

Towards paperless transport within the EU and across its borders

Executive summary of the final report



The Digital Transport and Logistics Forum (DTLF)
Sub-group 1: electronic transport documents

Final version

**DIGITAL
TRANSPORT**
& LOGISTICS
FORUM

DTLF is an expert group of the European Commission

Legal notice

Please note that this document represents views of the members of the Digital Transport and Logistics Forum (DTLF) and the Commission cannot be held responsible for any use which may be made of the information contained therein.

1. Introduction

With a Gross Value Added (GVA) at current prices of more than €650 billion (or ~5% of total 2015 GVA in the EU-28), the employment of more than 11 million people (or ~5.2% of the total workforce) and more than €1040 billion spent on transport-related items by private households (or ~13% of their total consumption), European transport is fundamental to the EU economy¹. It also plays a crucial role in enabling the mobility of goods and persons, as well as connecting other economic actors with each other.

Within the framework of the common European transport policy, the European Commission seeks to develop and support policies striving for an efficient and sustainable transport sector in the EU. In line with the European Commission's White Paper "Roadmap to a Single European Transport Area" (2011) and further with the priorities set by the Juncker Commission 2014-2019 aimed at the development of the Digital Single Market (DSM)², EU transport policy is increasingly focusing on digitalisation of operations. Digitalisation in transport and logistics is considered to be an important driver for efficiency and simplification. It could also lower the costs by making better use of resources and existing infrastructures. Moreover, digitalisation creates new opportunities for business and has the potential to change the way cargo and traffic flows will be organised and managed in the future.

To support digitalisation in transport and logistics, Directorate-General for Mobility and Transport (DG MOVE) established the Digital Transport and Logistics Forum (DTLF) in April 2015. The DTLF is a consultative platform for the coordination and cooperation between stakeholders from a cross-modal and cross-sectorial perspective. The aim of DTLF is to foster efficient electronic exchange of information in transport and logistics across Europe by removing technical, operational and administrative barriers between and within transport modes.

The Forum has been divided into two sub-groups, dealing respectively with the acceptance of digitalised transport documents (data) (sub-group 1) and the establishment of corridor information systems (sub-group 2). While sub-group 1 (SG1) has mainly focused on the (electronic) acceptance of data included in transport documents by authorities, sub-group 2 (SG2) took a broader approach by looking into data

shared within logistics networks.

The general objective of SG1 was to promote and facilitate the use of (data included in) transport documents in an electronic format. Specific objectives, as set out in the mandate³, were:

1. To ensure the acceptance of electronic transport documents by all stakeholders, in particular national authorities;
2. To contribute to better harmonisation of electronic transport documents across modes;
3. To further facilitate electronic exchange of information in transport and logistics.

Along the lines of these objectives, three teams have been established. Their work resulted in an overview of the transport documents used in the context of transport and logistics within the EU, an overview of the current state of play of digitalisation of these documents, and the identification of a number of requirements for a digital infrastructure that could be used to share (access to) data included in transport documents. An early recommendation by the DTLF led the European Commission to eventually adopt a proposal for EU regulation regarding digitally sharing (access to) document data between businesses and authorities⁴.

This executive summary presents the key findings and recommendations as a result of the work of sub-group 1. An elaborate discussion on the various topics can be found in the main report.

1.1 Disclaimer

The content of the main report and this executive summary is based on the work of DTLF sub-group 1 and the input received from various experts and members of the Forum. However well their knowledge and experience and the input from additional sources might be, completeness and correctness might not yet be achieved in these versions. Both documents could therefore be supplemented or revised on later occasions. In addition, the report and this executive summary are not intended to reflect the official views and opinions of the European Commission. The information and views expressed in this document pertain to the members of the DTLF as an expert group.

¹ European Commission, Statistical Pocketbook: EU Transport, 2017.

² Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions a Digital Single Market Strategy for Europe, COM(2015) 192 final, 2015.

³ Mandate of the subgroup on electronic transport documents of the Digital Transport and Logistics Forum, DTLF, http://www.dtlf.eu/sites/default/files/public/uploads/fields/page/field_file/mandate_for_sub-group_-_e-transport_docs_-_final.pdf.

⁴ Proposal for a regulation of the European Parliament and of the Council on electronic freight transport information (eFTI). COM(2018)/279/2 – 2018/0140.

2. Documents used in freight transport: an Overview

2.1 A taxonomy

There is a large and widely varied number of documents being used in the context of freight logistics operations. These documents are issued either by enterprises, authorities or (independent) certification bodies recognised by the authorities. They contain information on multiple aspects and serve a variety of purposes in both business-to-business (B2B) and business-to-administration (B2A) communication. The documents have in common that they include data pertaining mostly to the private sector, that needs to be made available to authorities in a variety of situations, for instance to proof compliance with applicable regulations, to deal with emergency situations or to fulfil customs requirements.

DTLF's SG1 has classified documents being used in the context of transport and logistics as follows:

- Documents concerning goods (freight documents): these documents contain information representing the goods and their transport. It covers both documents which serve the purpose of contract of carriage (waybills, consignment notes, bills of lading) and other documents concerning the goods, serving various other purposes, such as customs declarations and dangerous goods certificates.
- Documents concerning means of transport: these documents provide information on the means of transport from a safety perspective, usage and its nationality, certification, (vehicle) registration, insurance, et cetera.
- Documents concerning personnel: these documents contain information on the qualifications (safety perspective) and nationality (movement of

persons perspective) of the personnel operating a means of transport and/or the personnel handling the cargo.

An overview of the terminology used in both the DTLF SG1 report and this executive summary is provided below. The different categories of documents used in transport are further explained in the sections below (Figure1).

2.2 Documents concerning goods

The main focus of DTLF SG1 has been on documents concerning goods (or: freight documents).

A general distinction was made between documents that serve the purpose of contract of carriage and other freight (transport) documents, serving various other purposes.

2.2.1 Documents evidencing contract of carriage

A contract of carriage sets out the rights, duties and liabilities of a carrier of goods as service provider and a consignor or consignee as customer of logistics services. Documents evidencing the contract of carriage, as agreed by parties involved, bear different names (consignment note, waybill, bill of lading) depending on the mode of transport. Documents reflecting a contract of carriage provide an accounting record of a transaction between customer and service provider, but also lay down payment conditions, instructions on where and when to pick-up and deliver the goods, and instructions on the required handling of the goods.

