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Intelligent transport systems — Electronic information exchange to facilitate the movement of freight and its intermodal transfer — Road transport information exchange methodology

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National foreword

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Intelligent transport systems — Electronic information exchange to facilitate the movement of freight and its intermodal transfer — Road transport information exchange methodology

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Foreword

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ISO/TS 24533 was prepared by Technical Committee ISO/TC 204, *Intelligent transport systems*.

Introduction

Seamless exchange of accurate, complete, and timely data at transportation hand-offs has always been important for efficiency and accountability. There is also an understanding of needs for security of transport information, and for transfer of information related to security against terrorism as well as theft and traditional contraband. It is imperative for standards development organizations to address and facilitate dealing with these needs.

ISO/TR 14813-2:2000, 7.4.1 identifies a commercial vehicle functional domain:

> "These transactions maintain the TICS information about a shipment from the time of the order by the consignor to the reception of goods by the consignee. The key TICS transactions are to provide registers of service providers and to enable the goods to be tracked throughout intermodal journeys."

Consequently, Technical Committee ISO/TC 204, *Intelligent transport systems*, seeks to fill a role focusing on data exchange needs for the international supply chain that relate specifically to motor carrier transportation including data needs for the interface with all modes of transportation since freight movement normally includes interfaces with other modes of transportation. Those needs are essential for transport information and control systems.

Some international shipments are carried out entirely by highway mode, but most begin and end with motor carrier service and travel by other modes in the course of the shipment. This Technical Specification focuses on motor carrier transport interfaces through the supply chain, or those data items that deal specifically with the key pieces of transport information critical to getting the goods to the marketplace without delay related to data sharing. Therefore, the interfacing modes' data structures and formats must accommodate each other to assure efficiency and security from end to end. Truck, rail and ocean transport are vital components of intermodal, international shipping. It is recognized that a robust intermodal standard must include interface connections to all of these modes, and may need to be proven through demonstration tests. Research and tests carried out in the US motivated the use of a truck-air-truck supply chain (shown in Figure 3). Preliminary investigations suggest that there is no single organization responsible for transport data standards through the intermodal supply chain. To achieve a coherent set of transport standards requires coordination among the various international organizations working on component parts of these international standards. TC 204 has advanced the idea of close coordination among other appropriate ISO Technical Committees, OASIS, IATA, IEC, CEN, UN Centre for Trade Facilitation and Electronic Business, and the World Customs Organization. Contact has been made and interest has been expressed in cooperating on the development of intermodal data exchange standards that fully cover the supply chain. This Technical Specification is a preliminary step towards coordinating between the various standards organizations.

The vision expressed in this Technical Specification is to allow electronic data sharing through many-to-many relationships between supply chain partners which will help ensure sustaining standards. One-to-one relationships require only two partners to have standard data relationships with each other, and could require other partners to adopt the standards of the original two or require third party translators, which increases costs in the transport of goods. The many-to-many relationships also ensure that data initiated by the first partner will allow other partners equal access and can also help customs agencies to access data early in the progress of goods coming through the supply chain.

Intelligent transport systems — Electronic information exchange to facilitate the movement of freight and its intermodal transfer — Road transport information exchange methodology

1 Scope

This Technical Specification specifies the data concepts applicable to the movement of freight and its intermodal transfer. These data concepts include information entities (data elements), aggregated/associated information entities (groups of data elements) and messages that comprise information exchanges at transport interfaces along the chain of participants responsible for the delivery of goods from the point of origin through to the final recipient as presented in Figure 1. This Technical Specification focuses on a single "thread" of the overall end-to-end supply chain.

It includes motor transport data needs within the international supply chain to satisfy the requirements of both businesses and governmental organizations. This Technical Specification is applicable to shipments that originate in one country and terminate in another. It may also be applied to shipments that originate and terminate in a single country. This Technical Specification is applicable to freight movements that interface with other modes and incorporates requirements set for those other modes.

This Technical Specification does not constrain the requirements of customs, regulatory, and safety bodies at border crossings but does include the data elements likely to be required by customs authorities. The same is true with the requirements of any particular mode of operation.

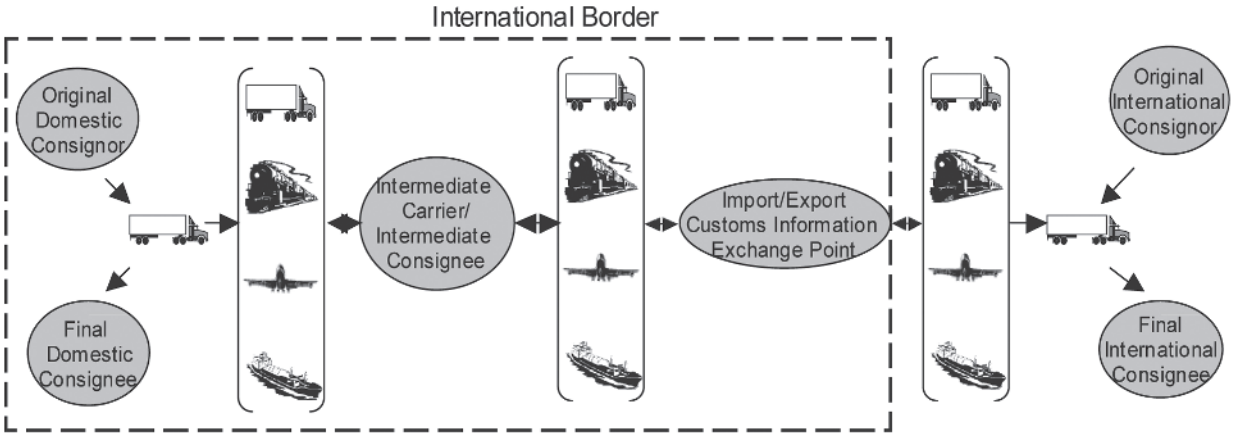


Figure 1 — Information exchanges at intermodal interface

NOTE This thread may be generalized to address the various combinations of segments that occur in the global supply chain while focusing on the information exchange at the interchange points.

2 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

2.1
agent
name and address of a person or organization authorized to act for or on behalf of another party

2.2
air carrier
carrier using aircraft to transport goods

2.3
air waybill
particular type of bill of lading, specifically a non-negotiable consignment note used to cover the transport of goods by airfreight

NOTE An air waybill serves as a receipt for the shipper, indicating that the carrier has accepted the goods listed therein, and obligates it to carry the consignment to the airport of destination according to specified conditions.

2.4
authority
statutory body existing within a jurisdiction and a specific area of responsibility that administers legislation to regulate trade and/or monitors compliance with existing legislation

2.5
bill of lading
document which evidences a contract of the carriage and the taking over or loading of the goods by the carrier, and by which the carrier undertakes to deliver the goods against surrender of the document

NOTE A provision in the document that the goods are to be delivered to the order of a named person, or to order, or to bearer, constitutes such an undertaking. The document has the following functions: 1) a receipt for goods, signed by a duly authorised person on behalf of the carriers, 2) a document of title to the goods described therein, 3) evidence of the terms and conditions of carriage agreed upon between the two parties.

2.6
buyer
customer
ultimate consignee
individual or entity purchasing goods or services

2.7
carrier
person or organisation, which owns and/or operates a transport means, engaged in the transportation of passengers or property by land, rail, air or water

2.8
certificate of origin
international business document that certifies the country of origin of the shipment

2.9
chain of possession
identification and appropriate collection of a history of the party with possession of some unit of freight, such as a consignment, and relevant supporting data attributes about the party, the freight, and the assets involved in enabling the transport or distribution of that freight

2.10
conformance
adherence of a candidate's implementation to a standard

2.11
consignee
receiver
person or company to whom goods are shipped

2.12
consignment
separately identifiable amount of goods items (available to be) transported from one consignor to one consignee via one or more modes of transport and specified in one single transport document

2.13
consignor
shipper
party which, by contract with a carrier, consigns or sends goods with the carrier, or has them conveyed by him

2.14
consolidation
grouping together of individual consignments of goods into a combined consignment for carriage

2.15
consolidator
person or organization engaged in the process of combining more than one consignment loaded in a container destined to one or more consignees, combining carload or truckload consignments to make carload or truckload movements

2.16
container
receptacle for the transport of goods, especially one readily transferable from one form of transport to another

2.17
customs
government organization that deals with the levying of duties and taxes on imported goods from foreign countries and the control over the export and import of goods

2.18
customs manifest
document itemising a list of cargo prepared by shipping companies from bills of lading which is presented to customs for formal report of cargo

2.19
delivery party
party to whom goods should be delivered, if not identical to consignee

2.20
despatch party
party to whom goods are to be, or have been, taken over, if not identical to carrier

2.21
electronic freight manifest
electronic supply chain manifest (ESCM)
proposed concept of generating, storing, distributing, and accessing manifest-related data along the end-to-end supply chain, facilitated by this Technical Specification

2.22
export agent
person or organisation authorised to act for or on behalf of another person or organisation in business or as a broker in respect of services concerning the export of goods out of the country

2.23
exporter
name and address of the person who makes, or on whose behalf the "export declaration" is made, and who is the owner of the goods or has similar right of disposal over them at the time when the declaration is accepted

2.24
freight
goods
any transported commodity

2.25
freight forwarder
party arranging the carriage of goods, including connected services and/or associated formalities, on behalf of a consignor or consignee

2.26
governance
system by which organizations are directed and controlled

2.27
house air waybill
document made out by an agent/consolidator which evidences the contract between the shipper and the agent/consolidator for the arrangement of carriage of goods

2.28
house bill of lading
freight forwarder's document which performs similar functions to the bill of lading but which is not a document of title, nor is it negotiable

NOTE A house bill of lading is used mainly as a control for the goods within the freight forwarder's own service system.

2.29
import agent
person or organisation authorised to act for or on behalf of another person or organisation in business or as a broker in respect of services concerning the import of goods into the country

2.30
importer
name and address of party who makes, or on whose behalf a customs clearing agent or other authorised person makes, an import declaration

NOTE This may include a person who has possession of the goods or to whom the goods are consigned.

2.31
intermediary
commercial party who provides services to customers, suppliers or authorities within the supply chain

NOTE This includes, but is not limited to, freight transport.

2.32
intermodal container
freight container designed and constructed to permit it to be used interchangeably in two or more modes of transport

2.33
intermodal freight
cargo containers interchanged between transport modes, and where equipment is compatible within multiple systems

NOTE Transport modes include: motor, rail, water, and air carriers.

2.34
intermodal (freight) transport
movement of goods in one and the same loading unit (e.g. intermodal container) or vehicle which uses several modes of transport successively without handling the goods themselves when changing modes

2.35
journey
physical movement of goods from the supplier to the consignee

2.36
manifest
specification of all cargo on board the transportation vessel or any other means of transport

NOTE The manifest contains details of contents, shipper, consignee, and other details that may be required by customs or consular authorities. Copies of manifests are provided for the country of export and country of import customs authorities.

2.37
manufacturer
party that manufactures goods

NOTE In the context of this Technical Specification, the manufacturer may be the seller.

2.38
master air waybill
air waybill covering a consolidated consignment, showing the consolidator as shipper

2.39
master bill of lading
bill of lading issued by the master of a vessel (in actuality, the owner or charterer of the vessel)

NOTE A master bill of lading can cover a number of house bills.

2.40
(transport) mode
any transportation method, including rail, highway, air, water or pipeline

2.41
motor carrier
motor carriage
carrier using for-hire or private motorized transport on roads to transport goods

2.42
multimodal transport
carriage of goods by at least two different modes of transport

NOTE In contrast, "intermodal transport" implies the change from one mode to another using the same form of loading unit. Multimodal transport implies that either there is more than one modal shift or that loads may be broken into partial loads as part of a modal change.

2.43
seller
name and address of party selling merchandise to a buyer

2.44
shipment
identifiable collection of one or more goods items (available to be) transported together from the original shipper to the ultimate consignee

NOTE A shipment can be transported in different consignments.

2.45
shipping marks
physical identification shown on individual packages, used to help move them without delay or confusion to their final destination, and to facilitate verifying goods against their associated documents

2.46
supplier
party that provides goods

NOTE This may or may not be the same entity as the consignor/shipper. The supply chain physically begins with the supplier.

2.47
tracing
function of retrieving information concerning goods, goods items, consignments or equipment

2.48
tracking
function of maintaining status information of goods, goods items, consignments or equipment

2.49
transport document number
reference assigned by the carrier or his agent to the transport document

2.50
transport documentation
legal and commercial documents that accompany the transport means during a journey

2.51
transport means
vehicle used for the transport of goods

EXAMPLE 1 A vessel, train, or truck.

EXAMPLE 2 The vehicles, trailers, vessels, aircraft, or combination thereof, to perform the journey to deliver the consignment to the receiver or return returnables, together with the driver/pilot/crew physically conducting the journey.

2.52
transport seal
equipment seal
mechanical or electronic device applied to a container, unit load device, trailer, etc. to guarantee authenticity or security

2.53
transport services provider
provider (seller) of transport services

2.54
waybill
document made out by, or on behalf of, the shipper and which evidences the contract between shipper and carrier for carriage of cargo

NOTE A "through air waybill" covers the entire transportation from departure to destination of consignment. It is not a document of title.

3 Symbols and abbreviated terms

ABIE	Aggregate Business Information Entity
ACC	Aggregate Core Component
AEO	Authorized Economic Operator
AES	Automated Export System
ASBIE	Association Business Information Entity
ASCC	Association Core Component
BCC	Basic Core Component
BIE	Business Information Entity
BBIE	Basic Business Information Entity
BPAWG	Business Process Analysis Working Group
CC	Core Component
CCT	Core Component Type
CCTS	Core Component Technical Specification
CDL	Commercial Drivers License
DUNS	Dun & Bradstreet D-U-N-S Number
ebXML	Electronic Business Extensible Markup Language
EIN	Employer Identification Number
ESCM	Electronic Supply Chain Manifest
JIT	Just In Time
NDR	Naming and Design Rules (UBL)
OASIS	Organization for the Advancement of Structured Information Standards
SSN	Social Security Number
UBL	Universal Business Language
UCR	Unique Consignment Reference

UN/CEFACT United Nations Centre for Trade Facilitation and Electronic Business

UN/ECE United Nations Economic Commission for Europe

UN/TDED United Nations Trade Data Element Directory

USDOT US Department of Transportation

4 Intermodal freight context

4.1 General

The procedures active within the international supply chain are complex, and often cumbersome. At work are numerous interactions between different parties, which are guided by many factors, including type of product, country, terms of business, and the methods of operation of both the consignee and the seller. Given the broad range of activities possible, it is hardly surprising that within the context of actually transporting goods, a single transaction may involve many languages (both electronic and human), standards, and operational practices.

This Technical Specification addresses a methodology for using standard messages and tools that will maximize the efficiencies for transporting goods from a seller (or “consignor”) to a buyer (or “consignee”), using intermodal transport that includes motor carrier and air links. It is appropriate for supporting operational freight movements that occur worldwide, whether that freight travels from point of origin to destination domestically or internationally. While this Technical Specification is not focused on single mode movements, and any unique requirements therein, it is considered complementary to standards of uni-modal freight movement.

This Technical Specification considers the four types of economic agents involved in business, as defined by the basic resource-event-agent ontology used by UN/CEFACT’s Unified Modeling Methodology. For the purposes of this Technical Specification, these are considered to be the following actor classes:

— Customer: A party who acquires, by way of trade, goods or services.

— Supplier: A party who provides, by way of trade, goods or services.

— Authority: A statutory body existing within a jurisdiction and a specific area of responsibility that administers legislation to regulate trade and/or monitors compliance with existing legislation.

— Intermediary: A commercial party who provides services to customers, suppliers or authorities within the supply chain. This includes, but is not limited to, freight transport.

There are many specific actors’ roles within these classes that participate in the supply chain. Those that are affected by this Technical Specification are shown in Table 1.

