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The Practice of Shared Responsibility and Liability in Space Law

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The Practice of Shared Responsibility and Liability in Space Law

Pablo Mendes de Leon and *Hanneke van Traa**

1. Introduction

The exploration and use of outer space by mankind has been shaped by multiple actors including states, international organisations, and private entities. Their interactive cooperation, in part governed by the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and other Celestial Bodies (Outer Space Treaty or OST),[1] may result in injurious consequences to third parties; environmental damage, including the production of space debris; and the malfunctioning of signals transmitted via satellites. Given the involvement of multiple actors, outer space operations have been subjected to a regime that provides for shared responsibility and liability.

After a brief introduction of the regime (section 2), this contribution examines such shared responsibility and shared liability under the Outer Space Treaty and the Convention on International Liability for Damage Caused by Space Objects (Liability Convention)[2] between four sets of actors: between launching states (section 3); between an international organisation and one or more launching states (section 4); between a launching state and a private entity (section 5); and between the European Union (EU) and its member states and/or private parties in respect of the 'Galileo' programme (section 6).

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[1] Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and other Celestial Bodies, London, Moscow, and Washington, D.C., 27 January 1967, in force 10 October 1967, 610 UNTS 205 (Outer Space Treaty or OST).

[2] Convention on International Liability for Damage Caused by Space Objects, London, Moscow, and Washington, D.C., 29 March 1972, in force 1 September 1972, 961 UNTS 187 (Liability Convention).

2. Primary and secondary norms of space law

International space law contains norms that address the conduct of states when carrying out activities in outer space. Examples can be found in the OST, which dictates that states parties may not appropriate outer space – including the moon and other celestial bodies – by claim of sovereignty, by means of use or occupation, or by any other means. Also, states must perform these activities 'in accordance with international law, in the interest of maintaining international peace and security', and with a view to 'promoting international cooperation and understanding'.[3]

The OST and other treaties governing outer space and activities carried out there thus lay down 'primary norms' as the term is defined by the International Law Commission (ILC).[4] They define rights and obligations of states when accessing outer space. From the beginning of man's venture into outer space, these rights and obligations have been laid down in the Declaration of Legal Principles of 1963 (Declaration),[5] and were later also confirmed in various provisions of the OST and other space-related treaties.[6] For instance, Principle 9 of the Declaration provides as follows:

> States shall regard astronauts as envoys of mankind in outer space, and shall render to them all possible assistance in the event of accident, distress, or emergency landing on the territory of a foreign State or on the high seas. Astronauts who make such a landing shall be safely and promptly returned to the State of registry of their space vehicle.

This principle has been established in the OST and its content has been elaborated in the provisions of the Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space (Rescue Agreement).[7]

Various outer space treaties also include norms that in the categorisation adopted by the ILC can be considered in terms of 'secondary norms' of international law, providing for consequences of a breach of a primary rule. These norms can be considered as *lex specialis* in

[3] Article III OST, n. 1.
[4] ILC *Yearbook* 1970/II, 179, para. 11; ILC *Yearbook* 1973/II, 169, para. 40.
[5] Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space, Resolution 1962 (XVIII), adopted at the 1280th plenary meeting of the United Nations General Assembly, 13 December 1963 (Declaration of Principles or Declaration).
[6] As to which see the following treaties: Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space, Washington, London and Moscow, 22 April 1968, in force 3 December 1968, 672 UNTS 119 (Rescue Agreement); Liability Convention, n. 2; and Agreement Governing the Activities of States on the Moon and Other Celestial Bodies, New York, 18 December 1979, in force 11 July 1984, UN Doc. A/RES/34/68 (1979) (Moon Agreement).
[7] See ibid.

relation to the general rules laid down in the 2001 Articles on Responsibility of States for Internationally Wrongful Acts (ARSIWA).[8] Article VI of the OST lays down a general principle of state responsibility.[9] Article III of the OST, which provides for the application of (general) international law by states parties engaged in space activities, strengthens this reading of Article VI. However, Article VI covers an even broader form of state responsibility than is accepted in the ARSIWA, by including responsibility for non-governmental entities.

Apart from the principle of state responsibility, space law has introduced the concept of state liability in Article VII of the OST[10] and in the subsequent Liability Convention. The term 'liability' relates to the obligation to pay compensation for the damage caused by space activities. On this point, the space law regime differs from the approach of the ILC. On the one hand, the obligation to pay compensation for damages is included in the obligations pertaining to *responsibility* listed in the ARSIWA in case of wrongful acts, in so far as such damage is not made good by restitution. But on the other hand, the ILC has reserved the term 'liability' for obligations with respect to injury arising from acts not prohibited by international law.[11]

Even though the terms 'responsibility' and 'liability' are used interchangeably in space law, and moreover a number of languages do not differentiate between them, for the sake of clarity and consistent use of terms we shall refer in this chapter to liability in order to denote the

[8] Articles on Responsibility of States for Internationally Wrongful Acts, ILC *Yearbook* 2001/II(2) (ARSIWA). Article 55 on *lex specialis* reads: 'These articles do not apply where and to the extent that the conditions for the existence of an internationally wrongful act or the content or implementation of the international responsibility of a State are governed by special rules of international law.'

[9] Article VI OST, n. 1, reads: 'States Parties to the Treaty shall bear international responsibility for national activities in outer space, including the Moon and other celestial bodies, whether such activities are carried on by governmental agencies or by non-governmental entities, and for ensuring that national activities are carried out in conformity with the provisions set forth in the present Treaty. The activities of non-governmental entities in outer space, including the Moon and other celestial bodies, shall require authorization and continuing supervision by the appropriate State Party to the Treaty. When activities are carried on in outer space, including the Moon and other celestial bodies, by an international organization, responsibility for compliance with this Treaty shall be borne both by the international organization and by the States Parties to the Treaty participating in such organization.'

[10] Article VII OST reads: 'Each State Party to the Treaty that launches or procures the launching of an object into outer space, including the Moon and other celestial bodies, and each State Party from whose territory or facility an object is launched, is internationally liable for damage to another State Party to the Treaty or to its natural or juridical persons by such object or its component parts on the Earth, in air space or in outer space, including the Moon and other celestial bodies.'

