

**When Technology takes the Wheel
Is the CMR ready to meet the demand for Autonomous Transportation?**

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Abstract

Vehicles, machines that helped people to succeed in throwing of the shackles of human- or animal-powered transportation, have long been developing but stayed fundamentally the same. Save for technological innovations, vehicles have remained dependent on humans. New, conceptually different vehicles have started cropping up because of their Artificial Intelligent (A.I.) systems. These systems enable autonomous operating vehicles. What is peculiar to the autonomous vehicles is that they will no longer be depended on human control but operate at the same level as humans. In the light of that, judges are about to face emerging problems connected with adapting legislation to the technology development. The notion ‘adapting’ should be stressed here due to the fact that creating the convention which will always comply with the technology development is almost impossible. At the level of international conventions the framework for their interpretation based on Vienna Convention on the Law of Treaties (VCLT) allows for stretching the currently existing concepts and adapting them among the others to technological change. This, however, has some boundaries because the interpretation needs always to be imbedded in parties’ will. The judges will also need to consider the evolving initiatives concerning autonomous vehicles, because these might collide with mandatory international conventions. The aim of this article is to analyze whether the CMR is future-proof for autonomous transportation. The functional aspects of dealing with autonomous vehicles are compiled with the instruments for the treaty interpretation to investigate what the consequences of adapting the concept of vehicle are. Within the CMR convention, the use of autonomous vehicles seems to stretch the current concepts and framework to its limits, giving rise to the question when the moment comes when stretching the framework leads to breaking the framework of the CMR convention.

Key words: A.I. systems, autonomous vehicles, treaty interpretation

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1. Introduction

Autonomous technology, including autonomous vehicles, is a perfect example of the step from dumb to smart technology. Future technological systems that are autonomous are not restricted to assisting humans, but are able to operate on the same level as humans. Autonomous vehicles use machine learning to operate without human control and are getting ready to arrive on the market in a few years.

Many steps have been taken to achieve the technological progress connected with vehicles' autonomy the society is facing now. From the industrial revolution onwards, technology evolved from rudimentary tools to complex technological systems that have been implemented on a large scale. These were until recently – in essence – dumb technological systems, merely complex tools that assisted and were controlled and coded by humans. The introduction of a personal computer and computational applications in commerce, government and everyday life in the second part of the twentieth century – with for example the Apple II and the IBM PC – started an era in which new technological possibilities were explored and the first steps to more intelligent technology have been set. The concept of Artificial Intelligence (A.I.) allowing the machines to operate autonomously in the future has been present during the development of computer technology, but proved hard to develop and to implement in the 1960's and 1970's, resulting in a fading interest in A.I. and the so-called A.I. winter in the 1980's. Breakthrough developments at the start of the twenty-first century rekindled the interest in A.I., re-established its funding, and since then progress has been made at an astonishing pace. The historical promise of A.I. – the rise of intelligent machines – not only seems to be plausible, but is actually happening.

These technological advances have also influenced the nature of transportation in Europe and globally. Automation by computer technology is deeply integrated into all aspects of the transportation process. Physical transportation of goods is one of these developments that is already being tested with autonomous technology.¹ Autonomous vehicles are not part of science fiction any more but are already present on the road. Small-scale transportation of goods with autonomous vehicles is being tested by companies like Alphabet and Amazon. Recently, ride-sharing company Uber acquired the self-driving truck start-up Otto to develop self-driving trucks² whereas Tesla announced their plans to develop an electric truck which will have their market-leading Autopilot software.³ These experiments can give valuable data on the potential benefits and problems with these types of autonomous transportation, data that can be used to develop or future-proof applicable regulation.

In the light of these developments, the question if the CMR convention is a future-proof for autonomous transportation is therefore an interesting one. In the field of transport law A.I. was so far discussed in the context of unmanned shipping under maritime law⁴ and some attempts were made to suggest the strict liability of the manufactures of autonomous vehicles in the context of passenger transportation.⁵ Here we focus whether the CMR is still adequate to cover cases where the autonomous vehicle plays a prominent role. In order to answer it, we focus firstly on interpretative tools that give an option to stretch the concepts existing in the conventions (Section 2). In turn we look at the autonomous vehicles in a functional way. Meaning, we elaborate on how sector deals with their autonomous character; who and what can functionally be considered as a driver or vehicle (Section 3). The outcomes of section 2 and 3 serve then as a base to

¹ Hengstler, Monika, Ellen Enkel, and Selina Duelli, 'Applied artificial intelligence and trust—The case of autonomous vehicles and medical assistance devices' [2016] 105 *Technological Forecasting and Social Change* 105-120.

