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Liability for Damage in International Civil Aviation from a GNSS Perspective

Leiden University

Pablo Mendes de Leon



The Era of GNSS

Only a few years ago, Global Navigation Satellite System, better known as GNSS, did not feature in the common man's vocabulary but was privy to a select circle of academics, scientists and government officials. Yet today, a cursory glance at Hollywood's blockbusters, the automobile industry and day-to-day conversation reveals that these complex technical developments have made their way into modern life.

GNSS technically constitutes three parts, namely: space segment; control segment; and user segment. Space segment is composed of dozens of satellites that transmit navigation signals from the outer space; control segment is a ground-based network of stations; and user segment refers to the equipment of terminal receivers that compute the location. Currently, the fully operational global systems are the Global Positioning System (GPS) belonging to the US, and *Globalnaya navigatsionnaya sputnikovaya Sistema* (GLONASS) belonging to Russia. Meanwhile, the EU is developing its Galileo system and China is also moving quickly towards its *BeiDou Navigation Satellite System* (BDS). The accuracy of GNSS signals could be improved by augmented systems.

As the era of multi-systems is approaching, a widespread utilisation of GNSS within the aviation sector is coming into reality, particularly under the framework of Communications, Navigation and Surveillance/Air Traffic Management (CNS/ATM) systems.¹ This will enable greater accuracy in determining the real-time position of aircraft *en route* as well as landing, and better management efficiency of a specific airspace through surveillance of aircraft by air traffic controllers, just to mention a few of the applications.

Although many problems will be simplified through the usage of GNSS, new issues will undoubtedly arise. From a legal perspective, the main concern is issues related to liability. Who will be liable in the event of damage caused by a failure of GNSS signals? Do existing liability regimes provide a legal recourse or is it necessary to create new legal instruments?

This chapter aims to address, amongst others, the above questions for the most part within the parameters of private international air law. First, a brief explanation is given about an important underlying issue: that of state sovereignty. Second, the importance of international law for the liability of GNSS is addressed. Third, the existing legal liability regime within the field of aviation is sketched. Fourth, the applicability of that liability regime is analysed. Following that, concluding remarks are made.

State Sovereignty

While applying any legal regime to GNSS, the principle of complete and exclusive sovereignty of States over the airspace above their territory, an essential rule of customary international air law enshrined in the 1919 Paris Convention and the 1944 Chicago Convention, must be taken into account. The Chicago Convention establishes the full authority and responsibility of a Member State to provide air navigation services, to control operations of aircraft and to enforce safety and other regulations in its own airspace.

As mentioned, GNSS was incorporated into CNS/ATM systems, but the legal problem is that most States have to rely on foreign GNSSs which are out of their control. It has been the primary concern that the implementation of GNSS in civil aviation may involve the infringement of State sovereignty on the provision of air navigation facilities.² Therefore, the ICAO Council already stated in 1994:

“that implementation and operation of CNS/ATM systems, which States have undertaken to provide in accordance with Article 28 of the Chicago Convention, shall neither infringe nor impose restrictions upon State sovereignty, authority, or responsibility in the control of air navigation and the promulgation and enforcement of safety regulations.”³

A Charter on the Rights and Obligations of States Relating to GNSS was adopted in 1998 to readdress the above statement made by ICAO Council.

Complying with the principle of State sovereignty over its airspace, Article 28 of the Chicago Convention allows its Member States to have the option of whether or not to introduce GNSS as a navigation aid within their respective airspaces, through the phrase “so far as it may find practicable”. Article 28 only obligates each Member State to provide “air navigation facilities”, but it does not specify what kind of air navigation aids should be used. GNSS is only one form of air navigation aid. GNSS technology is not accessible by the majority of States. Thus, the use of GNSS is not a compulsory obligation for those States which do not own the capability of GNSS technology.

Against this background, the lack of legal certainty on the liability of GNSS – one of the biggest concerns of GNSS-user States – is more or less delaying the implementation of GNSS. The international community has the freedom on whether or not to introduce GNSS before their concerns were responded to positively.

