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I. INTRODUCTION

In the context of human exploitation of the space environment, a satellite is an artificial object that has been intentionally placed into Earth orbit. Its payloads perform various functions such as intelligence, surveillance, and reconnaissance; positioning, navigation, and timing; and communication. Satellites have become pivotal to military operations since the widespread use of different satellite systems in 1991's Operation Desert Storm.[1] During the 2011 Operation Unified Protector, conducted in Libya, intelligence, surveillance, and reconnaissance satellites played a key role in effective targeting acquisition while minimizing the risk of civilian casualties.[2] With the development and greater availability of counter-space capabilities,[3] these satellites are becoming a prime target of military threats in the great power competition as well as in the event of an armed conflict.

The targeting of these satellites, whether it is done in peacetime or during a time of armed conflict, requires careful analysis due to two unique characteristics. First, the satellite itself is not necessarily a valuable asset unless it is designed to serve human activities in space (for example, a human habitation module and a co-orbital satellite equipped with anti-satellite weapons or robotic arms for in-orbit servicing). Its value is rather derived from the function it performs to enable or assist terrestrial activities through receiving, transmitting, and relaying signals. As such, military planners must consider terrestrial consequences of targeting a satellite, as well as its physical impact in space, especially in a debris-creating event.

Second, many satellites host multiple payloads. Some payloads may perform military functions and others may be dedicated to purely civilian services. There are also payloads that are of dual use, capable of serving both

1. DOUG MILLARD, SATELLITE: INNOVATION IN ORBIT 122–27 (2017).

2. Defense Committee of the U.K. House of Commons, 1 *Operations in Libya: Ninth Report of Session 2010–12*, at ¶ 107 (2012), https://publications.parliament.uk/pa/cm201012/cmselect/cmdfence/950/950.pdf.

3. *See, e.g.*, Todd Harrison et al., *Space Threat Assessment 2021*, CENTER FOR STRATEGIC AND INTERNATIONAL STUDIES (Mar. 31, 2021), https://www.csis.org/analysis/space-threat-assessment-2021; Defense Intelligence Agency, *Challenges to Security in Space* (2019), https://www.dia.mil/Portals/110/Images/News/Military_Powers_Publications/Space_Threat_V14_020119_sm.pdf; Global Counterspace Capabilities An Open Source Assessment (Brian Weeden & Victoria Samson eds., 2021), https://swfound.org/counterspace/.

civilian and military clients in areas such as navigation and communication.[4] Importantly, a satellite may serve the interest of multiple States and non-State entities of different nationalities through hosted payload or capacity lease arrangement.[5] The Intelsat-22 satellite, for example, hosts ultra-high frequency active high-power transponders to render military communication services to the Australian Defence Force, as well as forty-eight C-band and twenty-four Ku-band transponders to offer services for various network providers, media companies, and governments across Africa, Asia, Europe, and the Middle East.[6] An extremely high frequency communications payload is planned to be hosted on Space Norway's satellites for the U.S. Air Force, as well as commercial Ka-band payloads.[7] Japan's Quasi-Zenith Satellite System is expected to host two U.S. payloads to enhance space situational awareness capabilities over the Eurasian theater and facilitate resilient capabilities in the space surveillance network.[8] The involvement of multiple States as service recipients, as well as the dual use potential of these satellites, makes legal assessment of a targeting operation more complex.

With these two unique characteristics in mind, this article unravels the complexity of international legal regimes applicable to military operations

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4. *See generally* Joseph N. Pelton, *Small Satellites, Hosted Payloads, Dual Use, and Strategic Space Services*, *in* HANDBOOK OF SMALL SATELLITES 885 (Joseph N. Pelton ed., 2020); Jeff Foust, *An Opening Door for Hosted Payloads*, THE SPACE REVIEW (Oct. 29, 2012), https://www.thespacereview.com/article/2179/1; Richard A. Morgan, *Military Use of Commercial Communication Satellites: A New Look at the Outer Space Treaty and "Peaceful Purposes,"* 60 JOURNAL OF AIR LAW AND COMMERCE 237 (1994).

5. *See generally* Jimmy Gutzman, *State Responsibility for Non-State Actors in Times of War: Article VI of the Outer Space Treaty and the Law of Neutrality*, 80 AIR FORCE LAW REVIEW 87, 122–30 (2019); Andrew Stanniland & Denis Curtin, *An Examination of the Governmental Use of Military and Commercial Satellite Communications*, *in* HANDBOOK OF SATELLITE APPLICATIONS 187–219 (Joseph N. Pelton et al. eds., 2016); *Developments in Hosted Payloads*, GLOBAL MILITARY COMMUNICATION MAGAZINE 16 (June/July 2018), https://www.satelliteevolutiongroup.com/articles/hosted-payloads.pdf.

6. Peter B. de Selding, *Australian, U.S. Forces to Share UHF Satellite Capacity*, SPACE NEWS (Apr. 29, 2010), https://spacenews.com/australian-us-forces-share-uhf-satellite-capacity-agreement-involves-us-mobile-user/.

7. Caleb Henry, *Northrop Grumman to Build Two Triple-Payload Satellites for Space Norway, SpaceX to Launch*, SPACE NEWS (July 3, 2019), https://spacenews.com/northrop-grumman-to-build-two-triple-payload-satellites-for-space-norway-spacex-to-launch/.

8. Theresa Hitchens, *Air Force Funds Hosted Payloads on Japan Sats*, BREAKING DEFENSE (Feb. 19, 2020), https://breakingdefense.com/2020/02/air-force-funds-hosted-payloads-on-japan-sats/.

conducted against a satellite. It does so by contrasting threshold legal considerations necessary for the identification and application of relevant legal requirements under the law governing the use of force (*jus ad bellum*) and those under the law governing the conduct of hostilities in situations of armed conflict (*jus in bello*). For military planners, a clear understanding of differences in legal consideration under these legal regimes is the key to determining how the targeting of a satellite is legally characterized, which State is identified as the victim, and whether and to what extent its effects on the rights and interests of a third State must be taken into account.

For the purpose of this inquiry, targeting is broadly encompassed to include all possible engagement or action to alter or neutralize the function that the target satellite performs for the adversary.[9] This article does not confine the scope of inquiry to the legality of physical destruction of and damage to a satellite by means of a kinetic anti-satellite weapon.[10] Neither does it intend to address the legal debate regarding how relevant legal requirements for military operations might apply in space.[11] Instead, this article focuses on the threshold legal issues precedent to the identification and application of relevant legal requirements for military operations conducted against a satellite.

