Rapport

SINTEF A6714

Coordination of ARKTRANS and the ShortSea XML

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TITLE

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Ministry of Transport and Communication

REPORT NO.	CLASSIFICATION	CLIENTS REF.	
SINTEF A6714	Open	Trygve Roll-Hansen	
CLASS. THIS PAGE	ISBN	PROJECT NO.	NO. OF PAGES/APPENDICES
Open	978-82-14-043952	90C101.15	33
ELECTRONIC FILE CODE		PROJECT MANAGER (NAME, SIGN.)	CHECKED BY (NAME, SIGN.)
Endelig rapport.doc		Hans Westerheim	Marit Natvig
FILE CODE	DATE	APPROVED BY (NAME, POSITION, SIGN.)	
	2008-05-05	Eldfrid Ø. Øvstedal, Research Manager	

ABSTRACT

This report shows the results from the work with coordination of ARKTRANS, the Norwegian framework architecture for multimodal ITS, and the European ShortSea XML implementation project. The work was initialised and financed by The Ministry of Transport and Communications and has been done in cooperation between Norstella and SINTEF ICT.
ARKTRANS is managed by ITS Norway on behalf of the Ministry. As the national framework architecture for the transport domain, it should be the basis for national research and development projects within the transport sector. In addition, ARKTRANS is also used in several European projects. The ShortSea XML implementation project was specified without taking ARKTRANS into account, but the a comparison and a coordination of ARKTRANS and ShortSea XML can put the ShortSea XML results into a wider context and verify the usability of ARKTRANS.

This report shows that the limited scope of the transport sector addresses by the ShortSea XML project is well covered by ARKTRANS. Some of the functions in ShortSea XML are specified at a lower level than ARKTRA NS, but this does not cause any problems with the coordination at the high levels. The current version of ARKTRANS does not include a conceptual information model for freight transport, but the work is related to the TRIM model. No coordination or comparison is done at the information elements level.

KEYWORDS	ENGLISH	NORWEGIAN
GROUP 1	Information Technology	Informasjonsteknologi
GROUP 2	Coordination	Koordinering
SELECTED BY AUTHOR	ARKTRANS	ARKTRANS
	ShortSea XML	ShortSea XML

TABLE OF CONTENTS

1 Overview

ARKTRANS is the Norwegian System Framework architecture for the transport sector[1]. ARKTRANS provides a conceptual specification of the whole transport sector. ARKTRANS is being used as the basis for overall architecture development in several national and international projects within the transport sector. ARKTRANS is specified in a multi modal way, covering both passenger and freight transport.
The ShortSea XML project implements a set of messages facilitating electronic supported business processes for freight transport services. The project covers the short sea segment of the freight transport sector.
The ShortSea project relates to projects where ARKTRANS is being used. A harmonisation between ARKTRANS and ShortSea XML is therefore of interest. This report makes a comparison of ARKTRANS and the work with the ShortSea XML messages to show the links between the ARKTRANS framework and the ShortSea XML results.

1.1 Document description

The report starts with a description of ARKTRANS and the ShortSea XML project. This is followed by a comparison of the complete ShortSea XML project, its scope and the ARKTRANS Reference Model (see chapter 2).
Each of the business processes covered by ShortSea XML is compared with the ARKTRANS roles and the ARKTRANS functional viewpoint (see chapters 3, 4 and 5). The technical descriptions in ShortSea XML and ARKTRANS are also compared. There is no comparison at the information element level since the current version of ARKTRANS has no conceptual information models for freight transport.
The report does not cover the ShortSea XML process "Invoicing" since as invoicing is outside the scope of ARKTRANS.
The functionality recurred in the ShortSea XML activity diagrams are compared with the functionality addressed by ARKTRANS.

1.2 ARKTRANS

ARKTRANS is the Norwegian Framework Architecture for the transport sector. ARKTRANS specifies a reference model, roles, a functional view, an information view and a behaviour view of the transport sector.
The working process applied in the development of ARKTRANS has been developed through a top-down approach. The different aspects, or "layers", have been developed in an iterative process and the lower levels are building on the higher ones.

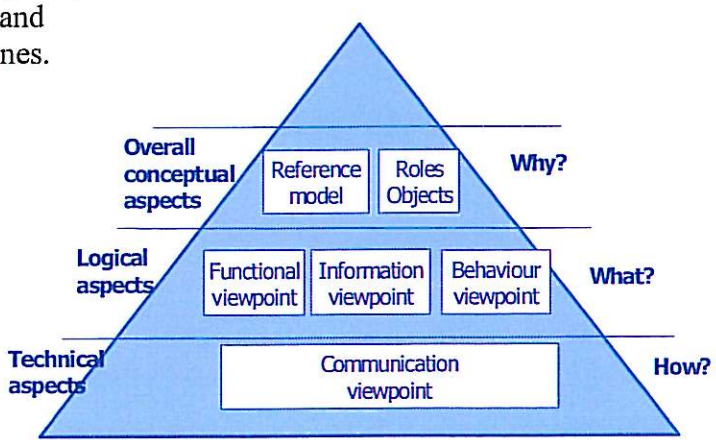

Figure 1 The ARKTRANS working process

[1] www.arktrans.no

1.3 Shortsea XML

The project concerns development, implementation, promotion and provision of training for Shortsea XML, which will become the open message standard for exchanging data between all parties in a door-to-door short sea logistics chain.
The aim is to make the intermodal short sea shipping more competitive by:

- improving customer service;
- reducing transport administration cost by up to 10-15%;
- improving utilization and load factor of transport units;
- resulting in modal shift from road to sea and water with the associated environmental benefits.

Shortsea XML is built on work done in other research projects and studies. The project will demonstrate practical use of Shortsea XML and promote the use of Shortsea XML to shippers and transport providers throughout Europe. This is an implementation and dissemination project - not an infrastructure, research or study project. A major focus will be put on mutual training in process integration.

1.3.1 ShortSea XML and UN/CEFACT

Shortsea XML work process is aligning with the UN/CEFACT process. UN/CEFACT is the United Nations Centre for Electronic commerce For Administration, Commerce, and Transport under the UN Committee on Trade, Economic and Social Council. The first document to be produced in a UN/CEFACT standardization process is Business Requirements Specification (BRS). Shortsea XML BRS is developed by the ShortSea XML Standardisation Group for submission to the UN/CEFACT's International Transport Work Group (TBG3). It is based on best business practice, the expertise from short sea shipping, and the experience gained in the implementation of e-business standards in the transport industry, notably through the guidelines from ITIGG (International Transportation Industry Guidelines Group, a subgroup of TBG3).

The next required document is Requirements Specification Mapping document (RSM). RSM aims to identify the complete set of class diagrams and the Business Information entities in the message. When RSM is finish there are different kinds of technical realizations to create messages for business use. The whole UN/CEFACT working process can be show as in picture below.

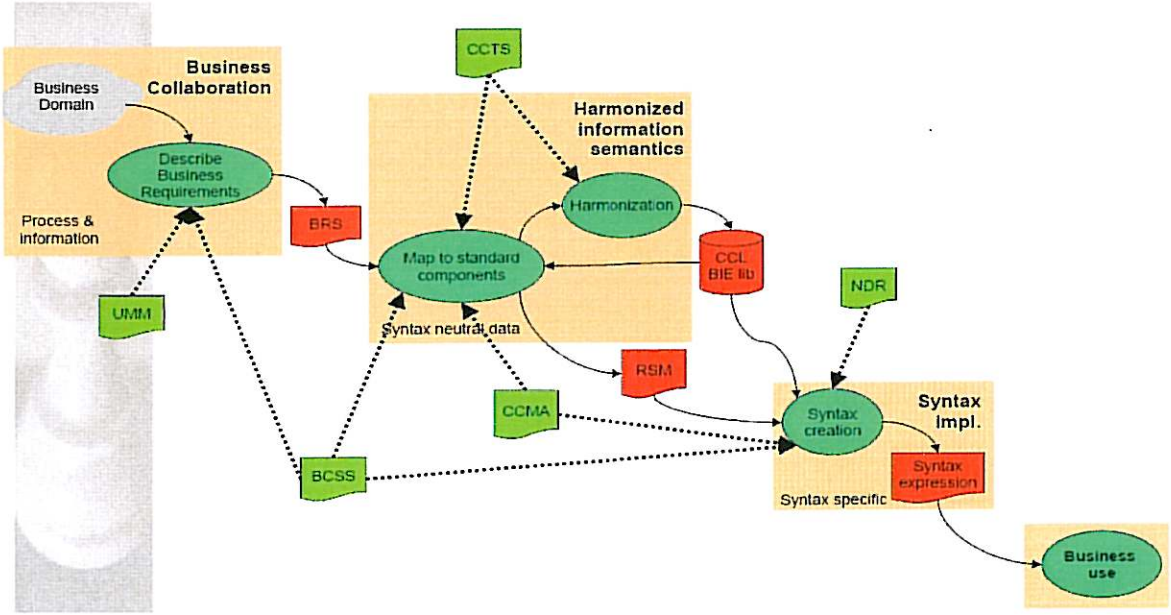

Figure 2 UN/CEFACT Standard Development Process

1.4 Scope of this report

The starting point for the comparison is the ARKTRANS Reference Model and the ShortSea XML Project Definition (see chapter 2). The ShortSea XML Project Definition establishes the scope of the ShortSea XML.

Since ARKTRANS has a much broader scope than ShortSea XML, ARKTRANS is used as the widest scope for the comparison. Comparison is done towards the Reference Model, the Roles and the logical parts of ARKTRANS. The Reference Model is used as a basis for the comparison. All the ShortSea XML business processes are related to the model. The Roles are compared for each of the business processes individually.

At the logical level the Behaviour Viewpoint in ARKTRANS is compared with the activity diagrams in each of the business processes in ShortSea XML. The Information Viewpoint is not compared since ARKTRANS in the current version has no conceptual information model for freight transport.

What one should expect however, is that if there is consistence between the layers in both ARKTRANS and ShortSea XML, the comparison at the overall levels should therefore be valid also for the under laying levels.

The report is based on the documentation of the version 5.0 of ARKTRANS.

2 The ShortSea XML business processes and the ARKTRANS Reference Model

The ARKTRANS Reference Model defines the scope of the transport sector. It also divides the transport sector into five sub domains: the Transport Network Management; the Transport Demand; the Transport Service Management; the On-board Support and Control; and the Terminal Management. The reference model is depicted in Figure 3.

