

The New HPCA's Optional Rules for Arbitration and Their Relevance to Disputes Arising From Erroneous Navigational Signals

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Abstract

The issues of dispute resolution and of liability arising from erroneous navigational signals provided from Global Navigational Satellite Systems (GNSS) are topical lately. The existing literature thus far supports the view that current space law provisions do not cover disputes and damage scenarios resulting from erroneous navigational signals. For example, according to the prevailing legal analysis, the Liability Convention for Damage Caused by Space Objects does not cover such kinds of disputes, given the fact that the navigational signal would not be qualified as a space object. As a result, most of the legal scholars further suggest the adoption of an international convention which would subject GNSS operators to a strict liability regime with a limitation on the amount of compensation and furthermore supplemented by a compensation fund. This contribution seeks to address the issues of damage and dispute resolution for erroneous navigational signals from a different perspective, particularly under a newly adopted legal mechanism: The Permanent Court of Arbitration's (PCA) Optional Rules for Disputes Relating to Outer Space Activities. One interesting provision contained within these rules is article 1. Article 1 par. 1 provides that *"the Outer Space Rules can be adopted by consent as the rules between any parties whatever their nature..."*. Furthermore, the last sentence of article 1 stipulates that *"the characterization of the dispute as relating to Outer Space is not necessary for jurisdiction under these rules..."*. Hence, one would argue that the scope of application -both personal and material- of the PCA rules is quite broad, depending exclusively on the will and the consent of the parties. In light of this broad scope of application of the new PCA rules, the paper will examine their relevance for disputes in the field of Global Navigational Satellite Systems. Additionally, it will assess the practical chances of success of this new legal instrument for potential GNSS related disputes.

Key Words

GNSS failure – Erroneous broadcasted navigational signals – Alternative mechanisms of dispute resolution – PCA rules

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I INTRODUCTION

I.I Research Theme

This paper will examine the relevance of the new PCA rules for Outer Space activities¹ in relation to disputes that might arise in the field of global satellite navigation. In doing so, it will attempt to answer the following questions: First, whether a dispute arising from erroneous broadcasted navigational signals could fall under the personal and material scope of application of the new PCA rules for Outer Space activities. Second, whether this new legal instrument could be considered as an efficient way to resolve such kinds of disputes. Finally, the paper will address the question of whether the new PCA rules would be a more appropriate resolution in lieu of proposing the adoption of an international convention² dealing exclusively with the concept of GNSS failure and GNSS damage.

I.II Sections

After providing key definitions and describing shortly the current state of affairs in the field of satellite navigation (Section II), the paper will briefly discuss the limits of already existing legal –mainly liability law- provisions for disputes relating to satellite navigation. To this end, international space law provisions, general international law provisions and some national – mostly tort- law provisions will be discussed in more detail (Section III). Subsequently, the paper will center upon the new PCA rules. The reasons behind the adoption of these rules as well as some of their important characteristics, such as their personal and material scope of application, will be briefly examined (Section IV). Finally, the paper will give some practical examples of potential applications of the PCA rules through the use of two case studies within the field of GNSS. At this part, the paper will also evaluate the chances of success of applying the new PCA rules for future disputes stemming from a GNSS failure rather than proposing the adoption of a public international law instrument which will be GNSS specific (Section V).

¹ Permanent Court of Arbitration, *Optional Rules for Arbitration of Disputes Relating to Outer Space Activities* (hereinafter PCA Rules on Outer Space Disputes), effective since 6th of December 2011.

² For the prevailing views in the literature for the adoption of a GNSS specific international convention see: Sergio Carbone & Maria Elena De Maestri, “The Rationale for an International Convention on Third Party Liability for Satellite Navigation Signals”, in *Uniform Law Review*, 2009, p. 38. See also in this regard: UNIDROIT, “An instrument on third party liability for Global Navigation Satellite Systems: A preliminary study”, 579, 2010, page 1. In this respect also: Ulrich Magnus, “Civil Liability for Satellite-Based Services”, in *Uniform Law Review*, 2008, p. 935.

II. SATELLITE NAVIGATION AND LIABILITY RISKS: A BRIEF OVERVIEW

II.1 Global Satellite Navigational Systems (GNSS)

1. What is Satellite Navigation?

One of the first fields of satellite based services which developed very quickly is that of navigation (more specifically, the field of Global Navigational Satellite Systems). By using the GNSS capabilities, many individuals around the globe can easily pinpoint their position on Earth and can easily decide where they would like to go. However, at this point, several questions arise: First, what is the meaning of GNSS? Second, what are most important elements for the operation of the GNSS technology? Third, what are the possible applications connected with this kind of technology? And last but not least, what are the current legal challenges associated with the use of the GNSS technology?

In a broad context, GNSS can be understood as a specific kind of space based technique. This technique has been designed in such a way as to provide in all weather conditions, three dimensional position, velocity and timing data³. It is worth mentioning that for the operation of GNSS, there is a need to employ advanced technology. This technology, essentially, works as follows⁴: A number of satellites are placed into fixed orbits in Outer Space, the satellites are constantly emitting navigational signals by indicating their position at any given time and in a very precise way. The navigational signals can be received by any person possessing the necessary technology such as a GNSS receiver. When receiving the signals from at least four satellites, the receiver can give information and pinpoint the position of persons and goods around the globe exactly to the meter. In principle, the service offered by GNSS can be viewed as quite similar to the Internet. Both are having global dimension, they are easily accessible with appropriate technology and are free of charge. In addition, the use of the GNSS technique is spreading as quickly as that of Internet. Currently, there are two GNSS structures in operation⁵: The United States' Global Positioning System (GPS), the first GNSS structure to become operational, and the Global Orbiting Navigation Satellite System (GLONASS), operated under the auspices of the Russian Federation. In the near future, an additional GNSS structure will become operational, Galileo,

³ UNIDROIT, "An instrument on third party liability for Global Navigation Satellite Systems: A preliminary study", S79, 2010, p.1 esp. p.4. See also: Ulrich Magnus, "Civil Liability for Satellite-based Services", in *Uniform Law Review*, 2008, p. 935, esp. p. 935-937.

