
State Liability for Space Object Collisions: The Proper Interpretation of ‘Fault’ for the Purposes of International Space Law

Joel A. Dennerley*

Abstract

When damage is caused by a space object in outer space, typically through a collision with another space object, international space law’s Liability Convention provides a mechanism for compensation for the injured state. Among other requirements, the Convention requires proof of state ‘fault’ in order for liability to arise, but it does not define this notoriously ambiguous term, nor does it establish a standard of care for those conducting outer space activities. The Convention is unique in international law being the only fault-based liability regime. This article argues that this gap in the Convention needs to be filled, and it proposes a solution to the problem of defining ‘fault’ by borrowing from general international law.

1 Introduction

The uses of outer space not only yield great rewards for humankind but also present us with serious risks due to the ultra-hazardous nature of space exploration.¹ This is aptly illustrated by the lives lost in the space shuttle *Challenger* (1986) and *Columbia* (2003) disasters. One such risk associated with the use of outer space is collisions that occur in space between man-made space objects and man-made space debris. Collisions of this kind can cause injury to persons, damage to functioning spacecraft

* Graduate, ANU College of Law, Australian National University, Canberra, Australia. The author wishes to thank Sarah Heathcote for her comments and support during the writing process.

¹ See generally Beer, ‘The Specific Risks Associated with Collisions in Outer Space and the Return to Earth of Space Objects: The Legal Perspective’, 25 *Air and Space Law (ASL)* (2000) 42, at 42.

and satellites, the creation of additional space debris and the de-orbiting of objects and their uncontrolled return to the earth.²

Considering these risks, the legal regime relative to outer space does not adequately manage state liability for space object collisions occurring in outer space.³ Article VII of 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)⁴ ‘provides for comprehensive international state liability for damage arising from the launch of a space object’.⁵ The Outer Space Treaty is a framework convention under which sits the Convention on International Liability for Damage Caused by Space Objects (Liability Convention).⁶ The Liability Convention ‘expands on this general principle of international state liability for damage resulting from a space object’.⁷ It sets up a regime of liability for damage caused by space objects, such as collisions between objects in outer space, but, as this article contends, it is incomplete. Like any typical liability regime, the Liability Convention focuses on causation and damage. In addition to requiring the elements of causation and damage, Article III, which imposes liability, curiously requires proof of fault for liability to be assigned to a state and thus provide a claimant state with a right to compensation. Article III states:

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, the latter shall be liable only if the damage is due to its fault or the fault of persons for whom it is responsible.⁸

Article III’s scope of application covers situations where the fault of a launching state results in a collision between space objects in outer space.⁹ For compensation to be owing to a victim state injured by a space object collision in orbit, the elements of causation, damage and, most notably, proof of fault must be satisfied.

The Liability Convention does not define the key terms of causation or, more significantly, fault, much less establish a standard of care for those actors conducting

² See generally United Nations Office for Outer Space Affairs, *Space Debris Mitigation Guidelines of the Committee on the Peaceful Uses of Outer Space (Debris Mitigation Guidelines)*, January 2010; Beer, *supra* note 1, at 42; Punnakanta, ‘Space Torts: Applying Nuisance and Negligence to Orbital Debris’, 86 *California Law Review* (2012–2013) 163, at 164, 171.

³ F. Lyall and P.B. Larsen, *Space Law: A Treatise* (2009), at 108–109.

⁴ See 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) 1967, 610 UNTS 205, Art. VII. The status of the Outer Space Treaty as of 1 January 2017 is 105 ratifications; 25 signatures.

⁵ Kerrest and Smith, ‘Article VII’, in S. Hobe, B. Schmidt-Tedd and K.U. Schrogl (eds), *Cologne Commentary on Space Law*, vol. 1: *Outer Space Treaty* (2009), at 128.

⁶ Convention on International Liability for Damage Caused by Space Objects (Liability Convention) 1972, 961 UNTS 187. The status of the Liability Convention as of 1 January 2017 is 94 ratifications; 20 signatures and three declarations of acceptance of rights and obligations.

⁷ Kerrest and Smith, *supra* note 5, at 129.

⁸ Liability Convention, *supra* note 6, Art. III.

⁹ *Ibid.*, Art. III does not apply exclusively to collisions between functional space objects but also to collisions involving non-functioning space debris. Kerrest and Smith, ‘Article III (Fault Liability)’, in S. Hobe, B. Schmidt-Tedd and K.U. Schrogl (eds), *Cologne Commentary on Space Law*, vol. 2: *Rescue Agreement Liability Convention Registration Convention Moon Agreement* (2009), at 133.

outer space activities. General international law equates fault with an actor's intention under the international legal system.¹⁰ Whether this is the proper interpretation of fault for the purposes of Article III, however, is unclear. If states are to explore and exploit the space domain, a clear and consistent legal regime must nonetheless be developed. If the Liability Convention is to operate as intended – by providing compensation to victims of damage caused by space objects – then the correct interpretation of Article III must be established.¹¹ This article will attempt to clarify the meaning of fault by ascertaining whether reference can be made to general international law and, if so, by establishing the solutions that general international law provides. The pressing need felt by the international community to address the problem of outer space collisions makes the contribution of this article both relevant and timely.¹²

2 Space Object Collisions

This article will reference various technical and legal phrases and terms. Of particular relevance are the terms 'space object' and 'space debris', both of which establish the parameters of this article.

A Context and Background

There are numerous types of space objects, and their uses and benefits vary. Man-made satellites are space objects, and they represent one of the most common uses of outer space. There are over 1,400 satellites currently in orbit around the earth.¹³ Satellites are primarily used for television broadcasting, earth observation and remote-sensing imagery, telecommunications, weather satellites, navigation and global positioning systems.¹⁴ Space objects, such as satellites, pose problems to the continued safety of space activities when they come to the end of their natural operational life spans and are no longer controllable. Fragments, elements or parts of space objects can break away or disconnect from their main structures and become non-functional space debris,¹⁵ which has the potential to damage spacecraft and satellites and can de-orbit

¹⁰ See generally A. Cassese, *International Law* (2nd edn, 2005) at 250–251; I. Brownlie, *System of the Law of Nations: State Responsibility*, part 1 (1983), at 44.

¹¹ For a discussion regarding the lack of a definition of fault, see especially B.A. Hurwitz, *State Liability for Outer Space Activities in Accordance with the 1972 Convention on International Liability for Damage caused by Space Objects* (1992), at 33; Lampertius, 'The Need for an Effective Liability Régime for Damage Caused by Debris in Outer Space', 13 *Melbourne Journal of International Law* (1991–1992) 447, at 455–456.

¹² See generally Debris Mitigation Guidelines, *supra* note 2, at iii; United Nations General Assembly (UNGA), International Cooperation in the Peaceful Uses of Outer Space, UN Doc. A/RES/71/90, 22 December 2016, at 2.

¹³ Bryce Space and Technology, prepared for the Satellite Industry Association, State of the Satellite Industry Report, June 2017, at 8.

¹⁴ See generally National Aeronautics and Space Administration, *What Is a Satellite?* (2015), available at www.nasa.gov/audience/forstudents/k-4/stories/what-is-a-satellite-k4.html#.V0rAprCUB4; Union of Concerned Scientists, *What Are Satellites Used For?*, 23 February 2015, available at www.ucsusa.org/nuclear-weapons/space-weapons/what-are-satellites-used-for#.WneqJP1X-Y.

¹⁵ Debris Mitigation Guidelines, *supra* note 2, at 1.

and return to the earth.¹⁶ In most instances, debris collides with other space objects and produces further debris fragments in what is called a ‘cascade effect’.¹⁷ This creates a hazardous environment for any space objects crossing into the orbital paths of these exponentially growing debris fields.¹⁸ Even a tiny fleck of paint, broken off from a space object, can cause damage because it has such a rapid orbital velocity.¹⁹ The incremental congestion of satellite orbital slots and the proliferation of space debris increase the chances that space objects will collide.²⁰ This issue is exacerbated because there is arguably no legal requirement to remove space debris or remediate the space environment.²¹

Currently, the National Aeronautics and Space Administration (NASA) is tracking 500,000 pieces of debris and estimates that there are many millions of objects so small²² that they cannot accurately be tracked.²³ Most space debris exists largely in two orbital locations: the lower earth orbit and the geostationary earth orbit,²⁴ which are the most frequently used earth orbits and are areas governed by space law.²⁵ These orbital locations around the earth are where most satellite and spacecraft activity occurs.