This article begins by reviewing existing legal frameworks applicable to military operations in space, especially by developing a three-stage process to address a potential issue of norm conflict arising from the application of the *jus ad bellum* and *jus in bello* regimes in the context of international space law. Based on that systematic understanding of existing legal frameworks, it

9. Chairman, Joint Chiefs of Staff, Joint Publication 3-60, Joint Targeting vii (2013).

10. *See, e.g.*, Bill Boothby, *Space Weapons and the Law*, 93 INTERNATIONAL LAW STUDIES 179, 206–8 (2017); David A. Koplow, *ASAT-Isfaction: Customary International Law and the Regulation of Anti-Satellite Weapons*, 30 MICHIGAN JOURNAL OF INTERNATIONAL LAW 1187 (2009).

11. *See, e.g.*, Dale Stephens & Cassandra Steer, *Conflicts in Space: International Humanitarian Law and Its Application to Space Warfare*, 40 ANNALS OF AIR AND SPACE LAW 1 (2015); Duncan Blake, *The Law Applicable to Military Strategic Use of Outer Space*, *in* NEW TECHNOLOGIES AND THE LAW OF ARMED CONFLICT 115, 129–36 (Hitoshi Nasu & Rob McLaughlin eds., 2014); P.J. Blount, *Targeting in Outer Space: Legal Aspects of Operational Military Actions in Space*, HARVARD NATIONAL SECURITY JOURNAL ONLINE (Nov. 25, 2012), https://harvardnsj.org/2012/11/targeting-in-outer-space-legal-aspects-of-operational-military-actions-in-space/; Arjen Vermeer, *The Laws of War in Outer Space: Some Legal Implications for Jus ad Bellum and Jus in Bello of the Militarisation of Outer Space*, *in* THE NEW ORDER OF WAR 69 (Bob Brecher ed., 2010); Michael N. Schmitt, *International Law and Military Operations in Space*, 10 MAX PLANCK YEARBOOK OF UNITED NATIONS LAW 89 (2006).

proceeds to examine differences in legal consideration in relation to three threshold legal issues:

1. Under what circumstances the targeting of a satellite amounts to a use of force prohibited under the *jus ad bellum* and constitutes an "attack" to which the law of targeting applies under the *jus in bello*;
2. Which State is considered as a victim State injured by the targeting of a satellite under the *jus ad bellum* and as a belligerent party under the *jus in bello*; and
3. Whether and to what extent the rights and interests of a third State are protected under the *jus ad bellum* and under the law of neutrality.

This article concludes with an observation that while its terrestrial impact is arguably relevant to the legal characterization of satellite targeting and the identification of an injured or belligerent State, there is no need to afford special protection to the rights and interests of a third State that may be affected as a result of the operation.

II. THE LEGAL FRAMEWORK GOVERNING SATELLITE TARGETING

The 1967 Outer Space Treaty remains the backbone of international law governing all space activities.[12] In particular, Article III of the Treaty occupies a place of prominence as it establishes that space activities are to be carried out "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."[13] This clause is designed to establish the international rule of law over human activities in outer space and on celestial bodies by operating as a conduit to project various rules of international law into outer space.

The extension of international law to outer space fills critical gaps left in space-specific treaties adopted with a piecemeal approach to a limited range of issues such as the placement of weapons of mass destruction,[14] the rescue of astronauts and the return of space objects,[15] liability for damage caused

12. Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, Jan. 27, 1967, 18 U.S.T. 2410, 610 U.N.T.S. 205 [hereinafter Outer Space Treaty].

13. *See also* G.A. Res. 1962, ¶¶ 2, 4 (Dec. 13, 1963).

14. Outer Space Treaty, *supra* note 12, art. 4.

15. *Id.* arts. 5, 8; Agreement on the Rescue of Astronauts and the Return of Objects Launched in Outer Space, Apr. 22, 1968, 19 U.S.T. 7570, 672 U.N.T.S. 119.

by space objects,[16] and the registration of space objects.[17] A further development of international space law has been halted due to continued failure to agree on additional instruments to address new issues arising from the modern development of space activities, such as the targeting of a satellite. These emerging issues cannot be resolved without having recourse to the wider body of international law including, most relevantly for the purpose of this article, the law governing the use of force and the law of armed conflict.[18]

However, this does not mean that the entire corpus of international law automatically finds application in space.[19] The extension of international law to space activities excludes domain specific principles and rules of international law—those that are intended to regulate, or are peculiar to, the specific domain in which the rules have been developed. Whether a particular rule of international law is domain specific or capable of general application in space will be dependent upon its object and purpose. For example, the legal regime

16. Outer Space Treaty, *supra* note 12, art. 7; Convention on International Liability for Damage Caused by Space Objects, Mar. 29, 1972, 24 U.S.T. 2389, 961 U.N.T.S. 187 [hereinafter Liability Convention].

17. Convention on Registration of Objects Launched into Outer Space, Jan. 14, 1975, 28 U.S.T. 695, 1023 U.N.T.S. 15 [hereinafter Registration Convention].

18. For the applicability of these bodies of international law in space, see Kubo Mačák, *Silent War: Applicability of the Jus in Bello to Military Space Operations*, 94 INTERNATIONAL LAW STUDIES 1 (2018); Jackson Nyamuya Maogoto & Steven Freeland, *Space Weaponization and the United Nations Charter Regime on Force: A Thick Legal Fog or a Receding Mist?* 41 INTERNATIONAL LAWYER 1091, 1098–99 (2007) (and the literature cited therein).