² See: <<http://www.reuters.com/article/us-uber-tech-volvo-otto-idUSKCN10T1TR>>

³ See: <<http://www.bloomberg.com/news/articles/2016-07-21/tesla-s-musk-calls-for-building-semi-truck-in-new-master-plan>>

⁴ Eric van Hooydonk, 'The law of unmanned merchant shipping – an exploration' [2014] 20(6) *The Journal of International Maritime Law* 403-424.

⁵ Dylan LeValley, 'Autonomous Vehicle Liability – Application of Common Carrier Liability' [2013] 36(5) *Seattle University Law Review* 5-26.

analyse the autonomous transportation in the context of CMR (Section 4). The last section concludes (Section 5).

2. Technology development and evolution of the CMR – is there a chance for compatibility?

The purpose of this section is to present the interpretative framework of the CMR with the special focus on evolutionary terms. In other words, we look for ways of achieving compatibility between changing concepts and the already existing regulation (2.2.) in the framework for the CMR interpretation (2.1). Our approach implies certain assumptions. First of all, creating a regulation which will always comply with the progressing development of technology is rather impossible due to a long process of drafting and implementing especially at the international level. For the international road transportation the CMR will therefore remain the basic legal tool. Secondly, international conventions are in principle of rather general nature. As a result, the judge adjudicating on the base of the CMR will have to interpret the text in the light of changing circumstances including technology development. Finally, a new regulatory framework might even not be necessary as a result of the fact that transport conventions are more often perceived as one field in looking for solutions to unresolved legal issues. This is not only because the transport conventions simply transplanted some solutions from their predecessors or ‘neighbours’ regulating a different transport mode⁶ but also due to the fact that national judges tend to pay attention to one another's case law in order to have some guidelines while deciding their cases.⁷

2.1. General framework for interpretation

The starting point on the interpretation of the CMR is its art. 47 conferring jurisdiction on the International Court of Justice as far as cases related to the interpretation or application of this Convention are concerned. The jurisdiction is not exclusive though. The Parties are not obliged to submit the case to the Court; instead they may do so if they are unable to settle by negotiation or by other means. Due to that the burden of interpretation and application of the CMR rests primarily on national courts. These in turn should interpret treaties (that is also international conventions) according to the framework of the Vienna Convention on the Law of Treaties. Concluded in 1969 and entered into force in 1980 – thus after CMR – causes a problem with its applicability to the treaties existing beforehand. However, since the articles 31-33⁸ VCLT – which are setting the interpretative framework – are regarded already as customary law⁹. Furthermore, these articles in principle conform to the practice of interpretation existing before the Law of Treaties, meaning the reliance on good faith and common intentions of the parties¹⁰, they will be the ground for the following considerations.

The framework of arts 31-33 VCLT provides to the judge instruments for interpreting international conventions. It assures the convention's autonomous standing, which is staying away from the national law in order to support the idea of unified law.¹¹ This is supported by increasing reliance on the comparative method where the courts instead of turning to national law do take the foreign judgements into

⁶ More on the ‘legal transplants’ see: Jörg Fedtke, ‘Legal transplants’ *Encyclopedia of Comparative Law*, (Edward Elgar 2012) 550-553.

⁷ Malcolm A. Clarke, *International Carriage of Goods by Road: CMR*, (Informa 2009) 10-11.

⁸ The framework includes also art. 33 VCLT which is not considered in deep in current submission.

⁹ Panos Merkouris, (Inter)Temporal Considerations in the Interpretative Process of the VCLT: Do Treaties Endure, Perdure or Exdure? in Mónika Ambrus (eds), *45 Netherlands Yearbook of International Law* (2014) 147-148 and case law cited there.

¹⁰ Andrea Bianchi and others, *Interpretation in International Law*, (Oxford 2015) 194-201.