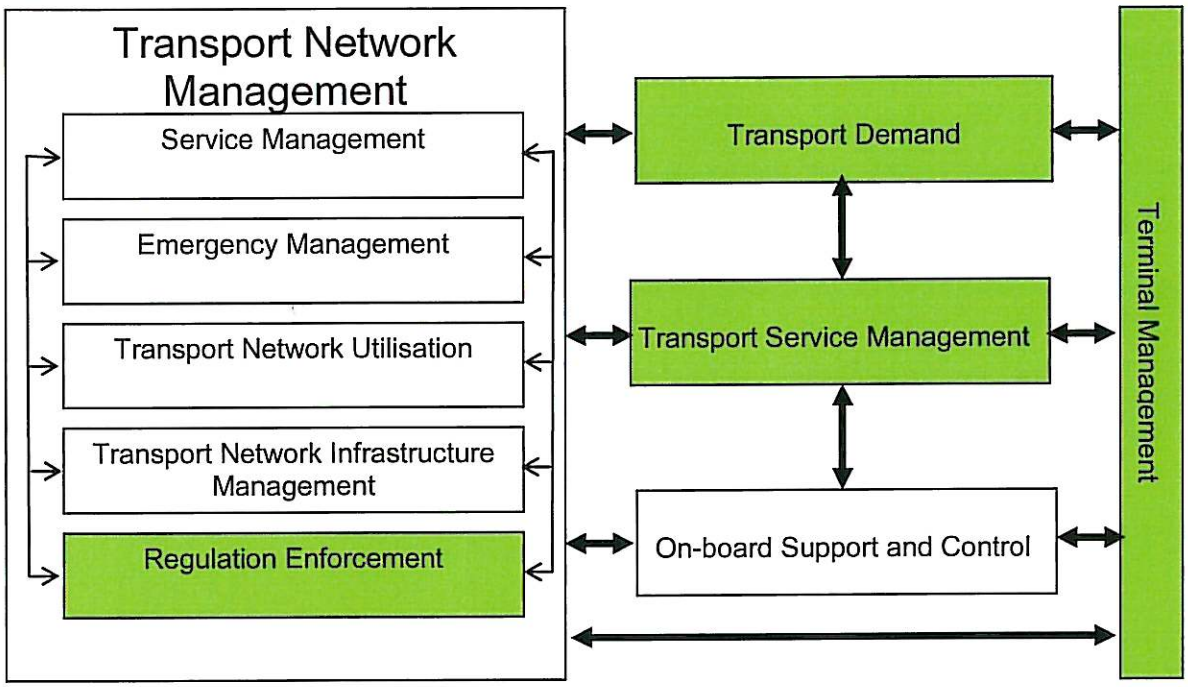

Figure 3 The ARKTRANS Reference Model

2.1 ShortSea XML Business Processes and the ARKTRANS Reference Model

In Figure 3 the sub domain of relevance to ShortSea XML are depicted green. The white sub domains are not covered at all by ShortSea XML.

The following business processes are addressed by ShortSea XML:

- Booking
- Operation
- Scheduling
- Invoicing.

ARKTRANS covers all these processes except for invoicing (generic and non-transport specific tasks like invoicing and accounting is outside the scope of ARKTRANS).

3 The ShortSea XML Booking Process

3.1 Scope of Booking

The ShortSea booking BRS is covering the booking for the transportation of goods from any origin to any destination regardless of route or prevailing commercial practice, but including at least one sea leg. The processes include space and consignment booking.

The business information entities described in the class diagram have been developed such that they can be reusable across all industries and modes of transport.

Categories	Description and Values
Business Process	(shortsea) booking
Product Classification	Provision of transport and transport related services to all industry sectors
Industry Classification	Domestic and international multimodal transport
Geopolitical	Global
Official Constraint	International cargo transport conventions & regulatory instruments
Business Process Role	Transport Services Provider, Transport Services Buyer, Consignor, Consignee, Carrier, Pick-up Party, Delivery Party
Supporting Role	Seller, Buyer, Freight Forwarder, Carrier Agent, Customs, Customs Broker, Ship From Party, Ship To Party
System Capabilities	

Table 1 Business Information Entities required by the Booking message

3.2 Role Comparison

3.2.1 Shortsea XML Roles

The main roles in the Booking BRS are these of Transport Services Provider and Transport Services Buyer (their naming is kept consistent with the BRS for International Forwarding and Transport).

The Transport Services Buyer can be either the consignor or the consignee.

The Transport Services Provider is usually the carrier (the shortsea shipping line).
Transport Services can also be provided by other parties, such as the agent and/or the stevedore.

Relations exist with authorities, notably Customs and the Port Authority. Figure 4 below shows the relationship between roles using Shortsea XML booking.

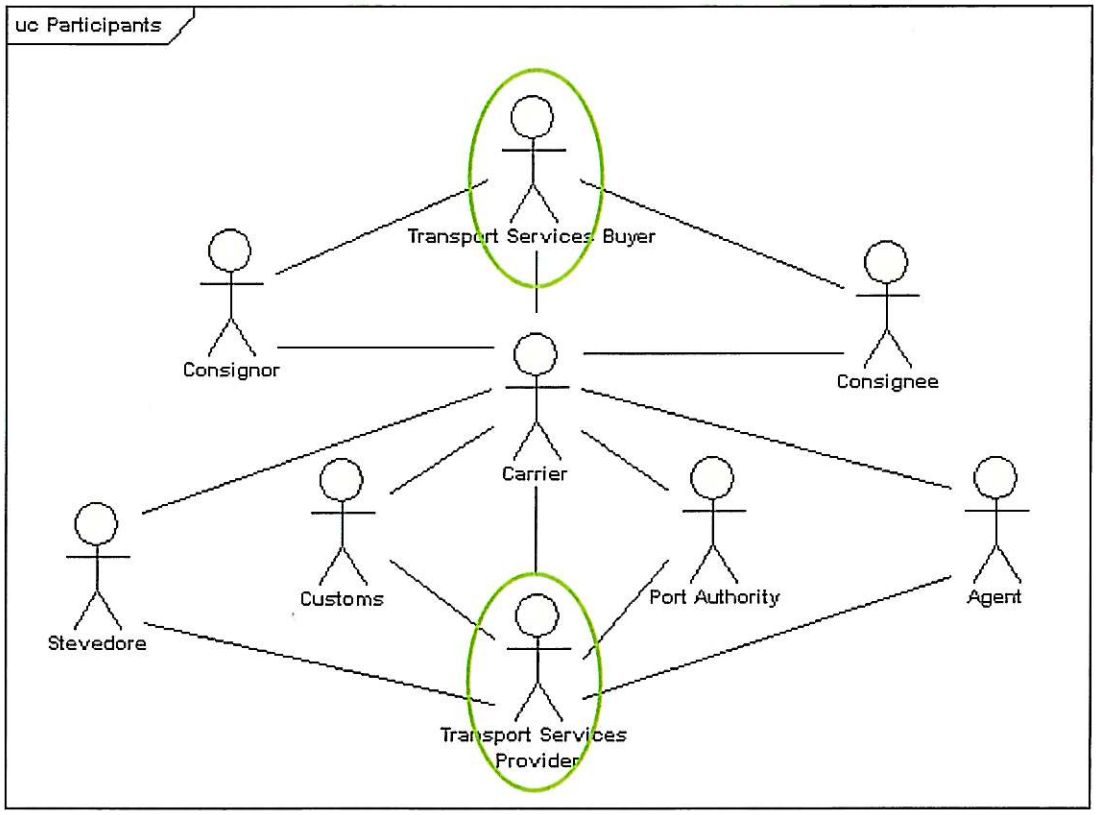

Figure 4 The relationship of roles using in booking

3.2.2 ARKTRANS Roles

For transport booking the two main roles from ARKTRANS are from the Transport Demand and Transport Service Management sub domains of the Reference Model.

3.2.2.1 Transport demand roles

The Transport Demand sub-domain has two freight related roles, namely the Transport User and the Transport User Agent. The Transport User Agent is however not directly related to the booking of transport services.
The Transport User is decomposed to more detailed roles, namely Consignee, Consignor and Cargo Owner. The Cargo Owner is not directly involved in the booking of the transport of the goods.

3.2.2.2 Transport service management roles

ARKTRANS specifies four overall roles for transport service management, all are related to freight transport. The roles are Transporter, Fleet Manager, Transport Means Owner and Transporter Agent.
The only role in direct contact with the Transport User, or the representative of the Transport User, is the Transporter. The Transporter is responsible for the provision of transport services. The Transporter is therefore the role from which the Transport User books the transport services.

3.2.3 The relation between the Shortsea XML and ARKTRANS roles

The overall ARKTRANS Transport User role covers the Shortsea XML Transport Services Buyers role.
The overall ARKTRANS Transporter role covers the Shortsea XML Transport Services Provider role.

There is no conflict with the defined roles in ARKTRANS and Shortsea XML when concerning booking.

3.3 Functional Comparison

3.3.1 Shortsea XML Booking Use Cases

The booking function in SSXML consists of both space booking and consignment booking see Figure 5.

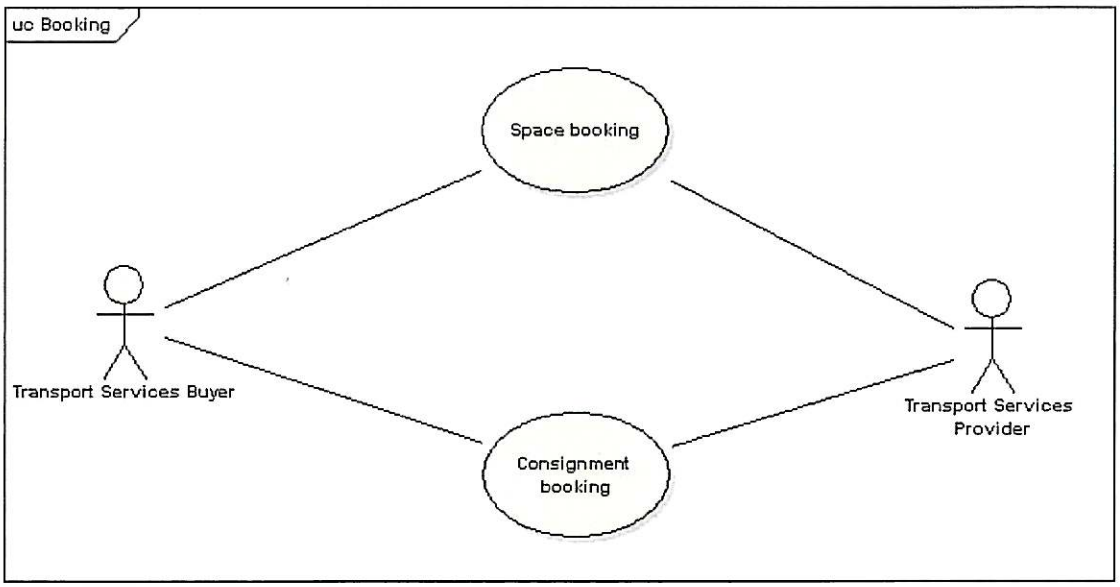

Figure 5 The ShortSea XML Booking Function

The division between the two processes is gradual, certainly in web based applications where several updates may happen between the initial request whether space is available for a certain cargo to be transported, until the final completion of the details of the individual consignment. The space booking is a request to reserve a space for one or more consignments on a means of transport while the consignment booking is a booking for a specific consignment to transport