⁴ *Ibid.*

⁵ Alessandra Andrade, "*The Global Navigation Satellite System*", Ashgate Studies in Aviation, Economics and Management, 2009, esp. p. 36-65.

which will operate under the auspices of the European Union⁶. An important element of GNSS worth mentioning is that the provision of these services is currently undertaken by State entities or supranational organizations. For instance, GPS is operated by the US Department of Defense⁷, whereas Galileo will most likely be operated by a specific EU GNSS body under the authority of the European Commission⁸.

Image 1: Functional model of GNSS⁹



2. A great range of civil applications

The first GNSS structure, namely that of GPS, was developed for military applications only. Nonetheless, since the year 2001, GPS has been made available for a great range of civil applications¹⁰ as well. With the advent of GPS and GLONASS, and soon enough with the addition of Galileo, the different civil applications associated with navigation, timing and location data have proliferated remarkably around the globe¹¹. One of the most well-known applications of GNSS is that of navigation. Different means of transportation such as airplanes, ships, cars and trains are and will be

⁶ http://ec.europa.eu/enterprise/policies/satnav/galileo/index_en.htm, last accessed on 11.06.2014.

⁷ <http://www.gps.gov/governance/agencies/defense/>, last accessed on 11.06.2014.

⁸ See Regulation (EC) No 683/2008 of the European Parliament and of the Council of 9th of July 2008 on the further implementation of the European satellite navigation programs (EGNOS and Galileo), esp. Article 16 of the said Regulation. At this point, it should be highlighted the fact that in the near future also private entities might be contributing to the provision of GNSS services.

⁹ Image source European Space Agency's website, http://www.esa.int/Our_Activities/Navigation/How_satellite_navigation_works, last accessed on 11.06.2014.

¹⁰ In 1996, the US administration, under the President Clinton, offered such civil use for a period of at least 10 years free of charge. For more details see "Fact Sheets US Global Positioning System Policy", 29th of March, 1996.

¹¹ UNIDROIT, "An instrument on third party liability for Global Navigation Satellite Systems: A preliminary study", S79, 2010, p.1, esp. p. 14-18. See also Ulrich Magnus, "Civil Liability for Satellite-based Services", in *Uniform Law Review*, 2008, p. 935, esp. p. 935-940.

navigated by using the navigational data offered by GNSS. However, the GNSS technique has developed far beyond its original goal which was the provision of navigational data. It can also provide information for timing and positioning. Consequently, many applications connected with timing as well as positioning have emerged. To illustrate further: Different financial institutions, such as banks, will synchronize their networks by using the GNSS timing capabilities. In addition, they will also record their economic transactions by exploiting the timing capabilities offered by GNSS. Hence, the GNSS technique has evolved into a constantly expanding field of satellite based services. For the near future, it is quite likely that many applications will continue to be developed. Therefore, the future of GNSS technology will not be limited to one specific field.

Image 2: Navigational capabilities of GNSS¹²



II.II Risks and Legal Challenges: The Concept of Dispute within the Field of GNSS and Possible Liability Scenarios

1. Different causes of errors that can result in a GNSS failure with important liability implications

Considering the foregoing analysis for the advent of the different –GNSS-civilian applications, there is no doubt that the GNSS technology will be quite advantageous for many areas of daily life. But still, when there are advantages, there also risks and legal challenges¹³. As discussed earlier, GNSS can be understood as a global system similar to the service offered by the Internet which is based on the use of advanced and sophisticated technology. Moreover, many actors contribute to the provision of GNSS services¹⁴: Basic signal providers, secondary/augmented signal providers, government

¹² Image source European Space Agency's website, http://www.esa.int/Our_Activities/Navigation/About_satellite_navigation2, last accessed on 11.06.2014.

¹³ Ulrich Magnus, "Civil Liability for Satellite-based Services", in *Uniform Law Review*, 2008, p. 935, esp. 935-937.

¹⁴ See Frans G. von der Dunk, "Liability for global navigation satellite services: A comparative analysis of GPS and Galileo", in *Journal of Space Law*, 2004, p. 129, esp.p.132-139.

regulators, launch contractors and insurers are just to name but a few. These facts, therefore, encompass a number of risks and uncertainties: Technological risks, governance risks and more importantly liability related risks can be mentioned¹⁵.

Regarding liability risks, situations including damage might be envisaged. For example, if the satellite system and the satellite based technology for GNSS do not function as anticipated, these might cause considerable damage with important liability implications. Considering the worst scenario, the malfunction of GNSS technology might even lead to catastrophic losses. This will not be the general rule, but nonetheless loss scenarios can be envisaged. Some hypothetical scenarios of damage would be an aircraft crash, a shipwreck or damage where a major financial transaction being executed is disrupted by satellite signal loss. Thus, the issue of civil liability for GNSS becomes significant.

In a broad context, the civil liability for a GNSS failure can be distinguished between **three different tiers/sources of errors**¹⁶. First, there might be liability implications at system level (i.e. errors caused by the manufacturer of the satellites and/or errors caused by the operator/signal provider as a result of a bad/negligent operation of the service). Second, there might be errors introduced at receiver level (i.e. errors introduced by the manufacturer of GNSS receivers). Finally, there will be also the possibility of errors resulting from *force majeure* (i.e. natural phenomena).

2. Some remarks for the limits and the assumptions of the legal analysis under the present contribution

Before proceeding further, it is important to underline the fact that this paper will focus on issues of liability dealing with one specific tier of errors resulting in GNSS failure, **namely errors at signal provider level**. In other words, the paper will purport to liability implications stemming from the use of erroneous broadcasted navigational signals resulting from a negligent operation of the service provider/signal provider. With respect to the sort of liability, the paper will focus on **tort or third party liability issues**¹⁷. Whereas contractual liability

¹⁵ Report from the Commission to the European Parliament and the Council, “Mid-term review of the European satellite radio navigation programs”, COM (2011) 5 final, Brussels, 2011, pages 8-11.