19. *See, e.g.*, Legal Sub-Committee of the Committee on the Peaceful Uses of Outer Space, 5th Sess., Summary Record of the Sixty-Fourth Meeting, at 6, U.N. Doc. A/AC.105/C.2/SR.64 (July 21, 1996) (France requesting clarity as to which principles of international law were meant when international law in general was mentioned); Legal Sub-Committee of the Committee on the Peaceful Uses of Outer Space, 5th Sess., Summary Record of the Sixty-Second Meeting, at 8, U.N. Doc. A/AC.105/C.2/SR.62 (July 19, 1966) (Brazil urging the automatic extension of international law to outer space and celestial bodies to be approached with care); Legal Committee of the Ad Hoc Committee on the Peaceful Uses of Outer Space, Summary Record of the Second Meeting, at 6, U.N. Doc. A/AC.98/C.2.SR.2 (May 27, 1959) (Mexico denying that all the provisions of the UN Charter and the Statute of the International Court of Justice were applicable to the international relations that might develop in outer space); Legal Committee of the Ad Hoc Committee on the Peaceful Uses of Outer Space, Summary Record of the First Meeting, at 7–8, U.N. Doc. A/AC.98/C.2/SR.1 (May 26, 1959) (UK questioning the automatic application to space activities of international law relating to international civil aviation or rules of maritime law).

of maritime blockade, which has been developed as a method of naval warfare through the practice of maritime powers,[20] does not operate to justify or regulate interference with a satellite passing into or out of a particular area in space. On the other hand, various rules of humanitarian character, including those applicable in situations of armed conflict, are capable of general application in space as "intransgressible principles" of customary international law.[21]

It is well established in jurisprudence that the mere existence of hostilities does not ipso facto terminate or suspend the operation of multilateral treaties as between belligerent parties or between a belligerent party and a third State.[22] This means that various treaty rules governing the exploration and use of outer space continue to apply in a time of armed conflict, in the same way as the UN Convention on the Law of the Sea continues to operate during naval warfare,[23] unless the operation of those rules is suspended. The concomitant application of space treaty rules and the domain-free rules of

20. *See generally* PHILLIP DREW, THE LAW OF MARITIME BLOCKADE: PAST, PRESENT, AND FUTURE (2017). Note, however, that space assets could be used as an aid to the maintenance and enforcement of an aerial or maritime blockade. *See* HARVARD MANUAL ON INTERNATIONAL LAW APPLICABLE TO AIR AND MISSILE WARFARE r. 152, ¶ 1 (2013) [hereinafter HARVARD MANUAL].

21. Legality of the Threat or Use of Nuclear Weapons, Advisory Opinion, 1996 I.C.J. 226, ¶ 79 (July 8).

22. *See* Int'l Law Comm'n, Rep. on the Work of its Sixty-Third Sess., at 183–85, U.N. Doc. A/66/10 (2011) (Chap. 6 of the ILC Report, Draft Articles on the Effects of Armed Conflicts on Treaties art. 3 and Commentary) [hereinafter ILC 2011 Draft Articles]; Legal Consequences of the Construction of a Wall in the Occupied Palestinian Territory, Advisory Opinion, 2004 I.C.J. 136, ¶ 106 (July 9); Nuclear Weapons Advisory Opinion, *supra* note 21, ¶ 25; The North Atlantic Coast Fisheries Case, 11 R.I.A.A. 167, 181 (Sept. 7, 1910). *See also* R. Rank, *Modern War and the Validity of Treaties: A Comparative Study*, 38 CORNELL LAW QUARTERLY 343–44, 436 (1952–53) (citing the advice from the U.S. State Department Legal Advisor, Ernest A. Gross, and from the U.K. Foreign Office, respectively). *Cf.* OSLO MANUAL ON SELECT TOPICS OF THE LAW OF ARMED CONFLICT r. 4 (Yoram Dinstein & Arne Willy Dahl eds., 2020) [hereinafter OSLO MANUAL].

23. *See, e.g.*, SAN REMO MANUAL ON INTERNATIONAL LAW APPLICABLE TO ARMED CONFLICTS AT SEA pt. II (Louise Doswald-Beck ed., 1995) [hereinafter SAN REMO MANUAL]. *See also* U.S. NAVY, U.S. MARINE CORPS & U.S. COAST GUARD, NWP 1-14M/MCTP 11-10B/COMDTPUB P5800.7A, THE COMMANDER'S HANDBOOK ON THE LAW OF NAVAL OPERATIONS ¶ 1.2 (2017).

the law of armed conflict may give rise to a normative conflict due to competing rights and obligations.[24] Reconciliation of this normative conflict could alter the lawful parameters of an anti-satellite targeting operation. A systemic approach must therefore be adopted to this potential issue of norm conflict by taking the following three steps.

The first step of inquiry is to ascertain the applicability of the space treaty rule between belligerent parties during an armed conflict. Whether a particular space treaty, or a particular provision thereof, is applicable to military operations depends, first and foremost, on the terms of the treaty as established through the rules of treaty interpretation.[25] For example, the prohibition of harmful radio interference within the International Telecommunication Union does not extend to military radio installations due to express exemption.[26] On the other hand, the placement of weapons of mass destruction in orbit around the Earth continues to be prohibited during armed conflict due to its object of arms control.[27] There is uncertainty as to whether the Liability Convention applies to intentional damage inflicted during armed conflict due to the absence of an exoneration clause referring to such circumstances, comparable to the one that appears in other strict liability conventions.[28] Although it is not expressly stated, there appears to have been a

24. Frans G. von der Dunk, *Armed Conflicts in Outer Space: Which Law Applies?* 97 INTERNATIONAL LAW STUDIES 188 (2021); Dale Stephens, *The International Legal Implications of Military Space Operations: Examining the Interplay between International Humanitarian Law and the Outer Space Legal Regime*, 94 INTERNATIONAL LAW STUDIES 75 (2018).

25. ILC 2011 Draft Articles, *supra* note 22, arts. 4, 5.

26. Constitution and Convention of the International Telecommunication Union arts. 6(1), 48(1), Dec. 22, 1992, 1825 U.N.T.S. 3 [hereinafter ITU Constitution].

27. Outer Space Treaty, *supra* note 12, art. 4(1); G.A. Res. 1884 (XVIII) (Oct. 17, 1963). *See also* WILLIAM H. BOOTHBY, WEAPONS AND THE LAW OF ARMED CONFLICT 299–300 (2d ed. 2016); BIN CHENG, STUDIES IN INTERNATIONAL SPACE LAW 529 (1997). *Cf.* Michel Bourbonnière & Ricky J. Lee, *Legality of the Development of Conventional Weapons in Earth Orbit: Balancing Space Law and the Law of Armed Conflict*, 18 EUROPEAN JOURNAL OF INTERNATIONAL LAW 873, 877–80 (2007).