The United Nations Office for Outer Space Affairs, a part of the United Nations Secretariat, in conjunction with the United Nations Committee on the Peaceful Uses of Outer Space (UNCOPUOS), a United Nations committee created by the United Nations General Assembly (UNGA), has identified space debris as posing a serious risk to spacecraft and satellites.²⁶ This has been formally acknowledged as a ‘concern to all nations’ by the UNGA in several reports and resolutions.²⁷ Collectively, the issue of space object

¹⁶ See generally Brownlie, *supra* note 10, at 277; Brearley, ‘Reflections upon the Notion of Liability: The Instances of Kosmos 954 and Space Debris’, 34 *Journal of Space Law* (2008) 291, at 291–292; Beer, *supra* note 1, at 46.

¹⁷ Punnakanta, *supra* note 2, at 166; Lyall and Larsen, *supra* note 3, at 305; Imburgia, ‘Space Debris and Its Threat to National Security: A Proposal for a Binding International Agreement to Clean Up the Junk’, 44 *Vanderbilt Journal of Transnational Law* (2011) 589, at 600.

¹⁸ Lyall and Larsen, *supra* note 3, at 305.

¹⁹ Space debris has an average relative impact velocity of 36,000 kilometres per hour. Beer, *supra* note 1, at 44. See also I.H.Ph. Diederiks-Verschoor and V. Kopal, *An Introduction to Space Law* (3rd edn, 2008), at 127; Punnakanta, *supra* note 2, at 169.

²⁰ Limperis, ‘Orbital Debris and the Spacefaring Nations: International Law Methods for Prevention and Reduction of Debris, and Liability for Damage Caused by Debris’, 15 *Arizona Journal of International and Comparative Law* (1998) 319, at 326.

²¹ See generally J. Chatterjee, ‘Legal Aspects of Space Debris Remediation: Active Removal of Debris and On-Orbit Satellite Servicing’ (2013) (LLM thesis on file at McGill University, Montreal).

²² Many millions of objects are smaller than one millimetre in size. Beer, *supra* note 1, at 43–44.

²³ National Aeronautics and Space Administration, *Space Debris and Human Spacecrafts*, 8 February 2015, available at www.nasa.gov/mission_pages/station/news/orbital_debris.html#.VNaoXGSUfB4.

²⁴ Office of Science and Technology Policy, *Interagency Report on Orbital Debris*, November 1995, at 4.

²⁵ Diederiks-Verschoor and Kopal, *supra* note 19, at 20–21.

²⁶ See generally UNGA, *Report of the Committee on the Peaceful Uses of Outer Space*, UN Doc. A/62/20 (2007), annex (Space Debris Mitigation Guidelines of the Committee on the Peaceful Uses of Outer Space).

²⁷ See especially United Nations Committee on the Peaceful Uses of Outer Space (UNCOPUOS), *Report of the Committee on the Peaceful Uses of Outer Space*, UN Doc. A/62/20 (2007), at 17, para. 120; UNGA, *International Cooperation in the Peaceful Uses of Outer Space*, UN Doc. A/RES/71/90, 22 December 2016, at 2.

collisions in the earth's orbit poses great risks to the continued beneficial uses of outer space. In light of their significance, it is now important to define the terms 'space object' and 'space debris' for the purposes of international law.

B Defining 'Space Object' and 'Space Debris'

This section is dedicated to explaining the definition of both space object and space debris as well as other relevant definitions as a matter of law. It is necessary to understand their meaning and scope as well as their relationship and limitations to adequately examine the topic of space object collisions.

1 Space Object

While the term space object does not have a universal definition, the legal definition of space object under the relevant treaties, namely the Liability Convention and the Convention on Registration of Objects Launched into Outer Space (Registration Convention), is as follows: "The term "space object" includes component parts of a space object as well as its launch vehicle and parts thereof."²⁸ Although this non-exhaustive definition remains vague, it is the principal governing legal definition of space object. The term space object is also used throughout other international treaties relating to spatial activities.²⁹ It generally denotes 'object[s] launched by man for [the purpose of] ... mission[s] into outer space'.³⁰ Therefore, each piece of hardware used in a launch collectively constitutes a space object, and states cannot choose what does, or does not, make up the object for the purposes of this legal definition.³¹

Of practical significance here is the United Nation's (UN) registry of objects launched into outer space.³² This chronicles information furnished by states to the UN regarding objects launched into space. From an examination of this database, space object includes man-made objects used across a broad range of space-related activities for a variety of uses, which are subsequently launched into outer space, such as satellites³³ and rockets,³⁴ as well as 'all parts used in a launch, even those ... not intended to reach outer space,' such as boosters.³⁵ These space objects are launched into space by a 'launching

²⁸ See Liability Convention, *supra* note 6, Art. 1(d); Convention on Registration of Objects Launched into Outer Space (Registration Convention) 1975, 1023 UNTS 15, Art. I(b).

²⁹ See Outer Space Treaty, *supra* note 4, Art. VII; Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space 1968, 672 UNTS 119, Art. V; Registration Convention, *supra* note 28, Art. 2.

³⁰ Diederiks-Verschoor and Kopal, *supra* note 19, at 9, citing V. Kopal, *Some Remarks on Issues Relating to Legal Definitions of 'Space Objects', 'Space Debris' and 'Astronaut'* (1994), at 99–108.

³¹ Kerrest and Smith, 'Article I (Definitions)', in Hobe, Schmidt-Tedd and Schrogl, *supra* note 9, at 115.

³² United Nations Office for Outer Space Affairs, *Registration of Objects Launched into Outer Space*, 24 February 2015, available at www.unoosa.org/oosa/en/SORegister/index.html.

³³ For a sample list of satellites, see generally UNCOPUOS, Information Furnished in Conformity with the Convention on Registration of Objects Launched into Outer Space, UN Doc. ST/SG/SER.E/736, 15 January 2015.

³⁴ For a sample list of rockets, see generally UNCOPUOS, Information Furnished in Conformity with General Assembly Resolution 1721 B (XVI) by States Launching Objects into Orbit or Beyond, UN Doc. A/AC.105/INF.372, 4 May 1978.

³⁵ Kerrest and Smith, *supra* note 31, at 115.

State’, which under the Liability Convention means: ‘(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.’³⁶ The notion of a launching state is essential for the purposes of imposing state liability for the damage caused by space objects. This is because international liability is only imposed on states falling under the definition of a launching state.³⁷

Finally, the term ‘collision’ does not have a specific legal definition in the space law context. It generally refers to two or more space objects ‘striking violently’ against one another or the uncontrolled return of a space object to the earth.³⁸ Some notable space object collisions in outer space include examples in 2011 and 2012 between an inactive NASA satellite, inactive German satellite and an inactive Russian probe,³⁹ in addition to the 2009 collision between two satellites, the US *Iridium 33* and Russian *Cosmos 2251*.⁴⁰ These examples serve to illustrate the real hazards and risks associated with the uses of outer space.

2 Space Debris

In the discussion concerning space object collisions, space debris will likely feature as a topic of relevance. The increasing creation and prevalence of space debris in orbit is contributing to the environmental pollution of outer space.⁴¹ Space debris generally refers to non-functioning, man-made objects in the earth’s orbit or to objects that have returned to the earth.⁴² A considerable number of collisions in outer space involve the impact between non-functioning space debris or between functioning space objects and a non-functioning piece or pieces of space debris.⁴³

Unlike the term ‘space object’, the term ‘space debris’ is not specifically defined in any international treaty. While there is no legal definition of space debris, there is a consensus as to its general characteristics. Among several definitions of space debris that exist, the common features between these definitions are that space debris constitutes: ‘[O]bjects, including fragments, parts and elements thereof’ that are ‘man-made’ and are ‘non-functioning’.⁴⁴ Debris is typically fragmentary in nature⁴⁵ and has become non-functional in the sense that it cannot be controlled.⁴⁶ For the purposes of

³⁶ Liability Convention, *supra* note 6, Art. I(C).

