	***5355,972***	***8267,812***	***mts***

10. Date and signature of Master, authorized agent or officer

ПОРТ ПОГРУЗКИ/port of loading: ПОТИ/POTI
ПОРТ ВЫГРУЗКИ/port of discharge: ЧЕРНОМОРСК/CHORNOMORSK

Voy[illegible]

ГРУЗОВОЙ МАНИФЕСТ / CARGO MANIFEST № 3

№ п/п/ No	ФИО/Name № пас./pass.	Марка/brand of car	Длина (м)/length (m)	Chassis #	Registry (plate) #	Отправитель/shipper	Получатель/consignee	Наименование груза/description of cargo	Кол-во мест/places	Вес груза (общий вес), кг/ Weight cargo (total weight) kg
1	БЕЗ ВОДИТЕЛЯ	MERCEDES BENZ B 180	5	[illegible]	8563II	[illegible]	[illegible]	ЛЕГКОВАЯ МАШИНА	1	1500
2	БЕЗ ВОДИТЕЛЯ	HYUNDAI ELANTRA	5	[illegible]	4167II	[illegible]	[illegible]	ЛЕГКОВАЯ МАШИНА	1	1500

Agent:

Cargo Declaration Page 1

[ ] Arrival [X] Departure

1. Vessel		2. Port where report is made	
C[illegible]		ODESA	
3. Nationality/Flag	4. Master	5. Port of Loading	ODESA
BELGIUM	SAI[illegible]H	Port of discharge	TO ORDER (Rio Haina)
6. Marks and Numbers	7. Number and kind of packages, description of goods	8.Gross Weight	9.Measurement
	STEEL PRODUCTS	44 041,663	MT

MANIFEST OF CARGO

Composed on 2 page (s)

PORT OF LOADING: ODESSA, UKRAINE

Page 1

PORT OF DISCHARGE:

B/L or M/R No.	S/O No.	SHIPPER	CONSIGNEE	NOTIFY ADDRESS	KIND OF PACKAGES AND DESCRIPTION OF GOODS	NUMBER OF COILS/ BUNDLES	NET WEIGHT, MT	GROSS WEIGHT, MT
1	[illegible]	[illegible]	[illegible]	[illegible]	REINFORCING STEEL BARS – PRIME SIZE LENGTH(MM) #3 (9.50 MM) 12000 MM #4 (12.7 MM) 12000 MM #5 (15.9 MM) 9000 MM #5 (15.9 MM) 12000 MM #6 (19.1 MM) 12000 MM #8 (25.4 MM) 12000 MM TOTAL:	 116 151 108 104 35 35 549	 206.134 282.920 207.654 202.584 67.713 67.333 1034.338	 206.770 283.810 208.110 203.020 67.860 67.480 1037.050
2	[illegible]	[illegible]	[illegible]	[illegible]	PRIME REINFORCING STEEL BAR IN COILS SIZE/DIAMETER(MM) 15.00 MM TOTAL:	 257 257	 524.496 524.496	 524.671 524.671
					TOTAL FOR PAGE 1:	806	1 558.834	1 561.721

3. Ship's stores declaration

IMO SHIP'S STORES DECLARATION

Page no 1 of 1

X Arrival ☐ Departure

1. Name of ship	2. Port of arrival: Odessa	3. Date of arrival
4. Nationality of ship	5. Port arrived from: Turkey	
6. Number of persons on board: 10	7. Period of stay	7. Destination: Turkey