[11] See Draft principles on the allocation of loss in the case of transboundary harm arising out of hazardous activities, ILC *Yearbook* 2006/II(2). As to which see also P.A. Nollkaemper and D. Jacobs, 'Shared Responsibility in International Law: A Conceptual Framework' (2013) 34 MIJIL 359, at 412-415.

rules of space law that regulate the consequences of a breach of international (space) law as *lex specialis*.[12]

One other feature in respect of which liability in space law differs from the rules laid out in the ARSIWA[13] is that it sets forth 'absolute' liability of states for damage caused by a space object on the surface of the earth, or an aircraft in flight.[14] That is, it excludes the possibility of a defence of absence of fault or any other defence, including an 'Act of God'. This approach, which is also known in instances of treaty-based civil liability of operators engaged in hazardous activities,[15] is an innovation in international law applying to state liability. However, in the event that damage has been caused elsewhere than on the surface of the earth (that is, to a space object or to persons or property on board) by a space object of another launching state, the liability of the launching state is based on fault.[16] This is different yet again from the general regime set up by the ILC,[17] which bases responsibility on illegality.

Another particular aspect of international liability based on space law concerns the settlement of claims through diplomatic negotiations.[18] If no settlement can be reached between the actors concerned, a Claims Commission established under the Liability Convention must decide the merits of the claim for compensation, and must determine the amount of compensation payable under the conditions laid down in the Liability Convention.[19] The decision of the Claims Commission shall only be final and binding if the parties have so agreed.[20]

No use has yet been made of these internationally agreed procedures. The *Cosmos 954* case, in which a Soviet nuclear-powered satellite disintegrated in 1987 over north-west Canada and

[12] See also section 3.2 below.
[13] As to which see Chapter V of the ARSIWA entitled 'Circumstances precluding wrongfulness', n. 8.
[14] See, in particular, Article II of the Liability Convention, n. 2.
[15] The term 'absolute' liability is not defined under international law; its meaning must be determined in accordance with the terms of the international agreement employing it. Commonly, absolute liability is a form of liability where, once damage and causation have been established, the defendant has no defences at all. The term 'absolute' liability is used in, for instance, Article II of the Liability Convention, ibid., under which a launching state is 'absolutely liable' for the compensation of damage caused by its space object on the surface of the earth or to an aircraft in flight. Under a strict liability regime there is no-fault liability, whereas, nevertheless, the defendant has defences available, such as Act of God/fortuitous event, and own fault of the victim. See also Chapter 35 in this volume, K. Kummer Peiry, 'Transboundary Movement of Hazardous Waste and Chemicals', ___.
[16] As to which see Article III of the Liability Convention, n. 2.
[17] See Part Two, Chapter I of the ARSIWA, n. 8.
[18] See Article IX of the Liability Convention, n. 2.
[19] See Article XIX(2) of the Liability Convention, ibid.
[20] See Article XIX of the Liability Convention, ibid.

contaminated a large amount of territory by debris, was settled through diplomatic negotiations.[21]

3. Shared responsibility between multiple states

In assessing the possibility of shared responsibility between states, a distinction will be made between the regime of the Outer Space Treaty (3.1) and that of the Liability Convention (3.2).

3.1 Shared responsibility under the Outer Space Treaty

The OST contains several 'primary' rules that in theory, when breached by multiple states, could lead to shared responsibility. One example is Article IV of the OTS, which obliges states parties

> not to place in orbit around the Earth any objects carrying nuclear weapons or any other kinds of weapons of mass destruction … The Moon and other celestial bodies shall be used by all States Parties to the Treaty exclusively for peaceful purposes.

So far, no cases involving multiple states under Article IV of the OST have been reported. The provision was discussed, however, when China conducted a successful Anti Satellite Missile Test (ASAT) against one of its own defunct polar-orbiting weather satellites in 2007.[22] In this case, Article IV was not applicable because it only bars nuclear and weapons of mass destruction from entering orbit, and not conventional kinetic kill vehicles that destroy their targets with a head-on collision.

In the event that multiple states, acting together, were to bring into earth orbit an object carrying a nuclear weapon or a weapon of mass destruction, the shared responsibility of the states concerned could be engaged. Breaching this primary rule (Article IV of the OST)

[21] P. Malanczuk, *Akehurst's Modern Introduction to International Law*, 7th revised edn (London and New York: Routledge, 1997), 201-208.

[22] The test produced at least 2,087 pieces of debris large enough to be routinely attracted by the United States Space Surveillance Network. The NASA Orbital Debris Program Office estimated it generated over 35,000 pieces of debris down to 1 centimetre in size. See T.S. Kelso, 'Analysis of the 2007 Chinese ASAT Test and the Impact of its Debris on the Space Environment', Centre for Space Standards & Innovation Technical Papers, 2007, available at http://celestrak.com/publications/AMOS/2007/AMOS-2007.pdf.

would constitute an internationally wrongful act, leading to the application of international responsibility of these states, as provided for in Article VI of the OST.

However, in such a case a complication may arise in view of the fact that Article VI of the OST stipulates the following:

> States Parties to the Treaty shall bear international responsibility for *national* activities in outer space … whether such activities are carried on by governmental agencies or by non-governmental entities (emphasis added).

It also provides that

> [t]he activities of non-governmental entities in outer space, including the Moon and other celestial bodies, shall require authorization and continuing supervision by the appropriate State Party to the Treaty.

Although this requirement is connected with non-governmental entities – which will be further discussed in section 5 below – it has been put forward that a state may only be internationally responsible for those activities over which it has the possibility to exercise *legal control*.[23] In this way 'control' would be a decisive element for the attribution of responsibility to a state. Following this interpretation would complicate the determination of shared responsibility when multiple states are acting together in carrying out space activities, yet only one state exercises the control function. The responsible state might be the state which launches the space object or procures the launching, but it might also be the state from whose territory the launching takes place. On such occasions, the state which exercises legal control by both authorising and continuously supervising the space activity could be held internationally responsible.

It is also possible that one state, for instance the state from whose territory the launching takes place, performs the control function of authorisation, whilst another state, for instance the state which launches or procures the launching, continuously supervises the activity. In such cases the requirement of authorisation *and* continuous supervision will not be fulfilled by any of the cooperating states, with the consequence that all of the cooperating states would escape international responsibility.

[23] See J. Hermida, *International Space Law* (excerpts from *Legal Basis for a National Space Legislation* (The Hague: Kluwer Academic Publisher, 2004), available at www.julianhermida.com/algoma/intlawreadingsspacelaw.pdf.

In view of these potential consequences, it could well be argued that responsibility should be placed both on the state that launches or procures the launching of a space object *and* on the state from whose territory an object is launched. In fact, this would be in line with the principle of state liability according to Article VII of the OST.