3.3.1.1 Space Booking

Business Process Name	**Space Booking**
Identifier	
Actors	Transport Service Buyer Transport Service Provider (Seller of Transport Service)
Description	The Transport Service Buyer requests the Transport Service Provider to reserve space on a means of transport for one or more consignments to be transported together.
Pre-condition	The Transport Service Buyer has one or more consignments to be transported and knows the mode of transport and the type of means of transport at which it needs to be transported on. The Transport Service Provider has space available on a means of transport. The Transport Service Buyer and the Transport Service Provider have a relationship.
Post-	The Transport Service Buyer and Transport Service Provider have or have

conditions	not come into a commercial agreement on the requested space booking. An agreement has been made between the Transport Service Buyer and the Transport Service Provider on the next steps (to be further defined)
Scenario	The Transport Service Buyer sends a request to the Transport Service provider to reserve space on a means of transport for one or more consignments to be transported together. The Transport Service Provider checks the availability of the requested space booking on the means of transport and either confirms the space booking and gives additional information or does not accept the space booking (and possibly supplies an option to the space booking). The Transport Service Buyer either accepts (which may be implicit) the reply to the space booking or not.
Remarks	

3.3.1.2 Consignment Booking

Business Process Name	Consignment Booking
Identifier	
Actors	Transport Service Buyer Transport Service Provider
Description	The Transport Service Buyer requests the Transport Service Provider to book the transport of a specific consignment.
Pre-condition	The Transport Service Buyer has a consignment to be transported and knows the mode of transport and the type of means of transport required for its transportation. The Transport Service Provider has space available on a means of transport. The Transport Service Buyer and the Transport Service Provider have a relationship.
Post-conditions	The Transport Service Buyer and Transport Service Provider have or have not come to a commercial agreement on the requested consignment booking. An agreement has been made between the Transport Service Buyer and the Transport Service Provider as to whether or not final transport instructions and/or transport arrangements are required and what will be the next steps to take in either case.
Scenario	The Transport Service Buyer sends a request to the Transport Service provider to make a booking for a consignment. The Transport Service Provider checks the availability of space for the requested booking on the means of transport and either confirms the consignment booking and gives additional information or does not accept the consignment booking (and possibly supplies an option to the consignment booking). The Transport Service Buyer either accepts (which may be implicit) the reply to the consignment booking or not.
Remarks	

3.3.2 ShortSea XML Booking Activity Diagrams

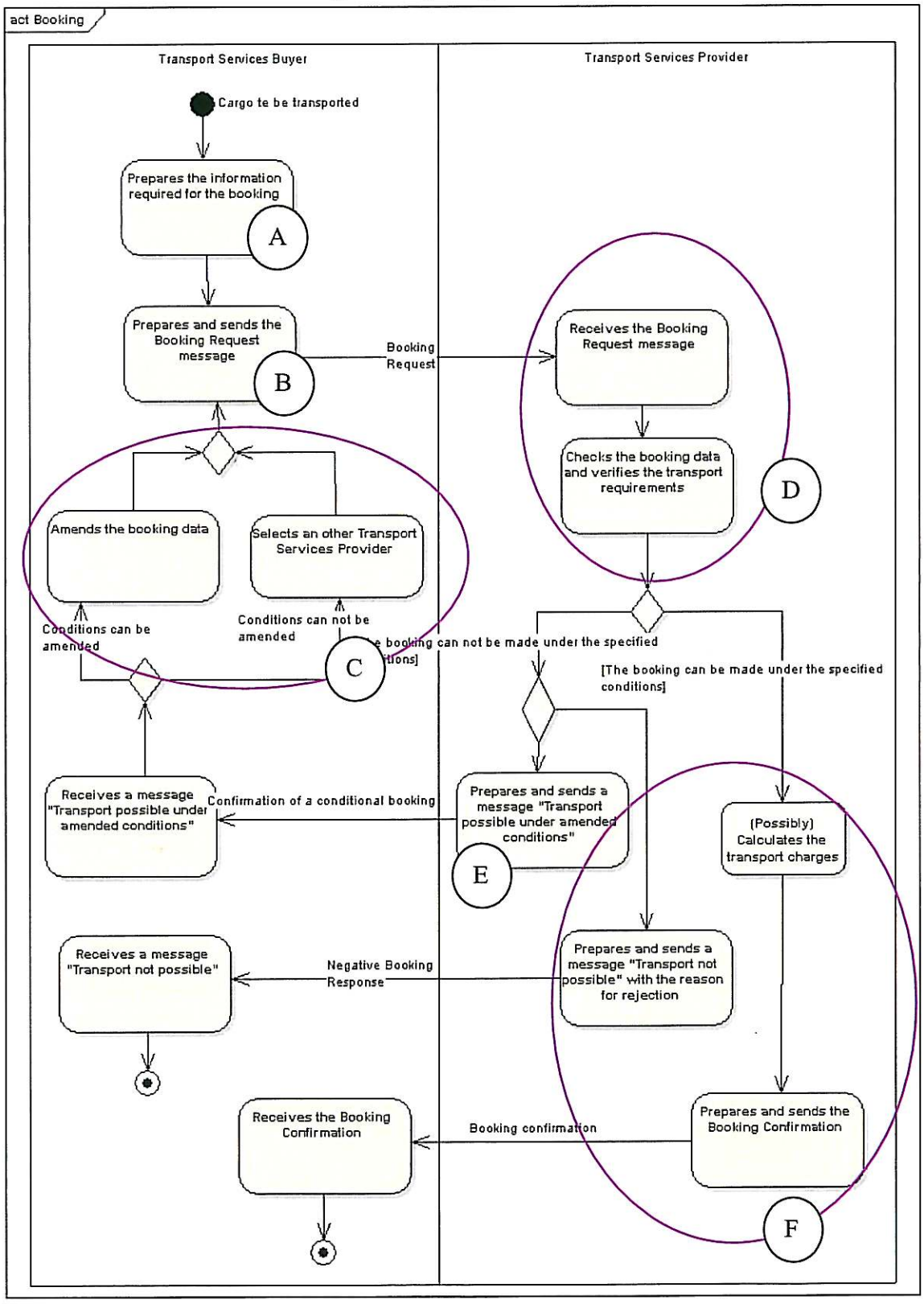

Figure 6 The booking process activity diagram

3.3.3 ARKTRANS Functional Viewpoint

There is a functional breakdown in ARKTRANS for each of the sub domains. For the Transport Demand sub domain there are four main functional areas, namely Transport Task Administration, Transport Preparation and Planning and Transport Task Control and Transport Task Termination. For the Transport Service Management sub domain there are three main functional areas, namely Strategical and Tactical Fleet Management, Operative Fleet Management and Transport Business management.

3.3.3.1 Transport Demand Functions

The starting point of the booking process in ShortSea XML is that there exists an agreement of transport between the Transport Services Provider and The Transport Services Buyer.
Contract Management is not reflected in ShortSea XML. The booking process in ShortSea XML, starting with the function "Prepares the information required for booking", marked A in the figure, is mapped to the function "7.1.2.2 Transport Order Administration" in ARKTRANS.
The ShortSea XML function "Prepares and sends the Booking Request Message", marked "B" on the figure is mapped to "7.2.1 Information gathering" in ARKTRANS.
The ShortSea XML functions "Amends the booking data" and "Selects an other Transport Services Provider", marked C on the figure, are mapped to the function "7.1.2.2 Transport Order Administration" in ARKTRANS.
The last three functions in ShortSea XML are described at a lower level than what is done in ARKTRANS. However, the ARKTRANS function "Transport Order Administration" will handle the type of incoming information as described by ShortSea XML.

3.3.3.2 Transport Service Management Functions

In ARKTRANS, the function 8.3.1.2.1 Transport Request Management" reflects the ShortSea XML functions "Receives the Booking Request Message" and "Check the booking data and verifies the transport requirements". This is depicted with "D" in the figure.
The ShortSea XML function "Prepare and send a message 'Transport possible under the amended conditions'", marked "E", is covered by the ARKTRANS function "8.3.1.2.3 Transport Booking Amendment".
The ShortSea XML functions "Calculates the transport charges", "Prepares and sends a message 'Transport is not possible' with the reason of rejection" and "Prepares and send booking confirmation", all marked by "F", are covered by the ARKTRANS function "8.3.1.2.2 "Order Management".

3.4 Conclusion Booking

The ShortSea XML booking process is very limited with respect to functionality and also with respect to the completeness of an overall and generic booking process as described by ARKTRANS.
The functionality in ShortSea XML booking is covered by ARKTRANS at the conceptual aspects level. The naming and the wording in the two different process and function descriptions are different, but the meanings and the semantics are recognisable.

4 The ShortSea XML Operation Process

4.1 Scope of Operation

The scope of the (shortsea) transport operations BRS can be expressed as a subset of the forwarding and transport BRS, which is a subset of The International Supply Chain Reference Model.
The (shortsea) transport operations BRS is covering the (shortsea) transport operations for the transportation of goods from any origin to any destination regardless of route or prevailing commercial practice.
The business information entities described in the class diagram have been developed such that they can be reusable across all industries and modes of transport.
Operations covers Manifest, Arrival notice, Loading list, Discharge list, Berth request, Dangerous goods declaration and hazardous manifest.

Categories	Description and Values
Business Process	(shortsea) transport operations
Product Classification	Provision of transport and transport related services to all industry sectors
Industry Classification	Domestic and international multimodal transport
Geopolitical	Global
Official Constraint	International cargo transport conventions & regulatory instruments
Business Process Role	Transport Services Provider, Transport Services Buyer, Consignor, Consignee, Carrier, Pick-up Party, Delivery Party
Supporting Role	Seller, Buyer, Freight Forwarder, Carrier Agent, Customs, Customs Broker, Ship From Party, Ship To Party
System Capabilities	

Table 2 Business Information Entities required by the Operation message

4.2 Role Comparison

4.2.1 Shortsea XML Roles

Main roles in the operation are these of Transport Services Provider and Transport Services Buyer (their naming is kept consistent with the BRS for International Forwarding and Transport).
The Transport Services Buyer can be either the consignor or the consignee.