³⁷ Kerrest and Smith, *supra* note 5, at 128.

³⁸ *Oxford Dictionaries*, 27 February 2015, available at www.oxforddictionaries.com/definition/english/collision.

³⁹ Punnakanta, *supra* note 2, at 164.

⁴⁰ Hertzfeld and Baseley-Walker, ‘A Legal Note on Space Accidents’, 59 *Zeitschrift für Luft- und Weltraumrecht* (2010) 230, at 231–232.

⁴¹ Diederiks-Verschoor and Kopal, *supra* note 19, at 127.

⁴² See especially Debris Mitigation Guidelines, *supra* note 2, at 1.

⁴³ Kerrest and Smith, *supra* note 9, at 133.

⁴⁴ For the definition of ‘space debris’, see especially Debris Mitigation Guidelines, *supra* note 2, at 1; C. Contant-Jorgenson, P. Låla and K.U. Schrogl (eds), *Cosmic Study on Space Traffic Management* (2006), at 21; Scientific and Technical Subcommittee of the United Nations Committee on the Peaceful Uses of Outer Space, Technical Report on Space Debris, UN Doc. A/AC.105/720 (1999), at 2, para. 6; *Encyclopedia Britannica Online: Academic Edition*, 27 February 2015, available at www.britannica.com/EBchecked/topic/1519020/space-debris.

⁴⁵ Lyall and Larsen, *supra* note 3, at 305.

⁴⁶ Diederiks-Verschoor and Kopal, *supra* note 19, at 128.

the law, space debris arguably amounts to these aforementioned common elements but, in any event, is covered by the definition of space object.

The reason why space debris will fall within the definition of space object, as outlined in the section above,⁴⁷ is because despite the non-functionality or fragmentary nature of debris, the 'object's use or usefulness' is not relevant to the definition of space object.⁴⁸ Several commentators have noted that the term 'component parts' in the treaty definition of space object⁴⁹ includes all elements that constitute a space object.⁵⁰ This would indicate that fragments, parts or elements thereof of a space object, which could be termed space debris, remain space objects themselves.⁵¹ Furthermore, registration data furnished to UNCOPUOS supports this view. US registration data lists several debris fragments from objects launched into space as space objects for the purposes of registration.⁵² This indicates that a state – one that is, moreover, particularly affected by the issue of the legal definition of space debris – considers the definition of space objects to be wide enough to include space debris, at least for the purposes of the Liability Convention.⁵³ Therefore, for the purposes of this article, space debris is considered a type of space object, and space law therefore applies to it.⁵⁴ With no separate legal regime for space debris, this is a reasonable conclusion.

3 Space Law and Liability

A The Concept of Liability

Liability is the legal obligation 'to compensate another ... for injury' following an event that causes damage.⁵⁵ Generally in international law, liability arises in the context of non-prohibited ultra-hazardous activities, such as spatial activities, that have the

⁴⁷ M. Pedrazzi, *Outer Space, Liability for Damage*, May 2008, available at <http://opil.ouplaw.com/view/10.1093/law/epil/9780199231690/law-9780199231690-e1203?rskey=5AUkek&result=1&prd=EPIL>.

⁴⁸ B. Cheng, *Studies in International Space Law* (1997), at 506.

⁴⁹ For treaty definition of space object, see Liability Convention, *supra* note 6, Art. I(d); Registration Convention, *supra* note 28, Art. I(b).

⁵⁰ E.g., fuel tanks and fuel would constitute elements of a space object. Diederiks-Verschoor and Kopal, *supra* note 19, at 9, citing S. Gorove, *Studies in Space Law: Its Challenges and Prospects* (1977), at 105; H.A. Baker, *Space Debris Legal and Policy Implications* (1989), at 63.

⁵¹ Schmidt-Tedd and Mick, 'Article VIII', in Hobe, Schmidt-Tedd and Schrogl, *supra* note 5, at 154.

⁵² For a list of space debris classed as space objects, see UNCOPUOS, Information Furnished in Conformity with the Convention on Registration of Objects Launched into Outer Space, UN Doc. ST/SG/SER.E/449, 21 April 2004, annex (Registration Data on Space Launches by the United States of America for January and February 2004).

⁵³ This constitutes the practice of a specially affected state, which is affected in a 'legal or practical sense' by the definitions of space object and space debris. See *Case Concerning Military and Paramilitary Activities in and against Nicaragua (Nicaragua v United States of America)*, Judgment, 26 November 1984, ICJ Reports (1984) 392, at 422, para. 68; *North Sea Continental Shelf Case (Federal Republic Germany/Denmark; Federal Republic of Germany/Netherlands)*, Judgment, 20 February 1969, ICJ Reports (1969) 3, at 43, para. 74.

⁵⁴ Office for Outer Space Affairs United Nations Office at Vienna, Proceedings United Nations/International Institute of Air and Space Law Workshop on Capacity Building in Space Law (2003), at 29.

⁵⁵ 'No-fault liability', *Oxford Reference*, 19 May 2015, available at www.oxfordreference.com/view/10.1093/oi/authority.20110803100236593. See generally Cheng, 'International Responsibility and Liability for Launch Activities', 10 *ASL* (1995) 297, at 308.

potential to cause harm but are not per se unlawful.⁵⁶ Liability is usually dependant on showing the elements of causation and damage, and, thus, reference to fault in Article III of the Liability Convention is at first sight perplexing. Indeed, the use of the term ‘fault’ in this area of international law is fraught with both conceptual and terminological confusion.⁵⁷ Commonly, one refers to either no-fault or fault liability regimes. No fault, or liability without fault, is in turn generally referred to as strict liability⁵⁸ and denotes a cause-and-effect relationship where the only relevant factors are causation and damage, and fault is not examined.⁵⁹

Strict liability is usually contrasted to fault liability. Arguably, this would mean that for compensation to be owing under a fault liability regime, the elements of causation and damage are required, in addition to proving that the defendant’s conduct contains a psychological element of blameworthiness, intention or negligence.⁶⁰ However, this is not how one usually appreciates the term. The term ‘fault’ is instead generally associated with a system of state responsibility for wrongful acts. As will be seen in this section, the reference to fault in Article III might lead one into the regime of state responsibility. Under contemporary appreciations of state responsibility, fault does not reside in the regime of state responsibility for wrongful acts per se but, rather, at the level of the primary rules of international law, which are the substantive obligations incumbent upon states whose breach attracts the secondary rules of state responsibility.⁶¹ This article now turns to an examination of the term in the context of liability for space object collisions and, in section 4, will deal with fault in relation to the law of state responsibility for wrongful acts.

B Liability under Treaty Law and Customary International Law

Fault under general international law is defined to mean a ‘blameworthy psychological attitude of the author of an act or omission’.⁶² Whether this is the correct interpretation of fault for the purposes of the Liability Convention is unclear. Therefore, it is necessary to have recourse to the relevant rules on treaty interpretation as outlined in Articles 31 and 32 of the 1969 Vienna Convention on the Law of Treaties (VCLT).⁶³

⁵⁶ Bedjaoui, ‘Responsibility for States: Fault and Strict Liability’, in R. Bernhardt *et al.* (eds), *Encyclopedia of Public International Law* (1987), vol. 10, at 361.

⁵⁷ Fundamental differences between the meaning and role of fault in international law are divided into two schools of thought, the objective theory and fault theory. G. Palmisano, *Fault*, September 2007, at para. 8, available at <http://opil.ouplaw.com/view/10.1093/law:epil/9780199231690/law-9780199231690-e1034?rskey=1KmHzq&result=2&prd=OPIL>. For a detailed examination of the conflicting views on fault, see especially ‘Chapter III Doctrine Section 1: Writings of Specialists’, 2(1) *ILC Yearbook* (1978) 188, paras 487–560.