9. Name of article	10. Quantity	11. For official use
Bonded Stores		
Cigarettes	45 crt	
Whisky 0,7 ltr	nil btl	

SHIP'S STORES DECLARATION

		X Arrival ☐ Departure		Page No
1.Name of ship		2.Port of arrival / departure **CHORNOMORSK**	3.Date of arrival / departure	
4.Nationality of ship **BULGARIA**		5.Port arrived from / Port of destination		
6.Number of persons on board		8.Place of stay **Berth No 26 / 27**		
9.Name of article	10.Quantity	9.Name of article	9.Name of article	10.Quantity
BONDED	№ 1 № 2	**INVENTORY**		
Spirits btl	71 138	Paint	930 ltrs	
Cigarettes x 200 pcs	Nil 131	Thinner	155 ltrs	
Wine pcs	Nil Nil	Ropes fibre	6 coils	
Beer pcs	Nil Nil	Ropes wire	5 coils	
		Video TR	2 pcs	
		Video cassettes	10 pcs	
		TV set	7 pcs	
		Tape recorder	2 pcs	
		Radio	6 pcs	
PROVISIONS		Binoculars	4 pcs	
Meat	420 kg	Sextants	3 pcs	
Poultry	270 kg	Computers	8 pcs	
Dairy	80 kg	Photo camera	2 pcs	
Eggs	1100 pcs	DVD player	3 pcs	
Fish	40 kg	SAT receiver/SAT ant.	2 pcs	
Fruits	80 kg	Refrigerator	14 pcs	
Vegetables	125 kg	Microwave oven	2 pc	
Sugar	15 kg	Washing machine	2 pcs	
Flour	120 kg	Vacuum cleaner	5 pcs	
Butter	7,0 kg	Printers	6 pcs	
Cheese	160 kg	Copier	2 pcs	
Cooking oil	106 ltrs	Dish washing machine	3 pcs	
Coffee	5,0 kg	Drying machine	1 pc	
Tea	1,0 kg	Pyrotechnics	40 pcs	
		Handcuffs	5 pcs	
		El. shock stick	1 pc	
		BUNKER		
		Fuel Oil	0.0 mt	
		Diesel Oil	250.0 mt	
		Lubricating Oil	16.8 mt	

4. Crew's Effects Declaration

CREW'S EFFECT DECLARATION

Arrival X Departure

Page No 1 of 1

1. Name of Ship	2. Articles acquired abroad by officers and members of the crew (except those exclusively for use on voyage or cleared through Customs authorities)	3. Arrival / Port of departure: ODESSA
4. Nationality of Ship: BELIZE		5. Date of Arrival / Departure

6. No	7. Family Name, Given Names	8. Rank or Rating	Cigarettes	Alcohol	Tobacco	Other items	9. Signature
1	[redacted]	Master	200	Nil	Nil	NIL	
2	[redacted]	Ch Off	160	NIL	NIL	1 MOB. TEL	
3	[redacted]	2nd Off	200	Nil	NIL	MOB PHONE 2 PCS LAPTOP ASUS" 1 PCS	
4	[redacted]	Ch.Eng	200	Nil	NIL	mob. phone 1 pcs laptop „ASUS" 1 pcs	
5	[redacted]	2nd Eng	200	NIL	NIL	MOB. PHONE 1 PCS LAPTOP „ACER"	
6	[redacted]	Electrician	200	NIL	NIL	MOB PHONE - 1 PCS LAPTOP 1 PCS	
7	[redacted]	Boatswain	NIL	NIL	NIL	MOB PHONE - 1	
8	[redacted]	AB	160	NIL	NIL	1 MOB TEL IPHONE 1 LAPTOP SONY PS-3	
9	[redacted]	AB	200	NIL	NIL	1. MOB. PHONE 1 Laptop - ASUS R6	
10	[redacted]	Cook	200	NIL	NIL	2 MOB. PHONE LAPTOP - ASUS 1 PCS	

CREW'S EFFECTS DECLARATION

1.Name of ship [redacted]

	4.Family name, given names	5.Rank	MONEY	CIGARETTES	SPIRITS	GOLD pc	EL TECHNIKA	OTHERS	SIGNATURE
1	Zla[redacted]ov	Master	100$	200	1	NIL	HDD LAPTOP	GSM-5	
2	Nec[redacted]ov	Ch.Off.	200	NIL	1	NIL	LAPTOP	GSM-2	
3	Di[redacted]	2/OOW	50$	200	1	NIL	LAPTOP	GSM	
4	Iv[redacted]ov	3/OOW	100$	200	1	NIL	Laptop1	GSM2	
5	St[redacted] Konstantin Petrov	Ch.Eng.	200$	NIL	NIL	NIL	NIL	GSM 1	
6	To[redacted]v	2 / Eng.	20 $	100	1	NIL	TABLET-2	GSM-3	
7	P[redacted]ov	3 / EOW	200$	NIL	1	NIL	LAPTOP	GSM	
8	[redacted]v	4 / EOW	100€	1	200	1	Laptop	GSM	
9	H[redacted]rov	E/E	100$	NIL	1	NIL	Laptop	GSM	
10	[redacted]v	Bosun	100$	200	1	NIL	LAPTOP	GSM	
11	[redacted]ov	A / B	150$	—	1	2	Laptop	GSM	
12	Kr[redacted] Krasimir Stoychev	A / B	100€	200	1	1	Kindle2	GSM	
13	Ko[redacted]	A / B	100€	200	1	NIL	LAPTOP	GSM	
14	T[redacted]ov	A / B	100€	1000	1	NIL	TABLET	GSM-5	