Table 1 — Actors and their roles defined in this Technical Specification

Actor class	Actor roles
Customer	Consignee Buyer Receiver Final consignee Ultimate consignee
Supplier	Original consignor (might be the manufacturer) Consignor Shipper Seller
Authority	Customs agencies Receiving authorities (e.g. Port authority) Control government agencies (e.g. Police)
Intermediary	Motor carrier Air carrier Transport services provider Third party logistics provider Freight forwarder Import agent Export agent
Note The seller, supplier, shipper and consignor are different parties that each have a specific role. Depending on the business transaction contract, their action can vary in the process. The same is true for customer, buyer and consignee.	

It is noted that in many supply chains, common business practice may mean that an identified consignee is an intermediate point towards the transport of a consignment to the final, or “ultimate”, consignee. For example, a supplier may give a consignment to a third party logistics provider, who then creates a transaction to deliver to the final consignee. Unless otherwise noted in Clause 4, use of the term “consignee” refers to the “ultimate consignee”.

4.2 Intermodal freight — Road transport component concept of operations

4.2.1 Objectives

There are a great many different types of exchanges of information that are required in a supply chain, particularly one that is intermodal and international in scope. The exchanges span multiple business functions. This Technical Specification is concerned with distribution, transportation and security-related information. A concept of operation of how a data standard would be used operationally is driven by two major types of benefit: operational efficiency and security.

4.2.1.1 Operational efficiency

Suppliers and consignees articulate speed, visibility, and reliability as three important requirements of supply chains, necessary to ensure efficiency, high productivity and competitive positioning. Among the challenges to speed, visibility and reliability are the information requirements that must be met to trigger various activities along the physical supply chain. For example, information transactions accompanying international consignments must be filed with customs authorities as a requirement to gaining customs clearances that

permit further freight movements towards the consignee. Paper-based information transactions frequently become a process bottleneck, holding up the movement of freight, not only with customs but at all interface points. Existing electronic-based information transactions, in the intermodal and international contexts, use standards that are not globally recognized and adopted, thus introducing the same kind of process delays that are symptomatic of the paper transactions. The use of data messages that are widely adopted throughout the supply chain, and that can be accessed on a real-time basis from the originator on a federated basis, fosters efficiency, and allow freight to flow without interruption. Other operational efficiencies include preventing data re-entry by various stakeholders along any given supply chain, reducing errors and rework, reducing re-orders, and improved operational planning and staging of labour resources by having advance shipping notices.

4.2.1.2 Security

Use of this Technical Specification is expected to promote the use of globally harmonized procedures to effect security, and this is an important requirement of an efficient and secure supply chain system. This Technical Specification promotes certain aspects of a chain of possession concept of the freight supply chain, as described in ISO 28000:2007. Whenever applicable, the existing regulations on security (local, national, European and international), e.g. the customs status Authorized Economic Operator (AEO), should be respected. The chain of possession refers to the identification and appropriate collection of a history of the party with possession of some unit of freight, such as a consignment, and relevant supporting data attributes about that party, the freight, and assets involved in enabling the transport or distribution of that freight. When authorized and authenticated stakeholders are given timely visibility to that information, it may enable preventive, deterrent, and investigative functions of a cargo security implementation. This visibility may take several forms, such as exception reporting, automatic system procedures, or manual querying.

This Technical Specification includes information entities and messages that are directly related to the information exchanges associated with freight consignments. It is intended to be complementary with messaging schemes for the physical, nested levels of shipment. It does not include the data elements and messages that are directly tied to the physical movement of goods (for example, data describing container seals and their status), or to the financial aspect of goods movement, or to any legal requirements between parties (domestic or international). However, the messages within this Technical Specification do have a strong indirect relation to the physical chain. For example, the Unique Consignment Reference (UCR), or equivalent, required by a customs agency, can be used as the access key to retrieve all the relevant information from the electronic exchanges. In a similar manner, the "license plate" (as defined in ISO 15459-1:2006) that uniquely identifies the physical transported unit could be used. The information exchanges encompassed by these messages affect and are affected by progress of the physical freight through the physical chain. Any chain is comprised of a variety of handoff points from one “possessor” to another. Information transactions accompany these handoffs. For example, an air carrier will not release a consignment to a cartage company without verifying the identity of the driver, and, in some countries, verifying security authorization documentation. The information availability provides triggers for the physical release of the consignment. If a physical security device such as a transport seal is being used, there would also be a transaction at this point to effect the change of possession to the motor carrier.

Another aspect of security is ensuring that the data collected, stored and transmitted is accessible by only those stakeholders who are recognized as having legitimate rights to view (or edit, or add or delete) this data. Ensuring this type of security is a requirement of the technology and processes that users would adopt in implementing this data standard.

There is a chain of possession of the information itself, separate from the chain of possession of the physical freight, that is supported by ISO 28000:2007, but that must be enforced through the processes and technologies used to implement it.

4.2.2 Overview of freight physical flow

Figure 2 provides a simplified depiction of the physical movement of the delivery of time-sensitive freight. This process was chosen based upon some testing conducted using four different air cargo supply chains from China to the United States involving fashion textiles. In practice, variations in the specific actors involved and the nature of the value these actors add to the supply chain may result in a more complex physical flow than Figure 2 depicts. This Technical Standard is intended to be sufficiently robust to handle these variations, assuming that the overall modality of the supply chain is: despatch party → motor carrier → air carrier →

motor carrier → delivery party. The business process that drives this physical flow begins with some form of an order triggering the demand for a freight movement transaction between a seller and a customer. The transaction physically begins at a despatch party location, which may or may not be the seller. This location may be a manufacturing facility or a distribution facility. A motor carrier picks up freight from the despatch party (Link 1). The motor carrier may bring freight to staging or flow-through facilities (this is not separately shown from the trucking icon in Figure 2). The motor carrier delivers freight to the staging facility (Link 2). There may or may not be a consolidation operation in which other freight of the same or different manufacturers are merged and transported on a different truck or trailer (2A versus 2B). After air transport, a motor carrier transaction moves the freight to destination. Whether the consignment is international or not determines whether the freight bypasses a customs authority function (Link 3A), or passes through customs (Link 3B). The eventual delivery to delivery party may, as above, involve a consolidation operation (Link 4B) or not (4A).

NOTE It is recognized that there are numerous variations in such a fundamental process; however the simplification is meant to capture the essence of time-sensitive freight flow for the purpose of dealing with the associated information flow.

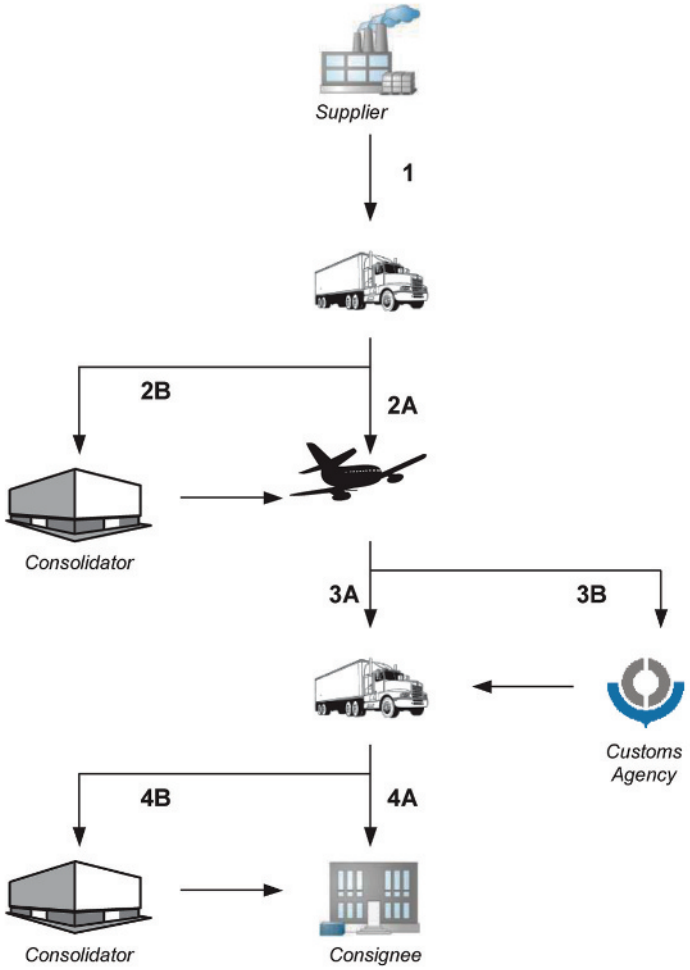


Figure 2 — Simplified depiction of physical freight flow for time-sensitive freight

4.2.3 Information exchange transactions

Associated with the physical freight movement transactions described in 4.2.2 are supporting information exchanges between two or more actors. This information may serve one of a number of business functions, including security and transportation. The scope of this Technical Specification focuses on distribution/transportation-specific and certain security-specific information. This subclause describes the type of information needed to support the business processes of the delivery time-sensitive freight supply chain.

There is some commonality to the information items that comprise distribution/transportation-specific documents that are transacted, regardless of which actors or links in the supply chain are involved. These include:

— Contract of carriage for the carrier to transport the goods, which have been duly marked, to the indicated consignee noted on the document;

— Title document, which may be negotiable or non-negotiable, depending on the terms of sale;

— Verification of goods receipt which documents that the goods have been physically taken into possession by the receiving actor, and in good condition except as may be specifically noted on the document;

— Mechanism for meeting regulatory and enforcement agencies' requirements, particularly in the air cargo area, where the documents serve this legal role.

Different names are used for these documents throughout the supply chain, depending mostly on which actors are transacting the document, and to a lesser extent, by which companies, industry sectors and geographic regions are involved. Table 2 lists the documents, and their specific name, according to position in the supply chain. The differences can create some confusion. For example, "manifest" is a loosely defined term that is at times used interchangeably with "bill of lading" (a more formal transportation document of title of the goods) or "waybill" (which conveys the same basic information as a bill of lading but does not convey title).

Table 2 — Distribution document type by link in the supply chain

Link[1)]	Source	Destination	Typical distribution document
1	Supplier	Motor carrier	The supplier can issue a transport booking, followed by an instruction for the execution of the transport. The carrier will issue a bill of lading for the shipper. Often, the destination actor providing the motor carriage function is a freight forwarder. They will also produce a Bill of Lading.
2A	Motor carrier	Air carrier	The motor carrier will produce a waybill or manifest
2B	Consolidator	Air carrier	Master waybill or master manifest created from individual waybills/manifests
3A	Air carrier	Motor carrier	Waybill or motor carrier's bill of lading
3B	Air carrier	Motor carrier (via customs authority)	Customs' commercial invoice
4A	Motor carrier	Consignee	Bill of lading — Arrival notice
4B	Consolidator	Consignee	Bill of lading — Arrival notice

1) Link numbers correspond to the depiction in Figure 2.

The information items that comprise these documents are generally:

— Consignor: name, address, other contact information,

— Consignee: name, address, other contact information,

— Freight description: cargo type, weight, quantity,

— Consignment description: reference number, date of consignment, package and piece count, special instructions, signature of recipient.

Other kinds of data may also appear. For example, bills of lading typically include the terms by which a motor carrier assumes liability for the freight.

Ancillary information that is also exchanged electronically by two or more supply chain actors, and that is consistent with the stated scope of the Technical Specification are also governed by this Technical Specification.

Figure 3 chronologically depicts the distribution and transportation information exchanges that may occur in a truck-air-truck supply chain, which is primarily used as an example in this Technical Specification, based up work that was conducted between China and the US on air cargo, as previously described. Figure 3 shows how these information exchanges relate to the physical flows.

Yet another parallel flow is the security-related exchanges that effect a chain of possession solution. To create the complete chain that is needed for a robust security definition, exchanges would be included at every place along the supply chain in which there is a transfer of possession from one individual/organization pair to another. This begins when the despatch party relinquishes a consignment (typically to a transport services provider), and ends when the delivery party confirms receipt of the consignment or a rejected consignment returns to a consignor or their agent.

4.2.4 Operational scenario

This subclause describes the processes and behaviours that the actors might perform in an operating scenario that could use a technical specification like this one. The vision of the scenario is as an operating environment that could be implemented and that delivers the goals of improved efficiency and security (the latter with specific regard to enabling a chain of possession concept).

4.2.4.1 Consignor trigger

The consignor triggers a request for consignment with some form of order. This transaction begins a process of transport and distribution that is the focus of this Technical Specification. The ordering process itself is not within the scope of this Technical Standard.

4.2.4.2 Supplier actions

The Technical Specification’s reach begins when a supplier (or another actor who initiates the consignment process, such as a seller) places a request for a motor carrier pickup with a carrier, forwarder, or third-party logistics provider. This request may use a technology solution (for example, based on biometrics) that authenticates and authorizes the user to perform the transaction. This Technical Specification does not include messaging for such a biometric solution, but is seen as consistent with the activities of other international standards that, taken together with this Technical Specification, provide an integrated security solution.

A system that implemented an electronic supply chain manifest (ESCM) would likely have a manifest template from which the base information describing the consignment would be constructed. The supplier will know most or all of the items in the template, and the user will fill out the data items, groups of which include consignor and consignee names, addresses, etc., and item level details about the consignment contents.

If an integrator will also be providing the air carriage services with the motor carrier role, then the supplier does not need to be concerned with the air services as a separate transaction to the motor carriage. If an integrator is not involved, then the system's architecture, using the intermodal data standard, permits the air carrier to easily be notified of the consignment without requiring a separate manual transaction to be constructed.

Such a system would provide appropriate reports and hard copy records of the manifest transactions, in addition to the electronic transaction captured within the system. At this point, the electronic manifest is transmitted to a system host, where the information becomes available to appropriate downstream supply chain providers.

Typical "Truck-Air-Truck" supply chain

with international component for time-sensitive delivery

Information flow

	Name	Created by	Used by	Notes	Triggers
1	**Shipment request**	**Supplier**	**Forwarder/Broker**	**May be faxed, emailed, telephoned, communicated by system, or simply part of a regular pickup schedule**	**Begin export clearance process**

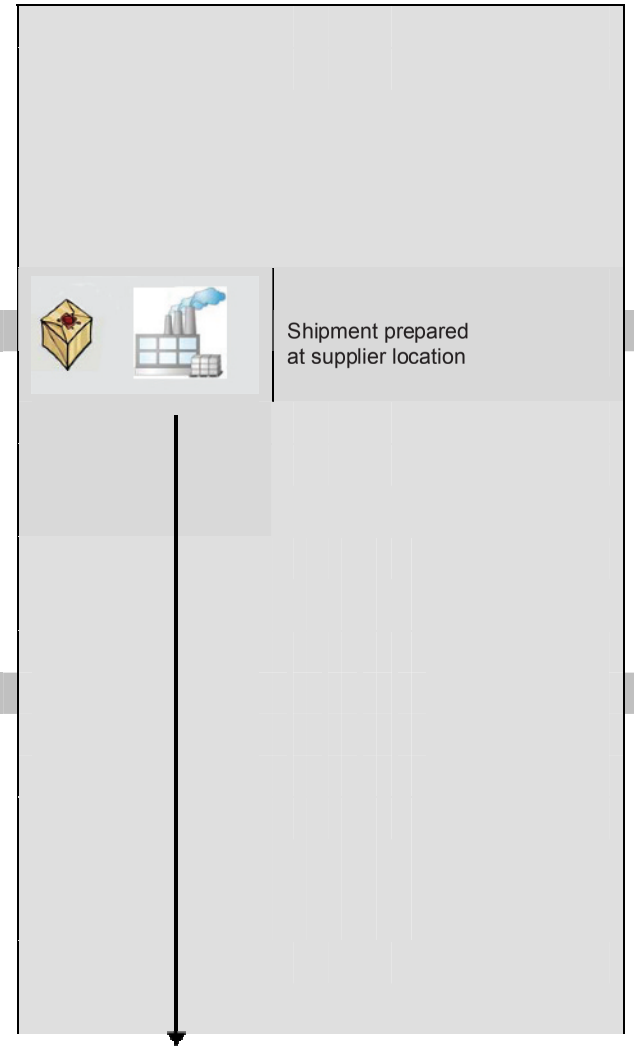
MILESTONE STATUS: Consignment is at, or being assembled at, point of origin (the "supplier")

	Name	Created by	Used by	Notes	Triggers
2	Entry to AES	Forwarder/Broker	Customs authority	In US only, a requirement after March 2004	
3	Export clearance	Customs authority	Forwarder/Broker		Shipment may now be scheduled.