⁵⁸ See also Goldie, ‘Concepts of Strict and Absolute Liability and the Ranking of Liability in Terms of Relative Exposure to Risk’, 16 *Netherlands Yearbook of International Law* (1985) 175, at 194.

⁵⁹ See generally Bedjaoui, *supra* note 56, at 358–359; Zemanek, ‘Chapter 7 State Responsibility and Liability’, in W. Lang, H. Neuhold and K. Zemanek (eds), *Environmental Protection and International Law* (1991) 187, at 195.

⁶⁰ See generally Brownlie, *supra* note 10, at 44–45; Palmisano, *supra* note 57.

⁶¹ Under which responsibility is deemed ‘objective’ rather than ‘subjective’.

⁶² Palmisano, *supra* note 57, para. 5.

⁶³ Vienna Convention on the Law of Treaties (VCLT) 1969, 1155 UNTS 331.

Pursuant to an interpretation of the 'ordinary meaning of the term', fault need not be interpreted as the commonly understood general international law meaning of fault but, rather, as it arises from the text of the Liability Convention.⁶⁴ Yet, as previously noted, the text of the Liability Convention does not define this key term.⁶⁵

With no indication as to the plain and ordinary meaning of the term in the Liability Convention itself, it is advisable to turn to the 'object and purpose' of the treaty for clarification.⁶⁶ While not explicitly stated, the Liability Convention in its fourth pre-ambular paragraph⁶⁷ details the need to 'elaborate effective rules and procedures concerning liability for damage caused by space objects'.⁶⁸ An effective interpretation of fault that best suits this goal is still obscure, as it is unapparent how fault operates. Turning to the context of the Liability Convention for the purposes of interpretation, the Outer Space Treaty, being a framework convention under which the Liability Convention operates, is an instrument that can assist in this investigation.⁶⁹ The Outer Space Treaty codifies the principles and rules of customary international law as part of the law relative to outer space.⁷⁰ Article III outlines that:

States Parties to the Treaty shall carry on activities in the exploration and use of outer space, including the Moon and other celestial bodies, *in accordance with international law*, including the Charter of the United Nations, in the interest of maintaining international peace and security and promoting international cooperation and understanding.⁷¹

Article III provides for the inclusion of customary rules of international law relating to state liability and state responsibility as elements of the regime of space law.⁷² Therefore, the difficulty of interpreting fault under the Liability Convention may force one to make recourse to the general rules of international law, if the term as it appears under the Liability Convention is unclear or ambiguous. The ambiguities of the Liability Convention's Article III force one to apply any other relevant rules of international law pursuant to Article 31(3)(c) of the VCLT,⁷³ namely any relevant rules of customary international law as 'evidence of a general practice accepted as law'.⁷⁴

Consequently, the question becomes whether there are any customary rules on international liability that can clarify the meaning of fault as it appears in the Liability Convention. The customary rules of state liability were addressed by the International Law Commission (ILC) during its work on various reports on the injurious consequences arising out of acts not prohibited by international law, of which, significantly,

⁶⁴ *Ibid.*, Art. 31(1).

⁶⁵ Hurwitz, *supra* note 11, at 33.

⁶⁶ VCLT, *supra* note 63, Art. 31(1).

⁶⁷ The context of the treaty includes its preamble, pursuant to the VCLT, *ibid.*, Art. 31(2).

⁶⁸ Liability Convention, *supra* note 6, Preamble.

⁶⁹ VCLT, *supra* note 63, Art. 31(2)(b).

⁷⁰ Kerrest and Smith, *supra* note 5, at 129.

⁷¹ Outer Space Treaty, *supra* note 4, Art. III (emphasis added).

⁷² Kerrest and Smith, *supra* note 5, at 129.

⁷³ VCLT, *supra* note 63, Art. 31(3)(c).

⁷⁴ Statute of the International Court of Justice 1945, 59 Stat. 1031, Art. 38(1)(b).

space activities are included.⁷⁵ This was an attempt to clarify the customary international law of state liability and was a topic of consideration by the ILC from 1978 until the early 2000s.⁷⁶ The ILC has noted that regimes of state liability were not a common concept in international law and that establishing a distinct notion of liability for hazardous consequences of lawful activities, as opposed to state responsibility for wrongful conduct, was confusing and ambiguous.⁷⁷ The ILC also mentioned the confusion and ambiguities that arose when attempting to clarify liability regimes based on fault and no fault.⁷⁸ This confusion was amplified by the lack of state practice supporting the development of state liability in international law.⁷⁹

Ultimately, when attempting to articulate customary liability, the ILC consistently found itself making reference to the link between liability for non-prohibited activities and state responsibility for wrongful acts.⁸⁰ The ILC noted that the difficulty in isolating state liability from state responsibility was that state liability had been 'adequately dealt with' by the ILC's Articles on State Responsibility.⁸¹ This was because the damage or harm that could arise in the course of legitimate activities not prohibited by international law often involved a duty of care relevant to this harm. This duty of care was ultimately derived from primary rules, considering the state's intention, and, therefore, its fault, as a relevant consideration in assessing the breach of these rules.⁸² By virtue of the fact that these rules or obligations could be breached by states, the ILC could not avoid falling into a regime of responsibility for wrongful acts, and it found in particular that the duty of due diligence was an obligation relevant to the harm that arose in the context of state liability.⁸³

Therefore, with little clarity as to the meaning of fault coming from customary international law, as well as the fact that the ordinary meaning of fault is ambiguous under

⁷⁵ See especially R.Q. Quentin-Baxter, Special Rapporteur, Fourth Report on International Liability for Injurious Consequences Arising Out of Acts Not Prohibited by International Law, UN Doc. A/CN.4/373, 27 June 1983; R.Q. Quentin-Baxter, Special Rapporteur, Second Report on International Liability for Injurious Consequences Arising Out of Acts Not Prohibited by International Law, UN Doc. A/CN.4/346 and Add.1 & 2, 12 and 30 June and 1 July 1981; R.Q. Quentin-Baxter, Special Rapporteur, Preliminary Report on International Liability for Injurious Consequences Arising Out of Acts Not Prohibited by International Law, UN Doc. A/CN.4/334 and Add.1 and 2, 24 and 27 June and 4 July 1980.

⁷⁶ P. Sreenivasa Rao, Special Rapporteur, First Report on the Legal Regime for the Allocation of Loss in Case of Transboundary Harm Arising Out of Hazardous Activities, UN Doc. A/CN.4/531, 21 March 2003, at 76, para. 5.

⁷⁷ *Ibid.*, at 79, para. 17.

⁷⁸ Quentin-Baxter, Preliminary Report, *supra* note 75, at 251, para. 15.

⁷⁹ Sreenivasa Rao, *supra* note 76, at 81, para. 35.

⁸⁰ Boyle, 'Part II International Responsibility: Development and Relation with Other Laws, Ch. 10 Liability for Injurious Consequences of Acts Not Prohibited by International Law', in J. Crawford *et al.* (eds), *The Law of International Responsibility* (2010) 95, at 97.

⁸¹ *Ibid.* International Law Commission (ILC), Articles on Responsibility of States for Internationally Wrongful Acts (Articles on State Responsibility), UN Doc. A/RES/56/83, 28 January 2002.

⁸² R. Higgins, *Problems and Process International Law and How We Use it* (1995), at 165.

⁸³ The ILC has noted that state responsibility can be engaged to enforce or 'implement' obligations of due diligence in the context of state liability. 'Chapter V: International Liability for Injurious Consequences Arising Out of Acts Not Prohibited by International Law (Prevention of Transboundary Harm from Hazardous Activities)', 2(2) *ILC Yearbook* (2001) 144, at 150, para. 6.

the Liability Convention, space law, as a special regime of international law, does not appear to contain a solution to the current problem of interpretation. Ian Brownlie has commented that 'international law, including the principles of the United Nations Charter, ... have become a part of general international law [that] applies in outer space'.⁸⁴ Space law cannot operate in isolation to the general rules of the international legal system. Indeed, 'legal subsystems coexisting in isolation from the rest of international law are inconceivable. There will always be some degree of interaction'.⁸⁵ While there is nothing inhibiting space law as a special legal regime from creating a mechanism such as the Liability Convention for the resolution of liability issues, there is a 'presumption against the creation of wholly self-contained regimes'.⁸⁶ In fact, where a special regime such as space law is inadequate or silent on a legal issue, the ILC's view is that one may have to 'fall-back' on general international law.⁸⁷ This is arguably the case regarding the space liability regime. Due to Article III's reference to the term 'fault', the Liability Convention cannot be examined in isolation from the general rules of international law, such as the Articles on State Responsibility.