There are currently no specific EU laws applicable to contracts of carriage. As such, international conventions provide the legal framework and uniform rules for contracts of carriage. Current international carriage conventions in force regulate the transport of goods for a single transport mode. Templates/standards for the transport documents drawn on the basis of these carriage conventions are agreed and maintained by the private sector, via associations. Most EU Member States have ratified or are in the process of ratification of the different international conventions for air-, rail- and road transport. There are also speci-

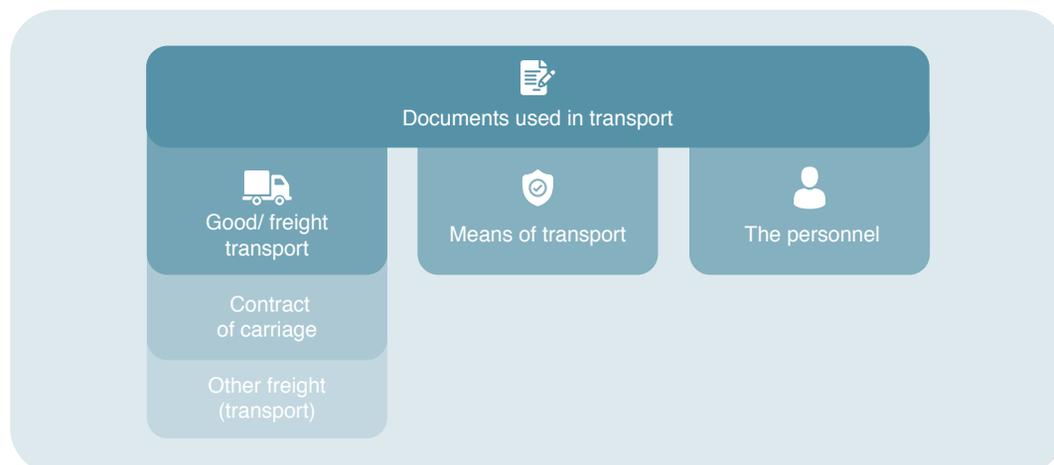


Figure 1: The different categories of documents used in transport

Mode	Convention
Road	<ul style="list-style-type: none"> • Convention on the Contract for the International Carriage of Goods by Road (CMR) (1956) • E-CMR Protocol (2008)
Rail	<ul style="list-style-type: none"> • Uniform rules concerning the Contract of International Carriage of Goods by Rail (CIM) (2006) – Appendix B to the Convention concerning International Carriage by Rail (COTIF) (1999)
Air	<ul style="list-style-type: none"> • Montreal Convention (1999) • ATA Resolution 672 (Multilateral e-AWB Agreement, which makes reference to other relevant resolutions) (2013)
Maritime	<ul style="list-style-type: none"> • International Convention for the Unification of Certain Rules of Law relating to Bills of Lading ("Hague Rules") (1924), as amended by the two protocols of 1968 ("Visby Rules") and 1979 ("SDR Protocol"), together known as the "Hague Rules" • Hamburg Rules (1978) • Rotterdam Rules (2008)
Inland waterway	<ul style="list-style-type: none"> • Budapest Convention on the Contract for the Carriage of Goods by Inland Waterway (CMNI) (2000)

fic laws that govern the carriage of goods at a national level. However, international carriage conventions, as uniform law, prevail over national legislation.

An overview of current international conventions governing the contract of carriage, including some additional protocols, is presented above.

Freight documents have different functions. First, the documents can provide evidence of the existence of a contract of carriage between the consignor and carrier for a specific set of goods. Secondly, some freight transport documents may constitute ownership title over the goods being transported. This is relevant when goods are being sold during transport and consequently switch ownership. Third, freight transport documents may provide proof of acceptance of the goods, upon signature by a customer and carrier, and proof of delivery, upon signature by a consignee and a carrier. Finally, the documents are used to describe cargo, transport legs (for instance place where the contract starts - place of acceptance - and where it ends - place of delivery) and agreed conditions (delivery, handling, payment, responsibility and liability of a carrier during transport).

Although freight transport documents are established and widely used by the private sector, the same documents (or data contained therein) are also used in Business-to-Administration exchange, most notably to verify compliance with legislation. Based on legal provisions, authorities are entitled to halt a transport means and inspect documents that are carried by a transport operator. Some of the data of freight transport documents is also used to complete authority

specific documents like customs declarations.

2.2.2 Other documents accompanying the goods

Apart from documents evidencing contracts of carriage, there are other documents that need to accompany goods during transport. The range of documents required depends on the type of goods, origin and destination, and the customs and excise regime under which the goods are transported. The transport of dangerous goods, for instance, requires a dangerous goods declaration, while a health certificate is needed for the shipment of live animals and animal products.

The main report lists a (non-exhaustive) set of transport accompanying freight documents.

2.2.3 Legal regime

Recent research into the use and barriers to the use of electronic documents in freight transport, commissioned by the European Commission, discussed the current legal framework as regards acceptance by authorities of freight transport documents (data) in electronic format⁵. The study concluded that the current legal framework is dispersed, as it consists of international conventions, EU legislation and national legislation in EU Member States.

The EU legal framework is limited, as there are no specific EU rules concerning electronic submission of transport- or goods related documents or the data included therein to enforcement authorities. There are also no EU rules determining how enforcement authorities of Member States should inspect transport documents.

⁵ Ecorys et al. (2018), State of play and barriers to the use of electronic transport documents for freight transport: options for EU level policy interventions.

Provisions concerning the use of electronic documents are included in (mode-specific) international conventions of carriage (section 2.2.1). The conventions regulate the content and validity of international contracts of carriage established by the commercial parties involved, including in electronic format, but do not require Member States' authorities to accept electronic freight transport documents when performing regulatory enforcement tasks. The international conventions are adopted upon formal signature and ratification by countries agreeing on their provisions. Most EU Member States have ratified or are in the process of ratifying international conventions for air, rail and road transport.