MILESTONE STATUS: Consignment at point of origin, now cleared for entry in the supply chain

	Name	Created by	Used by	Notes	Triggers
4	**Pre-alert**	**Forwarder/Broker**	**Import agent**	**Optional**	**May begin inbound shipment scheduling process**
5	**Assign unique tracking number**	**Import agent**	**Various**	**Referred to as "Customs Entry Number" in US**	

Physical flow



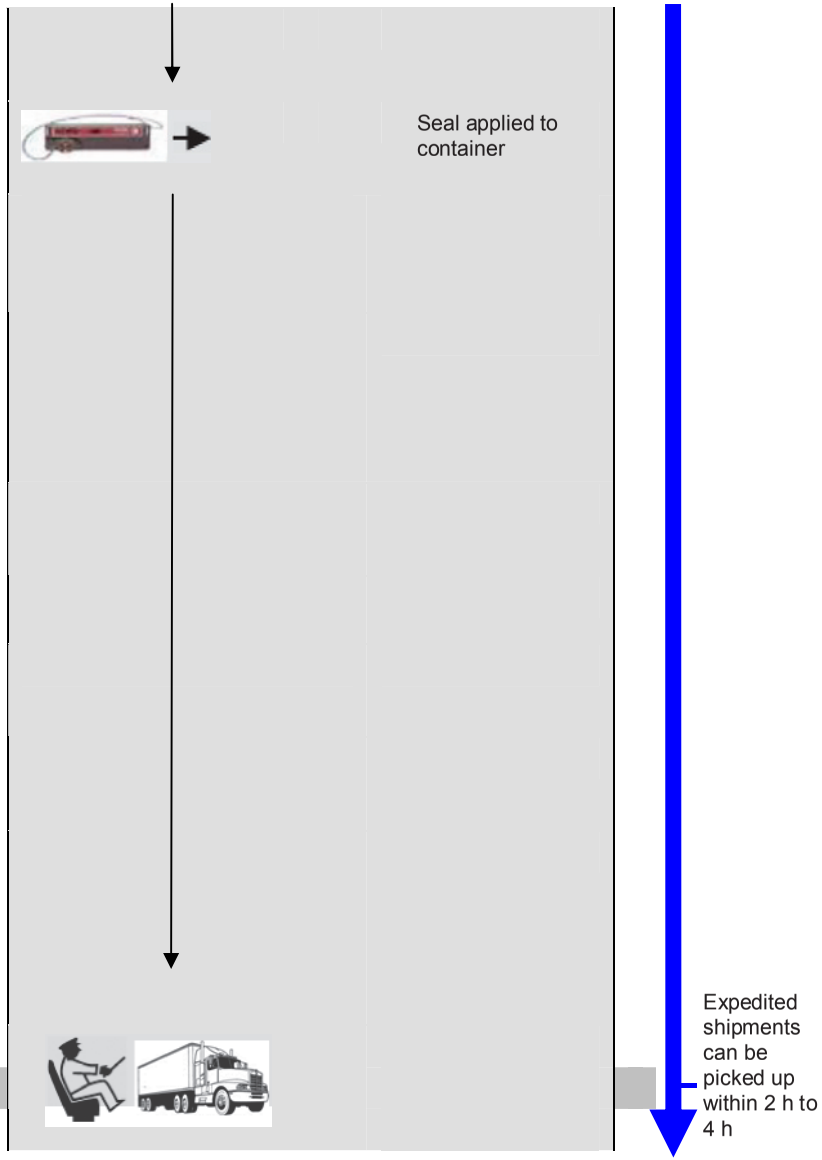
Time flow

Shipment request received at time = 0

Can occur within 4 h, assuming no complications

6	Shipping marks and packing list	Supplier	Various parties throughout the shipment cycle		
7	**Container sealed and locked**	**Supplier**	**Various**		
8	**Book outbound pickup**	**Forwarder/Broker**	**Motor carrier**	**May be delivered to consolidation facility or to air facility**	**Motor carrier schedules outbound pickup**
9	**Book inbound pickup from destination air facility**	**Forwarder/Broker**	**Motor carrier**	**Optional (may be completed after consignment has departed from origin air facility)**	**Motor carrier schedules inbound pickup**
10	**Dispatch advice**	**Supplier**	**Consignor**	**This is typically an unstructured communication**	
11	**Create manifest**	**Supplier**	**Various**		
12	Prepare consignment endorsements	Supplier	Motor carrier	As needed	
13	**Prepare bill of lading for consignment**	**Motor carrier**	**Various**		
14	**Book air carriage**	**Forwarder/Broker**	**Air carrier**	**Only done if forwarder is not using pre-existing capacity already purchased with air carrier**	

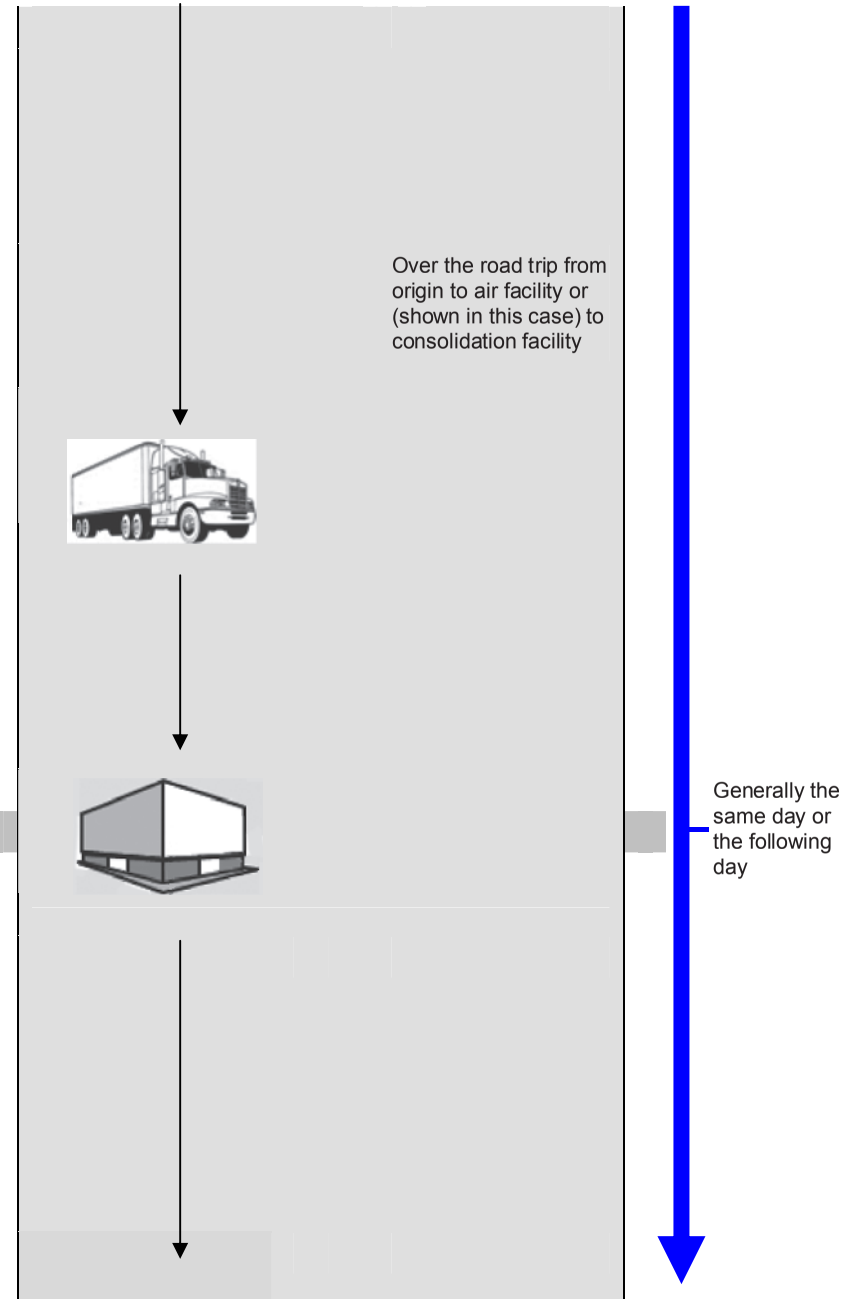
MILESTONE STATUS: Driver arrives at supplier location for pickup



	Name	Created by	Used by	Notes	Triggers
15	Allow gate entry	Supplier	Motor carrier	Optional. Supplier's gate management process may require driver validation (e.g. by CDL)	Permission to enter supplier's property
16	Validate driver's identity	Motor carrier	Supplier	In US, generally involves check of CDL. May include making and filing a copy of it.	
17	**Sign manifest**	**Supplier**	**Motor carrier**	**Driver sig ns manifest**	**Release of goods**
18	**Seal reading application**	**Supplier**	**Various**		
19	**Transfer documents**	**Supplier**	**Motor Carrier**	**Documents may include manifest and applicable endorsements including security documents and Certificate of Origin.**	

MILESTONE STATUS: Consignment arrives at originating consolidation point (optional)

	Name	Created by	Used by	Notes	Triggers
20	Validate driver's identity	Motor carrier	Transport provider	Optional. Depends on organizational relationship between carrier and forwarder/broker, and on operations protocol at consolidation facility	Entry into consolidation facility
21	**Create manifest**	**Transport provider**	**Motor carrier**	**Optional. Will occur if a**	



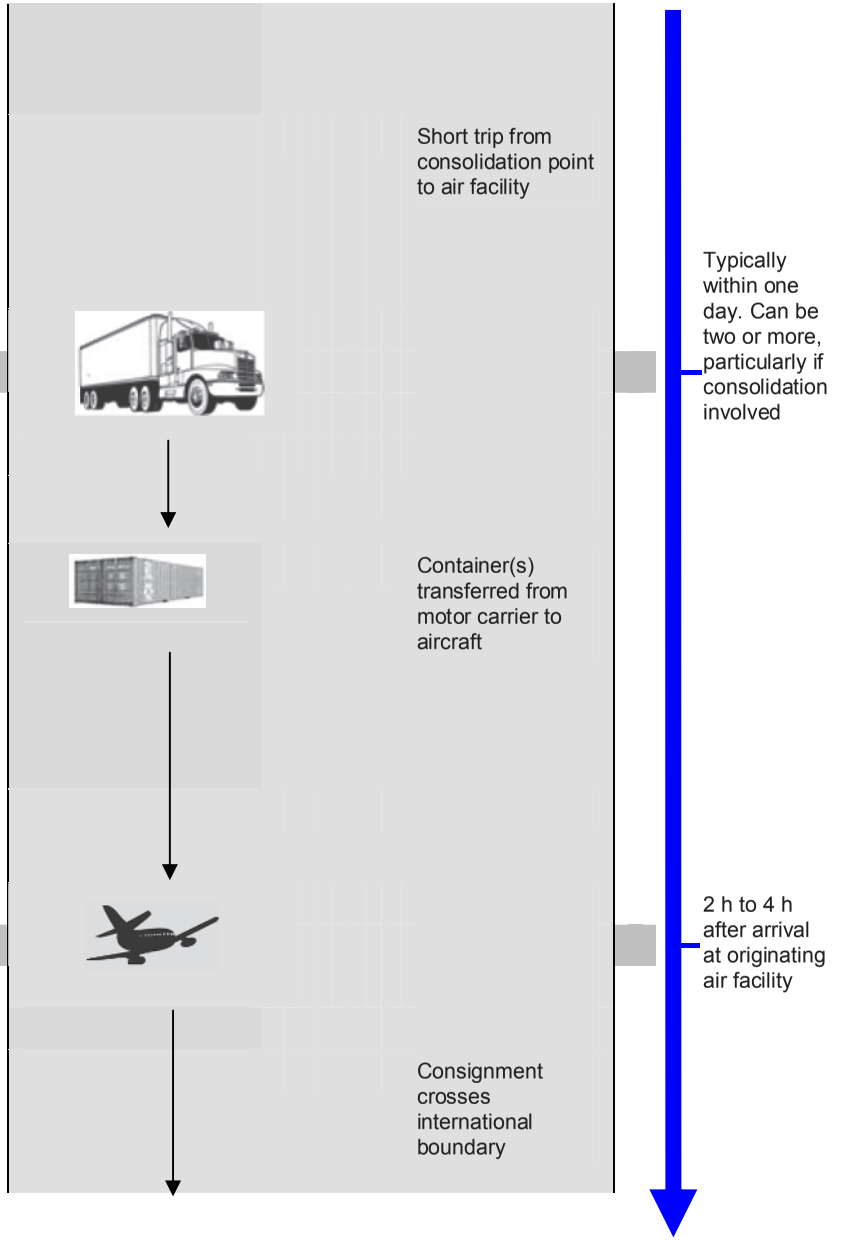
				separate company is hired for cartage to the air facility	
22	**Seal reading application**	**Motor carrier**	**Various**	**Possession transferred to transport provider or air carrier or cartage company**	

MILESTONE STATUS: Consignment arrives at originating air facility

	Name	Created by	Used by	Notes	Triggers
23	**Create waybill**	**Transport provider**	**Air carrier**		
24	**Create master waybill**	**Air carrier**	**Aviation authorities**	**Rides on aircraft with cargo. Available to aviation authorities if requested; only occurs in exceptional instances**	
25	**Seal reading application**	**Motor carrier**	**Various**	**Possession transferred to air carrier**	

MILESTONE STATUS: Aircraft leaves origin air facility

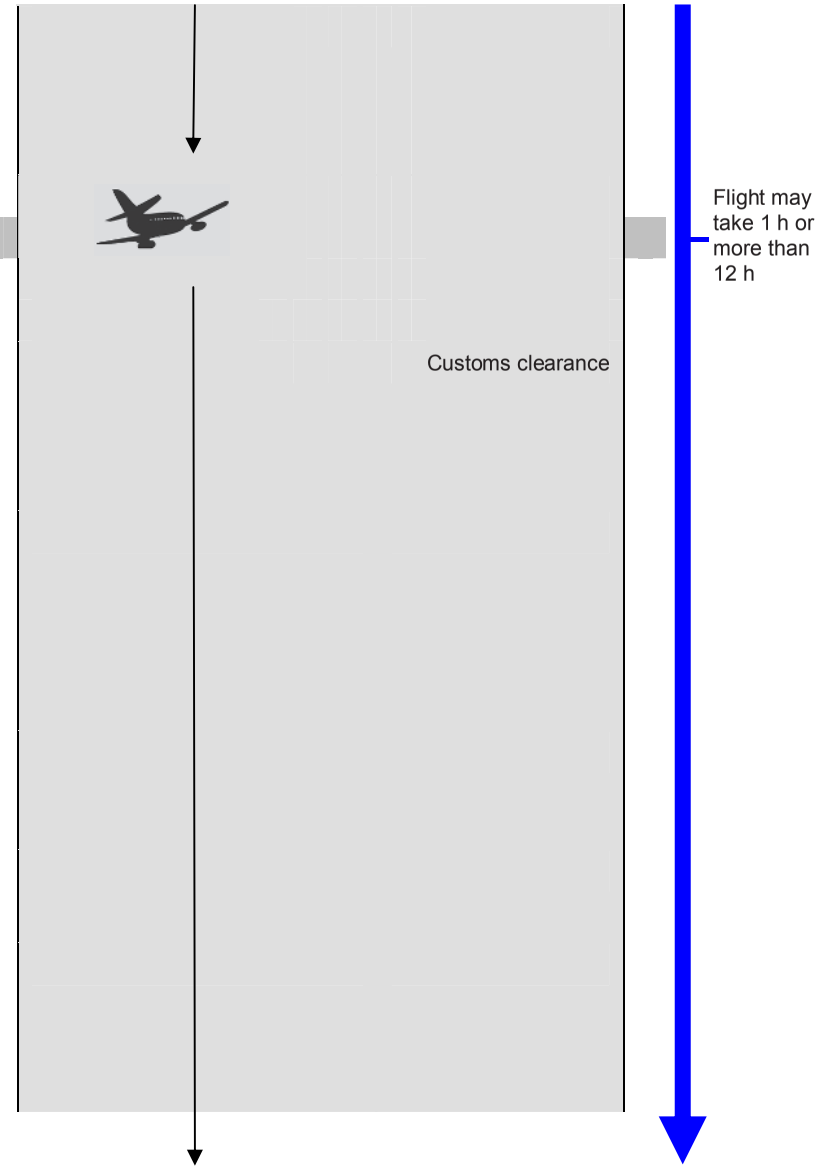
	Name	Created by	Used by	Notes	Triggers
26	Advance notify customs authority	Transport provider	Customs authority	Optional, depending on destination country's customs laws	Customs authority non-physical screening of cargo