¹¹ See for example the judgment of the Bundesgerichtshof from 14.02.2008 I ZR 183/05 as referred in [2008] 43(6) *European Transport Law Journal* where the court stated that the notion ‘contract of carriage’ should be understood autonomously that is out of the context of national law.

consideration.¹² The interpretation starts with the actual text of the convention and its natural meaning (compared also on the ground of other language versions of the convention) consistent with normal meaning and other parts or special meaning intended by the parties (i). While deciding the ordinary meaning the context should be taken in consideration which comprises possible modifying agreements and other connected instruments (ii). The same influence has also a subsequent agreement or practice in the application of the treaty (iii). All ambiguities in turn should be resolved in the light of the convention's purpose (iv). Should the interpretation on the ground of the preceding points lead to conflicting results the courts can recourse to supplementary means of interpretation, e.g. travaux preparatoires (v). Interpretation is correct if a legal decision is defensible and plausible. Plausibility is in turn supported if these decisions are predictable and acceptable – also with regard to passing over or stretching the ossified regulation – thus contributing to the legal certainty.¹³ Finally, acceptability should rest on protecting parties' intentions, legitimate expectations and treaty's object and purpose.¹⁴

In order to apply all the steps correctly the court should balance different means and principles of interpretation. The grammatical arguments should be supported by systemic, teleological and historical arguments whereas the leading principle of actuality by principles of integration, effectiveness and subsequent practice.¹⁵ The principle of actuality relates to the interpretation on the basis of actual text and natural meanings of the words, thus grammatical arguments. Integration and effectiveness imply that the treaties should be interpreted as a whole with reference to their object and purpose and the terms should be given the fullest weight and effect consistent with normal meaning and other parts.¹⁶ They basically imply teleological arguments but under command because actuality is the prevailing one - thus preventing excessive judicial discretion. The subsequent practice is in principle the interpretation operating between the parties.

Interpretation of the CMR constitutes thus a complex process, requiring many aspects to be taken into consideration. The convention, taken away from the national context, needs to be treated autonomously and there should be a constant balance between methods and principles of interpretation while taking the next steps of interpretation. As mentioned, interpretation is correct if a legal decision is defensible and plausible, that is predictable and acceptable. On the one hand, one may question predictability because there is no warranty of uniform application. Courts despite depending on the same framework may arrive with different conclusions. Nevertheless, the unified framework assures still higher certainty than adjudication on the base of different national jurisdictions. On the other hand, acceptability might be questioned as the call for balancing different methods and principles of interpretation is not founded on the strict rules. However, since the practice of interpretation is imbedded in good faith and common intentions of the parties, which in the case of the CMR can be broadly identified with the purpose of the convention, these will constitute a natural barrier for interpretations going beyond it.

¹² See for example the judgement of the Hoge Raad Der Nederlanden from 18.12.2009 Nr. 07/11057 as referred in [2010] 45(1) European Transport Law Journal where the court confirmed the interpretation of art. 32 CMR according to standards set in art. 31 VCLT and underlined that the case law and jurisprudence from the Member States form a primary tool of interpretation because of falling under the art. 31(3) VCLT.

¹³ See three elements of legal certainty as presented by Juha Raiti i.e. formal factual and substantive. Formal relates to predictability, substantive to acceptability whereas factual excludes obsolete laws, in: Juha Raitio, *The Principle of Legal Certainty in EC Law*, (Kluwer Academic Publishers 2003) 372-375.

¹⁴ Eirik Bjorge, *The Evolutionary Interpretation of Treaties*, (Oxford Scholarship Online 2014) 74-75.

¹⁵ G.G. Fitzmaurice, C.M.G., 'The Law and Procedure of the International Court of Justice: Treaty Interpretation and Certain Other Points' [1951] 28(1) British Year Book on International Law 7-24.

¹⁶ Compare with: Juha Raitio, *The Principle of Legal Certainty in EC Law*, Kluwer Academic Publishers (2003) p. 307; and Martin Gebauer, 'Uniform Law, General Principles and Autonomous Interpretation', [2000] 5 Uniform Law Review 687. Both authors opt for primacy of linguistic arguments supported systemic and then teleological arguments.