There is also relevant legislation in the individual EU Member States. The way transport is governed varies per Member State, per transport mode, per inspection purpose and per authority concerned. These conditions also influence requirements with respect to the acceptance of transport documents by authorities. However, international conventions, as uniform law, prevail over national law.

The legal survey conducted as part of the study commissioned by the Commission into the state of play and barriers to the use of electronic transport documents for freight transport (2018) made clear that none of the Member States that had provided information to the survey has a general rule that requires national authorities to accept transport documents in an electronic format for all available transport modes in all cases. Only in a limited number of Member States, there is a general "rule" that electronic freight transport documents can in principle be accepted by enforcement authorities. In some other EU Member States, general rules on the acceptance of electronic documents are deemed applicable also to transport documents, thus allowing authorities to accept transport documents in an electronic way.

The discussion above clearly shows that the legal landscape concerning acceptance of (data of) electronic freight transport documents, as evidence of the contract of carriage, is rather fragmented. The same holds for the acceptance of other freight documents in electronic format. The study did not identify any Member State where general rules as regards the acceptance of electronic freight transport documents (data), in all modes of transport, apply. However, electronic interfaces are used for sharing data of specific freight documents, for some transport modes, and by some Member States (authorities).

2.3 Documents concerning means of transport

Transport operators also need to carry documents concerning the means of transport (this section) and concerning the personnel (section 2.4). Documents concerning the means of transport reflect the status of a means of transport and indicate the country where the respective means of transport is registered and

approved. This information can be requested from a safety perspective, but also to verify compliance with specific rules for international cargo transport (e.g. cabotage).

The status of a transport means can be inspected regularly or through spot checks. Exact procedures, inspection regimes and information requirements differ per mode of transport and type of goods transported. Airplanes are inspected on a regular basis by their owner/operator, whereas barges, vessels and trucks are inspected by authorities. Infrastructure managers validate the condition of a (rail) wagon and are able to trigger maintenance and repair.

In comparison to documents concerning the goods, documents concerning means of transport usually have a longer lifetime. Typically, freight transport documents evidencing contract of carriage change after each and every transport leg, and other documents concerning the goods after the completion of a transport operation (i.e. delivery at final consignee). Technical inspection documents and reports concerning the means of transport, by contrast, usually remain valid for several months or years.

2.3.1 Road

Before a road vehicle is authorised to be placed on the EU market it has to undergo a so-called "type approval" procedure. This is the process in which national authorities of EU Member States certify that a vehicle type and model meets all EU safety-, environmental- and conformity of production requirements. Type approval within the EU is needed only once, as approvals granted by authorities in one Member State are recognised and accepted in other Member States. Every vehicle produced has to be accompanied by a certificate of conformity in which the manufacturer certifies that the vehicle corresponds to the approved type and model.

On the basis of the certificate of conformity, a vehicle can be registered anywhere in Europe. Approved vehicles obtain a unique licence number/plate that allows for easy identification. A Vehicle Registration Certificate (VRC) is issued to proof registration of a vehicle. Authorities are allowed to inspect these certificates during roadside checks.

Vehicles that are used to transport special types of goods (for instance dangerous goods, wide- or heavy load goods or livestock) require additional permits. The exact requirements are laid down in specific legislation. Heavy good vehicles, buses and coaches are obliged to undergo periodic technical inspection to certify compliance with safety-, environmental- and technical standards, but also to check their general roadworthiness. A roadworthiness certificate is issued after each test, and some EU Member States require operators to carry along these certificates when using the respective transport means.

DTLF survey findings have shown that data contained

in various vehicle related documents is already stored in different national databases.

The information is electronically available and accessible via national access points, but often not with tools at hand during roadside checks. Moreover, legislation still requires operators to carry paper or card versions of certificates concerning the vehicle during transport operations.

2.3.2 Rail

After a rail vehicle (wagon or locomotive) is authorised to be placed on the market, and before it is used for the first time, the vehicle has to be registered in the National Vehicle Register. This is a national and fully digitalised database, operated by national authorities of every Member State.

Information regarding rail vehicles has to accompany the train in printed (paper) format. Railway undertakings exchange information with the national safety authorities in paper format and also other Business-to-Administration communication is still largely based on physical flows.

2.3.2 Air

In accordance with the Chicago Convention, all civil aircrafts must be registered by the Civil Aviation Authority in a certain country. The exact procedures are set by the Civil Aviation Authority in the respective countries, but all registered aircrafts get a unique alphanumeric string for identification purposes. The unique string also includes a reference to the country of registration of an aircraft.

Civil Aviation Authorities issue a legal document that proves registration (“the Certificate of Registration”). This certificate must be carried when aircrafts are in operation. Pilots of civil aircrafts are also required to carry the “Certificate of Airworthiness”, which is issued by the Civil Aviation Authority in the country where the aircraft is registered. Both certificates are issued in paper format.

2.3.4 Inland waterway

Technical requirements for barges with regard to safety are laid down in Directive (EU) 2016/1629⁶ and Directive 2006/87/EC⁷. National authorities are re-

sponsible for certification of the vessels.

As proof of certification, a physical (paper) Vessel Certificate is issued, which has to be carried by the vessel operator.

2.4 Documents concerning personnel

Documents concerning personnel contain information on qualifications and nationality of personnel operating a means of transport and personnel handling cargo.

Qualifications are based on formalities laid down in rules and regulations, and proof of required qualifications can be inspected by authorities. Passports or other formal documents like visa⁸ prove identity of a person, whether that person is allowed to work for an employer and whether he/she is able to enter or leave a particular country.

2.4.1 Road

A truck driver has to be qualified for driving a specific truck or truck combination. In order to be able to prove qualification, a driver has to carry multiple documents while driving. Apart from a driving licence, which indicates qualification for the actual vehicle or vehicle combination, a driver needs a driver qualification card and a driver card (or tachograph card).

If a driver carries special types of goods, additional education is compulsory. Certificates proving completion of additional education should also be carried on board the vehicle.

2.4.2 Rail

Certification of train drivers is defined by common European standards in Directive 2007/59/EC⁹.