27	**Request transport status**	**Various**	**Transport provider**	**This transaction may occur throughout the chain. Its placement here is illustrative**	

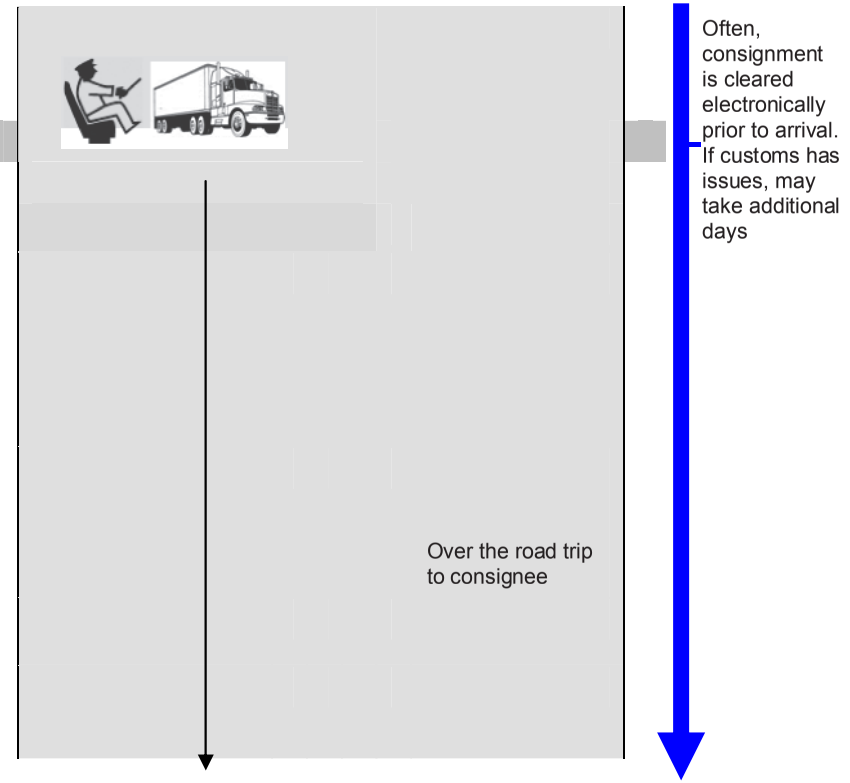
MILESTONE STATUS: Aircraft lands at destination; consignment taken to air carrier facility

	Name	Created by	Used by	Notes	Triggers
28	Provide goods documentation	Import agent	Customs authority	May be electronic and/or in hardcopy. May occur prior to physical arrival of goods	
29	Provide transport documentation	Import agent	Customs authority	Outside courier may be used to physically transfer documents. This step does not occur prior to physical arrival of goods	Customs authority decides whether physical inspection is needed on consignment
30	**Book inbound pickup**	**Forwarder/Broker**	**Motor carrier**	**May be delivered to consolidation facility or to consignee**	**Motor carrier schedules inbound pickup**
31	**Prepare bill of lading for consignment**	**Motor carrier**	**Various**		
32	Release goods	Customs authority	Transport provider	May be based on documentation approval or on a physical inspection of the goods	Permission to transport from entry port (generally air facility) to consignee



MILESTONE STATUS: Consignment cleared for delivery to consignee, and driver arrives for p/u

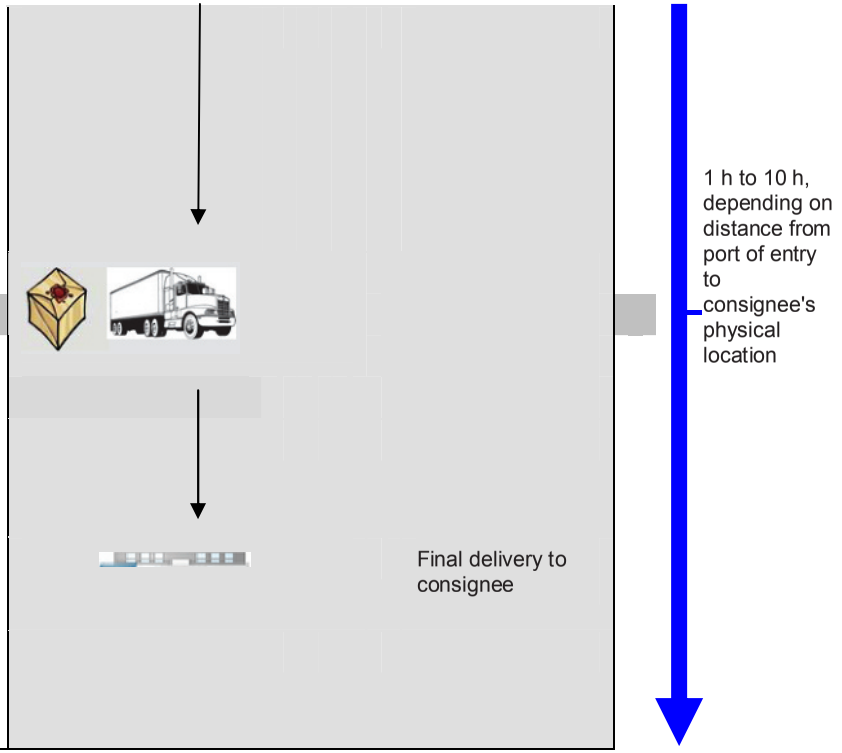
	Name	Created by	Used by	Notes	Triggers
33	Allow gate entry	Air carrier	Motor carrier	Optional. Supplier's gate management process may require driver validation, e.g. by CDL	Permission to enter air carrier's property
34	Validate driver's identity	Motor carrier	Air carrier	In US, generally involves check of CDL. May include making and filing copy of it	
35	**Sign manifest**	**Air carrier**	**Motor carrier**	**Driver signs manifest**	**Release of goods**
36	**Seal reading application**	**Air carrier**	**Various**	**Possession transferred to motor carrier**	



37	**Transfer documents**	**Air carrier**	**Motor carrier**	**Documents may include manifest and applicable endorsements including security documents and certificate of origin**	

MILESTONE STATUS: Consignment arrives at consignee

	Name	Created by	Used by	Notes	Triggers
38	**Sign bill of lading**	**Consignee**	**Motor carrier**	**Consignee signs, acknowledging receipt of goods**	**Payment process**
39	**Seal reading application**	**Motor carrier**	**Various**	**Possession concludes at consignee**	
40	**Proof of delivery**	**Motor carrier**	**Various**	**May be transmitted wirelessly by driver**	



Note: Each row corresponds to a document, message or communication between two or more actors. Rows in BLACK refer to information needed for transportation and distribution functions. **Rows in BLACK BOLD refer to transport/distribution functions within the scope of ISO/TS 24533 data message specification.** Rows in LIGHT-SHADE refer to information needed for security functions in a container seal deployment scenario. Information for other functions in the supply chain such as insurance and accounting are not depicted.

Figure 3 — Information exchanges in a generalized "Truck-Air-Truck" supply chain

4.2.4.3 Motor carrier transport provider actions

Authorized and authenticated users will have access to the consignment request. In many situations where this motor carrier does not have regularly scheduled pickups with the supplier, this request will trigger a pickup request. The user will be directed to the consignment perhaps by an email. The user may review the manifest generated by the supplier, but may not alter it.

The carrier's system for scheduling a pickup will be invoked. Depending on the process used for this, use of this Technical Specification may or may not provide an opportunity to automate a previously non-automated portion of the process. This process step triggers notification to a driver to make the pickup. If the supplier's action did not trigger a notification to the air carrier, then the motor carrier may do it.

When the motor carrier's driver arrives at the supplier's facility to make the pickup, the driver will complete a transaction that can verify his or her identity. This might involve the use of a smart card and/or a biometric technology solution. This Technical Specification does not dictate the implementation (which should be governed by other applicable standards as well as common business practices in each country for driver license recognition), but will verify that there is legitimate identification for the individual and by whom (the organization, such as the accredited agent for the transport company). This transaction will be sufficiently robust to effect a possession handoff from the supplier to the transportation provider and trigger a status notification to the air carrier.

Upon verification, the supplier then allows the freight to be loaded onto the vehicle or trailer and the consignment is released to the driver.

After leaving the supplier, the driver may deliver the freight to a facility for consolidation, or directly to an air cargo facility. This concept does not influence that decision, and will support either case. In the case where the consignment is brought into a facility for consolidation, the attendant there will follow a similar procedure as a supplier, i.e. logging in to the system, filling out a master manifest, and assigning it to a certain air carrier.

Upon arrival at the air cargo or other intermodal facility, the server, using the biometric/smart card or other security process, will verify the driver's identity. Upon verification, the consignment can be transferred to the air cargo attendant. At this point, an e-mail might be generated letting all the original participants in the distribution chain know that the consignment has reached its air cargo terminal.

4.2.4.4 Air carrier actions

Authorized and authenticated users will have access to the consignment request, perhaps by an email. The user may review the manifest but may not alter it.

When the truck driver arrives at the cargo facility, the attendant may log in to the system again and open the corresponding manifest. The driver's identity may be verified using a smart card and/or biometric or other technology solution. Upon verification, the consignment can be transferred over to the cargo facility. If the driver is not an authorized user of the system, an alert can be generated and the driver and cargo would be subject to additional screening procedures. Once the driver is verified and the cargo accepted by the cargo facility, an electronic notification (e.g. email) can be generated to notify the rest of the supply chain of the transfer.

Many air freight forwarders and airlines already communicate transactions using various message sets defined within the Cargo Interchange Message Procedures (IMP). It is expected that Cargo IMP users would, at their discretion, be able to enhance their current system to use both this Technical Specification and Cargo IMP, as this Technical Specification is intended to be consistent with Cargo IMP.

If the freight's destination requires it to pass through customs, the air transport provider will be able to provide a unique identifier such as a Unique Consignment Reference (UCR), and the system will be populated with this identification number.

Electronic notifications will also be generated as the cargo is transferred to downstream facilities and transporters. The transfer of freight from final air cargo facilities to final (truck-based) destinations will use the same procedures of verification and notification as originating shippers to originating air cargo facilities to destination air cargo facilities.

4.2.4.5 Customs authorities actions

The administrative representative or account manager of the relevant consignment account will interface with the customs authority's system for updating the account data, and may also access information about the consignment.

Upon arrival at a customs port of departure or entry (in this case, at the airport intermodal facility) the customs inspector accesses the system and opens the corresponding manifest from the air cargo e-seal and bin numbers. The inspector may verify the identity of the truck or air cargo carrier's representative using a technology solution that may include smart cards and/or biometrics. A description of the consignment may then be developed using electronic tags and scanners, and by visual methods. The truck or air cargo carrier representative and the customs inspector may then compare the description to the manifest, and make changes where the manifest was inaccurate. After all items are matched between the description and the manifest, and all necessary items are examined, the customs inspector and truck or air cargo representative can sign an electronic document.

At point of origin, advance notification data elements, especially for time-sensitive parcels in the consignment, can be verified and confirmed. The system is then updated and an electronic notification, e.g. e-mail, is generated alerting all participants in the distribution chain that the consignment has reached its customs point of departure or entry, and that it is cleared for international or domestic movement. The system automatically notifies the designated freight forwarder, truck carrier or air carrier at the facility, via the conforming message format/interface, that consignment has been cleared and is ready to be loaded. The transportation provider's representative may then load the consignment. This representative and the customs inspector may then sign an electronic document before the consignment leaves custom's control.

4.2.4.6 Consignee actions

The consignee, defined to be the final recipient of the freight, not an intermediate transportation service provider, has the opportunity to have added visibility into the integrated supply chain, which could serve such purposes as tracking, inventory management, and security incident management.

4.2.5 Maintaining the operational scenario

When considering the underpinning structures of this Technical Specification there needs to be a governance process to tie the loose ends together and allow the supply chain partners to keep their data exchange standards viable and effective. Governance is key to this process of maintaining the structures that allow for a high degree of supply chain productivity and for holding together the community partnerships that make such an arrangement economically advantageous. A governance specification is critical to making the process described in this Technical Specification effective. Annex A details this subject further and there is an expectation to develop a technical specification on governance that will keep the supply chain standards viable and useful for the community of users wishing to maximize their returns on investment.

4.3 Intermodal freight — Road transport component use cases

The use case descriptions and diagrams that follow examine one representative thread, consignment of goods between supplier and customer, within the global context of the international movement of freight. Furthermore, the information presented here is intended to identify the actors involved in arranging for and completing the transport of goods across multiple modes.

4.3.1 Business domain

This subclause defines the overall frame of reference for the business processes that are subsequently defined in the use case descriptions. This Technical Specification adopts the domain defined by the "BPAWG Reference Model of the International Supply Chain". It adopts the model's Level 2 Ship Case (Index: D-P&SI-1.U-Ship-2-4), but interprets it to allow definitions that are more robust in the context of this Technical Specification, specifically the transport function.

Description of business domain model	
Business domain model name	BPAWG Reference Model of the International Supply Chain — Ship Use Case
Description	Provide transportation services end-to-end along the supply chain, from physical origin (“Despatch Party”) to physical destination (“Delivery Party”), in an intermodal and international context.
Industry	Intended to apply to the broadest array of process and product industries that have the capability of practicing electronic business transactions with trading partners.
Business area	The enterprise business area represented by the portion of this model used in this Technical Specification is the normative category “Logistics”.
Business justification	Products are physically moved in business transactions that support international trade.
Category schema	Various schemas are available to describe the international supply chain, such as the Supply-Chain Council’s “Supply-Chain Operations Reference”.
Stakeholders	Consignor, despatch party, consignee, delivery party, transport services providers and intermediaries, government agencies such as customs authorities and port authorities.
References	BPAWG Reference Model of the International Supply Chain, Working Draft, March 2003.

Description of business area	
Business area name	Logistics
Description	Booking transport, then physically moving a consignment through a supply chain to its ultimate destination, providing status reports as needed en route.
Scope	Seller fulfils its commitment to a consignee to have goods delivered to consignee’s designated location. Various transport intermediaries fulfil their commitments to seller to provide physical carriage or related services aimed at goods delivery.
Process areas	Planning, distribution.
Objective	The objective of this business area is to provide the physical and information assets needed, when they are needed, to successfully transport a consignment of goods from consignor to ultimate consignee.
Business opportunity	Goods may be transported from supplier to consignee as part of a profitable business product sales transaction.
Category	Logistics
Business areas	The ordering and payment business areas may be within the scope of the logistics business area.