The relevant roles in the Operations BRS are Consignor, exporting agent, exporting terminal, shipping line (carrier), importing agent, importing terminal and Consignee.

Relations exist with exporting and importing authorities, notably Customs and the Port Authority.

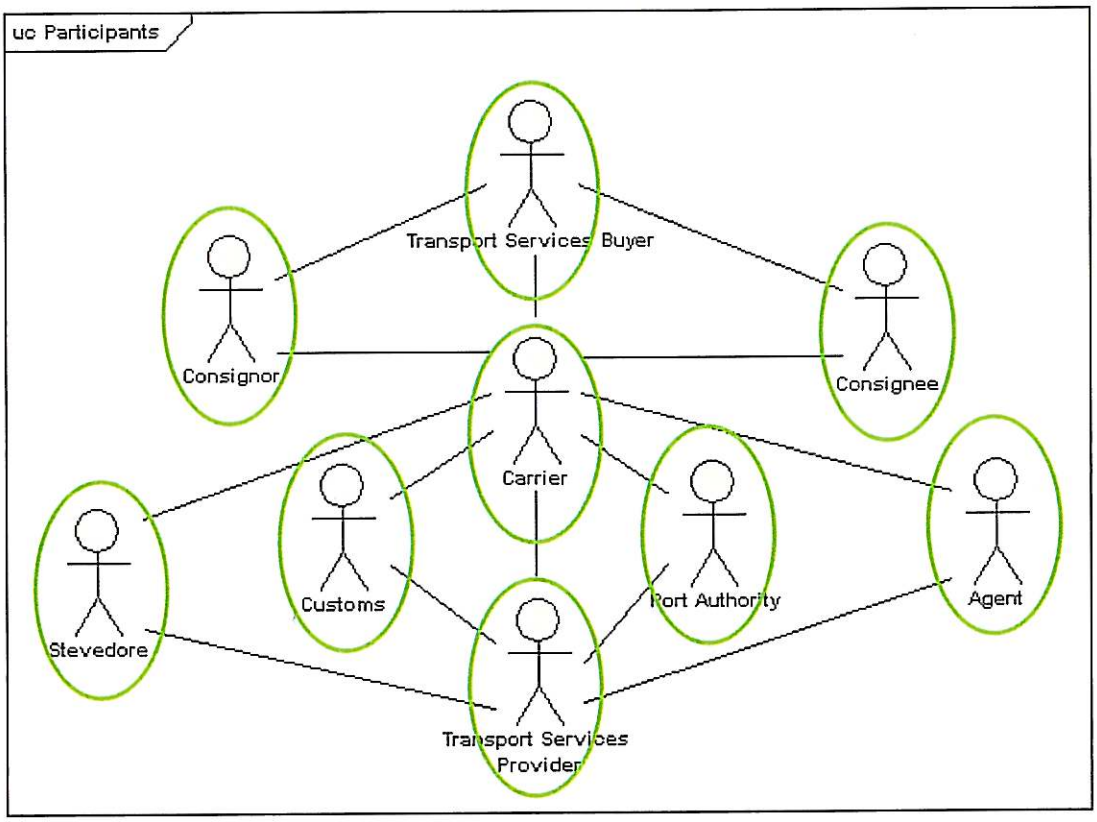

Figure 7 The relationship of roles using in Operation

4.2.2 ARKTRANS Roles

The Transport User and the Transport Service Management roles are the same as for the booking process.
Customs and Port Authority in the Operation process can be mapped to several roles under Regulation Enforcement in ARKTRANS.

4.2.2.1 Transport Demand and Transport Service Management Roles

For operation these are the same roles as in Booking. The mapping between ARKTRANS and the ShortSea XML is therefore the same.

4.2.2.2 Regulation Enforcement roles

4.2.2.2.1 Customs

In ARKTRANS the customs has the responsibility for receiving information about goods entering and leaving a country, i.e. the customs declaration. The Customs role in ShortSea XML is the same; it is the role receiving information about imported or exported goods from the Transport Service Management.

4.2.2.2.2 Port Authority

ShortSea XML has identified the role Port Authority, but the role is not described as it is not included in the exchange of information during the operation process. It has no purpose to relate it to the ARKTRANS role Port Authority.

4.2.2.3 Terminal Management Roles

The ARKTRANS role Terminal Manager covers the functions related to the entire document handling for a terminal, as well as the overall responsibility for the terminal operations. The

ShortSea roles Exporting Terminal and Importing Terminal are therefore covered by the ARKTRANS role Terminal Manager.
ShortSea XML has the role stevedore. This is the Terminal Operator or the Terminal Actor role in ARKTRANS.

4.2.3 The relation between the Shortsea XML and ARKTRANS roles

The overall ARKTRANS Transport User role covers the Shortsea XML Transport Services Buyers role.
The overall ARKTRANS Transporter role covers the Shortsea XML Transport Services Provider role.
The overall ARKTRANS Terminal Manager role covers the ShortSea XML Exporting and Importing roles.
The overall ARKTRANS roles Terminal Operator and Terminal Actor cover the ShortSea XML Stevedore role.
The overall ARKTRANS role Customs covers the ShortSea XML Customs role.

The overall ARKTRANS Port Authority is most likely not the same as the ShortSea XML role. Since the latter is not deepened in the documentation, and not a part of the information exchange, this role is not of interest to coordination at present

There is no conflict with the defined roles in ARKTRANS and Shortsea XML, with the possible exception of the Port Authority role, when concerning operation.

4.3 Functional view

4.3.1 Shortsea XML Operation Use Cases

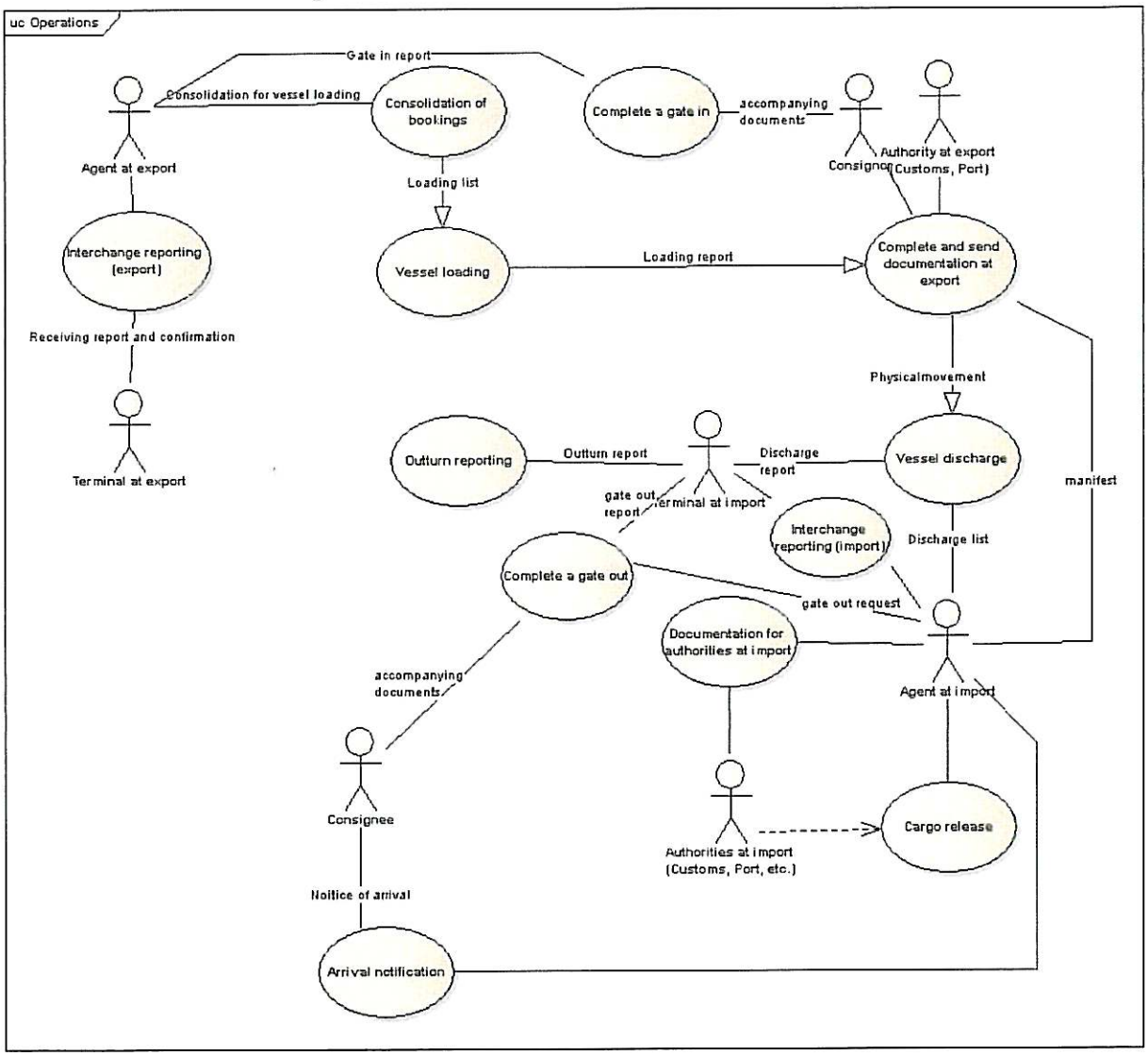

Figure 8 The ShortSea XML operation function

4.3.1.1 Complete a gate in

Business Process Name	**Complete a gate in**
Identifier	
Actors	Consignor, Exporting agent at export, Exporting terminal
Description	Cargo from the consignor arrives at the gate of the export terminal, is checked and accepted by the exporting terminal (if necessary in agreement with the exporting agent).
Pre-condition	Cargo has been booked at the exporting agent, and the exporting terminal is aware of this booking. Cargo is delivered from the Consignor. Accompanying documents with the cargo from the Consignor are available.
Post-conditions	The cargo is accepted at the exporting terminal. A gate in report is sent to the exporting agent.

	If the cargo is not damage free, further instructions (amended booking, amended cargo information, rejection) must be provided to the agent.
Scenario	Cargo from the consignor arrives at the gate of the export terminal. The exporting terminal checks the cargo against the corresponding receiving booking from the exporting agent. In case of irregularities the exporting terminal contacts the exporting agent for further instructions (amended booking, amended cargo information, rejection). If the cargo is not damage free, the exporting terminal waits for further instructions to be provided by the agent. On acceptance of the cargo, the exporting terminal sends a gate in report to the exporting agent.
Remarks	Accompanying documents are the documents that travel throughout its transportation with the cargo and may include: commercial invoice, dangerous goods documentation, certificates for health, agriculture, etc..; these documents vary according to the type of cargo and the specific trade. The exporting agent can sometimes act as the exporting terminal.