CREW'S EFFECTS DECLARATION
(IMO FAL Form 4)

1 Page Number

1.1 Name of ship	1.2 IMO number
1.3 Call sign	1.4 Voyage number 004
2. Flag State of ship BELGIUM	

3. No.	4.Family name	5. Given names	6. Rank or rating	7. Effects ineligible for relief from customs duties and taxes or subject to prohibitions or restrictions	8. Signature
1			MASTER	2 MOBILE PHONE,1 LAPTOP, 3 PORTABLE HARD DRIVES, 1 BLUETOOTH SPEAKER, 1 WRIST WATCH, 1 GUITAR, 1 AMPLIFIER, PERSONAL EFFECTS	
2			CHIEF OFFICER	SPIRITS- 1 BTL, 3 MOBILE PHONE,1 LAPTOP, 3 PORTABLE HARD DRIVES, 1 BLUETOOTH SPEAKER, 1 WRIST WATCH, 1 HAIR TRIMMER, 1 FLASH DRIVE, PERSONAL EFFECTS	
3			2ND OFFICER	SPIRITS- 1 BTL, 2 MOBILE PHONE,1 LAPTOP, 1 BLUETOOTH SPEAKER, 1 WRIST WATCH, 1 HAIR TRIMMER, 1 FLASH DRIVE PERSONAL EFFECTS	
4			3RD OFFICER	BEER- 4 CANS, 2 MOBILE PHONE,1 LAPTOP, 1 WRIST WATCH, 1 HAIR DRYER, 1 FLASH DRIVE, AIRPODS, PERSONAL EFFECTS	
5			DECK CADET	SPIRITS- 1 BTL, 1 MOBILE PHONE,1 LAPTOP, 1 PORTABLE HARD DRIVES, 1 DIGITAL CAMERA, 1 WRIST WATCH, 1 HAIR TRIMMER, PERSONAL	

5. Crew List

(IMO FAL Form 5)

Arrival [X] Departure

1.1 Name of ship :	1.2 IMO number :	1.3 Call sign : C.	1.4 Voyage number : 004
2. Port of arrival/departure : ODESSA (UKRAINE)	3. Date of arrival/departure :	4.Flag State of ship : BELGIUM	5. Last port of call : (TURKEY)

6. No	7. Family name	8. Given names	9. Rank or rating	10. Nationality	11. Date of birth	12. Place of birth	13. Gender	14. Nature of identity document	15. Number of identity document	16.Issuing State of identity document	17. Expiry date of identity document
1			MASTER	INDIAN		JHARKHAND	MALE	SEAMAN'S BOOK			
2			CHIEF OFFICER	INDIAN			MALE	SEAMAN'S BOOK			
3			2ND OFFICER	INDIAN			MALE	SEAMAN'S BOOK			
4			3RD OFFICER	INDIAN		HAMAD FEROZEPUR PUNJAB	MALE	SEAMAN'S BOOK			

IMO CREWLIST

1. Name of ship			X Arrival / Departure		Page no: 1
			2. Port of Arrival / Departure: ODESSA,Ukraine	3. Date of Arrival / Departure	
4. Nationality of ship: BELIZE			5. Port country arrived from / destination	☐	
7. No	8. Family names, given names	9. Rank or rating	10. Nationality	11. Date and Place of birth	6. Nature and No of identity document / (seaman's passport)
1		Master		08.04.1959 / USSR	
2		Ch Off	Russia	23.06.1985 / USSR	
3		2nd Off		29.03.1969 / BELARUS	14
4		Ch.Eng		26.12.1972 / USSR	1
5		2nd Eng		03.07.1978 / USSR	5
6		Electrician		10.09.1980 / USSR	

IMO CREW LIST

(IMO FAL Form 5)

X Arrival ☐ Departure Page # 1

1.1. Name and type of ship:	1.2. IMO number:
1.3. Call sign:	1.4. Voyage number **886**
2. Port where report is made **CHORNOMORSK, UKRAINE**	3. Date of arrival/departure
4. Flag State of the ship: ☐ **BULGARIA**	5. Last/Next port of call

6. No	7. Family name, given names	8. Rank or rating	9. Nationality	10. Date and place of birth	11. Nature and number of identity document
1	Zlatarov	Master	BG		
2	Vasil Lyubomirov	Ch. off.	BG		
3		O.O.W.	BG		
4		O.O.W.	BG		
5		Ch. eng.	BG		
6		2 eng.	BG		
7		E.O.W	BG		
8		E.O.W	BG		
9		El. eng.	BG		
10		A/B	BG		