4.3.2 Business requirements

The following several subclauses of this Technical Specification define the business collaborations that take place within the above-documented domain. The use case descriptions provide a frame of reference for the data definitions that appear in this Technical Specification, and for subsequent information sets that will directly support specific steps in the process.

In the context of ISO/IEC 14662, this Technical Specification primarily addresses the "actualization phase" of the logistics business area. It secondarily addresses the "negotiation phase" (through negotiating and booking transport with transportation providers) and the "post-actualization phase" (through delivery verification services).

4.3.3 Global context use case — Ship (Transport interpretation) — Level 1

Figure 4 provides a global overview of the general activities associated with the exchange of physical possession of a consignment, and the information transactions required for transferring possession and monitoring the status of the consignment. It is adapted from the BPAWG Reference Model of the International Supply Chain; however, it is interpreted to focus on the transport perspective. The use case description for the Ship (Transport interpretation) adds more details to the overview.

Name of use case: Ship (Transport interpretation)

Actor classes: Customer, supplier, authority, and intermediary

The use case for Ship (Transport interpretation) can be expressed in five Level 2 use cases reflecting the major stages in the process. These use cases are in turn dissected to reveal more detailed use case descriptions and the activities they represent.

The main use cases are:

1) Initiate consignment transport;

2) Export;

3) Import;

4) Transport consignment: Inbound;

5) Conclude consignment transaction.

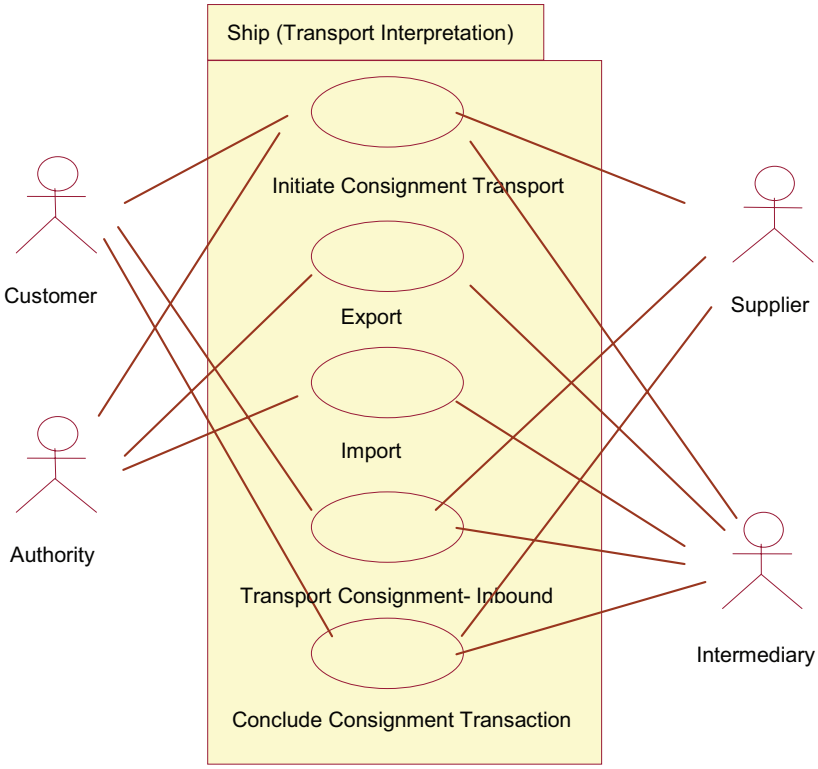


Figure 4 — Use Case Diagram – Ship (Transport Interpretation)

Use case description	
Name	Ship (Transport interpretation)
Traceability index	1) Ship (an interpretation of BPAWG Reference Model of the International Supply Chain, Working Draft, March 2003), D-P&SI-1.U-Ship-2-4)
Actors	Customer, supplier, intermediary, authority
Description	A supplier, in receipt of an order for goods consignment, contacts transport services provider, which arranges for transport to consignee using one or more carriers.
Pre-condition(s)	- Order has been received by the supplier. - Goods are available and ready for consignment. - Insurance and customs requirements for shipping have been met (supplier possesses required insurance certificates and, if consignment is international, export/import licenses).
Post-condition(s)	- Consignment is physically delivered to end-customer and is ready for payment or, if rejected, returned. - Transaction payment process may be initiated.

Main scenario	Starts when ordered goods are ready to be collected into a consignment and transported to consignee. - Supplier makes consignment request. - Address export regulations and requirements (if an international consignment). - Execute outbound movement, including pickup, any transhipping or consolidation activities, export clearances as needed, tendering to air carrier, and air carriage from origin to destination. - Address import regulations and requirements, and clear customs (if international consignment). - Execute inbound transportation, including pickup, any transhipping or consolidation activities, and delivery to ultimate consignee. - Carrier acquires proof-of-delivery from ultimate consignee.

4.3.4 Use case elaboration — Initiate consignment transport — Level 2

Use case description	
Name	Initiate consignment transport
Traceability index	1) Ship (Transport interpretation), 2) Initiate consignment transport
Actors	Customer, supplier, intermediary, authority
Description	With receipt of an order and acknowledgement by the supplier (seller) that the goods are available and ready to be shipped, the supplier (seller) initiates transportation arrangements. This includes booking the consignment with a transportation provider (through to the ultimate destination) and advising the consignee of the arrangements as needed.
Pre-condition(s)	- Order for goods has been received by the supplier (seller). - Goods are available and ready for consignment. - Relevant import and export requirements have been met (if consignment in international).
Post-condition(s)	- Consignment is physically at the air carrier's facility at the destination airport - (If international) consignment is ready to be transported to in-bond warehouse. - (If domestic) consignment is ready for cartage to destination.

Main scenario	Starts when ordered goods are ready to be collected into a consignment and transported to consignee. - Supplier (seller) books transport with a transport services provider (see 5.3.4.1). - Arrange carriage for both the outbound and inbound transportation segments (see 5.3.4.2). - Physically transport consignment along the “Road-Air” portion of the “Road-Air-Road” chain (see 5.3.4.3).

4.3.4.1 Use case elaboration — Book transport — Level 3

Use case description	
Name	Book transport
Traceability Index	1) Ship (Transport interpretation), 2) Initiate consignment transport, 3) Book transport
Actors	Customer, supplier, intermediary
Description	The transportation provider and the supplier (seller) negotiate and agree to an arrangement for the consignment’s transport. Generally a single transport services provider will be engaged. At times the supplier (seller) may have to repeat this process to get the consignment to its ultimate destination. “Booking” in this context refers to booking with the transport services provider, such as a freight forwarder. See “Arrange carriage” use case for booking with the actual carriers.
Pre-condition(s)	- Order has been received by the supplier (seller). - Goods are available and ready for consignment. - Relevant import and export requirements have been met (*if consignment in international*).
Post-condition(s)	- Transport services provider can book consignment with carriers. - Supplier (seller) prepares goods for consignment. - Consignee makes arrangements, as needed, to accept delivery of consignment.
Main scenario	Starts when ordered goods are ready to be collected into a consignment and transported to consignee. - Supplier (seller) registers consignment within a system implementation of the electronic freight manifest. - Supplier (seller) contacts transport services provider and provides shipping information: origin, destination, weight, number of pieces, special characteristics (e.g., dangerous goods classification). - Transport services provider takes information, then offers seller transport options.

	- Seller negotiates terms of pickup and/or delivery. - Transport services provider concludes transport booking. - Supplier (seller) produces packing list and other documentation as required. - Supplier (seller) affixes packing list to consignment, as well as other shipping marks as necessary. - Supplier (seller) communicates dispatch advice to consignee.
Alternate scenario	If this is the first time that the transport services provider and supplier (seller) are doing business, then known shipper documentation should be prepared by the supplier (seller) and submitted to the transport services provider as part of this booking process.

4.3.4.2 Use case elaboration — Arrange carriage — Level 3

Use case description	
Name	Arrange carriage
Traceability Index	1) Ship (Transport interpretation), 2) Initiate consignment transport, 3) Arrange carriage
Actors	Customer, supplier, intermediary
Description	The transport services provider (which can be the carrier) contacts the asset organizations who will actually transport the consignments. This can include outbound motor carriage, air carriage and inbound motor carriage. Arrangements are made with each confirming carriage and detailing schedule and special considerations (if any).
Pre-condition(s)	The transport services provider has agreed with a supplier (seller) to transport a consignment.
Post-condition(s)	With arrangements in place, the consignment is ready to move and to go through export/import procedures, if international.
Main scenario	Starts when the transport services provider has a consignment to transport. - Transport services provider contacts motor carrier and provides shipping requirements. - Motor carrier takes information describing destination, weight, number of pieces, special characteristics (e.g. dangerous goods classification), then offers transport services provider options. - Transport services provider negotiates with motor carrier for terms of pickup and/or delivery. - Carrier books transport (i.e. schedules its pickup and delivery with motor carriers). - Transport services provider contacts one or more air carriers, defining the destination, weight, dimensions and any special characteristics of the

	consignment, and receiving schedules, available capacity information and rate quotes. - (Optional: if transport services provider does not have an office in the destination location) transport services provider hires motor carrier for inbound transportation from air carrier to consignee.
Alternate scenario 1	In some instances, the supplier (seller) may actually contact the motor carrier and/or the air carrier, instead of the transport services provider. This would occur if and only if the supplier (seller) knows who the carrier is (doesn't need inputs from the transport services provider).
Alternate scenario 2	Transport services providers often have pre-arranged pickups with particular carriers, or may handle the motor carriage themselves. In this case, the contacting and negotiating between transport services provider and motor carrier is eliminated.
Alternate scenario 3	In some cases, transportation providers may have guaranteed 'positions' with certain air carriers, and therefore they can unilaterally decide to tender to a particular air carrier without entering into a discussion and negotiation with them.

4.3.4.3 Use case elaboration — Move consignment from supplier to destination air facility — Level 3

Use case description	
Name	Move consignment from supplier to destination air facility
Traceability Index	1) Ship (Transport interpretation), 2) Initiate consignment transport, 3) Move consignment from supplier to destination air facility
Actors	Customer, supplier, intermediary, authority
Description	The consignment is physically moved from its point of origin to the air facility of destination. It will visit the air carrier's origin facility, and may visit a consolidation point (e.g. trans consignment facility) prior to arrival at that air carrier's facility.
Pre-condition(s)	- (If international) customs authority has cleared consignment. - Consignment has been booked with transport services provider, motor carrier(s), and air carrier.
Post-condition(s)	- Consignment is ready for initial movement at destination facility for transfer to the air carrier's facility. - (If international) consignment ready for customs clearance.
Main scenario	Starts when transport services provider and motor carrier have committed to execute the consignment. - Motor carrier schedules assets (equipment and driver). - Motor carrier assembles bill of lading and standard shipping note (as required).

	- (If international) transport services provider files relevant documentation (shipping manifest) with customs authority. - Motor carrier dispatches driver. - Driver retrieves equipment and drives to source of consignment. - Driver is given any required gate clearance to enter yard. - Supplier (seller) validates driver's identity. - (Optional) supplier (seller) may scan driver's identity documents to retain for its records. - Driver records biometric identity within a system implementation of the electronic freight manifest. - Driver visually reviews consignment and signs supplier's manifest. - Supplier (seller) hands to driver manifest and applicable endorsements. Endorsements may include security documents and certificate of origin. - Supplier (seller) transfers possession of consignment to motor carrier. - Transport services provider prepares master air waybill for air carrier (might be omitted in cases where there is no consolidation). - (Optional) driver arrives at a consolidation facility, where freight is consolidated onto other equipment. - (Optional) consolidator records biometric identity within a system implementation of the electronic freight manifest. - Driver takes consignment to air carrier's facility. If this is a separate cartage company, then the transport services provider creates a manifest for this motor carrier, containing the origin city, airport of origin, air carrier identification, and a master air waybill number. - Air carrier records biometric identity within a system implementation of the electronic freight manifest. - Air carrier stages consignment for the intended flight. - (Optional) customs authority scans consignment (for example, with x-ray scanner). - Air carrier loads consignment into equipment. - Equipment and crew flies from origin to chosen destination air facility. NOTE: The international boundary crossing takes place with this process step. - Transport services provider may be asked at any point in this process by the consignee or supplier (seller) for transport status. If so, the transport services provider works with the motor carrier to generate an accurate communication about the consignment's location.

4.3.5 Use case elaboration — Export — Level 2

Use case description	
Name	Export
Traceability index	1) Ship (Transport interpretation), 2) Export
Actors	Intermediary, authority
Description	This use case is applicable only if there is an international movement. In this case, a transport services provider actor (broker, freight forwarder) must file information with required governmental organizations that have authority over exports, and the consignment must be cleared.
Pre-condition(s)	- Consignment has been booked with transport services provider and air carrier.
Post-condition(s)	- Consignment is available for transport by the air carrier.
Main scenario	Starts when a consignment has been booked. - Export agent files required export documentation with originating country's customs authority (optionally, depending on the country, separate documentation is filed with other regulatory agencies), possibly including: - Hazardous materials status; - In-bond status; - Type of export; - Control and reference numbers; - Notification of parties (unless designated as the supplier or consignee)*;* - Party types; - Export license numbers; - DUNS, SSN, EIN for shipper, consignee, or exporter; - Information concerning routed export transactions; - Equipment and seal numbers; - Country-specific license information. - Authorities with release responsibility "clear" the consignment for transportation and notify the export agent. The export agent has a unique identifier for the transaction (e.g. US exporters will have a system-generated AES number).

4.3.6 Use case elaboration — Import — Level 2

Use case description	
Name	Import
Traceability index	1) Ship (Transport interpretation), 2) Import
Actors	Intermediary, authority
Description	This use case is applicable if and only if there is an international movement. In this case, the destination country's customs authority (and other regulatory government agencies, depending on the country) must clear the consignment.
Pre-condition(s)	- Consignment has been cleared by exporting country. - Export agent has notified import agent of the consignment.
Post-condition(s)	- Consignment is ready for inbound transportation to consignee.
Main scenario	Starts when import agent is notified of a pending consignment, for example, via a faxed invoice from export agent. - (Optional) import agent receives pre-alert of a consignment from export agent usually by email or fax, and includes no more data items than what will travel physically with the consignment itself. - Import agent receives consignment invoice, often via fax. - Import agent assigns unique tracking number ("Customs Entry Number") to invoice. - Import agent decides where to process and clear consignment (for example, it may be at airport of entry or it may be trucked in-bond from airport of entry to location closer to ultimate physical destination). - Import agent provides customs authority with goods documentation, either electronically or in hard copy, possibly including: - Consignment description, including number of units, weights and values; - Entry type; - Bond number; - Broker, importer, manufacturer or consignee numbers; - Location of goods; - Tariffs and quotas; - Exchange rates. - Once the consignment has physically arrived at the destination point of clearance, the import agent provides customs authority with transport documentation, either electronically or in hard copy. If in hardcopy, there may

	be a courier from the destination in-bond warehouse to the customs authority facility. Documentation may include: - Air waybill numbers; - Consignment and entry dates; - Carrier and flight information; - Entry, arrival and destination airports; - Ultimate consignee (consignee) and address. - (Optional) customs authority scans consignment, e.g. with x-ray scanner. - (Optional) customs authority inspects consignment at in-bound warehouse and records biometric identity within a system implementation of the electronic freight manifest. - Customs authority assesses duties and payments. - Customs authority releases consignment.