Liability of GNSS

Similar to the US government, the Legal Bureau of ICAO expressed the view that should an accident occur because of an obstacle to the dependability of the signals, the relevant rules of liability will apply and the signal providers will be held responsible through recourse to the laws of the relevant State. Thus, a case involving the failure or defection of GNSS signals would be settled through the courts, and if for some reason an entity cannot bring the case to court, the matter can be pursued through the entity's government. Questions pertaining to the relevant rules of liability, reminiscent of the discussion of the liability of air traffic controllers where the ICAO Legal Committee decided against concluding a convention for regulating the liability of air traffic control agencies, led the Rapporteur of the Legal Committee to favour resolution by choice of law rules.⁴

However, the principle of State sovereignty from the public air law angle is inherently present when addressing complex issues related to the liability of GNSS under private air law. The principle of State sovereignty releases one State from the jurisdiction and the courts of another. Under the current pattern of the GNSS market, most GNSS signals are not provided by non-governmental entities, but by public authorities, either civil departments or military agencies of governments. Therefore, in most cases concerning the liability of GNSS, claimants have to first overcome the sovereign immunity of providers, which is hard to achieve by choice of law rules.

Furthermore, the global nature of GNSS distinguishes itself from the conventional terrestrial-based ATC system, which has very limited geographical coverage either because of the inherent characteristics of the infrastructure, or the topography of the area.⁵ This determines the liability of GNSS being inherently labelled by its international characteristics in most situations because of transnational litigant parties, cross-border triggers and damage in multiple jurisdictions which are generated by the global coverage and worldwide deployment of GNSS.

In brief, dealing with international liability of GNSS in the regime of air law, the domestic law approach based on choice of law rules will cause legal uncertainties. The next two sections check if any of the existing private international air law instruments have the potential to be applied to the issue of liability for damage caused in civil aviation from a GNSS perspective.

Existing Liability Regimes of Private International Air Law

Today, liability as an aspect of international private air law has become a complex issue involving a number of legal instruments and other stakeholders. Hence, the next paragraphs discuss the air law instruments that may be tailored to incorporate GNSS activities.

The liability regime in private international air law originated in 1929 with the drafting of the Warsaw Convention.⁶ The Convention, ratified by 152 States, provides uniform international liability rules for passengers and baggage based on a presumption of liability of the carrier as a *quid pro quo* for a limitation of that liability for the death or injury of passengers which occurred during international travel. Following the rapid development of the aviation industry, the Warsaw Convention was amended by the Hague Protocol of 1955 as modified by the Montreal Additional Protocols No 1, 2 and 4, and supplemented by the Guadalajara Convention, 1969.⁷ All those legal instruments form the "Warsaw System" or the "Warsaw Regime".⁸

The modernisation of the Warsaw System by ICAO has led to the conclusion of the Montreal Convention,⁹ with the intention to replace the entire Warsaw System. It has now been ratified by 135 States and entered into force on 4 November 2003. The Montreal Convention adapts a two-tier civil liability regime. The first tier lays down a no-fault liability system, where the carrier shall not exclude or limit its liability for damage not exceeding 113,110 SDRs (Special Drawing Rights);¹⁰ the second tier is a fault-based liability system, where the carrier shall not be liable for damage to the extent exceeding 113,110 SDRs if the carrier can argue against the claimant that: "such damage was not due to the negligence or other wrongful act or omission of the carrier or its servants or agents"; or that "such damage was solely due to the negligence or other wrongful act or omission of a third party".¹¹ The burden of proof has been placed on the carrier.

Article 28 of the Warsaw Convention provides rules for jurisdiction with the enumeration of four competent courts within the territory of the parties of this Convention: the court of the carrier's domicile; his principal place of business; an establishment by which the contract has been made; or before the court having jurisdiction at the place of jurisdiction. Article 33(2) of the Montreal Convention incorporates a so-called "fifth jurisdiction" to supplement these four jurisdictions in the original Warsaw Convention.

This would make an action possible:

"In respect of damage resulting from the death or injury of a passenger, an action may be brought before one of the courts mentioned in paragraph 1 of this Article, or in the territory of a State Party in which at the time of the accident the passenger has his or her principal and permanent residence and to or from which the carrier operates services for the carriage of passengers by air, either on its own aircraft, or on another carrier's aircraft pursuant to a commercial agreement, and in which that carrier conducts its business of carriage of passengers by air from premises leased or owned by the carrier itself or by another carrier with which it has a commercial agreement."

The European Community's Council Regulation No. 2027/97, hereafter also referred to as: the Regulation, on air carrier liability in the event of accidents came into force in October 1998, which has been amended by Regulation (EC) No. 889/2002 to bring it into line with the provisions of the Montreal Convention (1999), by setting up a uniform system of air transport liability.¹² The scope of the Regulation is limited to Community air carriers. Like the Montreal Convention (1999), the Regulation adopts a two-tier liability system. The first tier refers to a strict carrier liability for damages of up to 113,100 SDRs, where the air carrier cannot contest claims for compensation. The second tier is based on the presumed fault of the carrier for damage in excess of 113,100 SDRs, but the air carrier may avoid only by proving that it was not at fault.¹³ Again, the burden of proof is on the carrier. Community air carriers are also obliged to make advance payments of at least 16,000 SDR to relatives and passengers in the event of death or injury of passengers, respectively.¹⁴ These provisions also apply to *non-Community air carriers* in relation to carriage to, from or within the Community.