4.3.1.2 Consolidation of booking

Business Process Name	**Consolidation of bookings**
Identifier	
Actors	Exporting agent, exporting terminal
Description	Booked cargo is consolidated for being loaded onto a vessel for a specific voyage and a loading list is produced.
Pre-condition	Cargo for possible consolidation has been booked at the exporting agent. Cargo has been accepted at the exporting terminal and is available for loading.
Post-conditions	A loading list is being produced and continuously updated for the exporting terminal.
Scenario	The exporting agent consolidates a list of cargo for loading onto the vessel, including instructions to the exporting terminal. If necessary cargo is consolidated into units for transportation purposes. A (final) loading list may be produced.
Remarks	The shipping line may act as the exporting agent. The exporting agent may act as the exporting terminal.

4.3.1.3 Interchange reporting (export)

Business Process Name	**Interchange reporting (export)**
Identifier	
Actors	Exporting agent, exporting terminal
Description	Reporting on conditions of units of transport equipment when exchanging duty of care, and receiving reporting of general cargo
Pre-condition	Cargo has been booked with the exporting agent. Exporting terminal is aware of this booking. The arriving transport equipment is the same as specified on the booking.

Post-conditions	An Interchange Report (or Receiving Report in case of general cargo) is completed by the exporting terminal and sent to the exporting agent, and may be copied to the shipping line.
Scenario	Either the Exporting agent or the Exporting terminal produces the Receiving Report for general cargo and sends it to the Exporting terminal. The Exporting terminal checks the transport equipment and produces the Interchange Report.
Remarks	Transport equipment include trailers, (tank)containers, MAFI's. The Interchange report may consist of a set of pictures.

4.3.1.4 Vessel Loading

Business Process Name	**Vessel Loading**
Identifier	
Actors	Exporting terminal, Exporting agent, Shipping line
Description	The vessel is loaded and a loading report is produced.
Pre-condition	A loading list is available. The vessel is available and ready for loading. The cargo is cleared for loading. The weather conditions allow loading of the vessel and of the cargo. Special requirements (for example for the transport of dangerous goods) have been taken into account.
Post-conditions	The vessel is loaded. A loading report is produced and has been sent to the exporting agent.
Scenario	The exporting terminal loads the cargo on the vessel according to the loading list. The exporting terminal produces the actual loading report, including the differences from the original loading list and noting any damage during loading, and sends it to the exporting agent.
Remarks	

4.3.1.5 Complete and send documentation at export

Business Process Name	**Complete and send documentation at export**
Identifier	
Actors	Exporting agent, exporting authorities, importing agent, consignor
Description	Documentation about the loaded cargo on the vessel is produced and sent to relevant parties.
Pre-condition	The vessel is loaded and a loading report is available.
Post-conditions	Documentation sent to relevant parties.
Scenario	The exporting agent produces and sends the officially required documents to the authorities. The exporting agent sends the cargo manifest and other relevant documents to the importing agent. The exporting agent sends relevant documents to the consignor.

Remarks	

4.3.1.6 Vessel Discharge

Business Process Name	Vessel Discharge
Identifier	
Actors	Importing terminal, Importing agent, Shipping line
Description	The vessel is discharged and a discharge report is produced.
Pre-condition	A discharge list is available. The vessel is available and ready for discharging. The cargo is cleared for discharging. The weather conditions allow discharging of the vessel and of the cargo. Special requirements (for example for the transport of dangerous goods) have been taken into account.
Post-conditions	The vessel is discharged. A discharge report is produced and has been sent to the importing agent.
Scenario	The importing terminal discharges the cargo from the vessel according to the discharge list. The importing terminal produces the actual discharge report, including the differences from the original discharge list and noting any damage during discharging, and sends it to the importing agent.
Remarks	

4.3.1.7 Interchange reporting (import)

Business Process Name	Interchange reporting (import)
Identifier	
Actors	Importing agent, importing terminal
Description	Reporting on conditions of units of transport equipment when exchanging duty of care, and receiving reporting of general cargo
Pre-condition	The Importing terminal has been given the discharge list. The transport equipment is the same as specified on the discharge list.
Post-conditions	An Interchange Report (or Receiving Report in case of general cargo) is completed by the importing terminal and sent to the importing agent. It also may be copied to the shipping line.
Scenario	Either the Importing agent or the Importing terminal produces the Receiving Report for general cargo and sends it to the Importing terminal. The Importing terminal checks the transport equipment and produces the Interchange Report.
Remarks	Transport equipment include trailers, (tank)containers, MAFI's

4.3.1.8 Outturn reporting

Business Process Name	Outturn reporting
Identifier	
Actors	Importing agent, importing terminal
Description	Cargo is reported after being discharged from a vessel.
Pre-condition	Cargo has been arranged at the importing agent. Cargo has been accepted at the importing terminal and is available for discharging.
Post-conditions	A discharge report is produced by the importing terminal.
Scenario	The importing terminal produces a discharge report about the cargo and its condition and sends it to the importing agent.
Remarks	The shipping line may act as the importing agent. The importing agent may act as the importing terminal.

4.3.1.9 Documentation for authorities at import

Business Process Name	Documentation for authorities at import
Identifier	
Actors	Importing agent, Importing authorities, importing agent, consignee
Description	Documentation about the discharged cargo on the vessel is produced and sent to relevant parties.
Pre-condition	The vessel is discharged and a discharge report is available.
Post-conditions	Documentation sent to relevant parties.
Scenario	The importing agent receives the cargo manifest and other relevant documents from the exporting agent. The importing agent produces and sends the officially required documents to the authorities. The importing agent sends relevant documents to the consignee.
Remarks	

4.3.1.10 Cargo release

Business Process Name	Cargo release
Identifier	
Actors	Importing agent, importing authorities, consignee, importing terminal
Description	The cargo is being released by the authorities from the terminal.
Pre-condition	The cargo has been discharged from the vessel. The relevant documents for releasing the cargo are available.
Post-conditions	The cargo is released by the authorities for onward transport. The importing agent informs the consignee of the cargo release.
Scenario	The importing agent requests release of the cargo from the relevant importing authorities and files the required documentation for this.

	The importing authorities release the cargo and inform the importing agent.
Remarks	Depending on the type of trade and transport, the cargo may not require releasing by authorities.

4.3.1.11 Complete a gate out

Business Process Name	**Complete a gate out**
Identifier	
Actors	Consignee, Importing agent, Importing terminal
Description	Cargo for the consignee leaves the gate of the import terminal.
Pre-condition	The importing agent has given permission to release the cargo from the terminal. Cargo is released to the Consignee. Accompanying documents for the cargo are available.
Post-conditions	A gate out report is sent to the importing agent. If the cargo is not damage free, further instructions must be provided to the agent.
Scenario	Cargo for the consignee leaves at the gate of the import terminal. The importing terminal checks the cargo against the corresponding receiving information from the importing agent. In case of irregularities the importing terminal contacts the importing agent for further instructions. If the cargo is not damage free, the importing terminal waits for further instructions to be provided by the agent. On acceptance of the cargo, the importing terminal sends a gate out report to the importing agent.
Remarks	Accompanying documents are the documents that travel throughout its transportation with the cargo and may include: commercial invoice, dangerous goods documentation, certificates for health, agriculture, etc..; these documents vary according to the type of cargo and the specific trade. The importing agent can sometimes act as the importing terminal.

4.3.1.12 Arrival notification

Business Process Name	**Arrival notification**
Identifier	
Actors	Importing agent, consignee, importing terminal, importing authorities
Description	The scheduled arrival of the cargo and the vessel is reported.
Pre-condition	The arrival of the vessel and the cargo is expected. The loading report is available.
Post-conditions	The arrival of the vessel and the cargo has been reported.
Scenario	The importing agent reports the expected and/or actual arrival of the vessel and the cargo to the importing authorities, the importing terminal and the consignee.
Remarks	

4.3.2 Shortsea XML Operation Activity Diagrams

The operation diagram consist or four diagrams. Under each diagram the corresponding functions in ARKTRANS are listed. The summary of the ARKTRANS functional view is described in chapter 4.3.3.