6. Passenger List

DRIVERS LIST TIR's (Special personnel list)

X Arrival ☐ Departure

1.1. Name of ship: 1.2. IMO number: 1.3. Call sign: 1.4. Voyage number 886	2. Port of arrival/departure CHORNOMORSK, UKRAINE	3. Date of arrival/departure	4. Flag state of ship BULGARIA

#	5. Family name, given names	6.Nat-ty	8.Date of birth	8.Type of identity or travel document	9.Serial number of identity or travel document	10.Port of embarkation	11.Port of disembarkation	12.Truck #	10.Trailer #
1	[redacted]	UKR	[redacted]	PASSPORT	[redacted]	[redacted]	CHORNOMORSK	[redacted]	[redacted]
2	[redacted]	UKR	[redacted]	PASSPORT	[redacted]	[redacted]	CHORNOMORSK	[redacted]	[redacted]

7. Dangerous Goods

IMO DANGEROUS GOODS MANIFEST

(IMO FAL Form 7)

(As required by SOLAS 74, chapter VII, regulations 4.5 and 7-2.2, MARPOL 73/78, Annex III, regulation 4.3 and chapter 5.4, paragraph 5.4.3.1 of the IMDG C

1.1 Name of ship	1.2 IMO number	1.3 Call sign
1.4 Voyage number	2. Flag State of ship BELIZE	3. Port of loading [redacted]

4. Port of discharge ODESSA

5. Booking / Reference Number	6. Marks & Numbers Container Id. No(s). Vehicle Reg. No(s).	7. Number and kind of packages	8. Proper Shipping Name	9. Class	10. UN No.	11. Packing Group	12. Subsidiary Risk(s)	13. Flashpoint (in °C.c.c.)	14. Marine Pollutant	15. Mass (kg) Gross/Net	16. EmS
1	[redacted]		AEROSOL	2.1	1950	III		50		20.458,00 / 19.499,60	F-D,S-U
2	[redacted]		AEROSOL	2.1	1950	III		50		20.901,00 / 19.945,60	F-D,S-U
3	[redacted]		AEROSOL	2.1	1950	III		50		20.780,90 / 19.838,40	F-D,S-U
4	[redacted]		AEROSOL	2.1	1950	III		0		13719,91 / 11741,48	F-D,S-U
5	[redacted]		POTASSIUM NITRATE	5.1	1486	III				48816.00 / 48000.00	F-A,S-Q
6	[redacted]		SODIUM PERCARBONATE	5.1	3378	II				206000 / 20000	F-A,S-Q
7	[redacted]		ALKYD RESIN ADDITIVES	3	1866	III		6-30		20,693 / 19,350	F-E, S-E,S-D
8	[redacted]		AEROSOL	2.1	1950					4.426.00 / 3.290,32	F-D,S-U
9	[redacted]		DICHLORAMETHATE	6.1	2810	III				15128 / 13800	F-A-S-A
10	[redacted]		REED DIFFUSER	3	1266	II		19		6.660,62 / 4.836,62	

8. Maritime Health Declaration

MARITIME DECLARATION OF HEALTH

To be completed and submitted to the competent authorities by the masters of ships arriving from foreign ports.
Должна быть заполнена и представлена компетентным органам капитанами судов, которые прибывают из иностранных портов.