This suggestion of placing responsibility both on the state that launches or procures the launching of a space object *and* on the state from whose territory an object is launched could also be based on the proposition that the notion 'appropriate state' in Article VI of the OST should be interpreted as the *launching state*.[24] The term 'launching state' should be read as covering both the state which launches the space object and the state from whose territory the launching takes place. Hence, cooperative actions undertaken by multiple states may lead to 'shared responsibility' of the launching states, including the state which launches or procures the launching *and* the state from whose territory the launching takes place.

Another example of a primary rule that, when breached, may engage shared responsibility is Article IX of the OST, under which the concerned states are committed

> to avoid their harmful contamination and also adverse changes in the environment of the Earth resulting from the introduction of extraterrestrial matter … If a State Party to the Treaty has reason to believe that an activity or experiment planned by it or its nationals in outer space, including the Moon and other celestial bodies, would cause potentially harmful interference with activities of other States Parties in the peaceful exploration and use of outer space … it shall undertake appropriate international consultations before proceeding with any such activity or experiment.

When multiple states act contrary to the obligations set out in Article IX by not avoiding harmful contamination, they may share responsibility under the aforementioned Article VI of the OST. However, when damage has occurred this will also trigger liability, which will be analysed in the following section (3.2).

3.2 Shared liability under the Liability Convention

In the above examples we have dealt with shared state responsibility as a consequence of a breach of a primary rule constituting a wrongful act. In this section we will discuss shared

[24] See F.G. von der Dunk, 'The Origins of Authorization: Article VI Outer Space Treaty and International Space Law', Space and Telecommunications Law Program, Faculty Publications, Paper 69, 1 January 2011, at 12–13, available at http://digitalcommons.unl.edu/spacelaw/69; see also n. 30.

state liability which covers in particular those cases where injurious consequences in the form of damage have been inflicted by launching states upon other states parties or their natural or juridical persons.

Whilst the principle of state liability has been established by Article VII of the OST, the Liability Convention (in this section also referred to as the Convention) details the regime for the individual liability of states, and their joint and several liability when acting together. The purpose of this Convention is to grant a high level of protection to victims.[25] The particularly risky aspects of space activities have led to the introduction of international state liability to safeguard the interests of the victim by placing the emphasis on compensation for damage.

The Convention provides for two situations in which shared liability may arise. The first situation is governed by Article IV of the Liability Convention, and arises in

> the event of damage being caused elsewhere than on the surface of the Earth to a space object of one launching State or to persons or property on board such a space object by a space object of another launching State, and of damage thereby being caused to a third State or to its natural or juridical persons.

In such a case, the first two states shall be jointly and severally liable in relation to the third state.

In practice there has not yet been a case involving such shared state liability. However, one incident, namely the collision between the 'Iridium' and 'Cosmos' satellites, could have provoked a claim procedure based on the Liability Convention involving shared liability between the United States and Russia, and illustrates how shared liability may arise. Due to the collision both satellites were destroyed, resulting in a large cloud of small debris in low earth orbit that endangered satellites and the International Space Station. If in this case damage had indeed occurred to a space object of a third state, this could have been an illustration of shared liability.

[25] See for the drafting history, Verbatim Record of the Seventy-Second Meeting, UN Doc. A/A/AC.105/PV.72 (1969), at 46 (statement made by Canada). The Convention was intended to be victim-oriented, designed not as a reciprocal agreement between the two prevailing space powers, the United States and Russia, but as a safeguard for each state, perhaps in particular regarding non-space powers. See also Liability Convention, n. 2, in its Preamble: '*Recognizing* the need to elaborate effective international rules and procedures concerning liability for damage caused by space objects and to ensure, in particular, the prompt payment under the terms of this Convention of a full and equitable measure of compensation to victims of such damage.'

In such a case, Article IV(1)(b) of the Liability Convention would have provided for joint and several liability between the United States and Russia, based on the fault of either of these launching states or on the fault of persons for whom either was responsible. Hence the burden of compensation for the damage to a space object of a third state is to be apportioned between the states involved, in accordance with the extent to which they are at fault.[26] If the extent of the fault of each of these states cannot be established, the burden of compensation is to be apportioned equally between them. However, such apportionment is without prejudice to the right of the third state to seek the entire compensation from both states.[27]

Furthermore, Article IV(1)(a) of the Liability Convention provides for joint and several liability to be absolute if the damage has been caused to the third state on the surface of the earth or to aircraft in flight. Whilst this shared liability is absolute in relation to the third state, and this would mean that the third (victim) state does not have to prove fault to establish liability, the wording of Article IV(2) applies in all cases of joint and several liability referred to in Article IV(1). Although this brings the element of fault into play for the apportionment of damage between the first two states, the third state can seek the entire compensation from any or all of the launching states which are jointly and severally liable.[28]

The second situation in which shared liability may arise concerns cases involving two or more states acting together in launching a space object. In fact, the introduction of the 'launching state' criterion serves not only to identify the liable state, but also facilitates the concept of shared liability. The Liability Convention places liability on the 'launching state', which term means, according to Article I(c)(i)-(ii),

(i) A State which launches or procures the launching of a space object;
(ii) A State from whose territory or facility a space object is launched.[29]

Whilst the Liability Convention proceeds from individual liability placed on the launching state,[30] shared liability will arise when multiple actors meet the launching state criterion. When a state launches or procures the launching of a space object from the territory or facility of another state, both states are liable. This concept of shared liability, facilitated by the

[26] Article IV(2) Liability Convention, n. 2.
[27] Ibid.
[28] Article IV Liability Convention, ibid.
[29] See Article I(c) Liability Convention, ibid. This preposition has been elaborated in Article V(3) of the Liability Convention: 'A State from whose territory or facility a space object is launched shall be regarded as a participant in the joint launching.' See also Article VII of the OST, n. 1.
[30] Articles II and III Liability Convention, n. 2.

definition of the 'launching state', is grounded on Article V(1) of the Liability Convention, which stipulates:

> Whenever two or more States jointly launch a space object, they shall be jointly and severally liable for any damage caused.

Article V(3) of the Liability Convention adds:

> A State from whose territory or facility a space object is launched shall be regarded as a participant in a joint launching.

Such joint launchings have occurred several times, such as when a United States space shuttle was launched from the Baikonur Cosmodrome in Kazakhstan.[31] In the past, only a few countries had launched their space objects from their own territory because there were few available launching sites on earth. Another reason for launching from foreign territory is that the positions of certain launching stations are favourable for a successful launching into an envisaged orbit. Today, only the United States, Russia, China, Japan, France, India, Israel, Iran, and North Korea are launching space objects from their own territory.