4.3.2.1 Gate in

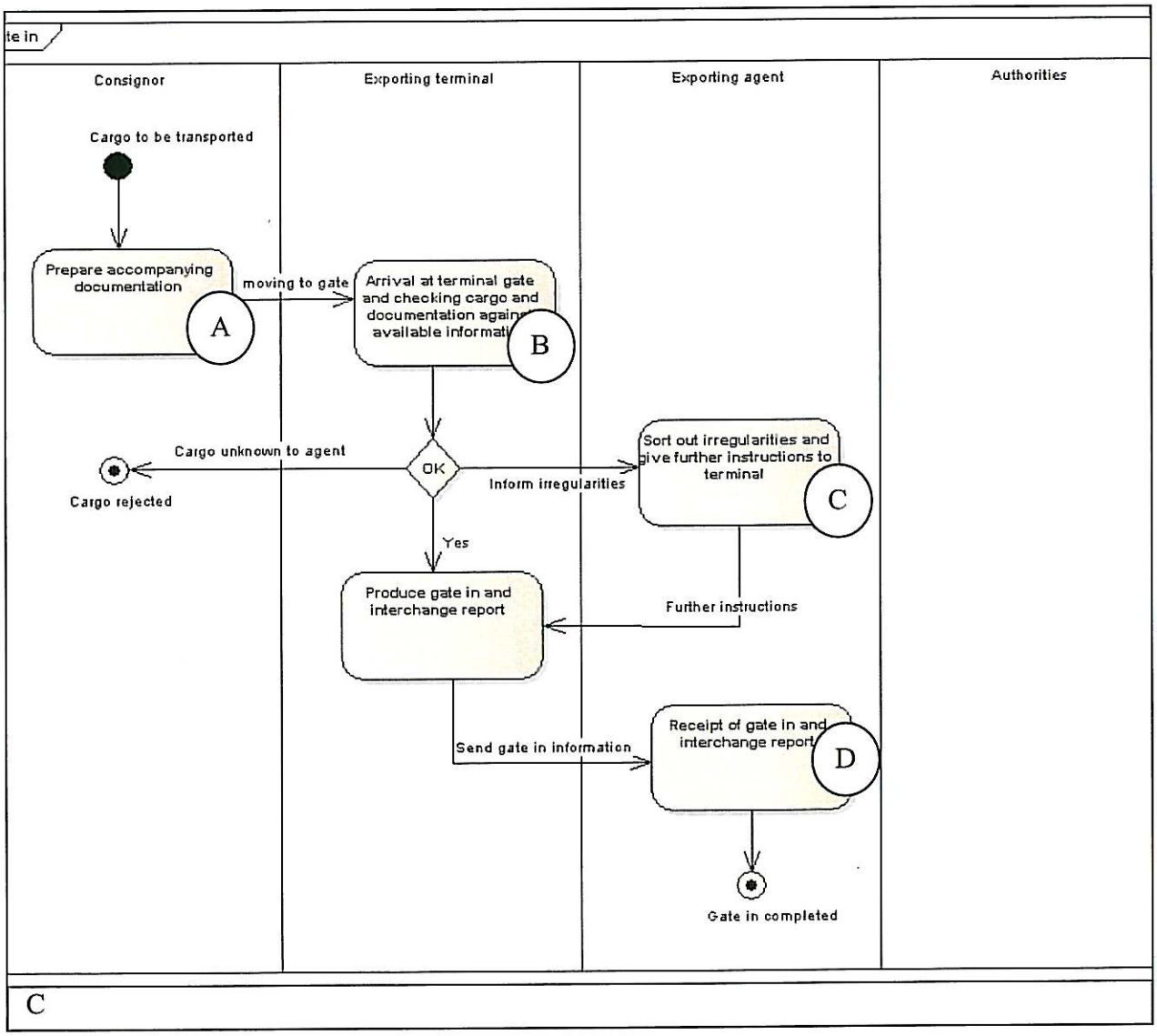

Figure 9 The Gate In activity diagram

The corresponding ARKTRANS functions are:

A. 7.3.3 – Transport Information Exchange
B. 10.2.2 – Inbound Control
C. 8.2.2.8 – Schedule and Deviation Management
D. 8.3.2 – Transport Information Management

4.3.2.2 Loading

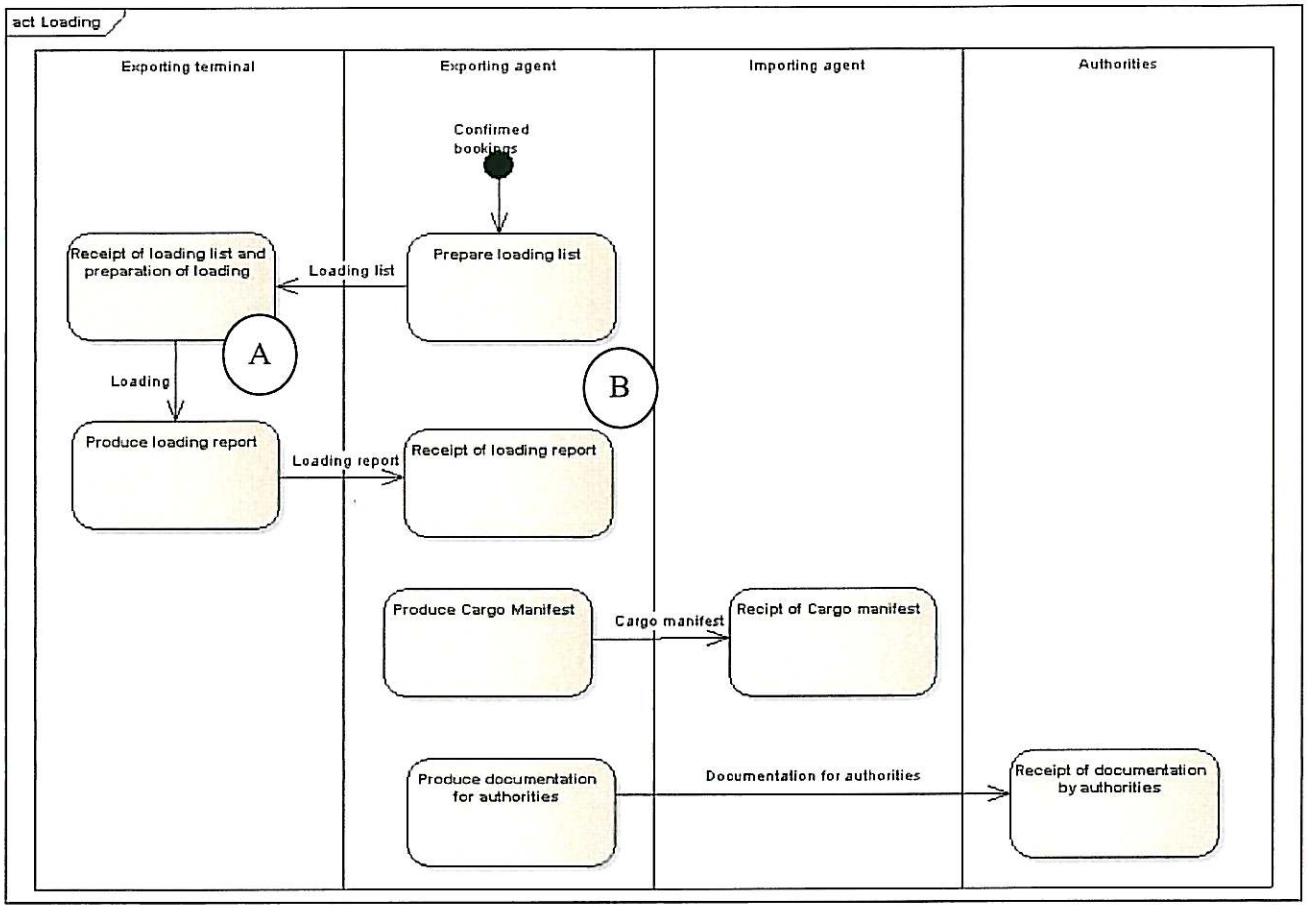

Figure 10 The Loading activity diagram

The corresponding ARKTRANS functions are:

A. 10.2.4 – Outbound Control
B. 7.3.3 – Transport Information Exchange

4.3.2.3 Discharge

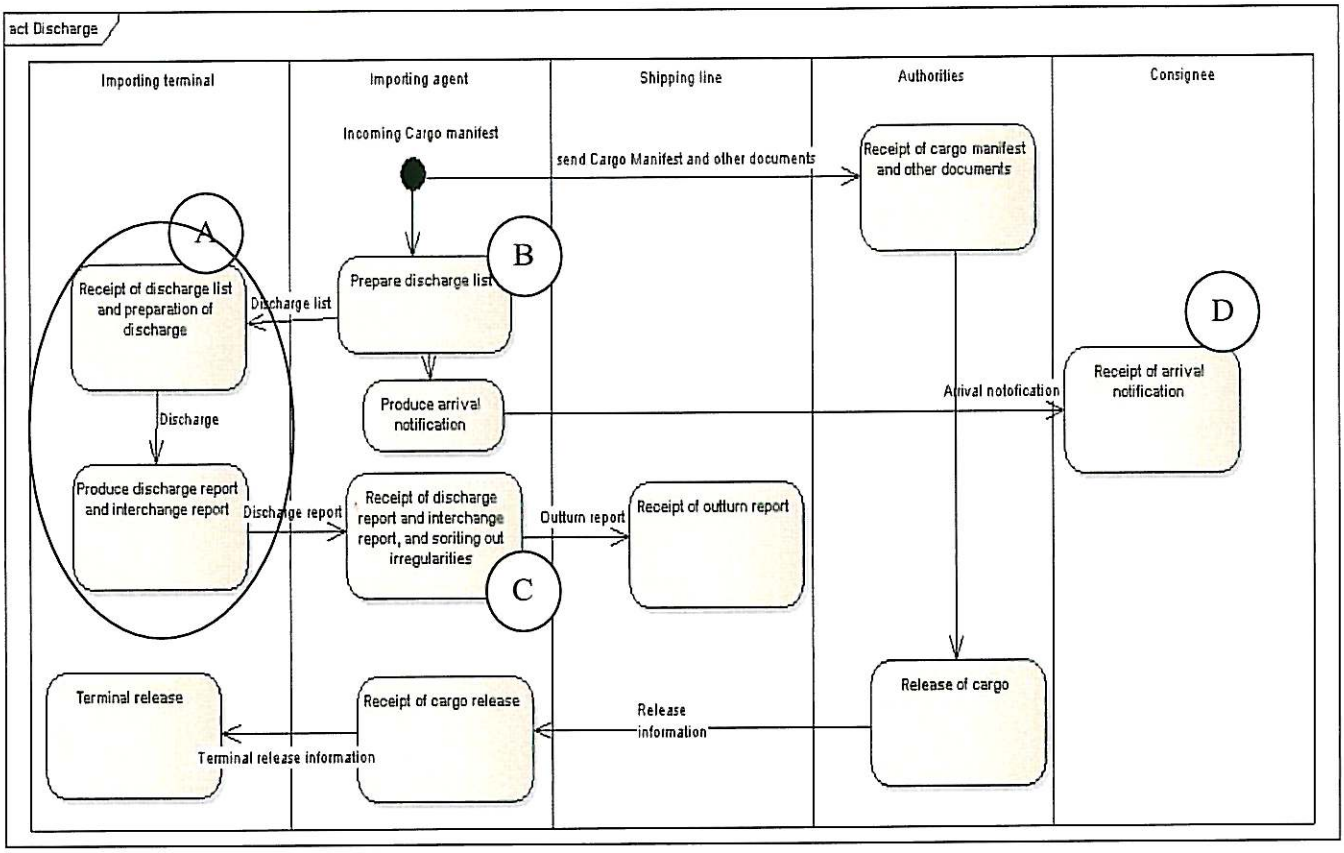

Figure 11 The Discharge activity diagram

The corresponding ARKTRANS functions are:

A. 10.2.2 – Inbound Control
B. 8.3.2 – Transport Information Management
C. 8.2.2.8 – Schedule and Deviation Management
D. 7.3.3 –Transport Information Exchange

4.3.2.4 Gate out

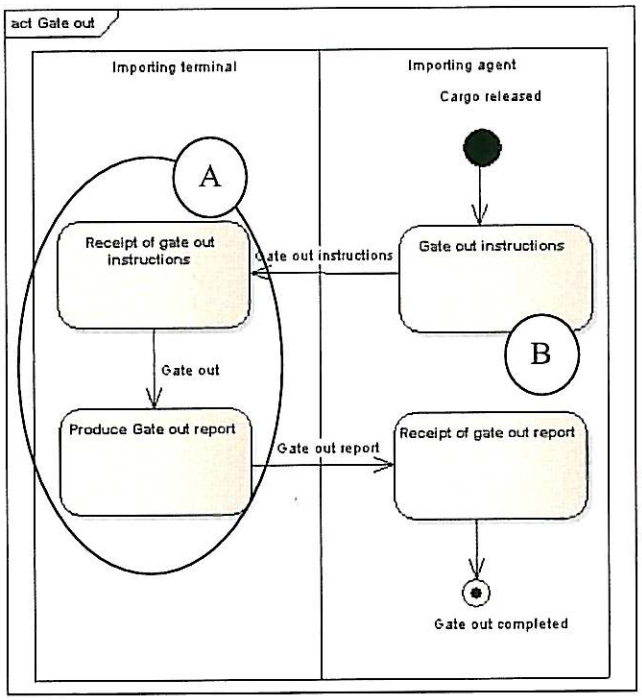

Figure 12 The Gate Out activity diagram

The corresponding ARKTRANS functions are:

A. 10.2.4 – Outbound Control
B. 8.3.2 – Transport Information Management

4.3.3 ARKTRANS Functional Viewpoint

The Operation Process in ShortSea uses the same main functions related to Transport Demand and Transport Service Management as for the Booking Process.
In addition, the Operation Process uses functionality also for the Terminal Management and Transport Network Management sub domains.