The Directive is part of the standardisation efforts to achieve railway interoperability within Europe. On this basis, national competent authorities issue train driver licences. The licence contains information about medical and psychological fitness of a driver and his/her general professional competence. Additionally, there are one or more complementary certificates which are issued by railway undertakings or infrastructure managers. These certificates indicate a driver’s language- and specific professional competence, for instance knowledge of specific infrastructure. Train drivers are required to take the abovementioned

⁶ Directive (EU) 2016/1629 of the European Parliament and of the Council of 14 September 2016 laying down technical requirements for inland waterway vessels, amending Directive 2009/100/EC and repealing Directive 2006/87/EC.

⁷ Directive 2006/87/EC of the European Parliament and of the Council of 12 December 2006 laying down technical requirements for inland waterway vessels and repealing Council Directive 82/714/EEC.

⁸ It should be noted that a wide range of documents (information) has to be presented to authorities to proof regulatory compliance. Documents like passports and visa are presented here for the sake of completeness, but DTLF has by no means looked into this area. As a result, recommendations in this area were also not considered.

⁹ Directive 2007/59/EC of the European Parliament and of the Council of 23 October 2007 on the certification of train drivers operating locomotives and trains on the railway system in the Community.

documents in paper format with them while operating the rail vehicle.

2.4.3 Inland waterway

Natural persons or undertakings wishing to pursue the occupation of carrier of goods by inland waterways need to hold a certificate of competence pursuant to Council Directive 87/540/EEC¹⁰. The EU Directive on the working time for inland waterway transport¹¹ provides that working and resting times of employees (crew members) need to be regularly recorded. In addition, in accordance with Rhine or national requirements, rest time of crew members needs to be filled in the logbook of the vessel. Boatmasters need to hold a boatmasters' certificate.

Directive 2017/2397 on the recognition of professional qualifications in inland navigation, which entered into force on 16 January 2018, introduces harmonised criteria for obtaining certificates of qualification for all crew members. The Directive foresees standard templates for certificates of qualifications and for the service record books and the logbooks, but these are still in paper/physical format.

¹⁰ Council Directive 87/540/EEC of 9 November 1987 on access to the occupation of carrier of goods by waterway in national and international transport and on the mutual recognition of diplomas, certificates and other evidence of formal qualifications for this occupation.

¹¹ Council Directive 2014/112/EU of 19 December 2014 implementing the European Agreement concerning certain aspects of the organisation of working time in inland waterway transport, concluded by the European Barge Union (EBU), the European Skippers Organisation (ESO) and the European Transport Workers' Federation (ETF).

3. Digitalisation: state of play

In the previous section, an overview of the required documents accompanying goods, means of transport and personnel was presented. This section presents the assessment that has been carried out by sub-group 1 of DTLF of the extent to which transport documents and/or the data contained therein are available in electronic format and are accepted as functionally and legally equivalent to paper-based documents when submitted to or accessed by authorities.

This section elaborates on the state of play as regards the availability, use and experienced barriers to the use of electronic transport documents/information, including their acceptance by Member States authorities for regulatory compliance assessment purposes.

3.1 Documents concerning goods

3.1.1 Use of electronic freight documents and barriers to their use

The survey¹² that has been carried out in the context of the work of sub-group 1 of the DTLF resulted in a number of insights on the current use and (experienced) barriers to the use of electronic freight transport documents (or: e-FTD) for each transport mode. As the survey covered all documents concerning the goods (documents evidencing contract of carriage and other freight documents), the text below will – similar to what was done in chapter 2 – refer to this combined set of (electronic) documents as “electronic freight (transport) documents” (or e-FTD).

The main findings are discussed below:

- Electronic freight transport documents are most used for cross-border operations in air transport (50% of the total 106 respondents). Electronic freight transport documents appear to be least used in cross-border road transport (12% of all respondents).
- For those that currently do not use electronic freight transport documents, reasons are predominantly related to the limited general uptake (clients/business partners do not use e-FTD). For road, the main barrier perceived by operators to the use of e-FTD seems to be the (lack of) acceptance of such electronic documents by authorities. Across all modes of transport, the idea is shared that it is necessary to move towards a digital, paperless freight transport environment.
- According to respondents who were already using

electronic freight transport documents, improved (paperless) administrative processes is the most important benefit of e-FTD, across all modes of transport.

- Less paperwork and faster administration of affairs is the most cited benefit of e-FTD compared to paper documents, including by those respondents that do not yet use electronic freight transport documents.
- The most cited barrier to the use of e-FTD is the legal and regulatory aspect. 46% of the respondents mentioned this barrier. Other barriers are of procedural and organisational nature, are security related or have to do with technical/technological aspects.

Stakeholders attach great importance to intervention at EU level to facilitate and ensure acceptance of electronic freight transport documents by Member States’ authorities, courts and more widely all transport and logistics companies. According to the respondents, the most needed intervention at EU level is the adoption of measures to ensure acceptance of e-FTD by Member States. The survey has also shown that stakeholders consider it necessary to take measures at EU level to ensure trust, confidentiality and data security between different solutions. In addition, access only by authorised parties has to be guaranteed.

3.1.2 Current solutions for electronic freight transport documents

An overview of current solutions for the electronic exchange of freight transport documents (data) per transport mode is presented below. Electronic freight document (data) solutions tend to be mode-specific, reflecting the mode-specific character of the international carriage conventions and the paper freight documents that are currently in use.

3.1.2.1 Road

Different commercial systems/solutions that can create an electronic road consignment note (e-CMR) are currently being developed or already available on the market. The available commercial solutions comply with or are in the process of confirming full compliance with the applicable e-CMR additional Protocol. More recently, UN/CEFACT and IRU have developed a standard for the electronic consignment note message to be exchanged between carrier, shipper and receiver of the goods.

¹² In total 106 respondents from 18 Member States, representing different stakeholders and parties involved in transport. Forwarders and logistic service providers are best represented (26% of replies), followed by shippers and consignees (18% of replies). Additional survey details can be found in the DTLF SG1 main report.

3.1.2.2 Rail

The International Railway Committee (CIT, Switzerland) has defined the functional and legal specifications for the Electronic CIM/SMGS consignment note. Moreover, RAILDATA, the international organisation of European cargo Railway Undertakings¹³, developed ORFEUS (Open Rail Freight EDI User System), which ensures the exchange of CIM consignment notes data between the co-operating railway undertakings.