¹⁶ Pamela L. Meredith, Presentation on “Legal and regulatory aspects of GNSS”, Munich Satellite Navigation Summit, 2009. Also: Francis P. Schubert, “An International Convention On GNSS Liability: When Does Desirable Become Necessary?”, *Annals of Air and Space Law*, Vol. XXIV, 1999, p.245, esp. p. 248-251.

¹⁷ Given the fact that GNSS will not operate in a legal and regulatory vacuum but current law will be applicable, one can take the view that the concept of liability as provided by current law will be applicable for GNSS liability risks. Thus, all different sorts of liability will be relevant for cases of damage stemming from the provision of erroneous navigational signals. Mostly non- contractual liability will be of bigger relevance for

claims might be triggered during the provision of GNSS services as well, these will not be examined as such by the present contribution¹⁸. Yet, it should be highlighted the fact that the legal analysis of the present contribution will be based upon the following assumption: **State authorities or supranational organizations run/will run the GNSS and therefore, they will bear the overall responsibility from the operation of these systems**¹⁹.

III. SATELLITE NAVIGATION AND DISPUTE SETTLEMENT: CHARACTERISTICS OF THE EXISTING LEGAL FRAMEWORK

III.I Preliminary Considerations

Generally speaking, the already existing legal framework which may be applicable for issues of liability and dispute resolution for GNSS lacks adequate and effective machinery for settling disputes caused by a GNSS failure. This does not mean to say that there are no legal mechanisms at all. On the contrary, as Professor Frans von der Dunk observes²⁰, there is a legal environment within which satellite based services more generally and GNSS more particularly will operate. But this, in principle, encompasses a large range of separate, already existing, specific legal environments, none of which were developed with satellite based services -and GNSS- in mind. This observation will be valid for issues of liability and dispute resolution for GNSS. Thus, already existing legal -including liability law- provisions may be of importance once a GNSS liability issue occurs.

III.II The International Law Perspective

One of the specificities of the GNSS technique is its inherent international dimension. Consequently, when a GNSS dispute arises, this will certainly have global effects with international dimension²¹. Hence, already existing legal -dispute settlement- mechanisms from the field of international law may come into play.

cases of damage caused by erroneous navigational signals. But still, for some categories of services, such as for Galileo, there will be the payment of a fee, thus, contractual liability might play a role as well. In more detail, see Frans G. von der Dunk, "Liability for global navigation satellite services: A comparative analysis of GPS and Galileo", in *Journal of Space Law*, 2004, p. 129, esp.p.132-135 and Ulrich Magnus, "Civil Liability for Satellite-based Services", in *Uniform Law Review*, 2008, p. 935, esp.p.942.

¹⁸ *Ibid.*

¹⁹ Whereas, for the near future, it is a likely scenario that private undertakings might contribute to the provision of navigational services, this scenario will be the subject of a separate work of research and not as such of the present contribution.

²⁰ See Frans G. von der Dunk, "Liability for global navigation satellite services: A comparative analysis of GPS and Galileo", in *Journal of Space Law*, 2004, p. 129, esp.p.132-135.

²¹ Francis Schubert, "An International Convention on GNSS liability: When does desirable become necessary?", *XXIV Annals of Air and Space Law*, 1999, p. 245, esp.p. 248-251.

1. The International Space Law Perspective

The United Nations Committee on the Peaceful Uses of the Outer Space (UN COPUOS²²) has encouraged the development of the GNSS systems. All states currently providing GNSS services are parties to the Outer Space Treaty²³, the Liability Convention²⁴ and the Registration Convention²⁵. With respect to Galileo, the European Space Agency has declared its acceptance of the Liability Convention and the Registration Convention and the majority of member states of the European Space Agency and of the European Union are parties to the Outer Space Treaty²⁶. Hence, the conclusion which can be reached is that GNSS will be subject to the normal rules as to the use of Outer Space²⁷.

In general, the five United Nations Space Treaties²⁸ provide the legal framework for the exploration and exploitation of Outer Space. Nonetheless, only two of these Treaties contain provisions with respect to responsibility, liability and dispute resolution mechanisms in case that a space related dispute arises, namely the Outer Space Treaty²⁹ and the Liability Convention³⁰. Now, the question which can be asked is as follows: Is there –if any- possibility of using the dispute settlement mechanisms as provided under the current space law treaties for the resolution of disputes caused by a GNSS failure (i.e. erroneous broadcasted navigational signals)? In brief, the prevailing views in the literature so far, can be summarized as follows: Whereas the Outer Space Treaty will be applicable for cases of damage and dispute resolution in the field of satellite navigation³¹, the Liability Convention will not be relevant due to restrictions imposed with respect to its material scope of application³². In particular:

²² <http://www.oosa.unvienna.org/oosa/COPUOS/copuos.htm>, last accessed on 22.06.2014.

²³ The Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and other Celestial Bodies (hereinafter Outer Space Treaty) 1967, 610 UNTS 205, 18 UST 2410, TIAS 6347.

²⁴ Convention on International Liability for Damage Caused by Space Objects (hereinafter Liability Convention), 1972, 961 UNTS 187, 24 UST 2389, TIAS 7762.

²⁵ Convention on Registration of Objects Launched into Outer Space (hereinafter Registration Convention), 1975 1023 UNTS 15, 28 UST 895, TIAS 8480.

²⁶ http://www.oosa.unvienna.org/oosa/SpaceLaw/multi_bi/esa_leg_001.html, last accessed on 16.06.2014.

²⁷ See Francis Lyall and Paul Larsen, “*Space Law: A Treatise*”, Ashgate, 2009, esp. p. 402-406.

²⁸ <http://www.unoosa.org/oosa/en/SpaceLaw/treaties.html>, last accessed on 16.06.2014.

²⁹ See endnote 23, the Outer Space Treaty.

³⁰ See endnote 24, the Liability Convention.

³¹ See endnote 27.