4 Fault in State Responsibility

A State Responsibility

Under the regime of state responsibility, an act (action or omission) that is attributable to a state and breaches an international obligation is wrongful, entailing the responsibility of that state.⁸⁸ More specifically, in the words of Special Rapporteur Roberto Ago, the term 'responsibility' in the context of the ILC's Articles on State Responsibility⁸⁹ denotes: '[T]he principles which govern the responsibility of States for internationally wrongful acts [, the Articles on State Responsibility, maintain] a strict distinction between this ... and the task of defining the rules that place obligations on States, the violation of which may generate responsibility.'⁹⁰

Accordingly, responsibility refers to the consequences of the breach of an obligation incumbent on a state, the substance of which varies from state to state.⁹¹ The particular obligations of international law are often referred to as primary rules

⁸⁴ Brownlie, 'The Maintenance of International Peace and Security in Outer Space', 40 *British Yearbook of International Law* (1964) 1, at 1.

⁸⁵ Simma and Pulkowski, 'Part II International Responsibility Development and Relation with Other Laws, Ch. 13 Leges Speciales and Self-Contained Regimes', in Crawford *et al.*, *supra* note 80, 139, at 143.

⁸⁶ J. Crawford, Special Rapporteur, Third Report on State Responsibility, UN Doc. A/CN.4/507 and Add. 1-4, 15 March, 15 June, 10 and 18 July and 4 August 2000, at 50, para. 157.

⁸⁷ 'Chapter III: The General Problem Underlying the Drafting of Part 2 of the Draft Articles', 2(1) *ILC Yearbook* (1982) 28, at 30, para. 54.

⁸⁸ Pursuant to Articles on State Responsibility, *supra* note 81, Arts 1, 2.

⁸⁹ *Ibid.*

⁹⁰ 'Chapter IV: State Responsibility', 2 *ILC Yearbook* (1970) 305, at 306, para. 66(c).

⁹¹ J. Crawford, *State Responsibility*, September 2006, at para. 2, available at <http://opil.ouplaw.com/view/10.1093/law:epil/9780199231690/law-9780199231690-e1093?rkey=flxp9V&result=1&prd=OPII>.

and establish ‘substantive obligations, for States, ... and [the] “secondary rules” [of state responsibility laid down] on what conditions a breach of a “primary rule” may be held to have occurred ... [and its consequences]’.⁹² Responsibility, therefore, covers the secondary obligations resulting from the breach of primary obligations.⁹³ This necessarily leads one to ask how fault fits into the regime of responsibility.

B The Link between State Responsibility and State Liability

In its work on injurious consequences, the ILC has suggested that there may exist a significant overlap between liability for damage in the absence of wrongful conduct and responsibility for wrongful conduct.⁹⁴ The nexus between these concepts arises in regard to the distinction between acts, which are actions or omissions encompassing the element of breach, and activities, where the former emerge as a consequence of the latter and could result in wrongful conduct, despite the activity itself not being wrongful or prohibited.⁹⁵ In short, spatial activities are not prohibited, but the consequences of acts stemming from these activities may breach or violate international obligations or duties and be considered wrongful. It is the commission or occurrence of an act or omission that violates an international obligation that would bring into operation the secondary rules of state responsibility. Therefore, the regime of liability established in the Liability Convention arises as a primary obligation, which has embedded within it the secondary obligations under state responsibility, which are activated upon breach of a primary obligation.⁹⁶ This demonstrates the link between the concepts of liability and responsibility in international law.

The relational nexus between liability and responsibility is evidenced by the incident whereby the Soviet *Cosmos 954* satellite re-entered the earth’s atmosphere on 24 January 1978 and intruded into Canadian airspace before crashing into Canadian territory and subsequently scattering debris.⁹⁷ Ian Brownlie’s analysis of the situation was that the relationship between sovereign states is governed by state responsibility and that these relationships may also involve liability for ultra-hazardous activities.⁹⁸ The consequences of breaching a liability regime can involve state responsibility. This example demonstrates the twin operations of an international liability regime and the regime of international responsibility in a single factual scenario.

Considering this link, Ago, when serving as the ILC’s special rapporteur on state responsibility explained that the term ‘fault’, in an objective regime of responsibility, means that the violation of a primary legal obligation might contain within it a fault

⁹² Cassese, *supra* note 10, at 321.

⁹³ Boyle, *supra* note 80, at 95.

⁹⁴ ‘Chapter V: Liability and Responsibility: Duality of Regimes’, 2(1) *ILC Yearbook* (2000) 121, at 121, para. 27.

⁹⁵ *Ibid.*, at 121–122, paras 29–30.

⁹⁶ Boyle, *supra* note 80, at 95.

⁹⁷ A claim was presented by Canada pursuant to the Liability Convention for damage caused by the Soviet satellite; however, this claim was settled through diplomatic channels.

⁹⁸ Brownlie, *supra* note 10, at 50.

requirement.⁹⁹ However, fault was excluded as an element or condition of an internationally wrongful act under the then draft Articles on State Responsibility per se.¹⁰⁰ Fault 'resides in certain primary rules', and the secondary rules of state responsibility capture fault through the objective breach of a specific primary rule.¹⁰¹

Explained another way, if an act of a state causes a breach of a primary obligation or rule of international law, the fault will lie at the level of the primary rule in international law, and intention exists, if it exists at all, as a constituent element of breach.¹⁰² This point demonstrates that treaty provisions, like the ones contained in the Liability Convention, create a regime of international liability, which itself contains the primary rules of causation and damage.¹⁰³ These elements are essential to any liability regime, but there is the further requirement under Article III to prove that a breach of these primary rules was due to the launching state's fault (intentional act or omission). This realization signals the fact that there can exist the twin operation of state liability and state responsibility in the context of space object collisions: 'The two regimes [are in fact] complementary'¹⁰⁴ as they 'exist upon different planes'.¹⁰⁵ Therefore, with the understanding that fault exists at the level of primary rules in international law, the article will now turn to an examination of the relevant primary rules and duties that contain a fault standard.

C The Due Diligence Obligation

The principal obligation on states with a fault standard is arguably due diligence.

1 The Concept of Due Diligence

In international law, various primary rules embody a due diligence obligation.¹⁰⁶ The nature of a due diligence obligation will depend on the 'precise formulation of [a primary rule] of international law'.¹⁰⁷ The general principle on which specific due diligence obligations are modelled was articulated in the International Court of Justice's (ICJ) *Corfu Channel* decision.¹⁰⁸ This is the duty incumbent upon states 'not to allow knowingly their territory to be used for acts contrary to the rights of other States'.¹⁰⁹ The due diligence obligation established in the *Corfu Channel* decision is part of

⁹⁹ 'Chapter III: Doctrine Section 1: Writings of Specialists', 2(1) *ILC Yearbook* (1978) 188, at 195, para. 499.

¹⁰⁰ See generally 'Chapter I: General Principles', 2(2) *ILC Yearbook* (2001) 32, at 36, para. 10.

¹⁰¹ See generally Heathcote, 'Aspects of Fault, Damage and Contribution to Injury in the Law of State Responsibility', in K. Bannelier, T. Christakis and S. Heathcote (eds), *The ICJ and the Evolution of International Law* (2012) 295, at 303–305.

¹⁰² Higgins, *supra* note 82, at 160.

¹⁰³ Montjoie, 'Part III: The Sources of International Responsibility, Ch. 34: The Concept of Liability in the Absence of an Internationally Wrongful Act', in Crawford *et al.*, *supra* note 80, 503, at 505.

¹⁰⁴ *Ibid.*

¹⁰⁵ Quentin-Baxter, Preliminary Report, *supra* note 75, at 253, para. 21.