3.1.2.3 Air

The International Air Transport Association (IATA) adopted the industry-wide “e-AWB” initiative to describe the interchange of electronic data (EDI) messages and to replace the paper Air Waybill (AWB) as established under the Warsaw Convention (1929) and modified by the Montreal Convention (1999) and their protocols. The e-AWB initiative is part of a broader e-freight initiative. More recently, based on the foundations of the e-freight initiative, IATA launched its “One Record” initiative, eventually aiming for an end-to-end digital logistics and transport supply chain where data is easily and transparently exchanged in a digital ecosystem of air cargo stakeholders, communities and data platforms.

3.1.2.4 Maritime

The European Commission adopted a proposal for a European Maritime Single Window environment in May 2018 that aims to facilitate electronic transmission of information relating to ships arriving in and departing from ports in the EU¹⁴. To do so, it seeks to establish a framework for a harmonised and interoperable European Maritime Single Window environment (EMSWe) through the creation of common datasets and databases based on international and EU reporting obligations.

3.1.2.5 Inland waterway

The “Convention on the Contract for the Carriage of Goods by Inland Waterways (CMNI)” transport document governs the contractual relationship between contracting parties in an inland waterway transport, but can also be used for other purposes. IVR¹⁵ has elaborated a model of the electronic transport document as defined by CMNI.

3.2 Documents concerning means of transport

Data included in documents concerning the means of transport is already mostly digitalised and stored in national registries.

Many Member States store Vehicle Registration Certificates (VRC) data in one national digital registry, operated by a special authority. Various other national authorities have access to the data in the registry, for instance police and roadside inspectors. While these national registries are implemented by all Member States, international agreements (e.g. the Vienna Convention on Road Traffic) still make it mandatory to carry a hardcopy of the VRC on board the vehicle when driving.

Results of the DTLF SG1 survey suggest that the most important benefits of digitalised vehicle-related data are linked to faster inspection of documents (data) by enforcement authorities and increased efficiency of operations for access control (in for instance city areas). Survey participants considered the simplified process (including reduction of administrative burden), the rapid access to information and reduced operation time as most important benefits of online access to information. In addition, cost reduction was mentioned as a benefit.

According to the respondents, the achievement of the abovementioned benefits is currently primarily hindered by legal and regulatory barriers at EU and national level. In particular, the different national regulations, the general lack of appropriate national legislative frameworks and the non-applicability of existing legislative frameworks at national level are mentioned as factors of influence. The fact that national authorities, both within the EU and in third countries, still request a paper copy for verification purposes is considered as the main procedural and organisational barrier to the acceptance and use of digital vehicle related data.

An overview of current solutions for the electronic information exchange of documents (data) concerning the various means of transport is provided below.

3.2.1 Road

Data included in driver’s licenses and additional certificates is already electronically stored in national databases, but access to this data is limited. Further-

¹³ In total 106 respondents from 18 Member States, representing different stakeholders and parties involved in transport. Forwarders and logistic service providers are best represented (26% of replies), followed by shippers and consignees (18% of replies). Additional survey details can be found in the DTLF SG1 main report.

¹⁴ Proposal for a Regulation of the European Parliament and of the Council establishing a European Maritime Single Window environment and repealing Directive 2010/65/EU - COM(2018) 278 final.

¹⁵ International association for the representation of the mutual interests of the inland shipping and the insurance and for keeping the register of inland vessels in Europe.

more, applicable regulations still require physical presentation of documents/cards during inspections.

Information on vehicles and drivers is exchanged by means of the European Car and Driving License Information System (EUCARIS). EUCARIS is a European information exchange mechanism based on decentral cooperation between registration authorities in Europe. In the early 1990's, five EU registration authorities set up a mechanism to prevent fraud and crime related to the import and export of stolen vehicles. Nowadays, EUCARIS is a general exchange mechanism for information on vehicles, driving licenses (if connected to RESPER) and other transport related items between all authorities of EU Member States, in some cases parallel to exchange mechanisms developed and maintained by the European Commission (e.g. ERRU, TACHONET). However, apart from enforcement of EU legislation related to fraud and crime prevention, EUCARIS cannot be used for the exchange of the same information necessary for the enforcement of other current EU legislation, as these pieces of legislation do not as yet foresee such electronic exchange.

3.2.2. Rail

Digitalisation of documents (data) concerning rail vehicles is covered by the Interoperability Directive (EU) 2016/797¹⁶. All relevant railway vehicle data is included in National Vehicle Registers operated by all EU Member States. The Registers contain information on for instance the Member State where the vehicles were originally registered, the Member States where the vehicles are authorised and details on the owner and keeper of the vehicles. Easy recognition and identification of railway vehicles is guaranteed by the European Vehicle Number that is allocated to any railway vehicle running in Europe.

As from 16 June 2021, the centralised and fully digitalised European Vehicle Register shall be operational, which will replace the current National Vehicle Registers operated by individual Member States. The information required to check compliance with regulatory requirements will be made available electronically via the register and arrangements for the exchange of data will be adopted by the Commission by means of Implementing Act, as provided by Directive (EU) 2016/797.

3.2.3 Maritime

The previously introduced European Maritime Single Window proposal, which aims to facilitate electronic transmission of information on ships arriving in and departing from ports in the EU, also covers electronic reporting of information concerning the vessel. Relevant data elements will be part of the common datasets and databases that still need to be developed, based on international and EU reporting obligations.

In 2017, the Once-Only Principle Project (TOOP) was launched by the European Commission, aiming to explore and demonstrate the once-only principle across borders. The goal is to improve the exchange of business related data or documents with and between public administrations. One of the TOOP pilot projects is on "Online Ship and Crew Certificates".

3.2.4 Inland waterway

Authorised authorities of EU Member States currently store and exchange information on inland waterway vessels electronically via the European Hull Database (EHDB)¹⁷. The EHDB includes vessel related information as name and unique ID of the vessel, name and address of the vessel owner and characteristics of the vessel. As provided by Directive (EU) 2016/1629, the EHDB will also contain an electronic copy of the vessel certificate and information regarding the status of application for such certificates in the future.