³² Only one legal scholar has expressed the view that damage resulting from incorrect navigational signal broadcasted by a GNSS satellite should be compensable under the Liability Convention for Damage Caused by Space Objects, see B.D.K Henaku, “The Law on Global Air Navigation by Satellite: An Analysis of Legal Aspects of the ICAO CNS/ATM System”, 1998, p.221.

a. The Outer Space Treaty

Articles VI and VII of the Outer Space Treaty provide for the principles of international responsibility and international liability of states for their national activities carried out in Outer Space. Given that GNSS will be subject to the normal rules as to the use of Outer Space, these principles would also be applicable to the field of satellite navigation. Thus, state entities operating the GNSS structures will be internationally responsible and internationally liable for their activities in the field of satellite navigation. However, it should be highlighted that there is one shortcoming within these provisions; these principles as provided by the Outer Space Treaty are of general nature. This means that they are further elaborated by other legal instruments. For instance, whereas according to the Outer Space Treaty, there is a general principle of responsibility and liability of states, there are no provisions relating to the attribution of liability, monetary compensation, plus specific dispute settlement mechanisms³³. Hence, recourse should be made to other legal instruments which elaborate further on these issues. For example, the Liability Convention further elaborates the principle of liability as provided under article VII of the Outer Space Treaty³⁴. With respect to the judicial settlement of disputes relating to Outer Space recourse can, *inter alia*, be made based upon other international mechanisms i.e. judicial settlement under the competence of the International Court of Justice would be an example³⁵.

b. The Liability Convention for Damage Caused by Space Objects

The Liability Convention for Damage Caused by Space Objects further elaborates the principle of liability of States as provided under article VII of the Outer Space Treaty. More precisely, the Liability Convention deals with issues of damage -and dispute resolution – caused by space objects. In short, under this Convention there is the adoption of a two tier system for the attribution of liability. First, in relation to damage caused on the surface of the Earth or to aircraft in flight, there is an absolute liability system, irrespective of fault³⁶. Second, for cases of damage suffered in other places rather than the surface on Earth or on aircraft in flight, the Liability Convention adopts a fault based liability system i.e. cases of collision of satellites³⁷. Along with the two different tiers of liability, the Convention also foresees a dispute settlement mechanism to be activated upon the occurrence

³³ http://www.en.uni.lu/media/files/evaluating_regulatory_instruments_von_der_dunk, last accessed on 29.06.2014; Presentation of Frans G. von der Dunk, “Evaluating Regulatory Instruments”, in 3rd Workshop of Satellite Communications on Harmful Interference, University of Luxembourg, May 2014, esp. slide number 4.

³⁴ *Ibid.*

³⁵ The applicability of general public international law for activities carried out in the Outer Space is explicitly recognized by article III of the Outer Space Treaty.

³⁶ Article II of the Liability Convention.

³⁷ Article III of the Liability Convention.

of a dispute among the parties in relation to the application of the Convention's provisions (the so called Claims' Commission³⁸). Having said that, then, the following question appears: Is there any possibility for the dispute settlement mechanism as provided for by the Liability Convention to be used for the resolution of disputes caused by the use of erroneous broadcasted navigational signals?

According to the prevailing views of the legal scholars thus far, the Liability Convention does not cover all the types of space related disputes but only those that meet the definition of "*damage caused by a space object*"³⁹. Although some attempts have been made for a broader interpretation of the notions "damage" and "space object"⁴⁰, most of the legal scholars support a strict –literal- interpretation of these terms⁴¹. Hence, they advocate the view that the Convention only applies to situations of damage caused directly by satellites and liability therefore; in other words, it applies only to cases of direct damage, attributable to a crashing space object or a collision between space objects in Outer Space. **Taking this view, the Liability Convention would not be applicable to damage caused indirectly through an orbiting GNSS satellite transmitting faulty navigation and positioning information**⁴². Nevertheless, it should be noted that the language of the Liability Convention does not specifically dictate such a narrow interpretation only. Some legal scholars are of the view that the Convention would be applicable to direct and indirect damage caused by a space object⁴³. Moreover, quite recently, during the proceedings of the 56th International Institute of Space Law Colloquium on the Law of Outer Space, two young scholars also drew attention to the fact that the literal interpretation of the Liability Convention is not the only way of interpreting the Convention, but on the contrary, there are also possibilities of applying other interpretation criteria that might lead to different results such as a possible broader interpretation of the notions of "damage" and "space objects" under the Liability Convention⁴⁴.

³⁸ Article XXII of the Liability Convention.

³⁹ See for the prevailing views in the literature so far endnote 2.

⁴⁰ See endnote 32.

⁴¹ http://legal.un.org/ilc/texts/instruments/english/conventions/1_1_1969.pdf, Vienna Convention on the Law of Treaties (hereinafter VCLT), done at Vienna on 23rd of May 1969 and entered into force on 27th of January 1980, United Nations Treaty Series, vol.1115. For the literal interpretation, see article 31 par.1 of the VCLT, most of the authors adopt an interpretation according to the ordinary meaning of the notion of damage and space object within the Liability Convention.

⁴² This is the US interpretation expressed at the Senate Hearing during the ratification of the Liability Convention.

⁴³ See endnote 32.

⁴⁴ Elena Carpanelli and Brendan Cohen, "The Notion of Damage caused by a Space Object under the 1972 Liability Convention", 56th International Institute of Space Law Colloquium on the Law of Outer Space, 64th International Astronautical Congress, Beijing, China, 2013, esp. p. 3-10.

2. The ITU dispute settlement system

Radio would be of vital importance for the smooth operation of GNSS and their augmentation. The navigational satellites cannot function without clear radio signals. The international use of radio is a matter for the International Telecommunication Union⁴⁵. Therefore, along with the space law provisions, it would next make sense to briefly investigate whether there will be any relevance of the current ITU legal framework for potential disputes that might result from a GNSS failure.

In brief, the ITU is a specialized agency of the United Nations that is responsible for issues that concern radio, information and communication technologies⁴⁶. The basic legal texts which govern the ITU are: The Constitution and Convention of the International Telecommunication Union⁴⁷. Along with the Constitution and Convention, the legal texts include the Optional Protocol on the Settlement of Disputes, the Decisions, Resolutions and Recommendations in force, as well as the General Rules of Conferences, Assemblies and Meetings of the Union⁴⁸.