¹⁰⁶ See generally 'Chapter III: Doctrine Section 1', *supra* note 99, at 197–222.

¹⁰⁷ Brownlie, *supra* note 10, at 40.

¹⁰⁸ *Corfu Channel case (United Kingdom v. Albania)*, Judgment, 9 April 1949, ICJ Reports (1949) 4.

¹⁰⁹ *Ibid.*, at 22.

customary international law and, therefore, applies to space activities. It obliges states to observe certain conduct with respect to a particular activity¹¹⁰ and contains an element of ‘good faith in [terms of] neighbourly relations’,¹¹¹ requiring states to control the acts of third parties where harm might occur between states. In the space context, the requirement of controlling third parties would extend not just to state activities but also to private actors partaking in spatial activities.

Due diligence is a duty of conduct, not of result, meaning that the obligation incumbent on states is to use their best efforts to try to prevent damage or harm occurring to other states.¹¹² As Dionisio Anzilotti explains it, the duty is not to ‘prohibit absolutely ... injurious act[s] [arising from its territory], but merely [to adopt] a specific policy for the prevention and repression of such acts’.¹¹³ However, a state’s control over its spatial activities does not take the form of control over territory but, rather, control over an activity, making it difficult to show negligence or a lack of due diligence to prevent a space object collision.¹¹⁴ This is because of the problem of demonstrating that a launching state has the capacity to prevent the damage occurring in the space environment.

Nonetheless, the ICJ in *Case Concerning Application of the Convention on the Prevention and Punishment of the Crime of Genocide (Bosnia and Herzegovina v. Serbia and Montenegro)* decoupled the due diligence obligation incumbent on a state from being exclusively relevant to a state’s control over its territory, as in *Corfu Channel*, to a more expansive application of the due diligence obligation – that is, the obligation extended to cover elements under a state’s jurisdiction and control that it has power over or has the capacity to influence.¹¹⁵ The launch and subsequent operation of space objects is an activity that launching states have control over, suggesting that the best efforts obligation of due diligence to prevent acts, such as space object collisions, that would cause damage to another state is a duty incumbent on launching states. If Article III of the Liability Convention does not articulate the meaning of fault, the default position will be to fall back on the general principle of due diligence as expressed in the *Corfu Channel* decision and expanded by the ICJ in *Case Concerning Genocide*.

However, while the *Corfu Channel* decision establishes a general due diligence obligation in relation to a state’s territory, there are more specific primary rules requiring due diligence obligations tailored to particular situations. For example, the concept of due diligence arose in the context of the ILC’s work formulating the Draft Articles on

¹¹⁰ A. Kees, *Responsibility of States for Private Actors*, March 2011, at para. 3, available at <http://opil.ouplaw.com/view/10.1093/law:epil/9780199231690/law-9780199231690-e1092?rskkey=mcFqi3&result=2&prd=EPIL>.

¹¹¹ Kulesza, ‘Due Diligence in International Internet Law’, 11 *Journal of Internet Law* (2014) 24, at 27.

¹¹² J. Crawford, *State Responsibility: The General Part* (2013), at 229–230.

¹¹³ ‘Chapter III: Doctrine Section 1’, *supra* note 99, at 192, para. 3.

¹¹⁴ See generally Heathcote, *supra* note 101, at 300–301.

¹¹⁵ *Case Concerning Application of the Convention on the Prevention and Punishment of the Crime of Genocide (Bosnia and Herzegovina v. Serbia and Montenegro) (Case Concerning Genocide)*, Judgement, 26 February 2007, ICJ Reports (2007) 43, at 221, para. 430.

Prevention of Transboundary Harm from Hazardous Activities, which built on the ILC's work addressing injurious consequences as previously discussed.¹¹⁶ Completed and adopted by the ILC in 2001, these articles considered the specific concept of prevention in relation to hazardous activities, including spatial activities that have the potential to cause transboundary harm.¹¹⁷ Under the Articles on Transboundary Harm, the failure to apply one's best efforts to prevent transboundary harm occurring is considered a breach of due diligence and would be 'equated to [the] objective failure to [adhere] to an international obligation'.¹¹⁸

It can be seen that the breach of any of the various iterations of a due diligence obligation, or the proving of a lack of due diligence on behalf of a state, is dependent on the fault (an intentional act or omission) of that state.¹¹⁹ The articulation or content of the primary rule establishing a due diligence obligation will determine the 'relevance of fault [or the obligation's] relative strictness' or its fault standard.¹²⁰ The fault standard in relation to the observance of a due diligence obligation is the degree or level of knowledge held by a state relevant to a circumstance or activity.¹²¹ Under a *Corfu Channel* due diligence obligation, constructive knowledge is the relevant fault standard. In that case, Albania did not necessarily know of the presence of mines in its territorial waters but 'should have known'.¹²² *Corfu Channel's* constructive knowledge presumes that a state should have known about a particular fact, situation or circumstance by virtue of its control over the territory. Proof of a state's constructive knowledge about acts that run contrary to the interests of other states is sufficient to satisfy a breach of the obligation. However, as we will see, some primary due diligence obligations can require a different fault standard relevant to specific circumstances, such as actual awareness. The fault standard is the element that tailors a specific primary obligation of due diligence. Considering the various specific primary due diligence obligations, one must determine what fault standard may apply to space activities.

2 Fault Standards

With a state's 'awareness or knowledge' being examined, 'the question becomes' which primary rule of due diligence and, thus, which fault standard is relevant to spatial activities.¹²³ As discussed previously, the standard of care established by the *Corfu Channel* decision is that of constructive knowledge. This standard of care presupposes that by virtue of a state's control over its territory, it should have known about the acts

¹¹⁶ 'Chapter V: International Liability for Injurious Consequences', *supra* note 83.

¹¹⁷ Where hazardous activities cause damage or harm, the Articles on Transboundary Harm operate as a liability regime, requiring states to compensate or remedy this damage. See 'Chapter V: International Liability for Injurious Consequences', *supra* note 83.

¹¹⁸ Bedjaoui, *supra* note 56, at 359.

¹¹⁹ Due diligence is considered a primary obligation that contains fault. See Heathcote, *supra* note 101, at 304.

¹²⁰ Brownlie, *supra* note 10, at 40.

¹²¹ Kulesza, *supra* note 111, at 28.

¹²² *Corfu Channel*, *supra* note 108, at 18.

¹²³ See generally Heathcote, *supra* note 101, at 302.

or omissions arising from within its territory that interfere with the rights of other states. Considering the ambiguities of proving fault under Article III, the *Corfu Channel* due diligence obligation with its constructive knowledge fault standard, expanded by the *Case Concerning Genocide* to include things under a state's jurisdiction and control, will be the relevant fault standard to fall back on with regard to space activities. The ramifications of this would mean that by virtue of a launching state's control over its space objects, it is presumed that a state will have constructive knowledge about the circumstances surrounding the operation of the space object, including the possibility of its collision with another space object.

Indeed, as one commentator has noted, 'space objects are operated consciously and knowingly,' meaning that when a space object deviates from its orbital path or behaves strangely, 'causing it to [collide with another space object,] the operator [failing to avert such a collision should be] held liable on the basis of fault'.¹²⁴ Launching states, as the operators of active space objects, are in a position to know when the objects under their control should be manoeuvred.¹²⁵ Arguably constructive knowledge would thus be the more appropriate standard of fault, as launching states should be expected to know about the circumstances relevant to the operation of their active space objects.