When damage is caused on the surface of the earth or to an aircraft in flight of a third state, the launching states 'shall be absolutely liable to pay compensation' to the third state.[32] Such 'absolute liability' can rest upon one launching state or two, depending on whether the launch took place from the territory of the same state or from the territory (or facility) of another state. In the latter case, the absolute liability is a shared liability by the launching state and the state from whose territory (or facility) the launching took place. In contrast, the Liability Convention provides for 'fault liability' in the event of damage caused elsewhere than on the surface of the earth to a space object of another launching state.[33]

As far as compensation between two liable states is concerned, Article V(2) provides that

> [a] launching State which has paid compensation for damage shall have the right to present a claim for indemnification to other participants in the joint launching. The participants in a joint launching may conclude agreements regarding the apportioning among themselves of the financial obligation in respect of which they are jointly and severally liable. Such agreements shall be without prejudice to the right of a State sustaining damage to seek the entire compensation due under this Convention from any or all of the launching States which are jointly and severally liable.

[31] See also on this, Chapter 4 in this volume, M.J. Strauss, 'Territorial Leases', __.
[32] Article II Liability Convention, n. 2.
[33] Article III Liability Convention, ibid.

This right of recourse might accommodate a fair and practical solution which is, however, without prejudice to the right of third parties to seek the entire compensation for damage from all or any of the launching states. Exemptions from these claims procedures exist for nationals of the launching state.[34] We will not further analyse these exemptions in the current context, as there have been no examples illustrating their application in practice.

Apart from the above-mentioned cases of shared liability based on Articles IV and V of the Liability Convention, a combination of these Articles will provide for even more instances of shared liability. If, for instance, state A launches a space object from the territory of state B, and this space object causes damage to a space object launched by state C, but from the territory of state D, and this results in damage to a third state E – either on the surface of the earth (or aircraft in flight) or to a space object of state E – this will lead to shared absolute liability by (launching) state A, B, C, and D, or to shared fault liability by (launching) state A, B, C, and D.

The regime sketched here differs in several respects from the general regime for responsibility laid down by the ARSIWA. One difference is the principle of absolute liability. Whereas under general international law defences are available for a breach of an international obligation constituting an internationally wrongful act, no defences are available in those cases where space law provides for absolute liability.[35]

However, even in the case of absolute liability, some exceptions can be found in Article VI of the Liability Convention. First, no liability arises under the absolute liability regime if the claimant state has committed gross negligence or an intentional wrongful act or omission.[36] However, such exoneration is not granted when the damage has resulted from activities by the launching state in breach of international law, including the Charter of the United Nations,[37] or the Outer Space Treaty.

Second, whilst the ARSIWA do not include fault in the conditions for state responsibility, the space law regime provides expressly for fault-based liability in certain situations.

[34] Article VII Liability Convention, ibid.
[35] See Part One, Chapter V 'Circumstances precluding wrongfulness' of the ARSIWA, n. 8.
[36] Article VI of the Liability Convention, n. 2. The Liability Convention also sets out other conditions for exoneration, as to which see Article VII: 'The provisions of this Convention shall not apply to damage caused by a space object of a launching State to: (a) Nationals of that launching State; (b) Foreign nationals during such time as they are participating in the operation of that space object from the time of its launching or at any other stage thereafter … as the result of an invitation by that launching State.'
[37] Charter of the United Nations, San Francisco, 26 June 1954, in force 24 October 1945, 1 UNTS 16 (UN Charter).

Third, as noted above, the outer space regime provides expressly for joint and several liability, notably in the case of joint launches on the basis of the launching state criterion in combination with Article V of the Liability Convention.

4. Shared responsibility between states and international organisations

The European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT) is an example of a traditional international intergovernmental organisation[38] that in international space law is referred to as an international organisation. Other international intergovernmental organisations actually involved in space activities, such as the International Telecommunications Satellite Organization (INTELSAT), the International Maritime Satellite Organization (INMARSAT), and the European Telecommunications Satellite Organization (EUTELSAT),[39] have developed in the direction of international commercial enterprises of a private nature when deploying their activities in outer space, under the names INTELSAT s.a., INMARSAT plc., and EUTELSAT s.a. (the latter changed to EUTELSAT Communications in 2005), respectively.[40]

EUMETSAT still serves as an international intergovernmental organisation. Its main purpose is to supply weather and climate-related satellite data, images, and products to the National Meteorological Services of the member states. To execute these tasks, EUMETSAT owns and operates a great number of satellites in outer space and, thus, as an international

[38] Convention for the Establishment of a European Organization for the Exploitation of Meteorological Satellites (EUMETSAT), Geneva, 24 May 1983, in force 19 June 1986, 1434 UNTS 3; amended 14 July 1994, in force 27 July 1994, 1999 UKTS 32. EUMETSAT has 30 member states: see www.eumetsat.int/website/home/InSight/NewsUpdates/DAT_2172908.html.

[39] INTELSAT was originally established by means of the Agreement Relating to the International Telecommunications Satellite Organization 'INTELSAT', Washington, 20 August 1971, in force 12 February 1973, 1220 UNTS 21, and the corresponding Operating Agreement Relating to the International Telecommunications Satellite Organization 'INTELSAT', Washington, 20 August 1971, in force 12 February 1973, 1220 UNTS 149. INMARSAT was originally established by means of the Convention on the International Maritime Satellite Organization (INMARSAT), London, 3 September 1976, in force 16 July 1979, 1143 UNTS 105, and the corresponding Operating Agreement on the International Maritime Satellite Organization (INMARSAT), London, 3 September 1976, in force 16 July 1979, 1143 UNTS 213. EUTELSAT was originally established by means of the Convention establishing the European Telecommunications Satellite Organization 'EUTELSAT', Paris, 15 July 1982, in force 1 September 1985, 1519 UNTS 149, and the corresponding Operating Agreement Relating to the European Telecommunications Satellite Organization 'EUTELSAT', Paris, 15 July 1982, in force 1 September 1985, 1519 UNTS 222.

[40] Respectively, as the International Telecommunications Satellite Organization (ITSO), the International Mobile Satellite Organization (IMSO), and the European Telecommunications Satellite Organization (EUTELSAT IGO), they continue to be the residual intergovernmental organisations charged with overseeing public service obligations.

(intergovernmental) organisation that is active in outer space, it must comply with the provisions of the OST.