The purpose of the CMR is expressly stated in its preamble. The point is to standardize ‘the conditions governing the contract for the international carriage of goods by road, particularly with respect to the documents used for such carriage and to the carrier's liability’. The wording of preamble clarifies the meaning of the convention’s purpose and sets a standard of rather restrictive understanding of the convention.¹⁷ This is also confirmed by the art. 41 CMR where it is stated that any stipulation which would directly or indirectly derogate from the provisions of this convention shall be null and void. It implies that the terms used in the convention were intended to fix the scope of parties’ rights and obligations. This however does not preclude dynamic interpretation as far as technical terms are concerned. In another words parties’ intention leaves a room for the evolution of technical terms as far dynamic interpretation of these terms satisfies parties’ intention and the purpose of the convention.

2.2. Evolutionary terms in the CMR interpretative framework

According to the Study Group on the Fragmentation of International Law the concept can be considered evolutionary if it ‘(a) (...) is one which implies taking into account subsequent technical, economic or legal developments; (b) (...) sets up an obligation for further progressive development for the parties; or (c) (...) has a very general nature or is expressed in such general terms that it must take into account changing circumstances.’¹⁸ Thus, the presumption is that highly technical or general terms imply evolutionary character of concepts inherent in the conventions.¹⁹ The notion “*evolutionary*” should be stressed here as entirely new concepts will never be allowed to enter the already established sets of legal rules.²⁰

There are in principle two approaches to evolutionary terms in international law. The first one is grounded in the subsequent practice as expressed in art. 31(3)(b) VCLT. The second is based on the arts 31(1) and 31(3)(c) VCLT. Here again the object and purpose of the convention are taken in consideration followed by applicability of relevant rules of international law. On the one hand these two approaches have different repercussions. Should the term be interpreted on the basis of subsequent practice, its new interpretation will remain fixed unless there is further subsequent practice. However, should there be signs in the text that the meaning of a term is dynamic, it will require interpretation on each occasion of the new case at hand.²¹ On the other hand, what these approaches have in common is that the recourse to them is still the subject to the intention of the parties.²²

The examples of evolutionary terms in transport conventions including CMR are illustrated by the cases concerning the status of a container, trailer or similar means used to group the cargo. The consequence of the container revolution resulted in the evolution of fact as the courts tend to accept the development in technology but also in evolution of law because of the Rotterdam Rules which are the legal response to these developments. These technical terms have highly influenced the understanding of concepts embedded in transport conventions, among the others – “goods”, “loading” and “ship”.

¹⁷ G.G. Fitzmaurice, C.M.G., 'The Law and Procedure of the International Court of Justice: Treaty Interpretation and Certain Other Points' [1951] 28(1) British Year Book on International Law 24-25.

¹⁸ Conclusions of the work of the Study Group on the Fragmentation of International Law: Difficulties arising from the Diversification and Expansion of International Law, United Nations (2006) note 7 para. 23.

¹⁹ See also different taxonomies for evolutionary terms in: Panos Merkouris, (Inter)Temporal Considerations in the Interpretative Process of the VCLT: Do Treaties Endure, Perdure or Exdure? in Mónica Ambrus (eds), *45 Netherlands Yearbook of International Law* (2014) 141- 143.

²⁰ Richard Gardiner, *Treaty Interpretation*, (Oxford 2008) 243.

²¹ Julian Arato, 'Subsequent Practice and Evolutive Interpretation: Techniques of Treaty Interpretation over Time and Their Diverse Consequences' [2010] 9 The Law and Practice of International Courts and Tribunals 450-455.

²² Panos Merkouris, (Inter)Temporal Considerations in the Interpretative Process of the VCLT: Do Treaties Endure, Perdure or Exdure? in Mónica Ambrus (eds), *45 Netherlands Yearbook of International Law* (2014) 143-144.