28. *See, e.g.*, Vienna Convention on Civil Liability for Nuclear Damage art. 4(3)(a), May 21, 1963, 1063 U.N.T.S. 265 (as amended by the 1997 Protocol, Sept. 12, 1997, 2241 U.N.T.S. 270); International Convention on Civil Liability for Oil Pollution Damage art. 3(2)(a), Nov. 29, 1969, 973 U.N.T.S. 3 (as amended by the 1992 Protocol, Nov. 27, 1992, 1956 U.N.T.S. 255).

general understanding that military activities in outer space did not form part of the object of the Convention.[29]

A space treaty may also be subject to suspension, termination, or withdrawal by notification to other States parties to the treaty. Such notification may be based on the recognized ground for terminating or suspending a treaty under customary international law,[30] should the requisite circumstances be established.[31] The right to terminate or withdraw from a treaty, or suspend its operation, due to the mere existence of armed conflict is less certain.[32] At the very least, belligerent States have the right to notify the other States parties of its intention to withdraw from the treaty, or suspend its operation, which may or may not be accepted by other parties.[33] However, these options are not available if the treaty, or a particular provision thereof, is designed to apply during an armed conflict or to establish permanent legal relations among States.[34] As such, it would not be possible to deny the adversary's access to space or to establish exclusion zones by claiming sovereignty over any area of outer space, including the Moon and other celestial bodies, through the suspension of or withdrawal from the Outer Space Treaty.[35] Likewise, the State may not be able to abrogate its responsibility for the hostile conduct carried on by non-State entities when their operation forms part of the State's national activities in outer space.[36]

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29. Legal Sub-Committee of the Committee on the Peaceful Uses of Outer Space, 4th Sess., Summary Record of the Fiftieth Meeting, at 10 (Canada), 11–12 (Mexico), 12 (Bulgaria), U.N. Doc. A/AC.105/C.2/SR.50 (Nov. 28, 1965). *See also* OSLO MANUAL, *supra* note 22, r. 5 ¶ 3.

30. Gabčíkovo-Nagymaros Project (Hung. v. Slovk.), Judgment, 1997 I.C.J. 7, at 38 ¶ 46 (Sept. 25).

31. Vienna Convention on the Law of Treaties arts. 56–62, May 23, 1969, 115 U.N.T.S. 331 [hereinafter VCLT]. *See also* Benny Tan Zhi Peng, *The International Law Commission's Draft Articles on the Effects of Armed Conflicts on Treaties: Evaluating the Applicability of Impossibility of Performance and Fundamental Change*, 3 ASIAN JOURNAL OF INTERNATIONAL LAW 51 (2013).

32. VCLT, *supra* note 31, art. 73.

33. ILC 2011 Draft Articles, *supra* note 22, art. 9.

34. *Id.* arts. 6, 7; LORD MCNAIR, THE LAW OF TREATIES 723 (1961) (referring to multilateral treaties that create rules of international law for regulating the future conduct of the parties, which survive a war, due to the intention to create permanent law).

35. Outer Space Treaty, *supra* note 12, arts. 1, 2. It is also possible to argue that these rules are reflective of customary international law and, as such, do not cease to apply merely due to the fact that an armed conflict exists. ILC 2011 Draft Articles, *supra* note 22, art. 10.

36. Outer Space Treaty, *supra* note 12, art. 6.

Second, if the space treaty rule continues to operate during armed conflict, it must be ascertained whether the rule has an effect of imposing restrictions upon military operations. The issue here is not whether space treaties are or are not applicable during an armed conflict, but rather whether the obligations stemming from these treaties are intended to impose total restraint on State conduct during armed conflict.[37] For example, assuming for the sake of analysis the applicability of the space liability regime during armed conflict, the duty to pay compensation for damage caused by space objects does not render the targeting of a satellite unlawful or restrict the lawful parameters of military operations to any degree. This is the case even if it causes damage to the satellite or other objects in space, on the surface of the Earth, or to aircraft in flight.[38] The liability regime establishes an obligation to compensate for damage or injury sustained as a result of a space activity irrespective of its lawfulness under international law.[39] The question of liability, as opposed to the responsibility for an internationally wrongful act involving a targeting operation, is a separate issue to be resolved through the application and interpretation of Article VII of the Outer Space Treaty and the terms of the Liability Convention if it is applicable between the relevant parties.[40]

The responsibility that the State bears for its national activities in outer space under Article VI of the Outer Space Treaty does not impose any restriction upon military operations. No matter how this responsibility is legally characterized,[41] its legal significance is confined to the realm of State responsibility for internationally wrongful acts and does not extend to the

37. Nuclear Weapons Advisory Opinion, *supra* note 21, ¶ 30.

38. Under the Liability Convention, different standards of liability apply depending on where the damage is caused. *Compare* Liability Convention, *supra* note 16, art. 2 (absolute liability in relation to damage caused on the surface of the Earth or to aircraft in flight), *with* art. 3 (fault-based liability in relation to damage caused elsewhere). For details, see, e.g., Paul Stephen Dempsey, *Liability for Damage Caused by Space Objects under International and National Law*, 37 ANNALS OF AIR AND SPACE LAW 333, 340–43 (2012).

39. *See* 1 COLOGNE COMMENTARY ON SPACE LAW: OUTER SPACE TREATY 446–47, 459–60 (Stephan Hobe et al. eds., 2009).

40. *See* Christopher Greenwood, *State Responsibility and Civil Liability for Environmental Damage Caused by Military Operations*, 69 INTERNATIONAL LAW STUDIES 397, 400 (1996).

41. For scholarly debate, see, e.g., Frans G. von der Dunk, *The Origins of Authorisation: Article VI of the Outer Space Treaty and International Space Law*, *in* NATIONAL SPACE LEGISLATION IN EUROPE: ISSUES OF AUTHORISATION OF PRIVATE SPACE ACTIVITIES IN THE LIGHT OF DEVELOPMENTS IN EUROPEAN SPACE COOPERATION 3 (Frans G. von der Dunk ed., 2011).

legal regime governing the conduct of hostilities. In other words, the State will not be drawn into an armed conflict merely because it may legally be held responsible for hostile conduct by non-State entities as part of national activities in outer space. Whether the State is a party to an armed conflict essentially concerns the classification of armed conflict, which is governed by the law of armed conflict. This means that the State will not become involved in an international armed conflict due to the protracted armed violence engaged between a non-State entity and another State unless the level of control the State exercises over the activities of the non-State entity satisfies the "overall control" test,[42] for example, by organizing, coordinating, or planning the conduct of hostilities directed against the other State. If, on the other hand, a belligerent State were to engage non-State entities to conduct hostilities in an international armed conflict, the State would be held responsible for any violation of international law caused by their national space activities carried on under Article VI of the Outer Space Treaty.