4.3.3.1 Transport Demand Function

The function involved from Transport Demand is 7.3.3 Transport Information Exchange. The Operation Process as described by the ShortSea XML focuses mainly on functions to be carried out by the Transport Service Provider, but during the operation there is a need to exchange information with the Transport User, and hence, the corresponding function by the Transport User is related to this exchange only. This function is engaged in both Gate In, Loading, Discharge and Gate Out.

4.3.3.2 Transport Service Management Functions

The function 8.3.2 Transport Information Management from Transport Service Management is involved in all the four business processes, to interact with the Transport User during Operation. The function from ARKTRANS that covers the ongoing transport operation is 8.2.2.8 Schedule and Deviation Management. This function reflects the functions "Sort out irregularities and give further instructions to terminal" and "Receipt of discharge report and interchange report, and sorting out irregularities" in the ShortSea XML functions.

ShortSea XML describes several functions closely related to the production of documents and exchange of information. ARKTRANS is not described at this low level, and these functions are therefore not mapped into ARKTRANS.

4.3.3.3 Terminal Management Functions

The ARKTRANS functions from Terminal Management that are mapped to the ShortSea Operation Process are 10.2.2 Inbound Control and 10.2.4 Outbound Control. These functions are applied when a transport means are entering or leaving the terminal. Inbound Control is applied for the Gate In functions in ShortSea XML, and Outbound Control is applied for the Gate Out functions in ShortSea XML.

4.4 Conclusion Operation

As for the Booking Process, also the Operation in ShortSea XML is described partly at a more low level than the conceptual functions in ARKTRANS. It is possible to map the Operation into ARKTRANS.
The Terminal Management functions are under discussion in ARKTRANS, and will most likely be changed. But for the version 5.0 of ARKTRANS they can be mapped to ShortSea XML.

5 The ShortSea XML Scheduling Process

5.1 Scope of scheduling

The (shortsea) scheduling BRS is covering the (shortsea) schedules for the transport means from any origin to any destination regardless of route or prevailing commercial practice. The processes include quotation and scheduling.

The business information entities described in the class diagram have been developed such that they can be reusable across all industries and modes of transport.

Categories	Description and Values
Business Process	(shortsea) scheduling
Product Classification	Provision of transport and transport related services to all industry sectors
Industry Classification	Domestic and international multimodal transport
Geopolitical	Global
Official Constraint	International cargo transport conventions & regulatory instruments
Business Process Role	Transport Services Provider, Transport Services Buyer, Consignor, Consignee, Carrier, Pick-up Party, Delivery Party, Infrastructure Information Provider
Supporting Role	Seller, Buyer, Freight Forwarder, Carrier Agent, Customs, Customs Broker, Ship From Party, Ship To Party
System Capabilities	

Table 3 Business Information Entities required by the Scehuling message

5.2 Role Comparison

5.2.1 Shortsea XML Roles

Main roles in Scheduling are these of Transport Services Provider, Transport Services Buyer and Infrastructure Information Provider.

The Transport Services Buyer can be either the consignor or the consignee.

The Transport Services Provider is usually the carrier (the shortsea shipping line).
Transport Services can also be provided by other parties, such as the agent and/or the stevedore.

Infrastructure Information Provider provides information about the roads, weather conditions and ports etc, information which can have any impact for the choice of the transport legs.

Relations exist with authorities, notably Customs and the Port Authority. Picture below shows the relationship between roles using in Shortsea XML scheduling.

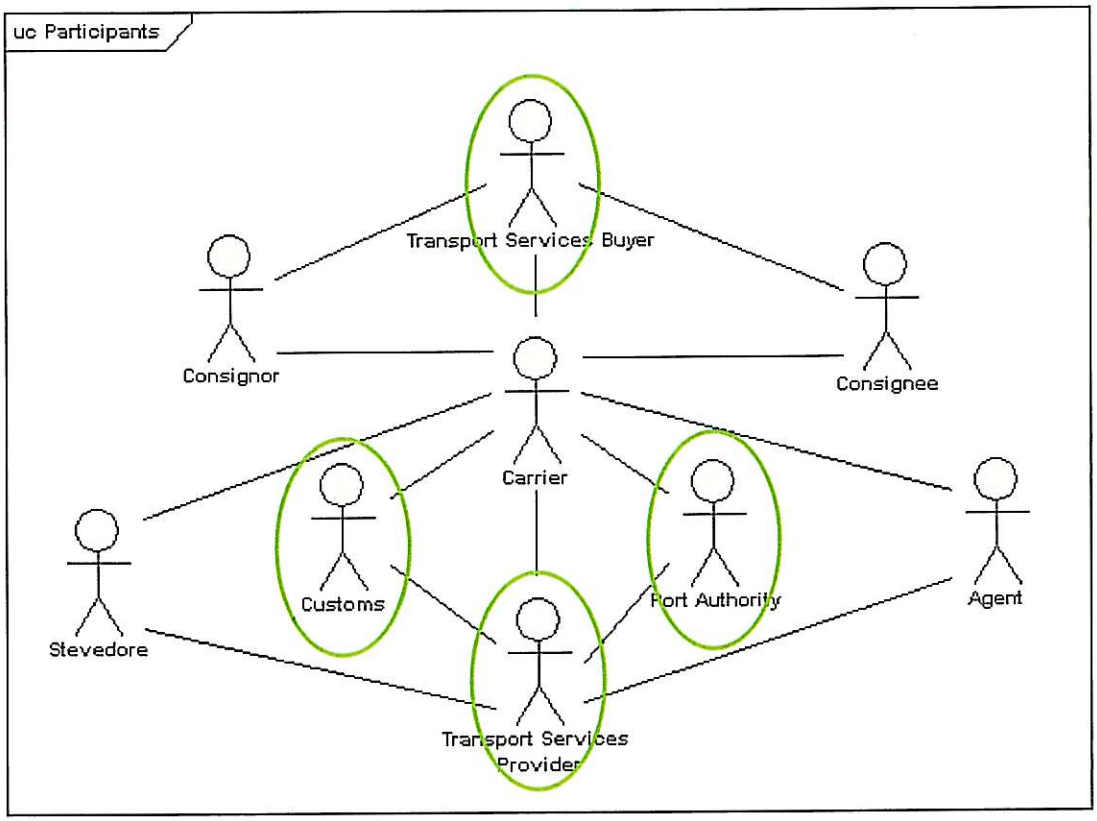

Figure 13 The relationship of roles using in scheduling

5.2.2 ARKTRANS Roles

The Transport User and the Transport Service Management roles are the same as for the Booking and Operation process.
Customs and Port Authority in the Operation process must be mapped to roles under Regulation Enforcement in ARKTRANS.