In the prominent judgement from the 1 February 2008²³, the Dutch Supreme Court decided that a container may be considered a part of the ship if it is provided by the carrier. Remarkably, the court decided to refer to the status of a container as referred in the Rotterdam Rules²⁴ despite the fact that the Hague Visby Rules were applicable and the Rotterdam Rules were – and still are – not in force. The court in the process of interpretation found out that neither the text of art. 3 paragraph 1 Hague Visby Rules nor its preamble give clear answer to the question whether the containers supplied by the carrier for the purpose of cargo transportation are to be considered part of the ship. Since the ordinary meaning of the convention – including its preamble – brought no results, the court took recourse to historical method of interpretation and referred to the travaux préparatoires of The Hague Visby Rules. Even though it is questionable whether the immediate recourse to supplementary means of interpretation was correct, these as well provided no answer to the problem. In view of this, the court took a position that in interpreting a provision of uniform private law the purpose and the scope of that provision have a decisive importance. In fact, the court turned to the teleological approach. It was further decided that the scope of the duty of care of the carrier under Art. 3 of the Hague Visby Rules includes also to the cargoworthiness, meaning that the ship has to protect the cargo against the dangers of the sea. This implies that the carrier must ensure that the containers provided by him are suitable to carry the load placed therein. The court did not finish its conclusions with the application of the purposive method as it subsequently supported its decision by the reference to the definition of a container contained in the art. 16 (1) Rotterdam Rules. *De facto* we can talk here about subsequent practice before the subsequent agreement is actually in force.²⁵ It is fair to presume that the court considered that the parties by using the technological developments intended the concepts of ‘goods’ and ‘ship’ to have the evolutionary character.

The technological developments inspires adjudication also under other transport conventions. Speaking of the CMR, containerization has influenced the dynamic meaning of the loading and stowing operations as far as the groupage service is concerned. Here again, the practise seems to recognize the status of a container or other means to group cargo similarly to the Rotterdam Rules. In principle, one who takes the initiative to load – or consolidate – and stow the groupage cargo in the containers is liable for the damage arising therefrom. For example, in the decision of Budesgerichtshof from 25.01 2007²⁶ the court stated that the carrier is liable for the groupage cargo if he performed the consolidation. This is consistent with the case Brussels 23.12.71 (1972) 7 ETL 865²⁷ where it was held that even if the groupage is performed by the operator acting as an agent of the sender, the groupage is still within sender’s risk and with the decision of Rechtbank van Koophandel te Gent (3e kamer) from 1.12.1998 where the groupage prepared by the sender but modified by the carrier resulted in shifting the risk from sender’s to carrier’s side.²⁸

Relying on the evolutionary character of terms must be thus a matter of necessity and subject to coherent approach in the field where the concepts can operate.²⁹ The concept based on evolutionary terms should still work within the framework prescribed by the convention and cannot contradict it. Since parties’ intention leaves a room for the evolution of technical terms, the court should pay special attention to the context and convention’s purpose while interpreting the natural meaning of the terms which are subject to

²³ The decision of the Dutch Hoge Raad from 1.02.2008, no C06/082HR. Available at: <http://uitspraken.rechtspraak.nl>

²⁴ Arts 1(24) in conjunction with 14 (c) and 17.5(a) Rotterdam Rules.

²⁵ On the difference between modification by the subsequent agreement and subsequent practice see: Georg Nolte, *Treaties and Subsequent Practice*, (Oxford 2013) 34-45.

²⁶ (I ZR 43/04)

²⁷ As reported in: Malcolm A Clarke, *International Carriage of Goods by Road: CMR*, (Informa 2009) 268. Clarke notices there also the possible dual role of a carrier if he performs loading according to the instructions of the sender. Even in these situations the sender bears the risk of loading.

²⁸ In its decision from 1.12.1998 as referred in [1999] 34(3) European Transport Law Journal the Rechtbank van Koophandel te Gent (3e kamer) decided that despite loading and stowing of a groupage by the consignor, the carrier is still liable for the damage of the goods when he unloads part of the groupage and does not protect the latter part.

²⁹ Andrea Bianchi and others, *Interpretation in International Law*, (Oxford 2015) 236.

technological change. This should be the case unless there is a subsequent agreement or practice explicitly constituting the change.

3. Functional application of autonomous vehicles

The CMR will not be easily replaced which is a common feature of systems of regulation on a supranational level. Due to that different methods of how to deal with operation of autonomous vehicles has been developed. These methods indicates the way the term 'vehicle' can evolve. It is therefore important to break the functional application of autonomous vehicles down into different categories that can be identified in the current practice. Autonomous vehicles are considered vehicles as such, vehicles driven by A.I. agent and vehicles equipped with autonomous system.