The Convention on *Damage Caused by Foreign Aircraft to Third Parties on the Surface*,¹⁵ better known, and hereafter referred to as the *Rome Convention of 1952*, is another legal instrument dealing with a specific kind of liability. According to Article 23, the Convention is applicable to damage caused to third parties on the territory of a contracting State by an aircraft registered in another contracting State. Article 2 of the Rome Convention embodies the principle of absolute liability. The burden of liability is placed on the operator rather than on the registered owner, if they are not one

and the same. As of November 2018, only 51 States have ratified this Convention. One reason mentioned for the limited application was that the liability limits were too low.

An attempt was made in 1978 to modernise the Convention by increasing the limits. But the resulting Protocol of Montreal was able to gather only four instruments of ratification since the increase in limits was not substantial enough.

In practice, damages are allocated according to national law. The reason being that, for the most part damages are allocated based on the principal of “*res ipsa loquitur*” which states that the fact that the plane has crashed in that State requires payment irrespective of fault. Even if the carrier is not at fault but other parties such as the Air Traffic Control (ATC) or manufacturer have contributed to the cause of the accident, the carrier, and the claims of the victims against the air carrier remain intact under the Rome Convention of 1952.¹⁶ In most cases that concern third party liability, a “genuine link” can be identified with a specific country since the damage occurs on its territory and the victims are its inhabitants. As national law provides a more suitable legal recourse, the Rome Convention of 1952 has never been applied.

Air Traffic Control agencies in most countries are State-run organisations, although certain States are looking at privatising this activity, and, indeed have already proceeded to privatisation or corporatisation. Traditionally, the State possesses sovereign immunity and, hence, liability of the ATC controllers is determined by applicable national governmental rules that regulate the position of its civil servants. These rules vary per State, and may develop over the course of time.

In the US, under the FTCA (Federal Tort Claims Act), to establish liability of the government it is essential that the negligence of the air traffic controller is proven and such negligence must be the proximate cause of the damage suffered.

In 1971 an Australian court held in a landmark decision, *Austrian National Airlines v. The Commonwealth of Australia and Canadian Pacific Airlines* (The TAA case), that both airlines involved were liable for 30% each but that the ATC was liable for 40% because the avoidance of collisions is a primary task of an ATC.

These examples illustrate that although a general trend exists that a government is liable in cases where negligence can be established, the components that constitute this “negligence” vary per jurisdiction. Given that aviation has a large international component, an attempt was made to set up international rules for the Liability of Air Traffic Control Agencies. The ICAO Legal Committee studied this issue for several decades, during which a Rapporteur presented a report, comments from States were received and Argentina even proposed a preliminary draft international convention on the liability of air traffic control agencies.¹⁷ However, basically, States do not see the need to change the existing practice and thus have not supported an international solution so many fundamental questions such as if an international convention is a feasible solution, remain unanswered.

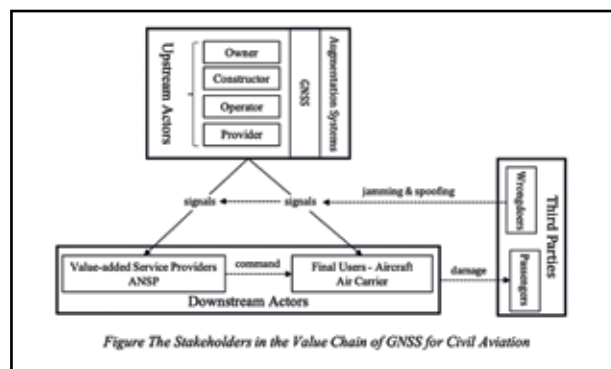
Applicability of Private Air Law to the Liability of GNSS

As shown above, a variety of private air law instruments regulate liability issues, but can they be applied to GNSS-related issues or are new legal instruments required for this purpose? In addressing this question, a division is made between the short- and long-term solutions.