Directive 2005/44/EC on harmonised River Information Services (RIS)¹⁸ established a framework for the development and implementation of RIS in an efficient, expandable and interoperable way, by providing interfaces to transport management systems and commercial activities. In line with the RIS Directive, the Commission defined technical guidelines and specifications for RIS through five implementing acts¹⁹, including Commission Regulation (EU) No 164/2010 on the technical specifications for electronic ship reporting in inland navigation.

This implementing act sets standards in order to facilitate the electronic sharing of information with authorities and parties involved in the chain, for instance as regards transport of dangerous goods. The same regulation can also be applied to other uses of electro-

¹⁶ Directive (EU) 2016/797 of the European Parliament and of the Council of 11 May 2016 on the interoperability of the rail system within the European Union.

¹⁷ Commission Directive 2013/49/EU of 11 October 2013 amending Annex II to Directive 2006/87/EC laying down technical requirements for inland waterway vessels.

¹⁸ Directive 2005/44/EC of the European Parliament and of the Council of 7 September 2005 on harmonised river information services (RIS) on inland waterways in the Community.

¹⁹ Commission Regulation (EC) No 414/2007 concerning the technical guidelines for the planning, implementation and operational use of RIS; Commission Implementing Regulation (EU) No 909/2013 on the technical specifications for the electronic chart display and information system for inland navigation (Inland ECDIS); Commission Regulation (EU) No 415/2007 concerning the technical specifications for vessel tracking and tracing systems (as amended by Commission Implementing Regulation (EU) No 689/2012; Commission Regulation (EU) No 164/2010 on the technical specifications for electronic ship reporting in inland navigation; Commission Regulation (EC) No 416/2007 concerning the technical specifications for Notices to Skippers.

nic cross-border information exchange.

Furthermore, the European Commission supported a study related to the Digital Inland Waterways Activity (DINA) that was published in 2017.

The objective of the study was to identify ways to improve digitalisation of information flows on infrastructure, people, operations, fleet and cargo in the inland waterway transport sector and to allow seamless integration of inland waterway transport in multimodal transport chains by connecting the information with other transport modes²⁰.

3.3 Documents concerning personnel

This section discusses the availability of documents (data) concerning the personnel in a digital format, as well as the current possibilities for exchanging this information in an electronic way.

3.3.1 Road

As highlighted before, EUCARIS is an example of a digital solution that is used for the exchange of information on vehicles and driving licenses. The use of EUCARIS for the exchange of vehicle registration data is either mandated (CBE Directive, Prüm Decisions) or allowed (ERRU, TACHONET) by EU legislation or is based on bilateral/multilateral agreements between Member States outside the scope of EU legislation. The driving licence data exchange takes place within the RESPER system, owned and maintained by the European Commission, to which EUCARIS is also connected. Member States have to be connected to RESPER first. Optionally, they may be connected to EUCARIS.

3.3.2 Rail

National competent authorities and national infrastructure managers keep a register of train driving licences (“National Registers of Train Driving Licences”). Railway undertakings and infrastructure managers keep a register of complementary certificates (“Registers of Complementary Certificates”). These registers facilitate the exchange of information on train personnel. Basic (harmonised) parameters for these registers, including criteria for the cross-border exchange of information, are adopted by the European Commission as part of Commission Regulation EU 36/2010²¹. This includes, for instance, data to be collected, format requirements, access rights of different authorities and data retention limits.

The Directive that sets out these parameters is cur-

rently subject to an evaluation process, which potentially leads to a revision of the Directive, including the layout and way of presentation of the complementary certificates.

3.3.3 Maritime

The TOOP pilot project on ship and crew certificates, as introduced in section 3.2.3, is an example of a potential solution that could contribute to the electronic exchange of information on the personnel operating on maritime vessels.

The European Maritime Single Window proposal also covers electronic reporting of information on the personnel, if this information has to be reported to authorities.

3.3.4 Inland waterway

With the implementation of Directive (EU) 2017/2397 on the recognition of professional qualifications in inland navigation, Member States will share data on certificates of qualifications, service record books and logbooks, by means of a database kept by the European Commission: the future European Crew Data Base (ECDB).

²⁰ European Commission, Digital Inland Waterway Area: Towards a Digital Inland Waterway Area and Digital Multimodal Nodes, October 2017.

²¹ Commission Regulation (EU) No 36/2010 of 3 December 2009 on Community models for train driving licences, complementary certificates, certified copies of complementary certificates and application forms for train driving licences, under Directive 2007/59/EC of the European Parliament and the Council.

4. Looking forward: digital blueprint

4.1 Documents versus data

One of the goals of DTLF SG1 has been to further contribute to the facilitation of electronic information exchange in transport and logistics. In that context, it has been noted that, continuing to refer to electronic “documents” when considering digitalisation might be misleading. Documents are essentially carriers of information/data. A federative network of platforms (or briefly federative platforms, DTLF sub-group 2) could support the sharing of (access to) data included in transport documents, independent of the modality or the paper document templates, models or standards currently in use. IT systems that store this data, operated by private sector stakeholders, should consequently be able to produce various types of documents from the same set of data.

Previous chapters made clear that there is a large variety of documents that accompany goods, means of transport and personnel. While certain documents (e.g. permits, inspection reports and qualifications of personnel) are issued by national authorities or recognised bodies, other documents are prepared and issued by parties involved in a particular shipment, for instance a shipper, forwarder or carrier. These transport documents partly contain the same data, though mainly within the same document category (i.e. on goods, means of transport, personnel).

Referring to freight documents (documents that serve the purpose of contract of carriage and other documents concerning the goods) in particular, the data as presented in the documents is currently stored in internal IT systems of a shipper, carrier or the combination of these systems (for instance an forwarding module, Enterprise Resource Planning system or Transport Management Systems). These distributed, heterogeneous IT systems of stakeholders in supply chains collectively contain all information needed to produce all types of freight documents. The documents serve a private sector purpose, for instance to evidence the (conditions of a) contract of carriage, but can also be used to meet public sector requirements. Yet authorities may formulate their own data formats that differ from the formats used in B2B communication. For example, a declaration based procedure requires data from an IT back office system, while part of the data is also used for transport documents and complemented by all relevant data required by an authority.