The first category is the vehicle as such, where the vehicle and A.I. system are defined as one technical concept. This categorization triggers the relocation of liability with the developer of the vehicle. For example Volvo has announced this approach as a step to allow further progress in the development, in testing, and the use their autonomous vehicles³⁰. When these vehicles are operating in autonomous mode, Volvo takes responsibility for any wrongdoing of the vehicle. The similar approach can be noticed in the European Parliament motion on the recommendations on Civil Law Rules on Robotics to the Commission on Legal Affairs.³¹ The premise of this motion is that A.I. systems and robotics can contribute to the economic and social welfare of the European Union, but that the risks and consequences are profound and regulation is required in order to address these and guard the values that are deemed important. European Parliament's recommendations underline the necessity of application of strict liability as a rule in case of the damage caused by autonomous systems where the liability of the machine-learning process to the A.I. would be measured by the system's learning capability. In other words, the longer it would take to equip the system with its autonomous skills, the greater the responsibility of the one in charge of equipping would be. The recommendations also highlight other solutions like obligatory insurance schemes or compensation fund, these in turn to protect producer, user or programmer who will bear high risk and responsibility of releasing systems on the market.³²

A second category is the distinction between the vehicle and the 'driving agent', in this case A.I. systems. This distinction separates the vehicle as a technical concept from the decision-making agent that is in control of the vehicle. The 'driving agent' finds its source in the Google Self-Driving Car Project. The Google Self-Driving Project is one of the largest experiments with 58 self-driving vehicles at this moment³³. These vehicles are allowed on the road in certain cities and states in the U.S., for which specific agreements have been made. Their fleet of vehicles are partly traditional vehicles that are equipped with self-driving systems, and partly new vehicles that are developed to drive autonomously without any driver controls. These last vehicles, introduced in 2014, encountered the problem that the legal definition of driver was inevitably human, even though humans cannot control this vehicle anymore. At the initiative of Google, the U.S.

³⁰ More on the federal guidelines for autonomous driving according to Volvo: <<https://www.media.volvocars.com/global/en-gb/media/pressreleases/167975/us-urged-to-establish-nationwide-federal-guidelines-for-autonomous-driving>>

³¹ Draft report with recommendations to the Commission on Civil Law Rules on Robotics, European Parliament Committee on Legal affairs. Available at: <<http://www.europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//NONSGML%2BCOMPARL%2BPE-582.443%2B01%2BDOC%2BPDF%2BV0//EN>>

³² Compare with: David C. Vladeck, 'Machines without principals: Liability Rules and Artificial Intelligence' [2014] 89 (117) Washington Law Review 145-150; European Parliament Draft Report with recommendations to the Commission on Civil Law Rules on Robotics from 31.05.2016 (2015/2103 (INL)) 10, 22.

³³ See for more information: <https://www.google.com/selfdrivingcar/reports/>

National Highway Safety Administration decided that the A.I. system that controls the vehicle is the legal driver of the vehicle³⁴

To further complicate matters, a third category can be recognized. Namely the A.I. system is considered here only an additional and assistive equipment of the vehicle. This equipment that is not inherently part of the vehicle can provide different levels of autonomy to the vehicle. Two examples are the Tesla Autopilot, which is an optional package on their vehicles that provides a limited level of autonomy to the vehicle³⁵. A second example is the self-driving car kit from Comma.ai³⁶, a kit that is being developed to install on a large set of vehicles to provide a limited level of autonomous driving in comparison to the Tesla Autopilot. The third category further complicates matters because the liability may only be determined on a case-by-case basis because of the very different applications, technical abilities, and use cases.

4. CMR & autonomous vehicle

Autonomous vehicle is not a legal but technical concept. What at the present day seems to be identified with autonomously operating trucks is probably going to change in few years' time, this especially in the light of discussed above categories of autonomous vehicles. It will matter as far as the interpretation of the CMR is concerned if new technologies can influence the meaning of the conventional terms. In the following section, the focus is on what the autonomous vehicle according to CMR can be.