Third, if the space treaty rule has an effect of restricting military operations, the competing rules in question must, as far as possible, be interpreted in harmony by employing recognized legal techniques of reconciliation.[43] For example, the obligation to undertake "appropriate consultations" under Article IX of the Outer Space Treaty, when the State has reason to believe that its national space activity would cause potentially harmful interference with the peaceful exploration and use of outer space by other States, can be interpreted not to arise in situations of armed conflict. This is because consultations may be deemed inappropriate under the hostile circumstances or the adversary's space activity may not be seen as representing a peaceful exploration or use of outer space.[44] Nevertheless, belligerent parties will still be

42. Prosecutor v. Thomas Lubanga Dyilo, Case No. ICC-01/04-01/06-2842, Judgment, ¶ 541 (and cases cited at n.1649) (Mar. 14, 2012); INTERNATIONAL COMMITTEE OF THE RED CROSS, COMMENTARY ON THE FIRST GENEVA CONVENTION: CONVENTION (I) FOR THE AMELIORATION OF THE CONDITION OF THE WOUNDED AND SICK IN ARMED FORCES IN THE FIELD ¶ 273 (2016); TALLINN MANUAL 2.0 ON THE INTERNATIONAL LAW APPLICABLE TO CYBER OPERATIONS r. 82, ¶ 6 (Michael N. Schmitt gen. ed., 2017).

43. *See* Int'l Law Comm'n, Fragmentation of International Law: Difficulties Arising from Diversification and Expansion of International Law, U.N. Doc. A/CN.4/L.682 (Apr. 13, 2006).

44. *See* Russian Federation, Survey of the Problem of Discretion Exercised by States in Interpreting Basic Legal Principles and Norms related to Safety and Security in Outer Space, ¶ 11, U.N. Doc. A/AC.105/2018/CRP.17 (June 21, 2018).

required to conduct hostile activities in outer space with due regard to the interest of third States in the exploration and use of outer space.[45]

As a result of applying these considerations, the legal regime that thus regulates the targeting of a satellite comprises the general rules of international law governing the use of force and the conduct of hostilities in situations of armed conflict, with a few additional requirements derived from space treaties. Under the *jus ad bellum*, the targeting of a satellite is unlawful when it constitutes a use of force or an intervention in the domestic affairs of another State,[46] although it can be justified when it is authorized by the Security Council or as an exercise of the right of individual or collective self-defense.[47] When targeting a satellite in situations of armed conflict, on the other hand, a belligerent party must exercise constant care to spare civilians and civilian objects,[48] and operate with due regard to the interests of third States in the exploration and use of outer space.[49] In cases where it constitutes an "attack" within the meaning of the law of targeting, there is an obligation to comply at all times with the principle of distinction, proportionality, and the duty to exercise feasible precautions.[50] The targeting of a satellite must be cancelled or suspended if it becomes apparent that the target

45. Outer Space Treaty, *supra* note 12, art. 9. *Cf.* SAN REMO MANUAL, *supra* note 23, §§ 10.6, 12.1–12.2, 36.1.

46. *See infra* Section III(A).

47. U.N. Charter arts. 2(4), 39, 41–42, 51; Russian Federation, Achievement of a Uniform Interpretation of the Right of Self-Defence in conformity with the Charter of the United Nations as applied to Outer Space as a Factor in Maintaining Outer Space as a Safe and Conflict-Free Environment and Promoting the Long-Term Sustainability of Outer Space Activities, at ¶ 3, U.N. Doc. A/AC.105/L.294 (Apr. 29, 2015) (affirming the applicability of self-defense in outer space); Ad Hoc Committee on the Peaceful Uses of Outer Space, Summary Record of the Third Meeting, at 3, U.N. Doc. A/AC.98/SR.3 (May 7, 1959) (U.S. stating that "the principles set forth in Articles 1 and 51 of the Charter were clearly applicable to questions relating to outer space"). *See infra* Section V(A) for further analysis.

48. Protocol Additional to the Geneva Conventions of 12 August 1949, and Relating to the Protection of Victims of International Armed Conflicts art. 57(1), June 8, 1977, 1125 U.N.T.S. 3 [hereinafter Additional Protocol I]; 1 CUSTOMARY INTERNATIONAL HUMANITARIAN LAW r. 15 (Jean-Marie Henckaerts & Louise Doswald-Beck eds., 2005) [hereinafter ICRC CUSTOMARY IHL STUDY]; OFFICE OF THE GENERAL COUNSEL, U.S. DEPARTMENT OF DEFENSE, LAW OF WAR MANUAL § 5.2.3.5 (rev. ed., Dec. 2016) [hereinafter U.S. DOD LAW OF WAR MANUAL].

49. Outer Space Treaty, *supra* note 12, art. 9.

50. Additional Protocol I, *supra* note 48, arts. 48, 51(5)(b), 57(2)(a); ICRC CUSTOMARY IHL STUDY, *supra* note 48, rr. 7, 14–15; U.S. DOD LAW OF WAR MANUAL, *supra* note 48, §§

satellite is not a legitimate military objective or the attack is expected to cause incidental loss of civilian life, injury to civilians, damage to civilian objects, or a combination thereof, which would be excessive in relation to the concrete and direct military advantage anticipated.[51] Effective warning must be given in advance of targeting a satellite if it may affect the civilian population, unless circumstances do not permit such an advance warning.[52]

On the surface, therefore, these rules operate by and large in the same way as these are applied in the conventional terrestrial context. However, there are critical differences in the way in which the targeting of a satellite should be legally characterized for the purposes of applying these rules. For example, does the targeting of a satellite constitute a use of force or an attack for the purposes of the law of targeting when it merely disrupts the satellite system? Does it matter if the disruption is not permanent, even though the terrestrial impact of signal interruption is often more severe and long-lasting than the duration of interference with the satellite itself? When multiple payloads are hosted on the satellite for servicing different States and private businesses, which State is considered as a victim State injured by the use of force or a belligerent party involved in an international armed conflict? And does international law afford any protection to the rights and interests of third parties affected as a result? Answering these questions is not so straightforward due to the unique characteristics of satellites. It requires various legal considerations in determining the legal characterization of satellite targeting, the terrestrial effects of targeting, and the impact of satellite targeting on the rights and interests of third States.

III. THE LEGAL CHARACTERIZATION OF SATELLITE TARGETING

There is a range of targeting options that can be employed to disrupt, degrade, damage, or destroy a satellite, including:

5.5, 5.10, 5.12. For the qualification of a satellite as a legitimate military objective, see OSLO MANUAL, *supra* note 22, rr. 9–10; Blount, *supra* note 11, at 9–15; Schmitt, *supra* note 11, at 116–17.