5.3 Functional view

5.3.1 Shortsea XML Scheduling Use Cases

5.3.1.1 Scheduling

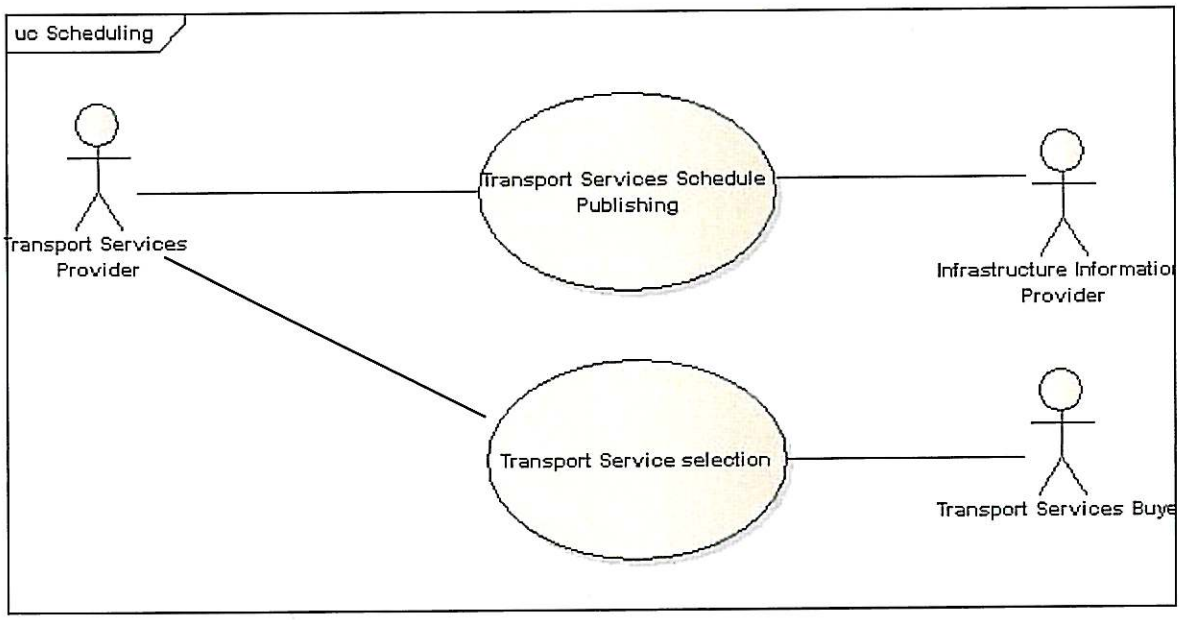

Figure 14 The Scheduling activity diagram

5.3.1.2 Quotation

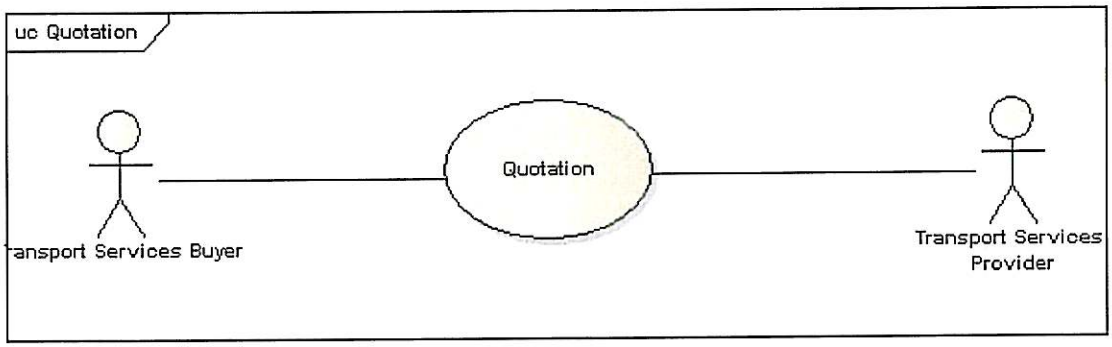

Figure 15 The Quotation activity diagram

5.3.2 Shortsea XML Scheduling Activity Diagrams

5.3.2.1 Transport services selection

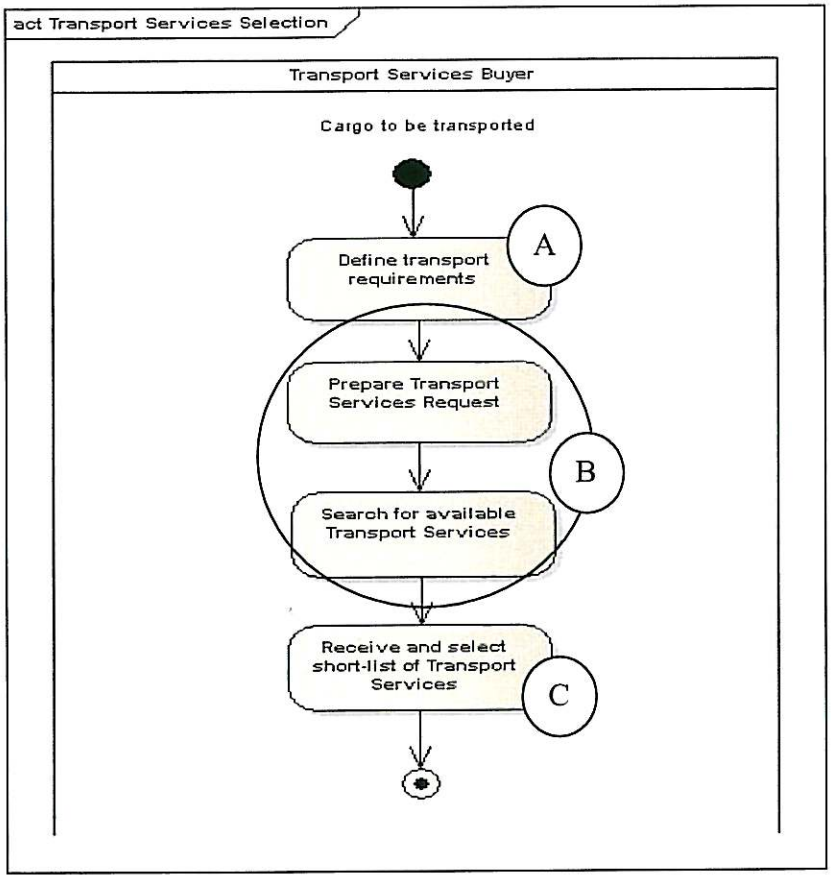

Figure 16 Transport Services Selection activity diagram

The corresponding ARKTRANS functions are:

A. 7.2.2. + 7.2.3 – General Transport Preferences Definition + Transport Demand Definition
B. 7.2.4 – Transport Execution Plan Definition
C. 7.2.4.2 – Transport Service Selection

5.3.2.2 Transport services schedule publishing

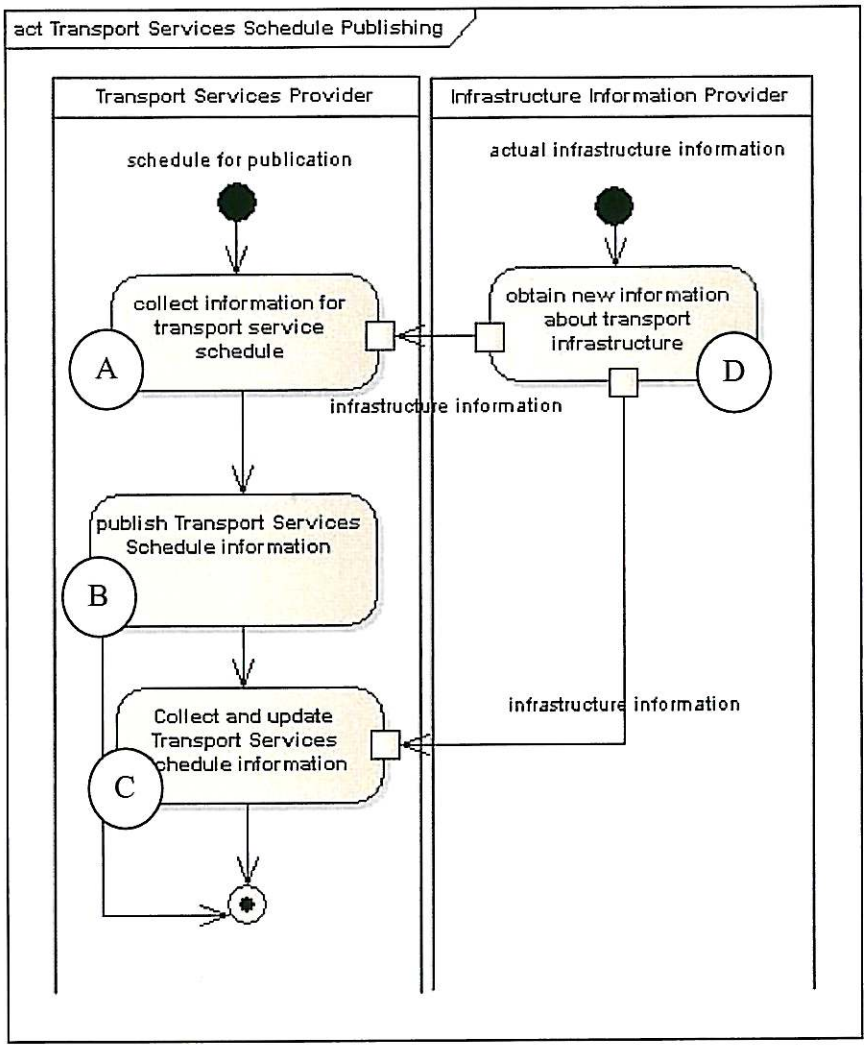

Figure 17 Transport Services Schedule Publishing activity diagram

The corresponding ARKTRANS functions are:

A. 8.3.4.5 – Traffic Condition Monitoring
B. 8.3.1.3 – Transport Service Marketing
C. 8.2.1 –Operative Planning and Preparation
D. 6.3.2.2 + 6.4.2.1 – Traffic Condition Monitoring + Transport Network Data Management

5.3.3 ARKTRANS Functional Viewpoint

5.3.3.1 Transport Demand Functions

When a schedule is set up in ShortSea XML, it is based very much on the preferences stated by the Transport User. The functions involved for the Transport User are those related to the definition of the transport preferences and the transport services, namely General Transport Preferences Definition, Transport Demand Definition, Transport Execution Plan Definition and Transport Service Selection

5.3.3.2 Transport Service Management Functions

Under Scheduling the Transport Service Provider needs to do the operative planning, and the situation at the transport network must be taken into consideration. Finally the services must be marketed. The ARKTRANS functions involved are Traffic Condition Monitoring, Transport Service Marketing and Operative Planning and Preparation.

5.3.3.3 Transport Network Management Functions

The Transport Network Manager needs to provide information to the Transport Service Provider needed for planning of actual transport services. The ARKTRANS functions involved are Traffic Condition Monitoring and Transport Network Data Management.

5.4 Conclusion Scheduling

As for the Booking and Operation Processes, also the Scheduling process in ShortSea XML is described partly at a more low level than the conceptual functions in ARKTRANS. It is possible to map the Scheduling process into ARKTRANS.

6 Technical Realisation

Shortsea XML is based on Internet and XML technology and will be simple to implement for many small and medium size shipping lines, ports and road haulers involved in short sea shipping. A central part of the SSXML project is to define and develop SSXML schema to meet the requirements of the short sea industry as part of the intermodal chain. Interoperability with commonly used EDIFACT messages must be secured. SSXML will be compatibility with EDIFACT since the majority of the shipping industry is using EDIFACT. A translation hub will translate between common EDIFACT messages and SSXML messages.

SSXML messages is compliant with the UMM and CCTS standards. UMM is the United Nations Modelling Methodology and CCTS is Core Components Technical Specifications.
UMM is a method to systematically describe the collaboration between two organisations so that this collaboration can be embodied in ebXML process and document definitions. The method is base on ISO 14662 (Open EDI reference model). UMM makes use of UML, the Unified Modelling Language, the de facto standard for information technology modelling.
Core Component specification indicates how information that is modelled in a UML class diagram can be recorded in a registry or in a spreadsheet. Core Component specification does not indicate how information can be represented in an XML message. It is syntax neutral and can be derive automatic from a set of rules, such as UN/CEFACT naming and design rules, to be an XML-document.
Chapters 16.2.1.5 and 16.2.1.9 in ARKTRANS describes technologies and possible solutions that can be use to gain interoperability between two interact partner. It is coincidence with technologies ShortSea XML is using.

7 Conclusions

The ShortSea XML results can be mapped to ARKTRANS. The main difference is the intentions for the descriptions in the two projects.

In ARKTRANS all of the descriptions are made generic. They are applicable to a large number of cases with different focuses. The basis is the reference model and the set of roles.
In the ShortSea XML description a specific interaction is the basis for all the descriptions.

In an ideal situation, ARKTRANS should have been used as the basis for the ShortSea XML descriptions from the beginning of the implementation project. This has not been the case. It is however still possible to map the two descriptions even though the wording is different and that parts of the descriptions in ShortSea XML are at lower levels than in ARKTRANS.

The experiences from the ShortSea XML project and the results from the mapping described in this report will be brought into guidelines on how to use ARKTRANS when running XML implementation project like ShortSea XML.

May 2008