Following the Declaration of Legal Principles,[41] Article VI of the Outer Space Treaty provides that

> [w]hen activities are carried on in outer space, including the Moon and other celestial bodies, by an international organization, responsibility for compliance with this Treaty shall be borne both by the international organization and by the States Parties to the Treaty participating in such organization.[42]

This principle differs markedly from the regime set up by the Articles on the Responsibility of International Organizations (ARIO)[43] which, apart from exceptional circumstances, do not make states participating in an organisation responsible for the activities of that organisation.[44]

The relevance of this provision in space law, and its potential to lead to an effective shared responsibility between an international organisation and its member states, was uncertain at the time of negotiating the OST. At that time, the discussion centred around the status of international organisations. Although states were the principle subjects of rights and obligations under international (space) law, it was eventually agreed that this did not exclude the possibility of them joining their efforts and acting jointly within an international organisation.[45]

By referring to the wording of Article VI of the OST, Lachs concluded that in such cases the general rule provides that responsibility shall indeed rest with the organisation and its member states. However, the question is whether the wording of this provision goes beyond the explicit responsibility for compliance with the treaty of the relevant international organisation and its member states in terms of the *sharing* of responsibility between the international organisation and its member states for their contribution to a single harmful outcome, i.e. shared responsibility. The Declaration does not explain whether the responsibility of an organisation and its member states is joint and several. Importantly, in reaching the above

[41] See n. 5.
[42] See discussion in M. Lachs, *The Law of Outer Space: An Experience in Contemporary Law-Making* (Sijthoff: Leiden, 1972), Chapter XI on Responsibility, 123.
[43] Articles on the Responsibility of International Organizations, ILC Report on the work of its sixty-third session, UNGAOR 66th Sess., Supp. No. 10, UN Doc. A/66/10 (2011) (ARIO).
[44] See S. Yee, '"Member Responsibility" and the ILC Articles on the Responsibility of International Organizations: Some Observations', in M. Ragazzi (ed.), *Responsibility of International Organizations: Essays in Memory of Sir Ian Brownlie* (Leiden: Martinus Nijhoff, 2013), 325.
[45] See n. 42.

conclusion, Lachs pointed to the joint and several *liability* of international intergovernmental organisations with their member states. This has been accommodated by Article XXII[46] of the Liability Convention, which will be discussed below.

Whilst during the codification process of the OST[47] Article XIII was adopted in connection with Article VI, providing for the inclusion of international organisations, the OST did not contain a provision for international intergovernmental organisations to become parties to the Treaty, which would place them on an equal footing with states parties. Nor did the OST contain a provision similar to Article XXII of the Liability Convention providing for a status assimilating their liability to that of states,[48] which would have facilitated the concept of an effective shared responsibility between an organisation and its member states.

In contrast, the question of *shared liability* between an international organisation and its member states was not in dispute from the beginning of the conclusion of the Liability Convention. The Liability Convention assimilates, under specified conditions, international organisations with states. It does so if a non-qualified majority of the member states of the international organisation are parties to the Liability Convention and the OST, and if an organisation declares its acceptance of the rights and obligations of the Liability Convention.[49]

Moreover, the Liability Convention provides explicitly for a regime of joint and several liability between an organisation and its member states, according to which a claim for compensation for damages shall first be presented to the organisation. If the organisation has not paid within six months, the claimant state may address the claim to the states parties of the Convention.

Again, there are currently no examples in practice of this regime of 'shared responsibility' or 'shared liability'. The special case of liability with regard to the 'Galileo' programme in the

[46] Article XXII(1) of the Liability Convention reads: 'In this Convention, with the exception of Articles XXIV to XXVII, references to States shall be deemed to apply to any international intergovernmental organization which conducts space activities if the organization declares its acceptance of the rights and obligations provided for in this Convention and if a majority of the States members of the organisation are States Parties to this Convention and to the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies.'

[47] See P.G. Dembling and D.M. Arons, 'The Evolution of the Outer Space Treaty' (1967) 33 *Journal of Air Law and Commerce* 419.

[48] Similar provisions can be found in Article VII of the Convention on Registration of Objects Launched into Outer Space, New York, 12 November 1974, in force 15 September1976, 1023 UNTS 15; and Article XVI of the Moon Agreement, n. 6.

[49] See n. 46, Article XXII(1) of the Liability Convention, n. 2.

European Space Agency (ESA)/EU context, involving responsibility and liability of international organisations, shall be dealt with in section 6.

5. Responsibility shared between states and non-governmental entities

5.1 The principle of state responsibility/liability for non-governmental entities

Non-governmental entities, i.e. private undertakings, increasingly take part in the exploration and use of outer space. This development is evidenced by the larger participation of private operators in the launch market and the creation of launch facilities in all parts of the world, as illustrated by the development of a Space Port in Curaçao, designed to service, among others, suborbital human space flights.[50]

The more frequent engagement of private undertakings with space activities raises the question of the sharing of responsibility and liability between states and private undertakings. Since states are the principle subjects of international (space) law, and only states can be held responsible and liable, it is left to states to regulate via their national legislative systems if and how the financial burden flowing from their international responsibility and liability for a private entity's conduct in space will eventually be shared between them and these private entities.

States parties to the OST are internationally responsible for national activities carried out by non-governmental entities.[51] This principle differs from the classical international law approach where states are normally not internationally responsible for acts of their nationals, except in case of the application of the concept of due diligence.[52] Although private entities may engage in space activities, states are responsible for the acts of these non-governmental entities according to Article VI of the OST.

Moreover, Article VI obliges states parties to the OST to ensure that non-governmental entities, including natural or juridical persons that are engaged in outer space activities, conduct these activities in accordance with the provisions of the Treaty. To fulfil this

[50] See Caribbean Spaceport, services, available at http://caribbeanspaceport.com/services.html.
[51] See Article VI of the Outer Space Treaty, quoted in n. 9.
[52] See F.G. von der Dunk, 'Liability versus Responsibility in Space Law: Misconception or Misconstruction?' (1991) *Proceedings of the Thirty-Fourth Colloquium on the Law of Outer Space* 363.

obligation, activities by non-governmental entities require 'authorization and continuing supervision by the appropriate State Party to the Treaty'.[53]

The OST affirms that only states can incur international liability.[54] Although the term 'launching state' is not explicitly mentioned in Article VII of the OST, it is incorporated there by reference. Hence, being a 'launching state' has become the criterion for applying international state liability, covering the state that launches or procures the launching of an object into outer space, and the state from whose territory or facility an object is launched.