51. Additional Protocol I, *supra* note 48, art. 57(2)(b); ICRC CUSTOMARY IHL STUDY, *supra* note 48, r. 19; U.S. DOD LAW OF WAR MANUAL, *supra* note 48, § 5.11.

52. Additional Protocol I, *supra* note 48, art. 57(2)(c); ICRC CUSTOMARY IHL STUDY, *supra* note 48 r. 20; U.S. DOD LAW OF WAR MANUAL, *supra* note 48, § 5.11.5; OSLO MANUAL, *supra* note 22, r. 14, ¶ 3.

1. Kinetic counter-space weapons, such as anti-satellite missiles and kinetic kill vehicles launched from a satellite through rendezvous and proximity operations;
2. Non-kinetic counter-space weapons, such as laser dazzling, high-powered microwave, or electromagnetic pulse to disrupt the normal operation of a satellite;
3. Electromagnetic interference, such as jamming to block a satellite's signal transmissions or spoofing by falsifying the signal; and
4. Cyber attack targeting data instead of transmission frequencies.

The employment of these technical means of interference may or may not involve a violation of international law. It depends on how it is legally characterized within existing legal frameworks—in particular, whether the targeting amounts to a use of force prohibited under the *jus ad bellum* and whether it constitutes an attack within the meaning of the law of targeting.

A. The Use of Force in the Jus ad Bellum

Whether the targeting of a satellite amounts to a use of force prohibited under customary international law is a threshold question for its legality. This is because restrictions on satellite interference below this threshold are limited to specific types of interference or interference with specific types of satellites. It is conceivable that the interference with satellites is used as a means of coercion, below the use of force threshold, to compel a State to change its policy on domestic affairs, which amounts to an intervention prohibited under customary international law.[53] However, such an operation is more likely to form part of an overall effort to exert pressure on the State, rather than constituting an internationally wrongful act on its own.

The International Telecommunication Union regulates radio signal interference with the use of a certain portion of the electromagnetic spectrum and proscribes it when it is harmful, as defined under this legal regime.[54] And

53. Armed Activities on the Territory of the Congo (Dem. Rep. Congo v. Uganda), Judgment, 2005 I.C.J. 168, at 226–27 ¶ 162 (Dec. 19); Military and Paramilitary Activities in and against Nicaragua (Nicar. v. U.S.), Judgment, 1986 I.C.J. 14, ¶ 205 (June 27) [hereinafter *Nicaragua*].

54. Radio Regulations of the International Telecommunications Union art. 1.169, Nov. 2, 2016 (defining harmful interference as "[i]nterference which endangers the functioning of a radionavigation service or of other safety services or seriously degrades, obstructs or repeatedly interrupts a radiocommunication service operating in accordance with the Radio Regulations").

the scope of these restrictions is further limited due to ambiguities and exceptions with regard to military radio installations.[55] This means that satellite interference by other methods, such as laser dazzling and physical contact, as well as radio signal interference that is not deemed harmful or involves military radio installations, is not specifically prohibited.

States may also have an obligation under arms control treaties not to interfere with satellites that serve as critical components of the national technical means of verification.[56] Under Article IX of the Outer Space Treaty, on the other hand, States are merely required to undertake "appropriate international consultations" when there is a reason to believe that their national space activity would cause potentially harmful interference.[57] Even though harmful interference in this context is broader than harmful radio interference prohibited under the International Telecommunication Union regime,[58] States are not prohibited from causing harmful interference. Instead, there is a considerable scope for discretion in deciding what constitutes potentially harmful interference, when consultations are appropriate, and how consultations are to be undertaken.[59]

The absence of a general prohibition on harmful interference with satellites has created abundant opportunities for recalcitrant States to develop

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55. ITU Constitution, *supra* note 26, art. 48. For details, see Sarah M. Mountin, *The Legality and Implications of Intentional Interference with Commercial Communication Satellite Signals*, 90 INTERNATIONAL LAW STUDIES 101, 133–39 (2014).

56. *See, e.g.*, Treaty between the United States of America and the Russian Federation on Measures for the Further Reduction and Limitation of Strategic Offensive Arms art. 10(1)(b), Apr. 8, 2010, *reprinted in* 50 INTERNATIONAL LEGAL MATERIALS 340 (2011); Treaty on Conventional Armed Forces in Europe art. 15(2), Nov. 19, 1990, 2441 U.N.T.S. 285, 2442 U.N.T.S. 3, 2443 U.N.T.S. 3. For detailed analysis, see David A. Koplow, *An Interference about Interference: A Surprising Application of Existing International Law to Inhibit Anti-Satellite Weapons*, 35 UNIVERSITY OF PENNSYLVANIA JOURNAL OF INTERNATIONAL LAW 737, 768–94 (2014).

57. Outer Space Treaty, *supra* note 12, art. 9.

58. *See* Russian Federation, Survey of the Problem of Discretion Exercised by States in Interpreting Basic Legal Principles and Norms related to Safety and Security in Outer Space, ¶ 11, U.N. Doc. A/AC.105/2018/CRP.17 (June 21, 2018) ("This term covers all situations"); U.S. DOD LAW OF WAR MANUAL, *supra* note 48, § 14.10.5.

59. This has proven to be the case with the absence of consultations prior to anti-satellite tests. *See, e.g.,* Michael C. Mineiro, *FY-1C and USA-193 ASAT Intercepts: An Assessment of Legal Obligations under Article IX of the Outer Space Treaty*, 34 JOURNAL OF SPACE LAW 321 (2008); Hitoshi Nasu & Michael Schmitt, *A Threat or a Warning: Russia's Weapons Testing in Space*, JUST SECURITY (July 31, 2020), https://www.justsecurity.org/71783/a-threat-or-a-warning-russias-weapons-testing-in-space/.

and exploit non-kinetic methods of interference that can be leveraged below the threshold of what would traditionally be considered as an act of hostility. Such threats to satellites are recognized in the 2017 U.S. National Security Strategy, which states that, "Any harmful interference with or an attack upon critical components of our space architecture that directly affects this vital US interest [of unfettered access to and freedom to operate in space] will be met with a deliberate response at a time, place, manner, and domain of our choosing."[60] The legality of hostile interference, as well as response options against it, hinges upon how the principle of non-use of force applies in space.

While the principle of non-use of force is well established under customary international law, the scope of its application has been subject to controversies due to its interpretive indeterminacy. First, there has been a debate regarding the restrictive interpretation of the principle that exempts certain types of use of force, such as humanitarian intervention, from the prohibition.[61] Second, the issue of minimum threshold has been raised to suggest that small-scale or targeted forcible acts do not fall within the scope of the prohibition.[62] Third, and most relevantly for the purpose of this article, the precise parameters of what amounts to a use of force has become obscured due to the emergence of non-traditional means to cause disruptive effects, such as cyber attacks.