But first the different parties involved with GNSS have to be lined up. This by no means is an easy task as many stakeholders are involved. The exact division of parties will depend on the regulatory

framework set up by, respectively, the US, the European Union or for that matter any other authority that envisions setting up its own system. Throughout the entire process from the generation of GNSS signals to air accident caused by the failure of those signals, parties may be roughly classified into three types, from a private law perspective, as follows (see also Figure 1 at the end of the chapter):

- **Upstream Actors.** These actors are involved in the provision of GNSS signals, ranging from the owner, constructor, and operator of navigation systems where augmented systems are included, and final provider of navigation signals.
- **Downstream Actors.** These actors refer to users of GNSS signals, including value-added service providers and final users. In the context of aviation, one of the typical value-added service providers are air navigation service providers (ANSP); final users direct to the air carrier whose aircraft use GNSS signals in flight.
- **Third Parties,** which includes the passengers suffering damage caused by the failure of GNSS, and the wrongdoers which lead to the failure of GNSS such as users of spoofing or jamming devices.



Considering the complexity of players in the value chain of GNSS, the consensus on the solution for the liability of GNSS has never been reached.

The European organisation for the safety of air navigation, Eurocontrol and the European Civil Aviation Conference (ECAC) have tabled the idea of establishing a contractual chain to channel the ultimate liability to the appropriate place, considering that more than one party will be involved in the provision of GNSS services. This chain includes users, States, an infrastructure organisation and the system operator(s). An aircraft with an onboard GNSS receiver to assist in navigation is expected to be the end user. The regulation of safety and air traffic service might be defined as the roles of the State or its designated entity. An infrastructure organisation will be responsible for an overlay system such as EGNOS and other related facilities which air traffic service providers may rely on. Space segments and signal-in-space will be provided by the system operator(s). A number of contractual arrangements are envisioned on the one hand to provide performance guarantees, and on the other hand to identify the extent of liability.¹⁸

The three examples given thus far are for the most part long-term solutions. In the meantime, the existing legal instruments will continue to be deployed on a case-by-case basis. Even without considering the barrier raised by the doctrine of sovereign immunity, the outcome will vary depending on the jurisdiction in which recourse is sought.

Civil liability, not including criminal liability, can be divided into either contractual or delictual (tort-based liability). The latter category of liability can arise under general legal provisions, such as common law or a basic civil code, or under specific legislation, such as statute or other positive law. Also it might surface under

the terms of an international treaty or convention in the event it has a direct effect under applicable domestic law. The question whether liability is subject to establishing fault or whether liability is absolute, without the need to establish fault, will be determined by the applicable international legal instruments.¹⁹

Looking at a contractual relationship, a possible application of the Montreal Convention (1999) can be examined. To begin with, the rules of the Montreal Convention (1999) are applicable exclusively to carriage by air so they do not apply to the liability of, for example, manufacturers or air traffic controllers.

In the first tier of the liability system in the Montreal Convention, claimants who are entitled to claim for compensation may easily get the compensation for damage not exceeding 113,100 SDRs. Based on Article 21, a carrier is not liable for damage exceeding that limit in the second tier if “such damage was not due to the negligence or other wrongful act or omission of the carrier or its servants or agents” or “such damage was solely due to the negligence or other wrongful act or omission of a third party”. The burden of proof is reversed so the onus is on the carrier. In the event of a proven GNSS signal failure, it should not be difficult for the carrier to be exonerated from liability fully or partially for damage exceeding 113,100 SDRs.

According to Article 2 of the Rome Convention, the principle of absolute liability applies. *Ergo*, once again the discussion of the source of damage can be considered foreclosed. The use of this instrument for the purpose of GNSS signal failure seems, at best, limited.

An example of tort-based liability can be provided, by using the experience rendered with ATC liability. If the negligence of a GNSS provider can be established then the carrier has a possible legal recourse using national law. But it is questionable whether the failure of the GNSS signal can be construed as a negligent act. Case law is not yet available for answering this question.

Conclusion

The above paragraphs illustrate that recourse for passengers is not an immediate worry since the existing international private air law instruments would cover their claims against a carrier. But what happens if the carrier’s liability is caused by the failure of the GNSS signal, an occurrence beyond its control?

In the interim period before a more appropriate legal instrument is drafted, the authors expect a use of the first tier of the absolute liability regime laid down in the Montreal Convention, which allows compensation for damage not exceeding 113,100 SDRs. Yet this may not offer full compensation to passengers or their relatives for damage above that limit. Another parallel development should be the implementation of “contractual chain”, proposed by Eurocontrol and ECAC, dealing with the various levels of liability on a contractual basis. This would provide legal recourse for all parties involved.

The long-term solution should be a convention taking into account the specific nature of GNSS. Rather than a comprehensive convention about GNSS liability, the Convention should deal with GNSS issues as a whole and dedicate, say, a separate chapter to liability.