Notably, the ITU legal framework provides for a few options of dispute settlement in case that a dispute arises. Nonetheless, the relevance of these mechanisms remains questionable for disputes relating to GNSS failure. In particular, according to the prevailing views amongst the legal scholars, **the ITU legal framework provides for settlement of disputes through arbitration only for very –few- specific matters such as cases of damage caused by harmful interference⁴⁹. Thus, it seems unlikely that damage scenarios caused by the use of erroneous navigational signals will be subject to the ITU dispute settlement mechanisms.** One would suggest that the ITU legal framework may be applicable for cases of GNSS signal failure caused by harmful

⁴⁵ The International Telecommunications Union (ITU) is a specialized agency under the umbrella of the United Nations and deals with issues concerning radio, information and communication technology. For more information: <http://www.itu.int/en/Pages/default.aspx>, last accessed on 22.06.2014.

⁴⁶ See Francis Lyall, *“International Communications”*, Ashgate, 2011, esp. p. 110; Francis Lyall, *“Law and Space Communications”*, Dartmouth, 1989, esp. p. 358.

⁴⁷ For an overview of the ITU legal framework see <http://www.itu.int/net/about/legal.aspx>, last accessed on 22.06.2014.

⁴⁸ http://www.itu.int/dms_pub/itu-s/opb/conf/S-CONF-PLN-2011-TOC-HTML-E.htm, last accessed on 23.06.2014.

⁴⁹ See article 45 of the Constitution of the ITU for the phenomenon of harmful interference. See also Optional Protocol on the Compulsory Settlement of Disputes Relating to the Constitution of the International Telecommunication Union, to the Convention of the International Telecommunication Union and to the Administrative Regulations (1992). See also Jakhu R., “Dispute Resolution under the ITU Agreements”, available from: <http://swfound.org/media/48115/Jakhu-Dispute%20resolution%20under%20the%20ITU%20agreements.pdf>, last accessed on 23.06.2014.

interference, but other than that, the ITU legal framework does not seem to address in a sufficient manner GNSS liability issues.

3. Other international law

Now, a few words about other international law instruments. In principle, various instruments coming from other branches of international law may play a role as long as a GNSS related dispute occurs; the fields of air law or maritime law are two examples. Additionally, traditional instruments coming from the field of general public international law may be important as well.

Currently, there is no uniform legal mechanism for a global liability regime for damages caused by global navigational satellite systems under any international convention. But still, if the malfunction of the GNSS technique causes loss, other branches of international law might be activated. For example, if the use of erroneous broadcasted navigational signals causes the loss of lives following an aircraft crash or pollutes the environment through a shipwreck, air and maritime law conventions may come into play⁵⁰. In the worst case scenario such as that of a nuclear accident resulting from a GNSS failure, nuclear conventions might come into play as well⁵¹. **It suffices to say that these legal instruments will -most likely- not address damage scenarios from a GNSS failure in a sufficient manner. They have been drafted in so as to deal with the liability of the air carrier, of the ship owner or the operator of a nuclear installation and they do not address GNSS liability risks as such.** In some cases, they might coincidentally cover damage caused by a GNSS failure, but in the majority of the cases they will not⁵².

Leaving aside other specific branches of public international law, it should be noted that disputes relating to Outer Space and satellite navigation more particularly may also be resolved under traditional dispute settlement mechanisms as provided under general public international law instruments; negotiations, enquiry mediation, arbitration and judicial settlement are just to

⁵⁰ From the field of Air Law see for example: "Convention on International Civil Aviation" Chicago, December 7th, 1944. From the field of Maritime Law see in more detail "The United Nations Convention on Civil Liability for Damage Caused during Carriage of Dangerous Goods by Road, Rail and Inland Navigation Vessels" Geneva, October 10th, 1989. See also "the International Convention on Liability and Compensation for Damage in Connection with the Carriage of Hazardous and Noxious Substances by Sea", London, May 3rd, 1996 (Hereinafter the HNS Convention).

⁵¹ See for example "The Convention on Third Party Liability in the Field of Nuclear Energy", Paris, July 29th, 1960 (Hereinafter the Paris Convention).

⁵² For instance, see "International Convention on Civil Liability for Oil Pollution Damage", Brussels, November 29th, 1969. The Convention explicitly excludes the ship's owner liability if "he achieves to prove that the damage was wholly caused by the negligence or other wrongful act of any government or other authority responsible for the maintenance of lights or other navigational aids. See also article 7 (2)(c) of the 1996 HNS Convention.

name but a few examples of mechanisms⁵³. The relevance of these mechanisms in the context of Outer Space activities is explicitly recognized by article III of the Outer Space Treaty which makes general public international law directly applicable also to Outer Space activities. **Nevertheless, the dispute settlement mechanisms of general public international law will not be expected to give satisfactory solutions for situations of damage within the field of satellite navigation either.** So far, practice has revealed states' tendency to be reluctant to accept adversarial forms of disputes such as judicial settlement. In addition, it is worth mentioning that the International Court of Justice has never been asked so far to intervene for the resolution of a dispute relating to Outer Space activities.

III.III The National Law Perspective

Finally, attention should be paid to the relevance of domestic dispute settlement mechanisms (i.e. mainly national tort law or third party liability provisions). A clear indication for the potential relevance of national legal provisions for the field of Outer Space is explicitly recognized under the Liability Convention. Under article XI, the Convention clearly stipulates the possibility to exploit domestic legal mechanisms as an alternative to its own dispute settlement mechanisms⁵⁴. Therefore, national contract and tort law provisions could be applicable as soon as a GNSS liability law incident occurs. At this point, it should be highlighted the fact that due to the inherent international dimension of GNSS, recourse should be made to the rules of private international procedural law and private international law before any substantive national tort and contract law to be applied. The general rule – with certain exceptions- under private international law dictates the application of the law of the country where the incident occurred, the so called *lex loci delicti*⁵⁵. Given that GNSS will have global dimension and will be used worldwide, GNSS loss can be sustained in every country of the world, thus, making the national laws of every country potentially relevant. Regarding the substantive law provisions which may be applicable, the starting point -in light of the inherent international dimension of GNSS- is

⁵³ See article 33 of the United Nations charter which contains a list of different dispute mechanisms for international disputes. See also for a similar analysis in the field of satellite communication disputes, Frans G. von der Dunk, "About the New PCA Rules and their Application to Satellite Communication Disputes", in 2nd Luxembourg Workshop of Satellite Communications at University of Luxembourg, Luxembourg, May 2013. This article will be published in "Dispute Settlement in the Area of Space Communication", edited by Mahulena Hofmann (publication is still under the stage of preparation, to be published by Nomos Verlagsgesellschaft).