It has traditionally been accepted that the use of force, or a threat thereof, prohibited under this principle refers to the use of "armed' force as a "physical" act of violence.[63] It concerns the instrument of choice as a means of

60. NATIONAL SECURITY STRATEGY OF THE UNITED STATES OF AMERICA 31 (Dec. 2017). *See also* Chairman, Joint Chiefs of Staff, Joint Publication 3-14, Space Operations § I-5 (Oct. 26, 2020).

61. *See, e.g.,* MYRES S. MCDOUGAL & FLORENTINO P. FELICIANO, LAW AND MINIMUM WORLD PUBLIC ORDER 240–41 (1961); D.W. BOWETT, SELF-DEFENSE IN INTERNATIONAL LAW 150–52 (1958); JULIUS STONE, AGGRESSION AND WORLD ORDER 43 (1958).

62. *See* Tom Ruys, *The Meaning of "Force" and the Boundaries of the Jus ad Bellum: Are "Minimal" Uses of Force Excluded from UN Charter Article 2(4)?* 108 AMERICAN JOURNAL OF INTERNATIONAL LAW 159 (2014); Mary E. O'Connell, *The Prohibition on the Use of Force*, *in* RESEARCH HANDBOOK ON INTERNATIONAL CONFLICT AND SECURITY LAW 89, 102–7 (Nigel D. White & Christian Henderson eds., 2013); OLIVIER CORTEN, THE LAW AGAINST WAR 50–92 (2010).

63. See the literature cited at n.12 *in* International Law Association, Final Report on Aggression and the Use of Force 4 (2018), https://www.ila-hq.org/images/ILA/Draft Reports/DraftReport_UseOfForce.pdf. On the jurisprudence of the International Court of Justice in this regard, see Claus Kreß, *The International Court of Justice and the "Principle of Non-*

coercion ("an instrument-based approach"). States have indeed rejected the idea that "force" included all forms of pressure, such as economic coercion.[64] In 2008, Russia and China suggested that a use of force would include "any hostile actions against outer space objects including, inter alia, actions aimed at . . . temporarily or permanently disrupting their normal functioning or deliberately changing their orbit parameters."[65] The U.S. criticized this approach on the basis that it "captures not only 'hostile' counter-space activities against another country's space objects that result in permanent and irreversible damage, but also hostile activities and actions that cause temporary and reversible effects, such as from radio frequency jamming and optical sensor dazzling."[66] In 2014, Russia and China changed their position, instead proposing to define the use of force as "any action intended to inflict damage on an outer space object under the jurisdiction and/or control of other States."[67] It would therefore appear difficult to maintain the position that mere disruption of a satellite's function could amount to a use of force, especially if the effect is only temporary or reversible.

In the space context, however, inflicting physical damage on a satellite may not, in itself, constitute a coercive event that the State would characterize as a use of force. As stated at the outset of this article, the value of a satellite is primarily derived from the function it performs to enable or assist terrestrial activities and, therefore, the terrestrial consequences arising from the disruption of the satellite have greater significance. States are more likely to condemn the loss of life in the terrestrial environment caused by non-physical means of interference, such as jamming, with a communication satellite used during emergency rescue operations than the physical damage to

Use of Force," in THE OXFORD HANDBOOK OF THE USE OF FORCE IN INTERNATIONAL LAW 561, 574–77 (Marc Weller ed., 2015).

64. *See* Oliver Dörr & Albrecht Randelzhofer, *Article 2(4)*, *in* THE CHARTER OF THE UNITED NATIONS: A COMMENTARY 200, 208–10 (Bruno Simma et al. eds., 3d ed. 2012).

65. Draft Treaty on the Prevention of the Placement of Weapons in Outer Space, and of the Threat or Use of Force against Outer Space Objects, art. 1(e), U.N. Doc. CD/1839 (Oct. 29, 2008).

66. Letter Dated 19 August 2008 from the Permanent Representative of the United States of America Addressed to the Secretary-General of the Conference Transmitting Comments on the Draft Treaty on Prevention of the Placement of Weapons in Outer Space and of the Threat or Use of Force Against Outer Space Objects, ¶ 5(i), U.N. Doc. CD/1847 (Aug. 26, 2008).

67. Draft Treaty on the Prevention of the Placement of Weapons in Outer Space, the Threat or Use of Force against Outer Space Objects, art. 1(d), U.N. Doc. CD/1985 (June 12, 2014).

a non-functioning component of a satellite or the destruction of a defunct satellite ("an effect-based approach"). Indeed, an increasing number of States have adopted the view that hostile activities by non-traditional means, such as cyber operations, may constitute a use of force when the scale and effects of such activities are comparable to those of a conventional act of violence covered by the prohibition.[68]

Ultimately, whether non-physical interference with a satellite would qualify as a use of force is likely to be context-dependent, with different factors motivating States when assessing the legal character of State conduct. Indeed, there are numerous factors, such as the military character of the operation, the severity of its consequences, its directness and invasiveness, and the prevailing political environment, which influence the assessment of whether a particular operation amounts to a use of force.[69] There are circumstances in which even the mere disruption of a satellite system can be characterized as a use of force when its terrestrial impact caused as a result is comparable to that caused by conventional acts of violence, as long as the consequences are reasonably expected. For example, a laser dazzling of sensors on board a satellite that can register specific heat signatures detected from missile exhausts could be considered as a use of force when it formed a critical part of the State's early warning system against missile attack.[70] In this case, it is not the loss of function caused by laser dazzling, but rather the

68. *See* Official Compendium of Voluntary National Contributions on the Subject of How International Law Applies to the Use of Information and Communications Technologies by States submitted by Participating Government Experts in the Group of Governmental Experts on Advancing Responsible State Behaviour in Cyberspace in the Context of International Security established pursuant to General Assembly Resolution 73/266, at 13 (Australia), 19 (Brazil), 26 (Estonia), 35 (Germany), 58 (Netherlands), 69 (Norway), 77 (Romania), 83 (Singapore), 116 (UK), 137 (US), U.N. Doc. A/76/136 (July 13, 2021); Government of New Zealand, The Application of International Law to State Activity in Cyberspace ¶ 7 (2020); *MINISTÈRE DES ARMÉES, DROIT INTERNATIONAL APPLIQUÉ AUX OPÉRATIONS DANS LE CYBERESPACE* § 1.1.2 (2019); U.S. DOD LAW OF WAR MANUAL, *supra* note 48, § 16.3.1.