Data used to serve one purpose can be re-used to serve other purposes as long as data semantics is the same for both purposes. Re-use of the same data stored in an IT back office system is facilitated by agreeing on semantics and utilising common formats and code values for data representation. A data dictionary is an example that contains these types of commona-

lities. Agreement on a common data dictionary would also facilitate transport; the United Nations Trade Data Elements Directory (UNTDDED) has been developed for this purpose.

4.2 Shortcomings of implementation of open (or de facto) standards

As the previous sections made apparent, a wide variety of solutions are currently available for electronic transport documents, in all transport modes. The requirements set by authorities as regards the way of representing data range from electronic documents represented in a PDF format to a structured data set based on open standards. Following the terminology elaborated in chapter 2, this chapter will concentrate on data included in all transport documents, unless stated otherwise. Electronic transport document is sometimes referred to as “eTransport document”.

Different formats and implementation guides of standards by both private- and public sector stakeholders lead to relatively high costs for implementation and maintenance of electronic links by individual stakeholders. Dominant players and ((air)port) communities are examples of different implementation guides for the same or other standards.

Each implementation guide of a standard requires additional implementation effort and cost for individual enterprises and authorities.

This generic problem has been identified in both sub-group 1 and sub-group 2 of the DTLF. From a digitalisation of transport documents perspective, it implies that different implementation guides will be developed for the same standard representing the data set of an eTransport document following this approach. For instance, different implementation guides will be developed for an e-CMR standard to support particular goods flows (for instance containers or dry bulk) or customer-carrier guides, where a customer acts as dominant player to a carrier. Moreover, governance, data dictionaries and data semantics differ between various implementations of (the same) standards. This also impacts the uptake of electronic transport documents, as small- and medium-sized enterprises are not able to implement these differences, which consequently influences the usefulness of electronic transport documents to larger enterprises.

Another aspect is the quality of data. On paper, changes are easily written on a document and documents can be retyped. However, in case data is duplicated by messages between IT systems or is retyped many times, data in multiple systems can become inconsistent. Upstream changes in documents or data sources are not cascaded downwards. This decrease of data quality may lead to unnecessary delays in logistics chains. An alternative solution is to share access to data, while data remains at the source and is accessible by relevant stakeholders. Upstream changes are immediately available downstream. Distributed

Ledger Technology, for example, is a technology that could be applied to share changes of data ('events') while the data remains at the source.

4.3 Options for achieving interoperable eTransport Documents solutions

In order to effectively share (access to) data of electronic transport documents, an open IT architecture is needed that guarantees interoperability between different solutions. There are multiple ways to represent and share data: unstructured data, structured data and logistics services.

4.3.1 Unstructured data sets

Unstructured data can be produced from IT systems that (re-)use data to produce different waybills and other relevant documents in a standardised format like PDF, which visually replicates a certain document template. The data can be viewed by utilising standard hardware and free available software like PDF viewers. The advantage of sharing unstructured data is that solutions are relatively easy to use and implement. However, it provides limited search capabilities. Individual data items are readable only if so-called 'Optical Character Recognition' (OCR) technologies are used, but then the data is converted into structured data.

4.3.2 Structured data sets

Structured data requires the implementation of standards to support all modalities. Any mode specific data dictionary with relevant data elements of a transport document therefore needs to be harmonised across modes. The use of structured electronic transport documents (data) is preferred only if the federative platforms provided by many systems and solutions implements the complete electronic freight transport document data sets, and if it provides an easy way for each individual enterprise to formulate data requirements/capabilities and integrate its IT back office solutions with a platform of choice (the so-called 'plug-and-play' functionality specified by DTLF sub-group 2). Alternatively, federative platforms should clearly indicate which part enterprises have to implement (for instance a particular focus on road transport, air transport or liquid bulk transport). By providing plug-and-play functionality, the solution fits in the existing solutions.

4.3.3 Logistics Services (supported by Logistics Core Components)

Logistics Services provide a general mechanism to specify data requirements at business (logistics service) level, supported by generic semantic specifications of re-usable logistics concepts like physical objects (container, truck, etc.). These semantic concepts can be shared across modalities, if applicable. The approach has been developed by DTLF sub-group 2 and introduces the concept of conceptual interoperability

for all logistics stakeholders, law enforcement agencies and all supply and logistic processes. The final report of sub-group 2 presents a methodology for the implementation of (open and de-facto) standards that is also applicable to eTransport documents. The methodology re-uses available standards such as the one for the road consignment note (e-CMR) published by UN/CEFACT in collaboration with IRU, where the standard is based on a core component library of definitions also used for the World Customs Organisation (WCO), e-Certificates, e-TIR and EU Customs data models.

The objective of the methodology is to make these types of standards available in an open standard Ontology Web Language (OWL), (i) that enables each enterprise to develop its specific interface to a platform of choice ('MyInterface') supporting its business, (ii) is the basis of standardised platform services for eTransport document data, and (iii) can be used by platform service providers to implement their platform services. This methodology reduces interoperability costs and supports on-boarding of individual enterprises by preventing the need for development and implementation of Implementation Guides. This methodology can be applied to all data sets representing eTransport documents, where the Visibility Services identified by DTLF SG2 (and any required Supporting Services like Monitoring Services and Identification-, Authentication- and Access Control Services) are the basis for developing platform services for eTransport document data sets.

4.4 Options for authorities to federative platforms for eTransport Document data

Member States' authorities have various requirements as regards possible solutions that allow sharing of (access to) transport data. First, digital solutions should fit the authorities' particular inspection regimes. Secondly, authorities require guaranteed data quality. Data should be:

- Complete: data has to represent all details relevant for the movement of the specific goods;
- Consistent: data of two sources reflecting the same physical situation has to be identical;
- Unambiguous: data can only be interpreted in one way;
- Correct: data has to reflect a real world situation of goods movements and has to be legally correct.

Third of all, administrative burden should not increase, so therefore the only-once principle has to be obeyed. This means that access to relevant transport data is provided by a data owner once to authorised end-users that require the data to perform their tasks, either from a legal or commercial perspective. Finally, sometimes particular archiving laws have to be considered.