⁵⁴ See Article XI (2) of the Liability Convention.

⁵⁵ See in more detail Regulation EC No 864/2007 of the European Parliament and of the Council on the law applicable to non-contractual obligations of 11th of July 2007. The Rome II Regulation, esp. article 5.

that all national tort laws worldwide could be potentially applicable for a potential GNSS liability incident. As a consequence, it is neither possible nor necessary here to give a full analysis of all the existing national tort law provisions. On the contrary, some general tendencies already exist amongst the different national legal systems worldwide and these will be described shortly: In principle, the general tendency is that compensation on tort is most frequently based on four requirements, namely, damage, wrongful act, fault and finally causation. As soon as these requirements are fulfilled, then full compensation is owned⁵⁶. Whereas these elements seem to be commonly accepted within all the legal systems worldwide, differences in the way of their application exist⁵⁷. For instance, some legal systems recognize strict liability regimes irrespective of fault whereas other jurisdictions only recognize compensation based on negligence and fault. Moreover, differences can also be noticed with respect to the compensable heads of damage under different national tort law provisions. Yet, some legal systems allow for punitive damages under tort, whereas some other countries permit only compensatory damages and prohibit the award of punitive damages⁵⁸. **All these differences may ultimately affect issues of liability and dispute resolution within the field of satellite navigation. For example, depending on the applicable substantive tort law provisions, GNSS victims in some cases might receive less or no compensation at all compared to this compensation awarded to other victims for similar kinds of losses under the application of different substantive law provisions.**

III.IV Concluding Remarks

To conclude, some legal mechanisms that may be relevant for issues of damage and dispute resolution within the field of satellite navigation already exist. As demonstrated, current international law provisions, national law provisions but also European law provisions (although due to the limited scope of this paper the EU perspective was not discussed, EU law⁵⁹ may be relevant in light of the advent of Galileo) might come into play once a GNSS

⁵⁶ For an extensive comparative analysis see in more detail Koziol (ed.), "Unification of Tort Law-Wrongfulness", Unification of Tort Law Series, Kluwer Law International (publisher), 1998.

⁵⁷ Ulrich Magnus, "Civil Liability for Satellite-based Services", in *Uniform Law Review*, 2008, p. 935, esp. 953-955.

⁵⁸ In the United States and Australia punitive damages are permitted under specific tort law provisions. On the contrary, the general tendency in European Continental legal systems is that punitive damages are not permitted in general under tort law provisions. See <http://www.translegal.com/european-union/punitive-damages-not-popular-in-europe>, last accessed on 30.06.2014.

⁵⁹ In light of the advent of Galileo, the European Union (EU) might have to confront potential liabilities from the provision of the Galileo services. In more detail see article 340 of the Treaty on the Functioning of the European Union (TFEU) for non-contractual liabilities of the EU.

liability law incident occurs. Nonetheless, the current legal mechanisms suffer from a number of shortcomings due to the inherent specificities of the GNSS technique and its global dimension. **As described, the relevant international legal mechanisms impose restrictions with regard to their personal and material scope of application. Concerning the national -tort law- provisions, there might be problems as well; complexities concerning the applicable law from the procedural and substantive point of view, diverse substantive laws recognition and enforcement of judgments, possible state immunities⁶⁰ (in light of the fact that state entities operate the systems) are just to name but a few examples.** Therefore, in light of these problems, some legal scholars have advocated the view for the adoption of an international law instrument addressing issues of liability and dispute resolution for GNSS. This paper does not intend to discuss further this possible scenario. The major idea underlying the present paper is the examination of alternative but already existing legal mechanisms that might be of importance for future GNSS related disputes. For example, the new PCA Rules for Disputes Related to Outer Space Activities were adopted very recently, in December 2011. However, there is no legal analysis so far for the future chances of success of this new legal mechanism for the resolution of disputes stemming from the use of erroneous broadcasted navigational signals. Hence, several questions can now be addressed: Can this new legal mechanism be exploited for GNSS related disputes? And if so, what are the chances of success for the new PCA rules to resolve such kinds of disputes?

IV. THE NEW PCA OPTIONAL RULES FOR ARBITRATION OF DISPUTES RELATING TO OUTER SPACE ACTIVITIES: A BRIEF OVERVIEW

IV.1 General Remarks on the New PCA Rules

On 6th of December 2011 the Permanent Court of Arbitration⁶¹ adopted the Optional Rules for Arbitration of Disputes Relating to Outer Space Activities⁶². In general, the adoption of these rules reflects a general effort to address fundamental gaps in the already existing dispute settlement mechanisms contained within the field of international space law⁶³. So far,

⁶⁰ “The United Nations Convention on Jurisdictional Immunities of States and their Property”, New York, December 2nd, 2004.

⁶¹ For further information see <http://www.pca-cpa.org/>, last accessed on 11.06.2014.

⁶² See endnote 1.

⁶³ See Fabio Tronchetti, “The PCA Rules for dispute settlement in outer space: A significant step forward”, in *Space Policy* 29, 2013, p.181, esp. p. 184-185. See also in this respect, Stephan Hobe, “The Permanent Court of Arbitration Adopts Optional Rules For Arbitration of Disputes Relating to Outer Space Activities”, in *German Journal of Air and Space Law*, 2012, p.4-6. See also Fausto Pocar, “An Introduction To The PCA’s Optional Rules for Arbitration of Disputes Relating to Outer Space Activities”, *Journal of Space Law* 38, 2012, p. 171, esp. p. 173-179.

and as demonstrated earlier, international space law provisions know only - the very few- specific provisions of the Liability Convention for situations of damage and dispute resolution for Outer Space activities. Apart from these rules which have never been exploited so far, there is no other legal instrument for the settlement of space related disputes. In addition and as discussed earlier, the Liability Convention imposes restrictions with respect to its material and personal scope of application and thereby, only -few- specific kinds of space related disputes can be subject to the Convention's provisions. Given these facts, in 2009, the Permanent Court of Arbitration recognized the need for the promotion of a new instrument, addressing the issue of resolution of possible disputes in matters related to the rapidly developing field of Outer Space activities. Consequently, the PCA Optional Rules for Outer Space Activities were adopted in 2011.