Another specific due diligence fault standard was established under the Articles on Transboundary Harm. The Articles on Transboundary Harm relate to the management of risks arising from hazardous and ultra-hazardous activities, which are considered activities not prohibited by international law but which involve risks of significant transboundary harm, of which space activities are included.¹²⁶ These Articles create a duty or obligation of prevention, unlike the *Corfu Channel* obligation, in the context of state liability for transboundary harm. Prevention in this context refers to a 'phase prior' to the possibility of serious damage or harm occurring, in which a state has a duty of due diligence or vigilance to take necessary steps to prevent any harm occurring.¹²⁷ In the words of the Articles on Transboundary Harm's commentary, the specific due diligence obligation created by the Articles constitutes the:

reasonable efforts by a State to inform itself of factual and legal components that relate foreseeably to a contemplated procedure and to take appropriate measures, in timely fashion, to address them. Thus, States are under an obligation to take unilateral measures to prevent significant transboundary harm or at any event to minimize the risk thereof arising out of [ultra-hazardous] activities.¹²⁸

This due diligence obligation requires states to create policies designed to prevent significant harm occurring or at least minimize the risks associated with their activities.¹²⁹

¹²⁴ Von der Dunk, 'Too-Close Encounters of the Third Party Kind: Will the Liability Convention Stand the Test of the Cosmos 2251-Iridium 33 Collision?', *Space and Telecommunications Law Program Faculty Paper No. 28* (2010), at 203.

¹²⁵ *Ibid.*, at 203–204.

¹²⁶ 'Chapter V: International Liability for Injurious Consequences', *supra* note 83, at 150, para. 6.

¹²⁷ *Ibid.*, at 148, para. 1.

¹²⁸ *Ibid.*, at 154, para. 10.

¹²⁹ *Ibid.*

While the Articles on Transboundary Harm do not explicitly refer to a fault standard, the standard of care to be observed, or the vigilance required by a state, will be higher proportionally to the degree or level of risk associated with the activity.¹³⁰ The consequence of this is that space activities, such as the operation of space objects, that encompass the potential to create space debris in orbit is considered ultra-hazardous for the purposes of the Articles on Transboundary Harm,¹³¹ and launching states will be required to inform themselves of 'factual and legal components' relevant to their spatial activities and design and enforce policies for the prevention of harm.¹³²

A fault standard potentially could be drawn from an emerging body of technical and international standards relating to policies for the minimization of space debris. The International Organization for Standardization (ISO) has designed and developed technical standards to '[ensure] that spacecraft ... orbital stages are designed, operated and disposed of in a manner that prevents them from generating debris throughout their orbital lifetime'.¹³³ Being a global network of standards bodies, the ISO has acknowledged that there is an 'international consensus that space activities need to be managed to minimize debris generation and risk'.¹³⁴ Under ISO standards, spacecraft providers are required to prepare space debris mitigation plans, the content of which must outline 'justification for non-compliance' with the standards.¹³⁵ States that agree to and employ these international technical standards, but whose acts do not abide by justifiable non-compliance reasons, may have demonstrated fault for the purposes of the Liability Convention if the space objects they operate or control break up in orbit, create debris or cause collisions. States have access to technical standards to assist them in minimizing the hazards and harm in the course of manufacturing, launching and operating space objects. This may indicate that space-faring states partaking in ultra-hazardous spatial activities have knowledge, or ought to have knowledge, of the information and circumstances, including hazards and risks, associated with operating space objects and minimizing debris generation.

It should be noted that the due diligence obligation established by the Articles on Transboundary Harm relates to international liability for acts not prohibited by international law. However, while the Articles separate the topics of international liability from state responsibility, the regime of state responsibility can still be engaged because, while the ultra-hazardous activity itself will remain non-prohibited, the non-fulfilment of the duty of prevention can engage the responsibility of a state. The due diligence obligation of prevention established by the Articles on Transboundary Harm is capable of being breached by the non-compliance with the obligation of prevention.¹³⁶ This will bring into operation the secondary rules of

¹³⁰ *Ibid.*, para. 11.

¹³¹ *Ibid.*, at 150, para. 4.

¹³² *Ibid.*, at 154, para. 10.

¹³³ Cl. 1, *ISO 24113:2011 Space Systems: Space Debris Mitigation Requirements* (2011), International Organization for Standardization, Geneva, at 1.

¹³⁴ *Ibid.*, at v.

¹³⁵ *Ibid.*, cl. 7, at 7.

¹³⁶ 'Chapter V: International Liability for Injurious Consequences', *supra* note 83, at 150, para. 6.

state responsibility for wrongful acts. Thus, it can be seen that in the space context, regardless of whether the due diligence obligation is derived from the *Corfu Channel* decision or from the Draft Articles on Transboundary Harm, the breach of either formulation of due diligence will be dealt with under the regime of state responsibility. Irrespective of which articulation of due diligence is applied to the space activities of launching states, both will lead to the same conclusion that the relevant fault standard is that of constructive knowledge.

However, an alternative fault standard is that of the actual awareness of a state or the organs for which it is responsible. This is a fault standard higher than that of constructive knowledge. The actual awareness fault standard would only be met if a launching state had knowledge of the circumstances or was aware that its acts (action or omission) assisted in bringing about a space object collision.¹³⁷ Consider the obligation pursuant to Article VIII of the Outer Space Treaty, which requires states to ‘retain jurisdiction and control’ over their space objects in outer space. The knowledge of a launching state would be examined regarding whether it was actually aware, or had knowledge of the facts,¹³⁸ that a space object under its ‘jurisdiction and control’ would likely be involved in a collision but that the state committed an act or omission bringing about the collision nonetheless.¹³⁹ This means that when a launching state attains knowledge or available information or becomes aware of the situation in which a space object under its ‘jurisdiction and control’ will collide with the space object of another launching state, there must be a ‘minimum period of time in order to evaluate the consequences of the facts, acts, or situation of which it has ... become aware’¹⁴⁰ and provide its best efforts to reduce the risk.¹⁴¹ Once an act or omission leading to a collision has occurred, a wrongful act would have been committed, in addition to the proving of fault via breach, which is necessary under Article III of the Liability Convention.

Considering the increasing creation and prevalence of space debris in orbits such as the lower earth orbit and the fact that such debris can be minuscule in size, the more reasonable fault standard is arguably actual awareness. This is because the potential for space debris to collide with active space objects under the control of launching states is often unanticipated and occurs without warning.¹⁴² Therefore, for fault to be proven, a launching state would have to be actually aware that its space object would be involved in a collision or know that its acts have led to the collision between a space object under its control and another space object. Considering that various fault standards could reasonably be applied to spatial activities, the subsequent practice of space-faring states can provide an indication as to the correct interpretation of

¹³⁷ See generally *Case Concerning Genocide*, *supra* note 115, at 222–223, para. 432.

¹³⁸ *Ibid.*

¹³⁹ For ‘jurisdiction and control’ requirements, see Outer Space Treaty, *supra* note 4, Art. VIII.

¹⁴⁰ Kohen and Heathcote, ‘Part V: Invalidity, Termination and Suspension of the Operation of Treaties, s. 1 General Provisions, Art. 45 1969 Vienna Convention’, in O. Corten and P. Klein (eds), *The Vienna Convention on the Law of Treaties: A Commentary* (2011), vol. 2, 1064, at 1076, para. 37.

¹⁴¹ Due diligence obligation of prevention is contained in the ‘Chapter V: International Liability for Injurious Consequences’, *supra* note 83.

¹⁴² See generally Beer, *supra* note 1, at 42–45.

Article III and, thus, the applicable fault standard. To this end, one needs to examine the emerging body of soft law in relation to norms and standards of behaviour in regard to space activities.

5 Soft Law: An Indication of the Fault Standard?

Soft law is evidence of possible evolving standards that may apply to the outer space context. The development of norms of behaviour and standards of conduct with which to regulate and manage outer space activities will assist in '[mitigating the] threats to safety, security, and stability in outer space'.¹⁴³ International and inter-agency declarations, reports and guidelines help to 'define the parameters of responsible behaviour' in space with regard to the maintenance of peace and security, ensuring space safety and the avoidance and management of space object collisions.¹⁴⁴ The United Nations Institute for Disarmament Research considers 'the use of norms of behaviour as [a key tool] ... to establishing a durable space-security regime at the multilateral level' in terms of improving the stability and safety of outer space activities.¹⁴⁵

A considerable number of international and inter-agency bodies are adopting policies for greater awareness in space as well as turning their attention to the development of technical and regulatory guidelines regarding standards of conduct in space.¹⁴⁶ The most recent annual reports of UNCOPUOS highlight an increasing focus by space-faring countries on the concept of space situational awareness (SSA).¹⁴⁷ SSA is a concept that aims to collect and share data between states about the space environment – in particular, the location of, and potential hazards caused by, space objects and debris. SSA has been endorsed by key space actors such as the European Space Agency, whose SSA programme consists of three key activities: monitoring space weather that has the potential to cause danger to spatial activities, detecting natural objects in orbit and space surveillance and tracking that monitors active and inactive space objects such as satellites and space debris.¹⁴⁸

Of great significance to the management of space object collisions are the various national and international mechanisms developed by space-faring states relating to codes of conduct in space and space debris mitigation.¹⁴⁹ In particular, the Inter-Agency Space

¹⁴³ United Nations Institute for Disarmament Research (UNIDR), *A Brief Overview of Norms Development in Outer Space* (2012), at 1.