The qualification of a state as a launching state will lead to that state's responsibility or liability for activities carried out by natural and juridical persons under its jurisdiction – that is, applying personal, territorial, or quasi-territorial jurisdiction – when these are engaged in launching activities. Thus, the responsibility and liability of states in the event of participation of non-governmental entities will be determined in accordance with agreements between the involved launching states, on the one hand, and the national laws of those states, on the other, explaining the terms used in international space law when needed. These terms include 'launching state', in particular the 'procurement' element, and the 'national activities' for which states are responsible.[55]

5.2 Shared responsibility and liability under national law

Although the Liability Convention places liability on the launching state or states according to more than one criterion, providing for shared liability of the launching states, the respondent state(s) might claim that it is not liable for non-governmental launching activities according to its national law. However, the claimant state could argue that reliance on domestic law by the respondent state is irrelevant, referring to the ARSIWA.[56] In order to establish clarity in connection with activities requiring huge investments, and also for undertakings and consistency of the use of international terms, it has been suggested that the territorial criterion

[53] Article VI of the OST, see section 3.1.
[54] See Article VII of the OST, n. 1, which reads: 'Each State Party to the Treaty that launches or procures the launching of an object into outer space, including the Moon and other celestial bodies, and each State Party from whose territory or facility an object is launched, is internationally liable for damage to another State Party to the Treaty or to its natural or juridical persons by such object or its component parts on the Earth, in air space or in outer space, including the Moon and other celestial bodies.' As to liability of international organisations, see subsection 4.
[55] As used in Article VI of the OST, n. 1 (see quote in n. 9).
[56] See Article 32 of the ARSIWA, n. 8.

of the launching state should be used, as a so-called safety device for ensuring that at least one state is liable for launching activities by a private enterprise.[57]

Indeed, a great number of space-faring nations, presently twenty-two countries,[58] have enacted national space legislation covering their national space activities. A minority of these have launching capabilities on their territories. The national space laws of these states include provisions on *jurisdiction* and *control*, including rules on licensing and indemnification, not only for national space activities, but also for all space activities performed from their territories. Hence the territorial criterion of the launching state provides for the liability of at least one launching state when the state from whose territory the launching takes place exercises jurisdiction and control over the private enterprise that launches the space object.

However, the territorial criterion can be, and has been, circumvented by a private launch from the high seas, as the case of the *Sea Launch* shows.[59] A private consortium registered in the Cayman Islands undertook its first launching from a movable launching platform on the high seas in March 1999. Although the application of 'quasi-territoriality' of the state of registry of the launching platform or vessel could overcome such a lacuna, the case of the *Sea Launch* would not answer the liability question even when applying the 'quasi-territorial' criterion. This is so because Liberia, the state of registration of the launching platform, is not a party to any of the above-mentioned space law treaties. In this case, the British nationality of the *Sea Launch* consortium did not bring about the liability of the United Kingdom (UK) as the state which launched or procured the launching, because the private undertaking had not been licensed under the provisions of the UK Outer Space Act.[60] Hence, control exercised by the UK as a determining factor for responsibility and jurisdiction[61] could not be established.

The above example illustrates the importance of the national (space) laws and their consistent interpretation of the terms used in international space law, particularly in relation to the

[57] See A. Kerrest, 'Special need for national legislation: the case of launching', in Project 2001, Legal Framework for the Commercial Use of Outer Space, Workshop Proceedings Volume VI: Need and Prospects for National Space Legislation, Munich, 5-6 December 2000, 25; Proceedings of the Project 2001 Workshop on National Space Legislation, Cologne, Mars 2001.

[58] See National Space Law Database, available at www.unoosa.org/oosa/en/ourwork/spacelaw/nationalspacelaw/index.html.

[59] See F.G. von der Dunk, 'Public Space Law and Private Enterprise – The Fitness of International Space Law Instruments for Private Space Activities', Project 2001 Legal Framework for Privatising Space Activities, Part II International Legal Framework and Private Space Activities, Proceedings of the Project 2001-Workshop on Legal Issues of Private Space Activities, 19 July 1999, Vienna, 12-39, in part, at 19, 20.

[60] UK Outer Space Act 1986, available at www.gov.uk/government/uploads/system/uploads/attachment_data/file/295760/outer-space-act-1986.pdf.

[61] See section 3.

allocation of responsibility and liability for non-governmental entities involved in space activities. For instance, the term 'space activity' in the Dutch Space Activities Act[62] covers 'the launch, the flight operation or the guidance of space objects in outer space'.[63] According to the definition of 'operation' and 'guidance' in the Dutch Space Activities Act, very small satellites which cannot be navigated or controlled in the sense of orbit correction are excluded from state responsibility as stipulated in Article VI of the OST, because of the impossibility of authorisation and control by the state.[64] Remarkably, such satellites are not licensed under the Dutch Space Activities Act, and are not authorised and supervised by the Netherlands.

As noted in section 3, the responsibility and liability of states in the event of the involvement of non-governmental entities will also be determined in accordance with the agreements between the launching states involved, as exemplified by the following. Negotiations are taking place between the Netherlands and Russia concerning launchings to be performed by a Dutch company called 'ISIS' from Russian territory. It is foreseen that, on the one hand, the Netherlands will retain authorisation and continuous control over the satellite to be launched, and hence the launching state will be responsible and liable for the operation of the satellite. On the other hand, Russia, as the state from whose territory the launch will take place, wishes to shift responsibility and liability for damage caused to third parties to the Netherlands, that is, the state which is responsible and liable for ISIS as a non-governmental entity established under Dutch law. Although there will be joint and several liability between the Netherlands and Russia according to Article V of the Liability Convention, this provision provides for apportioning responsibility and liability between the two states, which might lead to placing the total financial risks upon the Netherlands. However, such an agreement cannot prevent a victim from seeking full compensation from either the Netherlands or Russia, or from both. Indemnification by the Dutch company ISIS for compensation paid by the Dutch government

[62] Rules Concerning Space Activities and the Establishment of a Registry of Space Objects, 13 June 2006 (Dutch Space Activities Act), available at www.unoosa.org/oosa/en/ourwork/spacelaw/nationalspacelaw/netherlands/space_activities_actE.html.

[63] Ibid., Chapter 1, general provisions, section 1(b): 'The following definitions shall apply in this Act and its constituent provisions: space activities: the launch, the flight operation or the guidance of space objects in outer space.'

[64] See N. Palkovitz and T.L. Masson-Zwaan, 'Orbiting under the radar: nano satellites, international obligations and national space laws', in C. Jorgenson (ed.), *Proceedings of the International Institute of Space Law* (The Hague: Eleven International Publishing, 2013), 566.

should be covered by the provisions of Dutch national law, in particular the Dutch Space Activities Act, and a future license granted under that Act.[65]

Hence, national legislation must determine the indemnification of the compensation claim to be paid by the responsible and/or liable state.[66] National space law merely provides for indemnification by a private entity for the financial burden resulting from the compensation claim to be paid by the state based on state liability. Since state liability is unlimited, national laws in general provide for indemnification on the part of their nationals to an amount specified in national law, supplemented by the obligation for insurance to such an amount.[67] As to the difference between the total amount which is due by the liable state under international law and the limited amount for indemnification by private undertakings, one could speak of a 'quasi-sharing' or 'indirect sharing' of liability between the liable state and the private corporation, where the sharing is based on allocation of liability as laid down in national law. As pointed out in section 3 above, the claimant state can only take action against the liable, defendant, state.