IV.II Specific Remarks on the New PCA Rules

Going briefly through the PCA rules which consist of 43 articles, their most important aspects can be summarized as follows: First, the rules are of optional nature; that simply means that parties may want to use them but in any case they are not obliged to do so⁶⁴. Second, concerning their scope of application, it is interesting to highlight that both the personal and material scope of application of the new PCA rules is quite broad. According to Article 1 par. 1 *“the Outer Space Rules can be adopted by consent as the rules between any parties whatever their nature...”*. Hence, different entities, irrespective of their legal nature, will be able to rely on them; these will range from state actors, inter-governmental organizations, non-governmental organizations but also corporations and private undertakings⁶⁵. Concerning now the material scope of application of the new rules, the last sentence of Article 1 par. 1 stipulates that *“the characterization of the dispute as relating to Outer Space is not necessary for jurisdiction under these rules..”*. As demonstrated earlier, the material scope of application of other space law instruments has been limited by imposing restrictions on their scope of application. Conversely, under the new PCA rules, such kinds of restrictions do not exist. The new rules avoid difficult issues such as the definition of the term “space activities” and become more flexible as regards to their material scope of application⁶⁶. In addition, the new rules also avoid the difficult

⁶⁴ Fabio Tronchetti, “The PCA Rules for dispute settlement in outer space: A significant step forward”, in *Space Policy* 29, 2013, p.181, esp. p. 184-185.

⁶⁵ Stephan Hobe, “The Permanent Court of Arbitration Adopts Optional Rules For Arbitration of Disputes Relating to Outer Space Activities”, in *German Journal of Air and Space Law*, 2012, esp. p.6.

⁶⁶ Fabio Tronchetti, “The PCA Rules for dispute settlement in outer space: A significant step forward”, in *Space Policy* 29, 2013, p.181, esp. p. 185. See also, Frans G. von der Dunk, “About the New PCA Rules and their Application to Satellite Communication Disputes”, in 2nd Luxembourg Workshop of Satellite

question of where Outer Space begins. In principle, the applicability of the new rules will solely depend on the will and the consent of the parties. Finally, it should be noted that the award from the arbitral tribunal will be final and legally binding⁶⁷, thus, assuring a climate of legal certainty within the field of space activities.

V. CONCLUSIONS: THE NEW PCA RULES OR A GNSS INTERNATIONAL CONVENTION?

V.I Fictional Case Studies

Given the fact that current dispute settlement mechanisms will -most likely- not address issues of damage and dispute resolution for GNSS, at this point, several questions arise in light of the recent adoption of the new PCA rules. *Inter alia*: Will the new PCA rules include within their scope of application disputes stemming from a GNSS failure? If so, what kind of advantages might be offering? In answering these questions, the last section of the paper will use two fictional case studies for damage scenarios resulting from a GNSS failure (i.e. erroneous broadcasted navigational signals). More specifically:

Under the first case study, let us imagine that a Dutch ship enters the port of Rotterdam in the Netherlands under bad weather conditions. The captain - due to the bad weather conditions- decides to use the GNSS capabilities (i.e. GPS) in order to enter into the port more safely. However, the ship when entering the port collides with a wharf causing serious damage to the port infrastructure and the ship itself.

Under the second fictional scenario, the situation becomes even more dramatic: A German aircraft tries to pinpoint its location during the flight and subsequently to land at the airport of Zurich in Switzerland. Nonetheless, the signal emitted by the navigational satellites (i.e. GPS signal) becomes of very bad quality and this ultimately results in the crashing of the German aircraft to a mountain nearby to Switzerland.

A short remark: Both fictional damages scenarios described above are based on the following assumption, **that the accidents were ultimately caused by the use of erroneous navigational broadcasted signals resulting from negligent operation of the service provider, GPS signal provider.** In other words, the error which caused the bad quality of the signal was introduced at the level of the service/signal provider. Having said that, now several questions can be addressed: How should the current law respond to these fictional damage scenarios? How compensation can be sought by the victims of the disputes at

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⁶⁷ Convention on the Recognition and Enforcement of Foreign Arbitral Awards, New York, June 10th, 1958, (The New York Convention).

stake? Is there any possibility of using the new PCA rules for settling such kinds of disputes? Or neither current law nor the new PCA rules are sufficient enough and thereby, it should be further advocated the view for the adoption of a public international law instrument which will be GNSS specific?

Image 3: Possible liability scenarios⁶⁸



V.II Responses by Current Law

a. International law perspective: Under the first option the victims could bring different liability claims based upon the solutions offered by current international law instruments. More precisely, the victims must request the Netherlands and Germany⁶⁹ respectively to bring a claim on their behalf against United States (operator of the Global Positioning System) under different international law provisions, that is to say, space law provisions but also general international law provisions. The Liability Convention for Damage Caused by Space Objects, the general law of international responsibility and liability of States⁷⁰ but also other international instruments coming from the fields of air and/or maritime law can be used as different legal bases for the different liability claims that might be asserted. However, under these legal mechanisms, the victims would not have been able to obtain proper compensation due to a number of problems connected with the specificities of the GNSS technique. To explain further: The Liability Convention will not be applicable given the fact that the damage was caused by the navigational signal (indirect damage) and not from the navigational satellites directly (direct damage). In addition, if the victims choose general international law instruments, they will be obliged to prove fault and

⁶⁸ http://capnaux.blogspot.com/2013_09_01_archive.html, last accessed on 01.07.2014.

⁶⁹ Presumably, if all of the passengers are of German nationality. If there are other nationals as well, then their state of nationality might also bring a claim against the United States.