The scope rules of the CMR laid down in art. 1 underline as one of the requirements of the Convention's applicability the carriage of goods in vehicles. It is further provided that a 'vehicle' means motor vehicles, articulated vehicles, trailers and semi-trailers as defined in the art. 4 of the Convention on Road Traffic dated 19 September 1949. Without going into details on the applicability of the Convention on Road Traffic in its form from 1949 and its amended version from 1968 through the reference in the CMR³⁷, the core of the concept of vehicle presented there is the requirement of the presence of a person who drives a vehicle, ("driver").³⁸ Nevertheless, since the CMR refers only to exact definitions which do not include personal assistance of the driver or other type of navigation, autonomous road vehicles would be considered the vehicles falling under the art. 1.2 CMR. Meaning, they could be considered motor vehicles which are self-propelled vehicles normally used for the transport of persons or goods upon a road, other than vehicles running on rails or connected to electric conductors. The problem left is the qualification of the A.I. systems which operates the vessel.

How unmanned autonomous navigation will be integrated into the car is something of an open question. The ongoing projects present the solutions where the autonomous software is operating the vessel³⁹, is the integral part of the vessel or even aftermarket technology which can be applied in every "standard" car. As a result, the A.I. system can be the inherent part of the vehicle but also the equipment provided for the purpose of carriage. Then, in case of the software failure the situation is at a difficult crossroad because 3 liability regimes might be applicable. The carrier may be liable under 17.3 CMR in case software is qualified as a part of the vehicle. However, if this software is treated as a part for special equipment less strict duty from 17.4 in conjunction with 18.4 CMR will be applicable. Finally, if the software is neither

³⁴ NHTSA decision on Google Self Driving Car Project. Available at: <<http://isearch.nhtsa.gov/files/Google%20-%20compiled%20response%20to%2012%20Nov%20%2015%20interp%20request%20-%204%20Feb%2016%20final.htm>>

³⁵ More information available at: <https://www.tesla.com/nl_NL/presskit/autopilot?redirect=no>

³⁶ More information available at: <https://commaai.blogspot.nl/>>

³⁷ K.F. Haak, *The liability of the carrier under the CMR*, (Stichting Vervoeradres 1986) 48-49.

³⁸ Art. 4 in conjunction with art. 8 of the Convention on Road Traffic from 19 September 1949.

³⁹ Whereas now there is still a human 'controller', in the near future he will be also replaced by AI system. See e.g.: Sungwook Cho (et.al), 'Development of a Cooperative Heterogeneous Unmanned System for Delivery Services', [2014] 20 (12) Journal of Institute of Control, Robotics and Systems 1181-1188.

the part of the vehicle nor the special equipment, the liability of the carrier will be decided on the ground of art. 17.1 CMR.⁴⁰

Obviously, the synthetic distinction concerning the software being a part of vehicle or not will lead to uncertainty in judgments. The consequences of these 3 regimes are different. In the light of broad interpretation of the “latent vehicle’s defect”⁴¹ and rather high threshold of art. 18.4 CMR, if we consider the system as falling under the scope of respectively art. 17.3 or 17.4, this would question the issue of imposing unreasonable conditions on the carrier. Basically, any failure of an A.I. system, which would be attributable as either the defect of vehicle or lack of proper maintenance (for example in case of not preventing cybercrime and hacking) will be the ground to hold the carrier liable. The general liability rule from art. 17.1 CMR and exoneration clauses established especially in arts 17.2 (circumstances that could not be avoided) and 17.5 (liability to the extent of contribution to the damage, loss or delay) might also not assure certainty. Since AI systems are constantly developing, the circumstances which cannot be avoided today, may be easily prevented tomorrow. Similar problems can happen with the assessment of contribution to damage, loss or delay. The point is how to judge a diligent carrier when the A.I. system is playing a trick on him.⁴² Does the fact of using the systems which are subject to constant development make him immediately negligent?

For further consideration should be left whether for the future of autonomous vehicles and their autonomous standing new liability rules should be created. This is especially important in the light of new risks inherent to the autonomous vehicles and growing recognition of the autonomy of A.I. systems which are de facto capable of being in charge of some operations. As mentioned before, the US National Highway Traffic Safety Administration (NHTSA) for the purpose of Google which is testing autonomous vehicles has issued an interpretation where the computerized system has been considered the driver.⁴³ Should the A.I. system be assigned the commonly known functions of agent or even a carrier, the evaluation of commonly known concepts is required as for example it might be impossible to judge what the negligence of the agent A.I. system is or subject to which regulation the liability should be established. Another example is Volvo which decided to accept full liability for the wrongful actions of its autonomous cars. Should there be a clause in the carriage contract shifting the responsibility for the vehicle or vehicle and its A.I. system from the carrier to the producer, it might be found as a clause derogating from the CMR provisions under art. 41 CMR.