4.3.7 Use case elaboration — Transport consignment: Inbound — Level 2

Use case description	
Name	Transport consignment - inbound
Traceability index	1) Ship (Transport interpretation), 2).Transport consignment - inbound
Actors	Customer, consignee, supplier, intermediary, authority
Description	This use case is applicable for both international and domestic movements. The consignment has arrived and been cleared at the destination air cargo facility. It must be transported to the consignee.
Pre-condition(s)	- Consignment has arrived at destination air cargo facility and is staged for pickup and delivery. - All regulatory bodies have cleared consignment for transport to destination. - Inbound transportation has been booked.
Post-condition(s)	- Consignment is physically delivered to ultimate destination, and is ready for post-delivery transactions.
Main scenario	Starts when consignment has been cleared by customs (if international) and is ready to be delivered to consignee. - Transport provider creates a bill of lading for inbound consignment. - Motor carrier schedules assets (equipment and driver). - Motor carrier dispatches driver.

	- Driver retrieves equipment and drives to air cargo facility. - Driver is given any required gate clearance to enter yard at the property where the goods are physically located (may be the air carrier or a freight forwarder – the term “Transport Provider” is used through the rest of this main scenario description). - Transport provider validates driver’s identity. - (Optional) transport provider may scan driver’s identity documents for its records. - (Optional) transport provider clerk may give driver discharge &delivery order document, to be used by transport provider’s dock personnel to release consignment. - Driver visually reviews consignment and signs transport provider’s manifest. - Transport provider hands to driver manifest and applicable endorsements. - Transport provider transfers possession of consignment to motor carrier. - Motor carrier leaves yard with consignment. - (Optional) driver arrives at a consolidation facility, where freight is consolidated onto other equipment. - Driver takes consignment to consignee’s location. - Consignee or supplier (seller) may request transport status from transport provider at any point in this process. If so, the transport provider works with the motor carrier to generate an accurate communication about the consignment’s location.
Alternate scenario #1	Import agent may have decided to have consignment clear customs at a facility other than the entry airport. In this scenario, the pre-condition that regulatory agencies have cleared the goods would be relaxed. There would be an in-bond transport movement to another location, where the consignment would then be cleared by local authorities. In this scenario, a freight forwarder should create an in-bond movement document (for example, form CF7512 in the United States).

4.3.8 Use case elaboration — Conclude consignment transaction — Level 2

Use case description	
Name	Conclude consignment transaction
Traceability index	1) Ship (Transport interpretation), 2) Conclude consignment transaction
Actors	Customer, supplier, intermediary
Description	Once the consignment has been successfully delivered to the ultimate destination, information concerning the transaction is created and made

	available to interested stakeholders.
Pre-condition(s)	- Consignment has been physically delivered to, and received by, the consignee. - Consignee has signed manifest confirming delivery.
Post-condition(s)	- Consignment is physically delivered to end-customer and is ready for payment or, if rejected, a return process. - Transaction payment process may be initiated.
Main scenario	Starts when the consignment is physically delivered with the ultimate consignee and consignee has signed the manifest to acknowledge receipt. - Driver receives delivery confirmation from destination facility (delivery party) staff, perhaps via a signature on the bill of lading. - Delivery party records consignment delivery/termination within a system implementation of the electronic freight manifest. - Driver leaves destination facility, eventually returning to motor carrier facility. - Motor carrier receives delivery confirmation from driver. This includes date and possibly time of delivery, as well as any exceptional circumstances. - Motor carrier provides delivery confirmation to transport services provider. - Transport services provider provides delivery confirmation to seller (supplier). - Consignee records receipt of goods. - (If international) import broker arranges to have shipper pay duty as required (within the number of days agreed to between parties.)

5 Information modelling

5.1 Core components

The United Nations Centre for Trade Facilitation and Electronic Business (UN/CEFACT) supports activities dedicated to improving the ability of business, trade and administrative organizations to exchange products and relevant services effectively. UN/CEFACT's principal focus is on facilitating national and international transactions through the simplification and harmonization of processes, procedures and information flows.

A foundation for the work of UN/CEFACT is the Core Component Technical Specification (CCTS) which is also identified as ISO/TS 15000-5:2005. The CCTS provides a way to identify, capture and optimize the re-use of business information. Core Components (CC) are intended to be the basis for creating interoperable business process models and business documents using a controlled vocabulary. A basic reference for the definition of components is the UN Trade Data Element Directory (UN/TDED).

The central concept of the CCTS is the CC. The CC is a building block for the creation of a semantically correct and meaningful information exchange package. It contains only the information elements necessary to describe a specific concept. There are three different categories of Core Components:

1) Basic Core Component (BCC),

2) Aggregate Core Component (ACC),

3) Association Core Component (ASCC).

The most primitive of these is the BCC which have defined Core Component Types (CCT). Annex B presents the CCT list from ISO/TS 15000-5:2005.

When a CC is used in a real business circumstance it serves as the basis of a Business Information Entity (BIE) The BIE is the result of using a CC within a specific business context, for example within the context of the transportation domain.

A specific relationship exists between CCs and BIEs. All BIEs are based on CCs. So, there are also three different categories of BIEs:

1) Basic Business Information Entity (BBIE),

2) Aggregate Business Information Entity (ABIE),

3) Association Business Information Entity (ASBIE).

Therefore, a BBIE is a BCC used in a specific business context. Figure 5 presents a class diagram in Unified Modeling Language of an example ABIE representing the information entity, or object class, "Transport Event." The "Transport Event" ABIE includes BBIEs for "Completion Indicator", "Description", "Identification ID", "Occurrence Time", "Occurrence Date", and "Transport Event Type Code". Each BBIE is of a particular type. For example, "Description" is of CCT type Text and "Completion Indicator" is of CCT Type Indicator. Each BBIE also has a cardinality, e.g. 0..1, which means there can be zero or only one instance of the BBIE in its instantiation. The "Transport Event" ABIE also contains ASBIEs for "Current Status", "Reported Shipment", and "Contact" which link the "Transport Event" to the ABIEs of "Status", "Shipment", and "Contact".

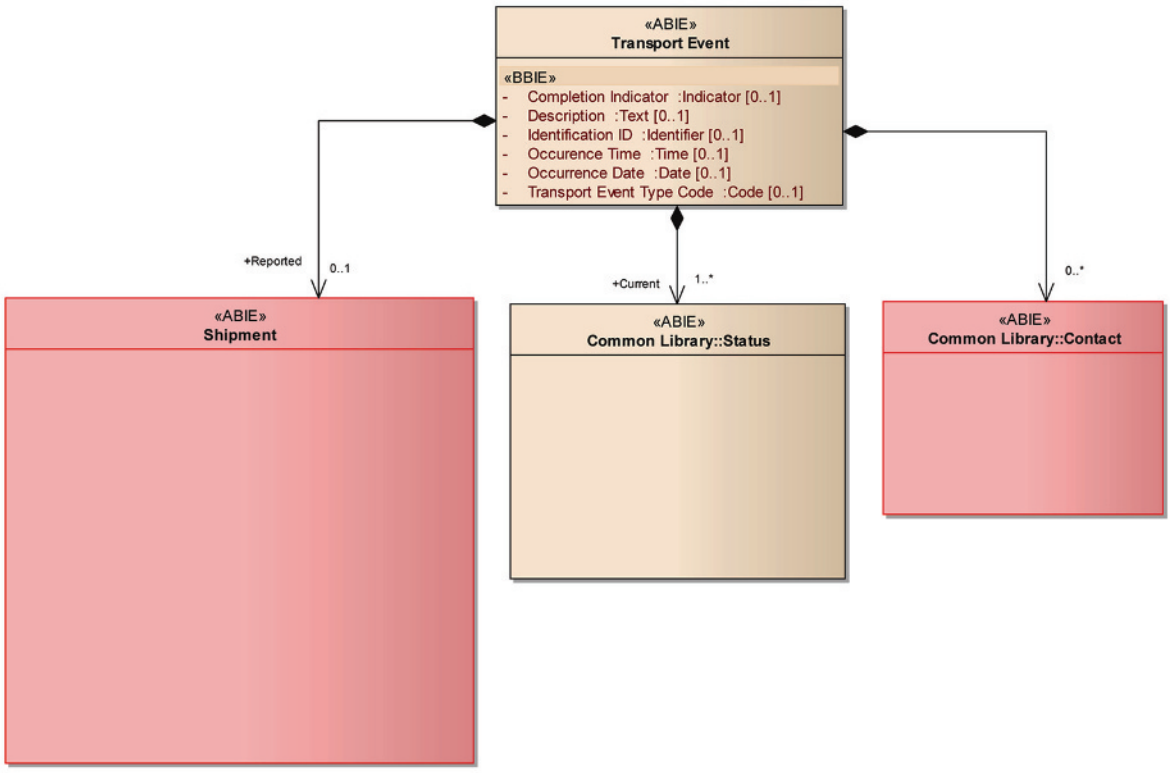


Figure 5 — "Transport Event" ABIE with BBIEs and ASBIEs

5.2 OASIS Universal Business Language

The Organization for the Advancement of Structured Information Standards (OASIS) Universal Business Language (UBL) is the product of an international effort to define a royalty-free library of XML schemas for business documents built upon a set of common components. UBL-formatted electronic messages enable direct connection into existing business, legal, auditing, and records management practices, eliminating the re-keying of data in existing fax- and paper-based supply chains. It aims to provide an entry point into electronic commerce for small and medium sized businesses.

5.2.1 UBL Core Component and document library

UBL Version 2, approved as an OASIS standard in December 2006, defines an XML interchange format for common business documents that can be extended to meet the requirements of particular industries. The complete UBL release package is available at <http://docs.oasis-open.org/ubl/os-UBL-2.0/UBL-2.0.html>[2)] The softcopy package includes an overall specification for UBL 2 along with a collection of subfolders each containing a particular kind of information such as document models, schemas, code lists, and test material.

As the first standard implementation of ebXML Core Components Technical Specification 2.01, the UBL XML schema library is based on BIEs. These BIE components are first collected into specific document assembly models such as for waybill and transportation status. The document assembly models are then processed against a set of naming and design rules to produce a set of UBL 2 XML schemas. The UBL 2 XML schemas are the only normative representations of the UBL 2 document types and library components. All of the UBL 2 XML schemas are contained in the xsd subdirectory of the UBL 2 release package. The xsd directory is further subdivided into xsd/maindoc and xsd/common subdirectories. For convenience in implementing the schemas, a parallel (and technically non-normative) “runtime” set of schemas with the annotation elements stripped out is provided in the xsdrt directory.

Specifically, UBL provides the following:

a) An XML schema of reusable BIEs such as “Party,” “Item,” and “Shipment” (these are the common data elements of everyday business documents).

b) A set of XML schemas for common business documents such as “Forwarding Instruction” and “Transportation Status” that are constructed from the UBL library of BIEs and can be used in transportation contexts.

c) A selected set of code list XML schemas and code list values (in XML).

All UBL schemas are modular, reusable, and extensible in XML-aware ways.

5.2.2 Applying UBL to intermodal freight movement

The UBL 2 documents and library are designed to support typical transport business processes, including an “Initiate Transport Services Process” and a “Report Status of Goods Process.” These processes define the ordering of logistical services for international trade. With receipt of an order and acknowledgement by the supplier party that the goods are available and ready to be shipped, the consignor or consignee initiates the transportation arrangements. This may include booking the consignment with a transport services provider such as the freight forwarder or carrier and advising the delivery party of the arrangements as needed. UBL document types in these processes include forwarding instructions, packing list, waybill, bill of lading, and transportation status. Each UBL document type captures all requirements that have been submitted to the UBL technical committee during the formulation process.

2) Update packages and future releases are available at <http://docs.oasis-open.org/ubl/os-UBL-2.0>. At the time of this writing UBL Version 2.1 is undergoing public reviews.

Regarding the transportation component of the UBL library, Figure 6 presents a Unified Modeling Language class diagram of the major information objects related to transportation. Each box in the graphic is an ABIE (object), e.g. "Consignment", containing the BBIEs (data elements) pertinent to that ABIE. Lines interconnecting the ABIEs are the associations or ASBIEs relating the two ABIEs.

5.3 The UBL transportation status document type

The UBL transportation status document type is a means for a freight forwarder (also known as the transport services provider) to communicate to the consignee or consignor (also known as the transport service buyer) or to notify the party of the status of shipments that are currently under the freight forwarder's management. A transportation status document is provided by the freight forwarder, either through an individual specific request or through an agreed status reporting procedure.

Within the UBL environment, requirements for the business information entities to be used in a particular document are delineated in a document assembly model (normally presented in the form of a spreadsheet and/or UML class diagram). The requirements of the UBL 2 transportation status document cover a wide range of business situations. It is not expected that any implementation will require all BIEs in the transportation status document model.

For the document assembly model for the UBL transportation status, see os-UBL-2.0/mod/maindoc of the UBL 2 release package.

Within the UBL environment, document assembly models are transformed into W3C XSD schema syntax in accordance with UBL Naming and Design Rules (NDR) available at <http://docs.oasis-open.org/ubl/prd-UBL-NDR-2.0.pdf>

For the XML schema for the UBL transportation status based on this document assembly model, see os-UBL-2.0/xsd/maindoc of the UBL 2 release package.

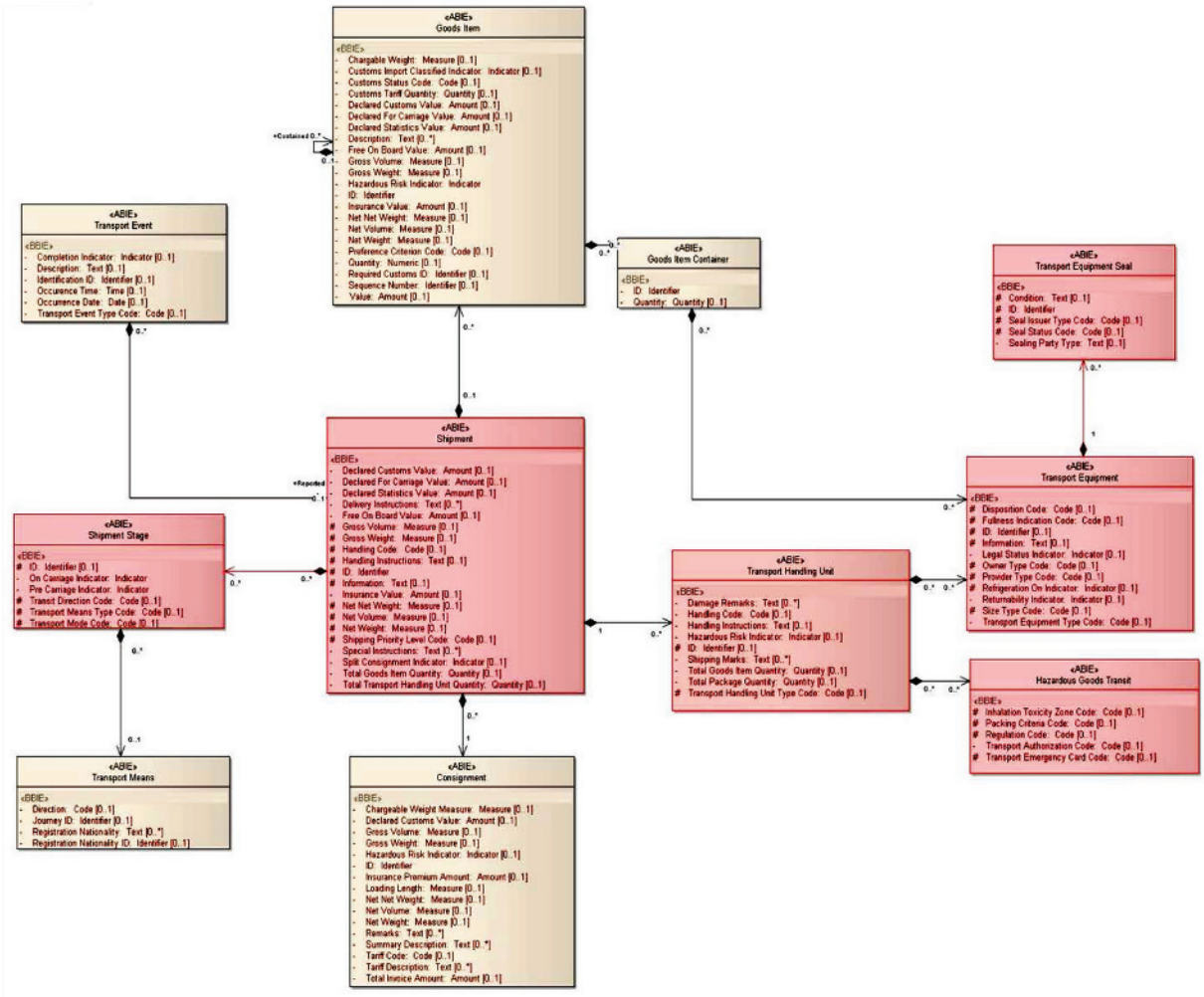


Figure 6 — Primary transport ABIEs and their associations

5.4 Customizing UBL document types

The overall collection of UBL material (including documents, information entities, schemas and codelists) may be viewed as a collection of "building blocks" that can be customized to match compatible solutions to particular project requirements.