¹⁴⁴ *Ibid.*, at 7.

¹⁴⁵ *Ibid.*, at 1.

¹⁴⁶ Kerrest and Smith, *supra* note 9, at 135–136 (Space Traffic Management).

¹⁴⁷ See generally UNCOPUOS, Report of the Committee on the Peaceful Uses of Outer Space Fifty-Ninth Session, UN Doc. A/71/20, 8–17 June 2016, at 14, para. 79; 15, para. 86; UNCOPUOS, Report of the Committee on the Peaceful Uses of Outer Space Fifty-Eighth Session, UN Doc. A/70/20, 10–19 June 2015, at 17, para. 106.

¹⁴⁸ European Space Agency, *About SSA*, 10 May 2015, available at www.esa.int/Our_Activities/Operations/Space_Situational_Awareness/About_SSA.

¹⁴⁹ United Nations Office for Outer Space Affairs, *Compendium of Space Debris Mitigation Standards Adopted by States and International Organizations*, 6 June 2014, available at www.unoosa.org/oosa/en/COPUOS/Legal/debris/index.html.

Debris Coordination Committee's (IADC) Space Debris Mitigation Guidelines outline responsible behaviours and standards of conduct for which space-faring states can voluntarily subscribe.¹⁵⁰ These guidelines are a response to the dangers that space debris pose to spacecraft and space missions and reflect 'existing practices, standards, codes and handbooks developed by ... national and international organizations'.¹⁵¹ The guidelines are based on best practice measures adopted by space-faring states¹⁵² and have been endorsed by the UNGA¹⁵³ and UNCOPUOS¹⁵⁴ and have been adapted into the Space Debris Mitigation Guidelines (Mitigation Guidelines).¹⁵⁵ Most space-faring states have contributed to the Mitigation Guidelines by way of membership in the IADC.¹⁵⁶ It could be argued that this is indicative of a 'global consensus' regarding proper conduct in space.¹⁵⁷

The UNGA has invited its member states to take measures to adopt and implement the Mitigation Guidelines.¹⁵⁸ In response to this, several states have formally endorsed the guidelines or announced the incorporation of the Mitigation Guidelines into domestic legal regimes.¹⁵⁹ The content of the Mitigation Guidelines that is relevant to space object collisions outlines the requirements on states to limit debris released during space operations, minimize the potential for break-ups during operations, limit the probability of accidental space object collisions and avoid the intentional destruction of space objects.¹⁶⁰ However, the Mitigation Guidelines, along with all other soft law, do not define or, indeed, address the issue of fault under Article III, even impliedly. Rather, programmes and soft law, such as SSA and the Mitigation Guidelines, increase the regulation of space and, thus, create greater awareness in relation to the operation and control of space objects. In turn, this implies that a higher, rather than a lower standard of care, such as constructive knowledge, would be the relevant and applicable fault standard. Indeed, the more regulations and requirements incumbent upon launching states, coupled with an increasing awareness or knowledge of the space environment, means the more it will be presumed that states have, or ought to have, knowledge about how to safely operate their space objects.

¹⁵⁰ Inter-Agency Space Debris Coordination Committee, *IADC Space Debris Mitigation Guidelines*, September 2007.

¹⁵¹ Debris Mitigation Guidelines, *supra* note 2, at 1.

¹⁵² UNIDR, *supra* note 143, at 5.

¹⁵³ UNGA, International Cooperation in the Peaceful Uses of Outer Space, UN Doc. A/RES/62/217, 1 February 2008, at 6, para. 26.

¹⁵⁴ UNCOPUOS, Report of the Committee on the Peaceful Uses of Outer Space Fifty-Seventh Session, UN Doc. A/69/20, 11–20 June 2014, at 17, paras 118–119.

¹⁵⁵ Debris Mitigation Guidelines, *supra* note 2.

¹⁵⁶ Which consists of 13 global space agencies. For a full list of members, see *Inter-Agency Space Debris Coordination Committee*, 23 April 2017, available at www.iadc-online.org/.

¹⁵⁷ Debris Mitigation Guidelines, *supra* note 2, at iii; Pusey, 'The Case for Preserving Nothing: The Need for a Global Response to the Space Debris Problem', 21 *Colorado Journal of International Environmental Law and Policy* (2010) 425, at 444.

¹⁵⁸ UNGA, International Cooperation in the Peaceful Uses of Outer Space, UN Doc. A/RES/62/217, 1 February 2008.

¹⁵⁹ For the list of states, see UNGA, Report of the Scientific and Technical Subcommittee on its Forty-Second Session, Held in Vienna from 21 February to 4 March 2005, UN Doc. A/AC.105/848, 25 February 2005, at 18–19, para. 91.

¹⁶⁰ These are Guidelines 1–4 from the Debris Mitigation Guidelines, *supra* note 2, at 2–3.

The increasing focus on the development of programmes, regulations and guidelines relative to spatial activities presents a great opportunity for states to define fault. Indeed, states could decide that an actual awareness standard is more appropriate, given the difficulty of controlling debris, which can be miniscule in size. Regardless of which standard applies, it is important that states do choose, rather than merely 'fall back' on, the constructive knowledge fault standard.

6 Concluding Remarks

Due to an inadequate extrapolation as to the meaning of fault under Article III of the Liability Convention, it is unclear whether the treaty refers to fault in the context of a fault liability regime or fault as understood within the regime of state responsibility for wrongful acts. The under-development and lack of clarity of Article III, as well as the customary law of liability, forces one to fall back on general international law. Therefore, as it currently stands, the Liability Convention's reference to fault, as argued here, is to be interpreted in relation to the regime of state responsibility, where fault is relevant at the level of primary rules. Arguably, the principal primary rule that contains a fault standard is due diligence. The question then becomes what due diligence fault standard is relevant. Soft law guidelines do not explicitly tell us anything in relation to fault, but where their use may lie is in the establishment of guidelines in relation to standards of care and acceptable behaviour in space. This ultimately has two possible consequences.

First, with the proliferation of soft laws relative to spatial activities, the space environment will become more densely regulated. Thus, as previously explained, the more likely due diligence obligation fault standard will be constructive knowledge under a regime of state responsibility for wrongful acts. This is because states engaging in spatial activities are increasingly aware of the associated risks of operating space objects. Therefore, with the increasing regulation of space, this leads one to a constructive knowledge fault standard, where states ought to have knowledge of the circumstances and facts surrounding the operation of their space objects.

Second, the increasing utilization of outer space presents a great opportunity for states to address the problem of the interpretation of fault. If states turn their attention to defining fault through soft law instruments, norms and standards of behaviour, this could assist in clarifying fault under Article III of the Liability Convention. This would constitute subsequent practice for the purposes of the VCLT.¹⁶¹ Significantly, if states engage in subsequent practice as a method for the clarification of the Liability Convention, issues of state liability for space object collisions will move from being addressed under a system of state responsibility for wrongful acts to being addressed under a liability regime. The significance of this would be that only compensation would be available to victims, not full reparation. Irrespective of whichever system is relied upon to resolve the issues of space object collisions, states could ultimately use soft law to develop and impose fault standards, such as constructive knowledge or actual awareness, pursuant to satisfying the requirement of fault under Article III.

¹⁶¹ VCLT, *supra* note 63, Art. 31(3)(a)–(b).