Undoubtedly, the presence of A.I. systems equals the occurrence of new risks. The assessment of these risks is getting very difficult or even impossible with the regulations at hand. The CMR as a legal model becomes in large parts also outdated. This in turn might produce something of a stalemate. In case of the CMR its aim to balance the powers between contracting parties and provide the uniformity of applicable law might not be any more possible even if the judges, deciding on the ground of the Convention, stretch its rules to the maximum. Subsequent problem, however, undoubtedly resulting from the preceding, is the moment when this 'stretching' must be stopped.

5. CMR – future proof or time for a reform?

Due to the fact that international conventions are not easily replaced, they should be found under certain circumstances as ‘living instruments’ and evolutionary terms facing technological development is certainly

⁴⁰ Compare with: Malcolm A. Clarke, *International Carriage of Goods by Road: CMR*, (Informa 2009) 245-247.

⁴¹ Compare: Jan Theunis (ed.), *International Carriage of Goods by Road (CMR)*, (LLP 1987) 85; Contrary: K.F. Haak, *The liability of the carrier under the CMR*, (Stichting Vervoeradres 1986) 152.

⁴² See as an example the cases of flash crashes on the financial markets, where it is difficult or impossible to establish the cause of system's failure. Available at: <https://www.sec.gov/news/studies/2010/marketevents-report.pdf>

⁴³ NHTSA decision on Google Self Driving Car Project. Available at: <http://isearch.nhtsa.gov/files/Google%20-%20compiled%20response%20to%2012%20Nov%20%2015%20interp%20request%20-%204%20Feb%2016%20final.htm>

one of these. It is especially important in the light of the fact that VCLT assures safety mechanisms for dynamic interpretations which will prevent judges becoming legislators. That is to say, the dynamic interpretation should be always imbedded in parties' will and purpose of the convention. Secondly, the practical applications show the way the term can evolved. Nevertheless, this again should comply with the framework of interpretation.

Speaking of autonomous vehicles in the CMR framework, the autonomy of the machines is a very challenging issue, especially due to the fact that they are considered to operate on the same level as humans without supervision. Whether this might be consistent with the CMR framework, even with its dynamic interpretation, is highly doubtful. The reason behind this doubt is that the autonomous vehicle stretches the concept of vehicle under the CMR until the point where the evolutionary character of the concepts can be questioned.⁴⁴ The practice shows that the term 'vehicle' can acquire such a meaning which will prevent the purpose of the CMR. That is to say, according to the available CMR liability regimes, the autonomous vehicle with its A.I. system will in principle always depart from the purpose to limit the carrier's liability. Furthermore, this liability in case of using autonomous vehicles - at least for now - may only be determined on a case-by-case basis because of the very different applications, technical abilities, and constant development of autonomous vehicles. In the light of this, the interpretation will never comply with the standard of predictability and acceptability.

As a result, some options can be taken in consideration. When the introduction of self-driving vehicles stretches the concepts and framework of the CMR to its limits, the consequences of breaking the framework of the CMR convention should be considered before the breaking point is actually met. Only then will the CMR convention demonstrate to be future-proof. Thus, a structural dialog between legislators, judges, legal scholars and the transportation sector is required to monitor the concepts of CMR and anticipate technological developments that may influence the concepts of the CMR. These developments will be uncertain and may never be fully anticipated, but proactive monitoring will provide grip on the uncertainties that these technological developments bring to the CMR. Should the situation reach the moment when new technological developments cause derogation from the convention's regime, the revision tools embedded in the conventions – in the context of this submission art. 49 CMR – must be finally taken into consideration.

⁴⁴ Conclusions of the work of the Study Group on the Fragmentation of International Law: Difficulties arising from the Diversification and Expansion of International Law, United Nations (2006) note 7 para. 23.