The UBL approach of identifying requirements in the form of BIEs in document assembly models and then translating them into XML schemas, facilitates the creation of other UBL-based document types beyond those specified in UBL 2.0. The UBL TC has provided a document entitled, UBL Guidelines for Customization Version 1.0, available at <http://docs.oasis-open.org/ubl/guidelines/UBL2-Customization1.0cs01.pdf>. Those guidelines are intended to aid users in developing custom solutions based on UBL. The goal of these UBL customization guidelines is to maintain a common understanding of the meaning of information being exchanged between specific implementations where the implementations use the same schema as a starting point.

5.4.1 Creating ITS transportation document assembly models

As an example, using the UBL transportation status document assembly model as a starting point, one could tailor the BBIEs and their attributes contained therein to produce an ITS transportation status document assembly model. A representative ITS transportation status document assembly model is presented in Annex C.

5.4.2 Creating ITS transportation XML schemas

As an example, transforming the ITS transportation status document assembly model in accordance with the UBL Naming and Design Rules would produce a conforming ITS transportation status XML schema. A representative ITS transportation status XML schema is presented in Annex D.

6 Code lists

6.1 UBL code list values and code list schemas

Code lists, the sets of codes such as "FR" and "USD" that are used to specify countries, currencies, and so on, play an important role in UBL just as they do in all electronic business messaging. A significant feature of the UBL approach to code lists is their separation from the XML schemas within which the coded information element is employed. With this arrangement, code lists can be managed independently from the XML schemas and can be maintained, updated and documented on their own schedule.

By default, UBL uses several lists of standard codes published by agencies such as ISO and UN/ECE, as well as some codes that are specific to UBL. Besides direct use of code list values, some CCTs also apply code lists. Four code list schemas defined by UN/CEFACT for use with their Unqualified Data Type schema are imported for use in UBL 2. These four code lists are:

a) CodeList_CurrencyCode**:** This is a list of global currencies and the three-character currency codes that are generally used to represent them. See xsd/common/CodeList_CurrencyCode_ISO_7_04.xsd of the UBL 2 release package;

b) CodeList_MIMEMediaTypeCode**:** This is a list of codes to designate Multipurpose Internet Mail Extensions (MIME) to the format of e-mail to support:

   1) text in character sets other than US-ASCII;

   2) non-text attachments;

   3) multi-part message bodies; and

   4) header information in non-ASCII character sets.

See xsd/common/CodeList_MIMEMediaTypeCode_IANA_7_04.xsd of the UBL 2 release package

c) CodeList_UnitCode**:** See xsd/common/CodeList_UnitCode_UNECE_7_04.xsd of the UBL 2 release package

d) CodeList_LanguageCode**:** This is a list of global languages and the two-character codes that are generally used to represent them. See xsd/common/CodeList_LanguageCode_ISO_7_04.xsd of the UBL 2.0 release package**.**

Additionally, the UBL 2 distribution package includes a template for each and every code list available for individual construction.

Implementers can apply their own code lists to supplement those of the UBL 2 package. Two options are available:

a) Adopting a standard code list published by international standards organizations such as ISO or UN/ECE. Examples of such code lists that would be appropriate include, but are not limited to:

   1) ISO 3166-1:2006

   2) UN Recommendation No. 3 — Code for the Representation of Names of Countries

3) UN Recommendation No. 5 — Abbreviations of Incoterms

4) UN Recommendation No. 16 — Code for trade and transport locations

5) UN Recommendation No. 17 — Payterms: Abbreviations for terms of payment

6) UN Recommendation No. 19 — Codes for modes of transport

7) UN Recommendation No. 21 — Codes for passengers, types of cargo, packages and packaging materials

8) UN Recommendation No. 23 — Freight cost code

9) UN Recommendation No. 24 — Trade and transport status Code

10) UN Recommendation No. 28 — Codes for types of means of transport

11) UN Trade Data Element Directory (TDED) code lists

b) Using industry- or company-specific code lists, as needed. Although the use of international standards, including standard code lists, is encouraged, there may be situations where it is more appropriate to use a customized code list to meet specific business partner requirements.

6.2 ITS transportation status code lists and code list schemas

The code lists, and their code list schemas, used by the ITS Transportation Status Message include the following:

— Transportation status code;

— TransportEventType code;

— SizeType code;

— Tariff code.

Annex A
(informative)

Governance in the context of intermodal electronic information exchange using UBL/XML

Governance has been defined as the system by which organizations are directed and controlled (adapted from Cadbury 1992 [13] and OECD 1999 [19]). As discussed in 4.2.5 there is a need for a governance process to tie the loose ends together and allow the supply chain partners to keep their data exchange standards viable and effective. Governance is key to this process of maintaining the structures that allow for a high degree of supply chain productivity and for holding together the community partnerships that make such an arrangement economically advantageous. A governance specification is critical to making the process described in this paper effective. There is an expectation to develop a technical specification on governance that will keep the supply chain standards viable and useful for the community of users wishing to maximize their returns on investment.

The policy for operation of governance rules is that all business entities wishing to engage with other business partners to facilitate certain standards of practice for information interchange will need to abide by certain rules, otherwise the efficiencies sought using the methodologies in this Technical Specification will be diminished. The intention of this Technical Specification is for business entities to adopt a common reference for conducting trade. If they do not totally adopt transport data standards for information exchange based on the OASIS UBL, eventually some manner of translation may need to be incorporated to allow the standards to operate as the common language between business entities. Rules of governance are intended to maintain standards harmony and to be approved through international consensus by the International Organization for Standardization Organization (ISO) and TC 204 as umbrella guidance for the members who will adopt the methodologies of this Technical Specification and keep the necessary standards relevant to their purpose.

A governance model that is elevated to an international technical specification means those investing in the implementation of the methodologies and standards activities that underpin this Technical Specification have some assurance of continuity, thereby promoting greater adoption and further leveraging investments, and use of the standards. There is a similarity between the business practices and methodologies described in this Technical Specification and the business processes and methodologies used in international banking transactions that allow travellers to foreign countries to use those banks as though they were at home. Governance standards allow that to happen in a fairly seamless manner throughout the world. That is the kind of vision expressed by this Technical Specification: to allow trading business partners to operate in as seamless a manner as possible to get goods to the marketplace.

Annex B
(informative)

Core component types

Table B.1 is a reproduction of Table 8.1 in ISO 15000-5:2005.

Table B.1 — Core component types

CCT *Dictionary Entry Name*	Definition	Remarks	*Object Class*	*Property Term*	CCT Components
`Amount. Type`	A number of monetary units specified in a currency where the unit of currency is explicit or implied.		`Amount`	`Type`	• `Amount. Content` • `Amount Currency. Identifier` • `Amount Currency. Code List Version. Identifier`
`Binary Object. Type`	A set of finite-length sequences of binary octets.	Shall also be used for *Data Types* representing graphics (i.e., diagram, graph, mathematical curves or similar representations), pictures (i.e. visual representation of a person, object, or scene), sound, video, etc.	`Binary Object`	`Type`	• `Binary Object. Content` • `Binary Object. Format. Text` • `Binary Object. Mime. Code` • `Binary Object. Encoding. Code` • `Binary Object. Character Set. Code` • `Binary Object. Uniform Resource. Identifier` • `Binary Object. Filename. Text`

CCT *Dictionary Entry Name*	Definition	Remarks	*Object Class*	*Property Term*	CCT Components
Code. Type	A character string (letters, figures or symbols) that for brevity and/or language independence may be used to represent or replace a definitive value or text of an *Attribute* together with relevant supplementary information.	Should not be used if the character string identifies an instance of an *Object Class* or an object in the real world, in which case the Identifier. Type should be used.	**Code**	**Type**	• **Code. Content** • **Code List. Identifier** • **Code List. Agency. Identifier** • **Code List. Agency Name. Text** • **Code List. Name. Text** • **Code List. Version. Identifier** • **Code. Name. Text** • **Language. Identifier** • **Code List. Uniform Resource. Identifier** • **Code List Scheme. Uniform Resource. Identifier**
Date Time. Type	A particular point in the progression of time together with relevant supplementary information.	Can be used for a date and/or time.	**Date Time**	**Type**	• **Date Time. Content** • **Date Time. Format. Text**

CCT *Dictionary Entry Name*	Definition	Remarks	*Object Class*	*Property Term*	CCT Components
Identifier. Type	A character string to identify and distinguish uniquely, one instance of an object in an identification scheme from all other objects in the same scheme together with relevant supplementary information.		**Identifier**	**Type**	• **Identifier. Content** • **Identification Scheme. Identifier** • **Identification Scheme. Name. Text** • **Identification Scheme Agency. Identifier** • **Identification Scheme. Agency Name. Text** • **Identification Scheme. Version. Identifier** • **Identification Scheme Data. Uniform Resource. Identifier** • **Identification Scheme. Uniform Resource. Identifier**
Indicator. Type	A list of two mutually exclusive Boolean values that express the only possible states of a *Property*.		**Indicator**	**Type**	• **Indicator. Content** • **Indicator. Format. Text**
Measure. Type	A numeric value determined by measuring an object along with the specified unit of measure.		**Measure**	**Type**	• **Measure. Content** • **Measure Unit. Code** • **Measure Unit. Code List Version. Identifier**

CCT *Dictionary Entry Name*	Definition	Remarks	*Object Class*	*Property Term*	CCT Components
Numeric. Type	Numeric information that is assigned or is determined by calculation, counting, or sequencing. It does not require a unit of quantity or unit of measure.	May or may not be decimal	**Numeric**	**Type**	• **Numeric. Content** • **Numeric. Format. Text**
Quantity. Type	A counted number of non-monetary units possibly including fractions.		**Quantity**	**Type**	• **Quantity. Content** • **Quantity. Unit. Code** • **Quantity Unit. Code List. Identifier** • **Quantity Unit. Code List Agency. Identifier** • **Quantity Unit. Code List Agency Name. Text**
Text. Type	A character string (i.e. a finite set of characters) generally in the form of words of a language.	Shall also be used for names (i.e. word or phrase that constitutes the distinctive designation of a person, place, thing or concept).	**Text**	**Type**	• **Text. Content** • **Language. Identifier** • **Language. Locale. Identifier**

Annex C
(informative)

Document assembly model for a representative ITS transportation status document

C.1 Main document assembly model

Table C.1 presents the main document assembly model for an ITS transportation status document.

NOTE The medium-shaded rows indicate an Aggregate Business Entity, light shaded rows indicate Association Business Entities, non-shaded rows indicate Basic Business Entities.

Table C.1 — ITS transportation status main document assembly model

UBL Name	Dictionary Entry Name	Data Type	Associated Object Class	Alternative Business Terms	Cardinality	Component Type	Definition
TransportationStatus	Transportation Status. Details					ABIE	A message to report the transport status and/or change in the transport status (i.e. event) between agreed parties.
UBLVersionID	Transportation Status. UBL Version Identifier. Identifier	Identifier. Type			0..1	BBIE	The earliest version of the UBL 2 schema for this document type that defines all of the elements that might be encountered in the current instance.
CustomizationID	Transportation Status. Customization Identifier. Identifier	Identifier. Type			0..1	BBIE	Identifies a user-defined customization of UBL for a specific use.

UBL Name	Dictionary Entry Name	Data Type	Associated Object Class	Alternative Business Terms	Cardinality	Component Type	Definition
ProfileID	Transportation Status. Profile Identifier. Identifier	Identifier. Type			0..1	BBIE	Identifies a user-defined profile of the customization of UBL being used.
ID	Transportation Status. Identifier	Identifier. Type		Freight Forwarding Instruction, Shippers Letter of Instruction	1	BBIE	Unique identifier of the Status message.
Description	Transportation Status. Description. Text	Text. Type			0..n	BBIE	Textual description of a status message.
Consignment	Transportation Status. Consignment		Consignment		1	ASBIE	An association to Consignment covered by the status message.
TransportEvent	Transportation Status. Transport Event		Transport Event		1..n	ASBIE	An association to Transport event
DocumentReference	Transportation Status. Document Reference		Document Reference		0..n	ASBIE	An association to Document Reference.
						END	

C.2 Common document assembly models

Table C.2 presents the main document assembly model for an ITS transportation status document.

NOTE The medium-shaded rows indicate an Aggregate Business Entity, light shaded rows indicate Association Business Entities, non-shaded rows indicate Basic Business Entities.