⁷⁰ Draft Articles on the Responsibility of States for Internationally Wrongful Acts, Report of the ILC on the Work of its Fifty-third Session, UN GAOR, 56th Sess, Supp No 10, p 43, UN Doc A/56/10 , 2001.

causation; this task will certainly be quite challenging, not to say even impossible, for the case of satellite signals. Lastly, other international conventions from the field of maritime or air law may also come into play but still their relevance remains questionable. Given the fact that these instruments address issues of liability for the air-carrier and the ship owner, they do not have many chances of success in addressing liability issues for the GNSS operator. At the disputes at stake, the error was introduced at the level of the GNSS provider/operator and thus, these instruments will not be relevant as such.

b. National –tort- law perspective: Under the second option, the victims could bring a tort claim against the United States under different national –tort- law provisions. Under the two fictional cases at hand, different tort law provisions from different countries could be invoked, namely, Switzerland, Germany, the Netherlands but also the United States of America. Nonetheless, this possibility might raise difficult and complicated issues associated with the applicability and the suitability of national tort laws to deal with a situation of damage ultimately caused by a navigational signal emitted from Outer Space. Moreover, it is a likely scenario that the United States may try to benefit from the defense of state immunity, if the victims finally choose to sue the United States before the courts of Germany, Switzerland or the Netherlands. Problems might also occur with respect to the enforcement and the recognition of judgments. For example, it would be quite challenging –not to say impossible- task to enforce a judgment from a German, Swiss or a Dutch Court at the United States of America. Yet, this option will be quite expensive for the potential victims at the cases at hand given the fact that they will need legal assistance not only in the country where they had the judgment but also in the country where they would like to execute and enforce the judgment, namely the United States.

In summing up: From the foregoing analysis, it seems that none of the existing legal mechanisms, under current international and national laws, could address in a satisfactory way the settlement of disputes at stake. Thus, the victims should possibly search for other –alternative means- for dispute resolution. To this end, the new PCA rules for Outer Space Disputes could be a possible future alternative.

V.III Concluding Remarks: Responses by the New PCA Rules

In the alternative case that the victims decide to benefit from the dispute settlement system established by the new PCA rules, this option might offer the following advantages: First, the parties of disputes at stake will have the independent right of action against the United States of America, the operator of the Global Positioning System. In other words, the victims are not obligated to bring a claim through their state of origin but they can directly assert a liability claim against the United States' government. Further on, the new PCA rules' material scope of application is quite broad; there are no

definitions with respect to the notions of “space activities” and “Outer Space”. Thus, disputes stemming from the use of erroneous broadcasted navigational signals could be subject to the dispute settlement mechanism of the new rules on the condition that the victims and defendants have explicitly agreed on the creation of an arbitral panel. Moreover, the victims can also benefit from various provisions of the new PCA rules: They would be able to choose the applicable law in advance⁷¹, and thus, they will avoid differences between diverse substantive laws. They will also have the possibility for the creation of a panel consisting of arbitrators with specialized knowledge in the field of space activities and space law⁷². Lastly, the victims will be able to have a final, legally binding and enforceable arbitral award.

But still, at this point it should be highlighted the fact that there might be potential problems and complexities as well. The first issue relates to the arbitrability of tort law or third party liability claims. In general, according to the views in the literature⁷³, the arbitrability of tort claims in general within the field of arbitration is disputed. However, this seems not to be the case with the new PCA rules. Considering Article 1 par.1 of the new PCA rules which stipulates that “*Where parties have agreed that disputes between them in respect of a defined legal relationship whether contractual or not shall be referred to arbitration under those rules...*”, one by adopting a literal interpretation of this provision can take the view that tort liability claims will not be excluded by the scope of application of the new PCA rules. The second problem is rather more complicated and concerns the willingness of the GNSS providers/operators -as for instance United States of America at our cases at hand- to use the PCA rules as an ultimate instrument of dispute resolution for cases of damage and dispute resolution within the field of GNSS. While it would be difficult to predict whether State entities or supranational organizations will be willing to use the new PCA rules, it is evident that their future success will depend on the willingness of both state and non-state actors to use and make recourse to them. It is worth mentioning that there are already some indicators which bear testimony to the fact that the PCA rules might be eventually seen as a valuable new instrument by both states and non-state actors within the field of space activities⁷⁴. For example, other arbitration rules (i.e. Optional Rules relating to Natural Resources or the Environment) promoted by the PCA have gradually been recognized by the international community as valuable mechanisms of dispute resolution for sector specific disputes by state and

⁷¹ Article 35 of the PCA Rules on Outer Space Disputes.

⁷² Article 29 of the PCA Rules on Outer Space Disputes.

⁷³ http://www.lawmemo.com/arbitrationblog/2006/04/tort_was_not_ar.html, last accessed on 03.07.2014.

⁷⁴ Fabio Tronchetti, “The PCA Rules for dispute settlement in outer space: A significant step forward”, in Space Policy 29, 2013, p.181, esp. p. 187.

non-state actors. Further on, the first signs that space actors will be making use of the new PCA rules can be noticed. For instance, the European Space Agency has already expressed its willingness to make recourse to the new PCA rules for its future contracts⁷⁵. This means that if ESA and its counterpart decide to solve a dispute through arbitration, the new PCA rules will govern the arbitral proceedings. Hence, the future of PCA rules seems relatively bright for space activities in general.

In conclusion: The new PCA rules certainly constitute a timely step forward, providing space law with an alternative, plus a new dispute settlement mechanism. However, whether this legal instrument will be able to accommodate liability issues within the field of satellite navigation remains to be seen. Rather than advocating the view for the adoption of GNSS international convention, in our opinion, the new PCA rules for Outer Space activities could form a future alternative instrument addressing issues of dispute resolution and liability for GNSS. Given the broad scope of application of the new rules, GNSS incidents could fall under those rules. In addition, if one takes into account the fact that victims can choose the panel and they can ultimately have an arbitral award which will be final and legally binding, these will most likely lead to an environment of legal certainty something which is necessary for the future development of the GNSS technique worldwide.

⁷⁵ *Ibid.*