When states incur claims for damage resulting from space activities based on state responsibility provided for in Article VI of the OST, and their national space legislation does not provide for indemnification by private entities under their jurisdiction, they cannot recover their damages from the private undertaking which caused the damage.[68] Again, states should make provision for this 'quasi-sharing' in their national space laws.

6. Liability under the Galileo programme of the EU

6.1 Governance and management of the Galileo programme

[65] Dutch Space Activities Act, n. 62, Chapter 4. Redress, section 12 '1. If the State is obliged to pay compensation under Article VII of the Outer Space Treaty or the Liability Convention, the State is entitled to recover this sum, in full or in part, from the party whose space activity has caused the damage.'

[66] As explained earlier in this subsection.

[67] See for instance the Australian Space Activities Act 1989, section 48: Insurance requirements; the Swedish Act on Space Activities (1982-963), section 6, contains regulations on liability covering reimbursement of liability by the state; the United States Commercial Space Launch Act (CSLA) 49 USC Par 2601-2623 (Supp. II 1984), section 70112(a), contains regulations on liability insurance to compensate for the maximum probable loss from claims by third parties resulting from an activity carried out by the license; and the French Space Operations Act (FSOA 2008), Articles 13 and 14 cover indemnification by the operator for compensation for damage paid by the French government.

[68] The Dutch Space Activities Act, n. 62, mentions only the possibility of redress in case of liability, by mentioning Article VII of the Outer Space Treaty, n. 1, and the Liability Convention, n. 2.

The Galileo programme for the development of Global Navigation Satellite Systems (GNSS), designed to provide for the launching of four satellites, raises questions about the sharing and allocation of liability between the concerned parties. The fully deployed system will consist of 30 satellites (27 plus three spare) positioned in three circular Medium Earth Orbit (MEO) planes at an altitude of 23.222 kilometres above the earth. Third party liability risks will arise should damage be caused by the launching of a Galileo satellite or signal malfunctioning of the satellites.

The EU is the owner of the Galileo System, whereas the ESA functions as the Procurement Agency.[69] A contract for the launch services was awarded by the ESA, acting on behalf of the European Commission, to 'Arianespace', which is a private enterprise established under French law, for launches taking place from the Guyana Space Centre (CSG) in Kourou in French Guyana.

6.2 Third party liability of states in relation to international organisations

Should damage occur from launching activities carried out as activities under the Galileo programme, the international organisations the EU and the ESA, their member states which are parties to the Liability Convention, and France as the launching state and the state in which Arianespace is established, may be held jointly and severally liable for damage caused to third parties, as explained above.[70] If France as the launching state is sued for third party liability, it will have, according to the French Space Operations Act (FSOA),[71] the right of recourse against the space operator for an amount which is limited to the fixed ceiling of 60 million euros, by channelling the liability to the operator. The French government guarantees the amount of compensation exceeding this amount.

[69] See Article 8 of Regulation (EC) No. 683/2008 (9 July 2008), OJ L 196/1, on the further implementation of the European satellite navigation programmes (EGNOS and Galileo), which was amended by Regulation (EU) No. 912/2010 (22 September 2010), OJ L 276/11, setting up the European GNSS agency, which is governed by the following provisions on liability: Article 19 of Regulation No. 912/2010: '1. The contractual liability of the Agency shall be governed by the law applicable to the contract in question. The Court of Justice shall have jurisdiction to give judgment pursuant to any arbitration clause contained in a contract concluded by the Agency. 2. In the event of non-contractual liability, the Agency shall, in accordance with the general principles common to the laws of the Member States, make good any damage caused by its departments or by its servants in the performance of their duties.'

[70] See section 3.2.

[71] See P. Clerc, 'The French Space Operations Act. One year of implementation', presented at the 6th Eilene Galloway Space Symposium on Critical Issues in Space Law, 'A Comparative Look at National Space Law and Their International Implications', 1 December 2011, Washington, D.C., published in (2001) *Proceedings of the International Institute of Space Law* 543.

The French state concluded agreements (the Guyana Space Centre (CSG) Agreement)[72] with the ESA for the use of the French Guyana Space Centre and for third party claims for damage caused by satellites launched in the Galileo programme by regulating its liability in relation to that of the ESA and its member states by an indemnification clause in the event that the ESA is the customer of Arianespace, and the ESA payload is at the origin of the damage.[73] The CSG Agreement exempts the ESA in all other cases from liability as a launching state in the sense of the ESA procuring the launch of a space object. However, should the French state be called upon for compensation, Arianespace will have to reimburse the French state up to the ceiling of 400 million francs per launch.[74] This division of liability can be seen as a form of 'quasi-shared' liability. So far no damage claims have been presented in this context.

6.3 Liability for malfunctioning of signals

The satellites launched under the Galileo programme also run the risk of creating damage caused by the malfunctioning of signals provided by the navigation satellites. The use of Galileo data is widespread on a global level, making the risk of financial loss through the provision of wrong data significant.

However, the absence of uniform international rules on the provision of data and services causes problems, because the applicability of the provisions of the Liability Convention is uncertain, as the Convention covers liability for the compensation of damage caused by an object launched into outer space. The question is whether damage or loss caused by the malfunctioning of the GNSS signal, which seems to be *indirect* damage,[75] is covered by the damages foreseen in the Liability Convention.[76] It has been argued that the Liability

[72] See Guyana Space Centre (CSG) Agreement, reprinted in G. Lafferanderie, 'Responsabilité juridique internationale et activités de lancement d'objects spatiaux au CSG' (1994) 80 *ESA Bulletin* 58; see also V. Kayser, *Launching Space Objects: Issues of Liability and Future Prospects* (Dordrecht: Kluwer Academic Publishers, 2001), 141.
[73] Article 11.3 of the CSG Agreement, ibid.
[74] See Article III.9 of the Declaration by certain European Governments relating to the Ariane Launcher Production Phase (Ariane Declaration), reprinted in (1981) VI *Annals of Air and Space Law* 723. This amount has not changed in the renewed Declaration. The equivalent of 400 million French francs is about 61 million euros.
[75] That is, damage caused by the signals in contrast with damage caused by the space object.
[76] See N. Jingjing, 'Civil Aviation Authority of China, The Future of uniform International Rules on GNSS Liability' (2011) *Proceedings of the International Institute of Space Law* 339.