Authorised access for authorities, to enable them to monitor certain transport data, can be established in different ways. Data can be “pushed” to an authority, but it is also possible that authorities collect the data in the private domain (“pull”). There should always be one unique identifiable endpoint that can be used to share (access to) data. In case transport data is electronically stored in the public domain (i.e. the endpoint is in the public domain), the authority needs to provide authorised access to enterprises, as the commercial parties should be able to provide and access the data at that endpoint. This would imply that an authority competes with available commercial solutions, which might not be the preferred situation.

Authorities require (access to) information/data for a variety of regulatory purposes and may use different inspection procedures. Different inspection procedures require a particular mechanism for accessing data. For instance, random inspections can be supported by on request access to data, while risk based inspections require (permanent) access to data, either pushed (declarations) or retrieved-based by receiving links (subscriptions).

Depending on the access mechanism, authorities may have particular requirements as regards provision of data, either in an unstructured or structured way. This might also require additional development efforts by the authorities themselves. If for instance all data is pushed to authorities, they should implement a mechanism to distribute, store and archive the data in accordance with (inter)national laws. If authorities require access to data via a search mechanism, they need a copying mechanism to store the data in case of detecting irregularities.

Various EU funded interoperability projects (EU FP7 SEC Cassandra and CORE, EU FP7 INFOS iCargo, and H2020 AEOLIX) have demonstrated mechanisms for sharing data between enterprises and authorities, including a variety of platform solutions. The “once-only” principle can be applied for seamless integration of relevant eTransport data and solutions as required by national authorities. Depending on the inspection regime of a national authority, a federative network of platforms supporting electronic transport datasets requires various functions. Examples of how such a federative network of platforms could be implemented are presented in Annex H of the main report. These examples, which only serve as illustration, are built on the same concepts as those discussed in DTLF sub-group 2.

5. Next steps: conclusions and recommendations

5.1 Conclusions

Based on the work presented in the previous sections, the following conclusions have been drawn. More detailed conclusions are included in the main report.

- A wide variety of documents are currently used in relation to the transport of goods: documents concerning the goods, documents concerning the means of transport and documents concerning the personnel. Their common denominator is that they are required to be available for inspection by authorities, to present proof of compliance with various regulatory requirements in place. A certain subset of these documents, namely the goods related documents that represent contract of carriage, perform also a central business-to-business role, as they reflect both the responsibilities and liabilities of the parties and record evidence of the completion of these responsibilities.
- Moving towards a digital, paperless freight transport environment is considered necessary and beneficial for the EU logistics and transport sector as a whole. Stakeholders identified current legal and administrative barriers as the main bottleneck on the way to paperless logistics.
- Essentially, digitalisation is not about the documents in themselves, but about ensuring electronic sharing of the information these documents carry. The legal possibility of using electronic documents or electronic data sets currently represented by transport documents and the extent to which common rules for electronic information exchange between business and authorities are applied across the EU depend on the Member State, authority and transport mode concerned.
- Digital platforms for storage, management and inspection of data of transport documents should be aligned with authority requirements in terms of provision of data and data quality and integrity, based on the authorities' current and future inspection regimes. The platforms should also guarantee data interoperability and allow for authorised access and data exchange between enterprises and authorities, for all modes and all commodities.

5.2 Recommendations

The recommendations below build on the above conclusions and have as overall aim reaching the main objective laid down for DTLF, namely fostering more efficient electronic exchange of information in transport and logistics, with the objective of removing technical,

operational and administrative barriers between and within transport modes. In particular, these recommendations point to necessary action that would still need to be undertaken to fulfil the mandate that had been given to sub-group 1 in the following three focus areas: acceptance of electronic transport documents by all stakeholders, and particularly by national authorities; the possible harmonisation of these documents at data elements level and across all transport modes; and the development of possible common IT infrastructures/environments to support the electronic exchange of this data, both among the private stakeholders and, in particular, with the authorities.

Recommendation no. 1: Work needs to continue towards further digitalisation of the exchange (business-to-administration/B2A), reuse (administration-to-administration/A2A) and acceptance (administration-to-business/A2B) of information for the purposes of regulatory compliance in transport and logistics. In particular, follow-up efforts are necessary in order to:

- Further identify barriers and propose relevant solutions to ensure full digital exchange of regulatory information related to goods, means of transport and personnel;
- Further explore, develop and test options for IT infrastructure concepts for the exchange (B2A), reuse (A2A) and acceptance (A2B) of information for the purposes of regulatory compliance in transport and logistics;
- Work on proposals for legislative action and soft measures to speed up the uptake of the IT infrastructure concepts. The soft measures may include funding of initiatives/projects, communication activities, consensus building and creating communities, awareness raising and identification of relevant adoption instruments (e.g. best practices, roadmaps, guidelines for implementation, etc.);
- Initiate and/or contribute to the development of the specifications of the interfaces between the IT infrastructure concepts (services and protocols);
- Collaborate and synchronise with current and future projects/initiatives and other privately and publicly funded developments that strive to develop and implement (part of) these IT infrastructure concepts;
- Collaborate with all relevant private and governmental stakeholders in transport and logistics, including standardisation bodies, to establish the necessary IT infrastructure;
- Further investigate the need and form for appropriate governance structures for the systems and cooperation necessary to ensure the secure digital exchange, reuse and acceptance of information

required for regulatory compliance in transport and logistics.

Recommendation no. 2: To facilitate such efforts, the European Commission should renew the mandate for DTLF. The DTLF allows a unique opportunity for public administrations (such as transport administrations and customs), business and science to meet, discuss and engage in exploring various opportunities to make optimal use of the digitalisation in the supply and logistics chain for the all stakeholders.

Recommendation no. 3: The next DTLF should have sufficient knowledge, skills and expertise to complete the various tasks it will be mandated to carry out, based both on active members' contribution and on external experts supporting DTLF for specific topics.

Recommendation no. 4: The work program of DTLF should focus on well-defined deliverables in the areas identified under Recommendations 1 and 2. In particular, the immediate focus should be on deliverables aimed at assisting the Commission in the preparatory work for the implementation of the Regulation on electronic freight transport information (eFTI), once adopted, including via regular participation in the working groups to be established by the Commission for the preparation of the secondary legislation foreseen by the Regulation.



Contacts

Digital Transport Logistics Forum website:
www.dtlf.eu

Registry of the European Commission expert group:
<http://ec.europa.eu/transparency/regexpert/>