Endnotes

1. The term “CNS/ATM systems” is a concept based on GNSS, which was developed by ICAO in 1988. Since then, CNS/ATM systems have been implemented to replace traditional

ATC systems, with the purpose to meet an increasing need for air traffic services as a result of the dramatic development of civil aviation in recent decades. See ICAO, Report of the Fourth Meeting of the Special Committee on Future Air Navigation Systems, Doc. 9524, FANS/4, Rec. 2/1, 1988.

2. See, Michael Milde, Institutional and Legal Problem of the Global Navigation Satellite System (GNSS): *Solution in Search of a Problem?*, in Cheng, Chia-Jui, Tu-hwan Kim and Doo Hwan Kim, *The Utilization of the World’s Air Space and Free Outer Space in the 21st Century* (Kluwer Law International, 2000), pg. 340.
3. See, Jiefang Huang, Development of the Long-term Legal Framework for the Global Navigation Satellite System, *Annals of Air and Space Law*, Volume XXII-I, 1997, pg. 590; this principle has been reiterated by the Exchanges of Letters and the Legal and Technical Expert Panel (LTEP).
4. See ICAO and the Legal Framework of GNSS Planning and Implementation, *Annals of Air and Space Law*, Volume XXI-II, 1996, pg. 203.
5. B.D.K. Henaku, *The Law on Global Air Navigation by Satellite: A Legal Analysis of the ICAO CNS/ATM System* (AST Leiden, 1998), at xv.
6. The Convention on the Unification of Certain Rules Relating to International Carriage by Air, 137 L.N.T.S 11, ICAO Doc 7838.
7. Pablo Mendes de Leon, *Introduction to Air Law* (Wolters Kluwer, 2017), at 152.
8. *Ibid.*
9. The Convention for the Unification of Certain Rules for International Carriage by Air, agreed during Montreal 28 May 1999.
10. The limit of civil liability has been increased from 100,000 SDRs to 113,100 SDRs since 30 December 2009, which was first reviewed to remain the same in 2015. See ICAO, Working Paper C-WP/13478, the 188th session of ICAO Council, 7/10/09; ICAO, Electronic Bulletin EB2014/035, 15 July 2014. In addition, the limits of liability are counted by SDRs as defined by the International Monetary Fund, and those limits have to be reviewed and regularly revised in the context of the Montreal Convention. See Articles 23 & 24 of the Montreal Convention.
11. Article 21 of the Montreal Convention.
12. Europa, Air carrier liability in the event of accidents, <https://eur-lex.europa.eu/legal-content/EN/LSU/?uri=celex:31997R2027>, last accessed 18 November 2018.
13. Annex to Regulation (EC) No. 2027/97, as amended by Regulation (EC) No. 889/2002.
14. Article 5 of Regulation (EC) No. 2027/97, as amended by Regulation (EC) No. 889/2002.
15. Convention on Damage Caused by Foreign Aircraft to Third Parties on the Surface; 310 UNTS 181.
16. Unless one of the following situations arises: “Nevertheless there shall be no right to compensation if the damage is not a direct consequence of the incident giving rise thereto, or if the damage results from the mere fact of passage of the aircraft through the airspace in conformity with existing air traffic regulations.” See Articles 1(2) of the Rome Convention of 1952.
17. See ICAO, Secretariat Study: Liability of Air Traffic Control Agencies, Doc C-WP/7781, 20/1/84.
18. See ICAO, Development of a contractual framework leading towards a long-term legal framework to govern the implementation of GNSS, A35-WP/125, LE/11, 21/9/04, presented by the 41 Contracting States, Members of the European Civil Aviation Conference, at 4.

19. See Liability of Air Traffic Control Agencies, Regulation of the Global Navigation Satellite System (GNSS): A Conference to examine Legal and Policy Interests Involved in the Implementation of GNSS, 1996, pg. 171.

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- Environment & Climate Change Law
- Family Law
- Financial Services Disputes
- Fintech
- Franchise
- Gambling
- Insurance & Reinsurance
- International Arbitration
- Investor-State Arbitration
- Lending & Secured Finance
- Litigation & Dispute Resolution
- Merger Control
- Mergers & Acquisitions
- Mining Law
- Oil & Gas Regulation
- Outsourcing
- Patents
- Pharmaceutical Advertising
- Private Client
- Private Equity
- Product Liability
- Project Finance
- Public Investment Funds
- Public Procurement
- Real Estate
- Securitisation
- Shipping Law
- Telecoms, Media & Internet
- Trade Marks
- Vertical Agreements and Dominant Firms

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