Convention only refers to damage caused *by space objects*, thus covering *direct* physical damage, while excluding damage caused by signals.[77]

Moreover, the procedure for the victim to recover damages, based on the Liability Convention via diplomacy between states, and the nature of the decision by and the procedure of the Claims Commission, hampers the effectiveness of the Convention. Indeed, this decision will only be binding and final if the parties have so agreed, and the procedure is complicated for claimants. The absence of uniform international law on the provision of data and services causes problems including the risks of multiple applicable jurisdictions and uncertainty concerning the notion of reimbursable loss.

The European Commission has to ensure that all conditions for operating and exploiting the Galileo programme, including an applicable third party liability regime, are in place when it introduces the positioning services. This requirement has caused the European Commission to propose legislation for a specific regime for civil liability for damages deriving from the provision of Galileo-related services, designed to strike a balance between two conflicting interests, namely, that of the defendants, including the players in the EU GNSS chain, the owner, and/or operator; and the interest of the claimant victims in the EU.[78]

A new liability regime as proposed by the European Commission should be built on two tiers: first, a strict liability regime with a limitation ceiling; and second, a regime referring to a fault-based and unlimited liability.

The ceiling could be set at different levels depending on the services provided, that is, Open Service; Safety of Life Service; Search and Rescue; Commercial Services; and Public Related Services. The strict liability scheme for GNSS operations and service provisions is attractive for claimants in third states, but they are not prevented from seeking compensation based on applicable law in local jurisdictions.

For the sake of creating uniformity, a solution might be to extend the application of the EU Regulation covering a new liability regime, proposed by the European Commission and referred to above, by the conclusion of bilateral agreements with third states. However, this

[77] See A. Roma, K.-U. Schrogl and M. Sánchez Aranzamendi (eds.), 'Policy Aspects of Third Party Liability in Satellite Navigation. Preparing a Roadmap for Europe', ESPI (European Space Policy Institute) Report No. 19, 19 July 2009, 20, available at www.espi.or.at/studies/reports. See also U. Magnus, 'Civil Liability for Satellite-based Services' (2008) 13 *Uniform Law Review* 935, at 967.

[78] See M. Ferrazzani, 'Recent Legal Developments of GNSS In Europe' (2011) *Proceedings of the International Institute of Space Law* 359.

will be complex in practice because of the high number of jurisdictions involved, given the global coverage of the GNSS. Acknowledging that an EU Regulation would not be sufficient for any GNSS system that is used worldwide, action should be taken both in Europe and through worldwide cooperation in order to solve the liability aspects, in particular.

The European initiative elaborated in the European Commission proposal would include a channelling of third party liability to the EU, based on strict liability but with a limitation, even when the damage was caused by one of its co-contractors. Nonetheless, the EU would have a recourse action against this co-contractor, implying a quasi-shared liability between the EU and its co-contractor.[79]

Situations of shared responsibility could arise in connection with the EU-United States Agreement[80] on the promotion, provision, and use of Galileo and GPS satellite-based navigation systems and related applications, between the EU or its member states, or the EU and its member states, within their respective areas of competence, on the one hand, and the United States, on the other.[81]

This multi-party participation might lead to shared responsibility of the parties in the exercise of the established measures and covered by Article 3 of this Agreement.[82] However, a problem has arisen concerning the competence of the 'European Party', being either the European Community and/or its member states.[83]

[79] Through mandatory provisions as a regulatory foundation for contractual and insurance schemes.
[80] Agreement on the Promotion, Provision and Use of Galileo and GPS Satellite-based Navigation Systems and Related Applications, 26 June 2004 (EU-US Agreement), available at http://ec.europa.eu/enterprise/policies/satnav/galileo/files/2004_06_21_eu_us_agreement_en.pdf.
[81] As to which see Article 19(1) of the EU-US Agreement, ibid., entitled 'Responsibility and Liability' reading: 'The Parties shall have the responsibility for failure to comply with obligations under this Agreement.'
[82] Cf. Article 3 of the EU-US Agreement, ibid.: 'Except as otherwise provided therein, this Agreement pertains to all measures established by the Parties concerning civil satellite-based navigation and timing signals and signal providers, civil satellite-based navigation and timing services and service providers, augmentation, value-added services providers, and global navigation and timing goods.'
[83] Therefore Article 19(2) of the EU-US Agreement, ibid., reads: 'It is unclear whether an obligation under this Agreement is within the competence of either the European Community or its Member States, at the request of the United States, the European Community and its Member States shall provide the necessary information. Failure to provide this information with all due expedience or the provision of contrary information shall result in joint and several liability.'

7. Conclusions

This contribution has concluded that while international law and space law provide for an umbrella regime indicating broad lines of responsibility, the increasing number of international cooperative undertakings, and the diversity of the participants in those undertakings, require a more careful and detailed examination of the subject and formulation of rules.

Space law forms, in certain respects, a *lex specialis* of general international law, the rules of which regime prevail over those established by general international law.[84] This conclusion refers in particular to the more articulated distinction made in space law between responsibility and liability, and the basis of liability for the compensation for damage. Also, the role of private undertakings receives more attention under space law compared to general international law.

International agreements between launching states and licenses granted to private corporations under national space law are filling the gaps in international space law. These are the instruments regulating the liability for the damage caused by space activities in the first place, if they are carried out by more than one state, in cooperation with private corporations, in which context we introduced the term 'quasi-shared' liability.

However, the differentiation in national space legislation resulting from the application of personal and/or territorial jurisdiction, and the different interpretation of the terms used in international space law, such as 'space activities', 'national space activities', and 'space objects', do not always provide a clear answer to the question of attribution of liability, shared liability, or 'quasi-shared' liability in a particular case.

Moreover, the participation of international organisations in space programmes has added to the complexity of the attribution of shared liability among an international organisation and its member states, as illustrated by the Galileo programme of the EU.

It seems to us that the complexity, the global nature, and the high costs involved with the safe and efficient performance of space activities calls for greater legal clarity, particularly concerning the sharing of liability between the parties involved. It would be advisable to harmonise space legislation between states involved in space activities. In this respect the

[84] See n. 8.

European Union might propose that its member states commence harmonisation, which is all the more compelling since the Treaty on the Functioning of the European Union confirms the competence of the EU for space activities.[85]

[85] See Article 189 of the Treaty on the Functioning of the European Union, consolidated version, OJ C 326 (26 October 2012).