Table C.2 — ITS transportation status common document assembly model

Dictionary Entry Name	Data Type	Associated Object Class	Alternative Business Terms	Cardinality	Component Type	Definition	UN/TDED Code
Address. Details					ABIE	Information about a structured address.	
Address. City Name. Name	Name. Type		LocalityName	0..1	BBIE	The name of a city, town, or village.	
Address. Country Sub entity. Text	Text. Type		AdministrativeArea, State, Country, Shire, Canton	0..1	BBIE	A territorial division of a country, such as a county or state.	
Address. Country		Country		0..1	ASBIE	An association to Country.	
Consignment. Details					ABIE	An identifiable collection of one or more goods items to be transported between the consignor and the consignee. This information may be defined within a transport contract. A consignment may comprise more than one shipment (e.g. when consolidated by a freight forwarder).	
Consignment. Identifier	Identifier. Type		Unique Consignment Reference number (UCR)	1	BBIE	Unique number assigned to goods, both for import and export.	1202
Consignment. Summary_ Description. Text	Text. Type			0..n	BBIE	General descriptive text that is not part of any remarks.	
Consignment. Total_ Invoice Amount. Amount	Amount. Type			0..1	BBIE	Total of all invoice amounts declared in a single consignment.	5072

Dictionary Entry Name	Data Type	Associated Object Class	Alternative Business Terms	Cardinality	Component Type	Definition	UN/TDED Code
Consignment. Declared Customs_ Value. Amount	Amount. Type			0..1	BBIE	Amount declared for customs purposes of those goods in a consignment, whether or not they are subject to the same customs procedure, tariff/statistical heading, country information, and duty regime.	5070
Consignment. Tariff Description. Text	Text. Type			0..n	BBIE	A description of the tariff applied to a consignment.	5430
Consignment. Tariff Code. Code	Code. Type		Tariff code number (WCO ID 145)	0..1	BBIE	Code specifying a tariff applied to a consignment.	5431
Consignment. Insurance Premium Amount. Amount	Amount. Type		Insurance Cost	0..1	BBIE	Amount of premium payable to the insurance company for insuring the goods.	5486
Consignment. Gross_ Weight. Measure	Measure. Type		Total gross weight (WCO ID 131)	0..1	BBIE	Total weight (mass) of goods for a declaration, including packaging but excluding the carrier's equipment.	6092
Consignment. Net_ Weight. Measure	Measure. Type			0..1	BBIE	Total net weight (mass) of all the goods items referred to as one consignment.	6014
Consignment. Net Net_ Weight. Measure	Measure. Type			0..1	BBIE	Weight (mass) of the goods themselves without any packing.	6048
Consignment. Chargeable_ Weight. Measure	Measure. Type		Chargeable Weight. Basis.Measure	0..1	BBIE	Gross weight (mass) on which a charge is to be based.	6030
Consignment. Gross_ Volume. Measure	Measure. Type		Cube	0..1	BBIE	Total volume of all goods items referred to as one consignment.	6422

Dictionary Entry Name	Data Type	Associated Object Class	Alternative Business Terms	Cardinality	Component Type	Definition	UN/TDED Code
Consignment. Net_ Volume. Measure	Measure. Type			0..1	BBIE	Net volume of all goods items referred to as one consignment.	
Consignment. Loading_ Length. Measure	Measure. Type			0..1	BBIE	Total length in a means of transport or a piece of transport equipment whereby the complete width and height over that length is needed for loading all the consignments referred to as one consolidation.	6042
Consignment. Remarks. Text	Text. Type			0..n	BBIE	Remarks concerning the complete consignment to be printed on the transport document.	4244
Consignment. Hazardous Risk_ Indicator. Indicator	Indicator. Type		Dangerous Goods RID Indicator	0..1	BBIE	Indication that the transport is or is not subject to an international regulation concerning the carriage of dangerous goods.	7184
Consignment. Consignee_ Party. Party		Party	Consignee (WCO ID 51 and 52)	0..1	ASBIE	Party to which goods are consigned.	3036 and 3039
Consignment. Exporter_ Party. Party		Party	Exporter (WCO ID 41 and 42)	0..1	ASBIE	The party who makes the export declaration, or on whose behalf the export declaration is made, and who is the owner of the goods or has similar right of disposal over them at the time when the declaration is accepted.	3036 and 3039

Dictionary Entry Name	Data Type	Associated Object Class	Alternative Business Terms	Cardinality	Component Type	Definition	UN/TDED Code
Consignment. Consignor_ Party. Party		Party	Consignor (WCO ID 71 and 72)	0..1	ASBIE	The party consigning goods, as stipulated in the transport contract by the party ordering transport.	3036 and 3039
Consignment. Importer_ Party. Party		Party	Importer (WCO ID 39 and 40)	0..1	ASBIE	The party who makes an import declaration, or on whose behalf a customs clearing agent or other authorized person makes an import declaration. This may include a person who has possession of the goods or to whom the goods are consigned.	3036 and 3039
Consignment. Carrier_ Party. Party		Party	Transport Company, Shipping Line, NVOCC, Airline, Haulier, Courier, Carrier (WCO ID 49 and 50)	0..1	ASBIE	The party providing the transport of goods between named points.	3036 and 3039
Consignment. Freight Forwarder_ Party. Party		Party	Consolidator (WCO ID 192 AND 193)	0..1	ASBIE	The party combining individual smaller consignments into a single larger shipment (so called consolidated shipment) that is sent to a counterpart who mirrors the consolidator's activity by dividing the consolidated consignment into its original components.	3036 and 3039
Consignment. Notify_ Party. Party		Party	WCO ID 57 and 58	0..1	ASBIE	The party to be notified.	3036 and 3039

Dictionary Entry Name	Data Type	Associated Object Class	Alternative Business Terms	Cardinality	Component Type	Definition	UN/TDED Code
Consignment. Original Despatch_ Party. Party		Party		0..1	ASBIE	The original despatch party.	
Consignment. Final Delivery_ Party. Party		Party		0..1	ASBIE	The final delivery party.	
Contract. Details					ABIE	Information about a Contract.	
Contract. Issue Date. Date	Date. Type			0..1	BBIE	The date on which the Contract was issued.	
Country. Details					ABIE	Information about a geopolitical country.	
Country. Name	Name. Type			0..1	BBIE	The name of the Country.	
Delivery. Details					ABIE	Information about Delivery.	
Delivery. Identifier	Identifier. Type			0..1	BBIE	Identifies the Delivery.	
Delivery. Actual_ Delivery Date. Date	Date. Type			0..1	BBIE	The actual Delivery date.	
Delivery. Latest_ Delivery Date. Date	Date. Type			0..1	BBIE	The latest delivery date allowed by the buyer.	
Delivery. Delivery_ Address. Address		Address		0..1	ASBIE	An association to Delivery Address.	
Delivery. Delivery_ Location. Location		Location		0..1	ASBIE	An association to Location.	
Delivery. Requested Delivery_ Period. Period		Period		0..1	ASBIE	The requested Period for Delivery.	
Delivery. Promised Delivery_ Period. Period		Period		0..1	ASBIE	The promised Period for Delivery.	

Dictionary Entry Name	Data Type	Associated Object Class	Alternative Business Terms	Cardinality	Component Type	Definition	UN/TDED Code
Delivery. Estimated Delivery_ Period. Period		Period		0..1	ASBIE	The estimated Period for Delivery.	
Document Reference. Details					ABIE	Information about a document referred to in another document.	
Document Reference. Identifier	Identifier. Type			1	BBIE	Identifies the document being referred to.	
Document Reference. Document Type. Text	Text. Type			0..1	BBIE	The document type, expressed as text.	
Goods Item. Details					ABIE	A separately identifiable quantity of products of a single product type.	
Goods Item. Identifier	Identifier. Type			1	BBIE	An identifier for the goods item.	
Goods Item. Description. Text	Text. Type		Description of goods (WCO ID 137)	0..n	BBIE	Plain language description of a goods item sufficient to identify it for customs, statistical, or transport purposes.	7002
Goods Item. Gross_ Weight. Measure	Measure. Type		Actual Gross Weight	0..1	BBIE	Weight (mass) of goods, including packaging but excluding the carrier's equipment.	6292
Goods Item. Net_ Weight. Measure	Measure. Type			0..1	BBIE	Weight (mass) of goods item, excluding all packing but including any packaging that normally goes with the goods.	6016
Goods Item. Quantity	Quantity. Type			0..1	BBIE	Number of goods items.	

Dictionary Entry Name	Data Type	Associated Object Class	Alternative Business Terms	Cardinality	Component Type	Definition	UN/TDED Code
Goods Item. Goods Item Container		Goods Item Container		0..n	ASBIE	Association to describe the transporting of a goods item in a unit of transport equipment (e.g. container).	
Goods Item. Invoice Line		Invoice Line		0..n	ASBIE	Association to information directly relating to a line item of an invoice.	
Goods Item Container. Details					ABIE	How goods items are split across transport equipment.	
Goods Item Container. Identifier	Identifier. Type			1	BBIE	Identifies goods items split across transport equipment.	4223
Goods Item Container. Quantity	Quantity. Type		Number of packages stuffed	0..1	BBIE	Number of goods items loaded into or onto one piece of transport equipment as a total consignment or part of a consignment.	7228
Goods Item Container. Transport Equipment		Transport Equipment		0..n	ASBIE	Associates the containers for a single goods item.	
Invoice Line. Details					ABIE	Information about an Invoice Line.	
Invoice Line. Identifier	Identifier. Type			1	BBIE	Identifies the Invoice Line.	
Invoice Line. Order Line Reference		Order Line Reference		0..n	ASBIE	An association to Order Line Reference.	
Invoice Line. Price		Price	Unit Price, Base Price	0..1	ASBIE	An association to Price.	
Location. Details					ABIE	Information about a location.	

Dictionary Entry Name	Data Type	Associated Object Class	Alternative Business Terms	Cardinality	Component Type	Definition	UN/TDED Code
Location. Identifier	Identifier. Type			0..1	BBIE	The unique identifier for the location, e.g. the EAN Location Number, GLN.	
Location. Address		Address		0..1	ASBIE	Association to the address of the location.	
Order Line Reference. Details					ABIE	Information about an Order Line Reference.	
Order Line Reference. Line Identifier. Identifier	Identifier. Type			1	BBIE	Identifies the referenced Order Line assigned by the buyer.	
Order Line Reference. Order Reference		Order Reference		0..1	ASBIE	An association to Order Reference.	
Order Reference. Details					ABIE	Information about an Order Reference.	
Order Reference. Identifier	Identifier. Type			1	BBIE	Identifies the referenced Order assigned by the buyer.	
Order Reference. Issue Date. Date	Date. Type			0..1	BBIE	The date on which the referenced Order was issued.	
Package. Details					ABIE	Information about a package.	
Package. Identifier	Identifier. Type			0..1	BBIE	Identifies the package.	
Package. Quantity	Quantity. Type			0..1	BBIE	The quantity (of items) contained in the package.	
Package. Goods Item		Goods Item		0..n	ASBIE	An association to Goods Item.	

Dictionary Entry Name	Data Type	Associated Object Class	Alternative Business Terms	Cardinality	Component Type	Definition	UN/TDED Code
Party. Details					ABIE	Information about an organization, sub-organization, or individual fulfilling a role in a business process.	
Party. Party Name		Party Name		0..n	ASBIE	An association to Party Name.	
Party. Postal_ Address. Address		Address		0..1	ASBIE	The party's postal address.	
Party Name. Details					ABIE	Information about a party's name.	
Party Name. Name	Name. Type			1	BBIE	The name of the party.	
Period. Details					ABIE	Information about a period of time.	
Period. Start Date. Date	Date. Type			0..1	BBIE	The start date of the period.	
Period. End Date. Date	Date. Type			0..1	BBIE	The end date of the period.	
Shipment. Details					ABIE	An identifiable collection of one or more goods items to be transported between the seller party and the buyer party. This information may be defined within a commercial contract. A shipment can be transported in different consignments (e.g. split for logistical purposes).	
Shipment. Identifier	Identifier. Type		Waybill Number	1	BBIE	Identifies a shipment.	

Dictionary Entry Name	Data Type	Associated Object Class	Alternative Business Terms	Cardinality	Component Type	Definition	UN/TDED Code
Shipment. Consignment		Consignment		1	ASBIE	An association to Consignment covering the shipment.	
Shipment. Goods Item		Goods Item		0..n	ASBIE	An association to Goods Item (for Bulk Goods).	
Shipment. Shipment Stage		Shipment Stage		0..n	ASBIE	An association to Shipment Stage.	
Shipment. Delivery		Delivery		0..1	ASBIE	An association to Delivery.	
Shipment. Transport Handling Unit		Transport Handling Unit		0..n	ASBIE	An association to Transport Handling Unit used for loose and containerized goods.	
Shipment Stage. Details					ABIE	Information about a shipment stage.	
Shipment Stage. Identifier	Identifier. Type			0..1	BBIE	Identifies a shipment stage.	
Shipment Stage. Transit_ Period. Period		Period		0..1	ASBIE	An association to Transit Period.	
Shipment Stage. Carrier_ Party. Party		Party		0..n	ASBIE	An association to Carrier.	
Shipment Stage. Transport Means		Transport Means		0..1	ASBIE	An association to the means of transport.	
Shipment Stage. Loading Port_ Location. Location		Location		0..1	ASBIE	An association to the port location of loading.	
Shipment Stage. Unloading Port_ Location. Location		Location		0..1	ASBIE	An association to the port location of unloading.	

Dictionary Entry Name	Data Type	Associated Object Class	Alternative Business Terms	Cardinality	Component Type	Definition	UN/TDED Code
Shipment Stage. Transship Port_ Location. Location		Location		0..1	ASBIE	An association to the port location of transshipment.	
Status. Details					ABIE	The information relevant to a condition or a position of an object.	
Status. Condition Code. Code	Transportation Status_ Code. Type			0..1	BBIE	A code specifying the status condition of the related object.	
Status. Reference_ Date. Date	Date. Type			0..1	BBIE	A reference date value for this status.	
Status. Description. Text	Text. Type			0..1	BBIE	A textual description of this status.	
Transport Equipment. Details			Shipping Container, Sea Container, Rail Wagon, Pallet, Trailer, Unit Load Device, ULD		ABIE	Information about Transport Equipment; a piece of equipment used to transport goods.	
Transport Equipment. Identifier	Identifier. Type			0..1	BBIE	Identifies the transport equipment.	
Transport Equipment. Size Type Code. Code	Code. Type		Container Size Type Code	0..1	BBIE	The size and type of a piece of transport equipment, expressed as a code. When the transport equipment is a shipping container, it is recommended to use ContainerSizeTypeCode for validation.	

Dictionary Entry Name	Data Type	Associated Object Class	Alternative Business Terms	Cardinality	Component Type	Definition	UN/TDED Code
Transport Equipment. Transport Equipment Seal		Transport Equipment Seal		0..n	ASBIE	An association to Transport Equipment Seal.	
Transport Equipment. Loading_ Location. Location		Location	Vanning address (WCO ID 068), Stuffing location	0..1	ASBIE	Identifies the location where the goods are loaded into the transport equipment.	3268
Transport Equipment Seal. Details			Container Seal		ABIE	Information about a transport equipment seal (a security device attached to the doors of a shipping container).	
Transport Equipment Seal. Identifier	Identifier. Type			1	BBIE	Identifies the seal.	
Transport Event. Details					ABIE	A significant occurrence or happening related to the transportation of goods.	
Transport Event. Identification. Identifier	Identifier. Type			0..1	BBIE	An identifier for the event.	
Transport Event. Occurrence Date. Date	Date. Type			0..1	BBIE	The date of an occurrence of the event.	
Transport Event. Transport Event Type Code. Code	Code. Type			0..1	BBIE	A code specifying the type of event.	
Transport Event. Description. Text	Text. Type			0..1	BBIE	A textual description of the event.	
Transport Event. Completion_ Indicator. Indicator	Indicator. Type			0..1	BBIE	Indicates if this event is completed.	

Dictionary Entry Name	Data Type	Associated Object Class	Alternative Business Terms	Cardinality	Component Type	Definition	UN/TDED Code
Transport Event. Reported_ Shipment. Shipment		Shipment		0..1	ASBIE	Information about the separately identifiable collection of goods items (available to be) transported from one consignor to one consignee via one or more modes of transport.	
Transport Event. Current_ Status. Status		Status		1..n	ASBIE	The status of the event.	
Transport Handling Unit. Details			Logistics Unit, Handling Unit, THU		ABIE	A uniquely identifiable physical unit consisting of one or more packages (not necessarily containing the same articles) for enabling physical handling during the transport process.	
Transport Handling Unit. Identifier	Identifier. Type			0..1	BBIE	Identifies the transport handling unit.	
Transport Handling Unit. Actual_ Package. Package		Package		0..n	ASBIE	An association to Actual Package.	
Transport Handling Unit. Transport Equipment		Transport Equipment		0..n	ASBIE	An association to Transport Equipment.	
Transport Means. Details			Conveyance		ABIE	The particular vehicle used for the transport of goods or persons.	

Dictionary Entry Name	Data Type	Associated Object Class	Alternative Business Terms	Cardinality	Component Type	Definition	UN/TDED Code
Transport Means. Journey Identifier. Identifier	Identifier. Type		Voyage Number, Scheduled Conveyance Identifier (WCO ID 205), Flight Number	0..1	BBIE	An identifier assigned to a regularly scheduled service of a means of transport.	8028
Transport Means. Registration_ Nationality Identifier. Identifier	Identifier. Type		Nationality of Means of Transport (WCO 175, 178 and 179)	0..1	BBIE	Formal identification of the country in which a means of transport is registered.	8453
					END		

Annex D
(informative)

XML schema for an ITS transportation status document type

This Annex contains the XML Schema for the OASIS UBL TransportationStatus document type Version 2.0.

NOTE In lieu of including machine readable artefacts in this Technical Specification, the schema is available at:

http://docs.oasis-open.org/ubl/os-UBL-2.0-update/xsd/maindoc/UBL-TransportationStatus-2.0.xsd

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