Submitted at the port of) **ODESA, Ukraine** Date
Представлена в порту Дата
Name of ship or inland navigation vessel Registration/IMO **BELIZE CITY /** arriving from
Название судна или судна внутреннего плавания № Регистрации/ №29 -000008 прибывшего из
Sailing to (Nationality) (Flag of vessel) **B**
Направляющегося в (Гражданство) (Флаг судна)
Master's name ☐
Фамилия капитана
Gross tonnage (ship) **2936** Tonnage (inland navigation vessel)
Брутто регистровый тоннаж судна Тоннаж (судна внутреннего плавания)
Valid Sanitation Control Exemption/Control Certificate carried on board ? yes X no Issued at **ODESSA** ,Ukraine Date
Имеется ли на борту действительное свидетельство об освобождении от санитарного контроля/
Свидетельство о санитарном контроле?
Re-inspection required ? yes no X
Требуется ли повторная инспекция ?
Has ship/vessel an affected area identified by the World Health Organization ? yes no X
Заходило ли морское судно/ судно внутреннего плавания на зараженную территорию, определенную ВОЗ ?
Port and date of visit
Порт и дата посещения
List ports of call from commencement of voyage with dates of departure, or within past thirty days, whichever shorter:
Перечислите порты захода с начала международной поездки с датами отправления или в течении последних тридцати дней, зависимости от того, какой период короче **Evyap 31.03.2021**;Ambarli 30.03.2021; Novorossiysk 28.03.2021; Odesa 24.03.2021; Evya 21.03.2021;Ambarli 21.03.2021; Novorossiysk 18.03.2021 Odesa 16.03.2021; Ambarli 14.03.2021; Evyap 13.03.2021; Novorossiysk 10.03.202 ; Odessa 08.03.2021 ; Evyap 06.03.2021; Ambarli 05.03.2021; Novorossiysk 02.03.20; Odessa 28.02.2021
Upon request of the competent authority at the port of arrival, list crew members, passengers or other persons who have joined ship/vessel sinc international voyage began or within past thirty days, whichever is shorter, including all ports/countries visited in this period (additional names t the attached schedule):
По просьбе компетентного органа в порту прибытия перечислите членов экипажа, пассажиров и других лиц, которые произвел посадку на морское судно/судно внутреннего плавания после начала международной поездки или в течении последних тридцати дней в зависимости от того, какой период короче, включая все порты/страны, которые они посетили в этот период (добавьт дополнительные фамилии к прилагаемому списку):
(1)
(2)
(3) NIL
(4)
(5)

Number of crew members on board **10** Number of passengers on board NIL
Число членов экипажа на борту Число пассажиров на борту

Health questions
Вопросы, касающиеся здоровья

(1) Has any person died on board during the voyage otherwise than as a result of accident? **yes no** X
If yes, state particulars in attached schedule. Total no of deaths
Умер ли кто-нибудь на борту во время международного рейса по каким-нибудь причинам, кроме несчастного случая?
Если да, укажите подробные данные в прилагаемом дополнении. Общее число умерших
(2) Is there on board or has there been during the international voyage any case of disease which you suspect to be of an infectious nature?
If yes, state particulars in attached schedule. **yes no** X
Имеется ли на борту или имелось во время международной поездки случай заболевания с подозрением на инфекцию необычного характера? Если да, укажите подробные данные в прилагаемом дополнении.
(3) Has the total number of ill passengers during the voyage been greater than normal/expected? **yes no** X
How many ill persons?
Было ли общее число больных пассажиров в течении поездки больше обычного/ожидаемого?
Сколько больных?
(4) Is there any ill person on board now? **yes no** X
If yes state particulars in attached schedule.
Находится ли в настоящее время на борту больное лицо? Если да, укажите подробные данные в прилагаемом дополнении.
(5) Was a medical practitioner consulted? **yes no** X
If yes, state particulars of medical treatment or advice provided in attached schedule.
Была ли проведена консультация с врачом? Если да, укажите подробные данные медицинского лечения или рекомендации в прилагаемом дополнении.
(6) Are you aware of any condition on board which may lead to infection or spread of disease? **yes no** X
If yes, state particulars in attached schedule.
Известны ли вам какие-либо обстоятельства на борту, которые могут привести к заражению или распространению болезни?
Если да, укажите подробные данные в прилагаемом дополнении.
(7) Has any sanitary measure (e.g. quarantine, isolation, disinfection or decontamination) been applied on board? **yes no** X
If yes, specify type place and date

Annex II. Results of the mapping of documents to the UN/CEFACT MMT RDM

MMT IMO FAL Guide_UNECE-Real Documents(Ukraine) - agent1 .xlsx
MMT IMO FAL Guide_UNECE-Real Documents(Ukraine) - agent2 .xlsx
MMT IMO FAL Guide_UNECE-Real Documents(Ukraine) - agent3 .xlsx

Annex III. Results of the mapping of documents to the EMSA Data Model

EMSA-epc(Ukraine) — agent1.xlsx
EMSA-epc(Ukraine) — agent2.xlsx
EMSA-epc(Ukraine) — agent3.xlsx

Annex IV. Study on transforming datasets between UN/CEFACT MMT RDM and EMSA models

EPC-RDM-mapping.xlsx

Annex V. Samples of electronic document equivalents created with the prototype

DENİZ AKAY_IMO.xml
DENİZ AKAY.xml
Admiral Moon Arrival.xml