69. *See* TALLINN MANUAL 2.0, *supra* note 42, r. 69, ¶¶ 8–10; Michael N. Schmitt, *Computer Network Attack and the Use of Force in International Law: Thoughts on a Normative Framework*, 37 COLUMBIA JOURNAL OF TRANSNATIONAL LAW 885, 914 (1999).

70. *Cf.* Certain Activities Carried Out by Nicaragua in the Border Area (Costa Rica v. Nicar.) and Construction of a Road in Costa Rica Along the San Juan River (Nicar. v. Costa Rica), Judgment, 2015 I.C.J. 665, 823 ¶ 52 (Dec. 16) (Robinson, J., observing that "the pointing of weapons is probative of a use of force" because "[i]t is a signal of its willingness to shoot when it considers that to be necessary").

death, injury, destruction, or damage that is caused as a result of disabling missile defence capability that controls the assessment.

States will enjoy greater freedom to employ a variety of non-physical means of interference to disrupt other States' space activities and associated terrestrial activities, such as signal jamming and laser dazzling, if the prohibition is limited to physical acts of violence. In that case, defensive measures such as the use of redundant systems, decoys, camouflage, and frequency-hopping for communication channels would be the only means to protect space assets. If, on the other hand, even non-physical means of interference were to be characterized as a use of force depending on the reasonably expected consequential effects, the defending State would be able not only to condemn it as an internationally wrongful act but also, in the event that it amounts to an armed attack, to justify a forcible response in the exercise of the right of self-defense. For States that are vulnerable to hostile space operations, the latter yields a greater range of strategic choice as they can utilize existing military capabilities to counter the armed attack (for example, by launching air strikes against the jamming radar).

B. The Notion of Attack in the Jus in Bello

In situations of armed conflict, the threshold question is whether the targeting of a satellite constitutes an "attack" to which the law of targeting applies.[71] This body of law controls the legality of military operations that involve an act of violence against the adversary causing death or injury to persons or damage or destruction of objects.[72] Other military operations, such as the dissemination of propaganda and misinformation for deceptive purposes, are not subject to the law of targeting, although belligerent parties are

71. *See generally* GARY D. SOLIS, THE LAW OF ARMED CONFLICT 397–418 (3d ed. 2022); GEOFFREY S. CORN ET AL., THE LAW OF ARMED CONFLICT: AN OPERATIONAL APPROACH 247–80 (2d ed. 2018); Michael N. Schmitt & Eric Widmar, *The Law of Targeting*, *in* TARGETING: THE CHALLENGES OF MODERN WARFARE 121 (Paul A.L. Ducheine et al. eds., 2016); WILLIAM H. BOOTHBY, THE LAW OF TARGETING (2012); IAN HENDERSON, THE CONTEMPORARY LAW OF TARGETING: MILITARY OBJECTIVES, PROPORTIONALITY AND PRECAUTIONS IN ATTACK UNDER ADDITIONAL PROTOCOL I (2009).

72. *See* Additional Protocol I, *supra* note 48, art. 49(1) (defining "attacks" as "acts of violence against the adversary, whether in offence or in defence"); TALLINN MANUAL 2.0, *supra* note 42, r. 92, ¶ 2. For differences between military operations and attacks, see UK MINISTRY OF DEFENCE, THE JOINT SERVICE MANUAL OF THE LAW OF ARMED CONFLICT ¶ 5.32 (2004) [hereinafter U.K. LOAC MANUAL].

nonetheless required, as a general duty of due diligence, to take constant care to spare civilians from the adverse effects of military operations.[73]

The launch of an "attack" is also a determining factor for the existence of an international armed conflict between States that triggers their obligation to comply with the law of armed conflict. An international armed conflict arises when one or more States have recourse to armed force against another State, regardless of the reasons for or the intensity of the confrontation.[74] Any act of hostility in the form of an "attack" in inter-State relations, whether it is launched by military forces or civilian government agencies,[75] gives rise to an obligation to comply with the law of armed conflict. In other words, the law of armed conflict applies from the moment the State commences an interference with the satellite operated by another State when the act qualifies as an "attack." On the other hand, the same conduct by a non-State entity does not necessarily rise to the level of intensity required to qualify the situation as a non-international armed conflict.[76]

The notion of attack in the context of the law of targeting is not constrained to the physical means of violence. Due to its intrinsically humanitarian character, the law of targeting applies to "all forms of warfare and to all kinds of weapons, those of the past, those of the present and those of the

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73. *See* COMMENTARY ON THE ADDITIONAL PROTOCOLS OF 8 JUNE 1977 TO THE GENEVA CONVENTIONS OF 12 AUGUST 1949 ¶ 2191 (Claude Pilloud et al. eds., 1987).

74. AUSTRALIAN DEFENCE HEADQUARTERS, ADDP 06.4, LAW OF ARMED CONFLICT ¶ 1.51 (2006) [hereinafter AUSTRALIAN LOAC MANUAL]; DANISH MINISTRY OF DEFENCE, MILITARY MANUAL ON INTERNATIONAL LAW RELEVANT TO DANISH ARMED FORCES IN INTERNATIONAL OPERATIONS 48 (2016) [hereinafter DANISH MILITARY MANUAL]; *MINISTÈRE DE LA DÉFENSE, MANUEL DE DROIT DES CONFLITS ARMÉS* 33 (2012) [hereinafter FRENCH LOAC MANUAL]; FEDERAL MINISTRY OF DEFENCE (GERMANY), ZDV 15/2, LAW OF ARMED CONFLICT MANUAL ¶ 203 (2013) [hereinafter GERMAN LOAC MANUAL]; 4 NEW ZEALAND DEFENCE FORCE, MANUAL OF ARMED FORCES LAW: LAW OF ARMED CONFLICT §§ 5.2.6–5.2.9 (2017) [hereinafter NEW ZEALAND LOAC MANUAL]; NORWEGIAN CHIEF OF DEFENCE, MANUAL OF THE LAW OF ARMED CONFLICT §§ 1.33–1.34 (2013) [hereinafter NORWEGIAN LOAC MANUAL]; U.K. LOAC MANUAL, *supra* note 72, § 3.3; U.S. DOD LAW OF WAR MANUAL, *supra* note 48, § 3.3.1. *See also* KUBO MAČÁK, INTERNATIONALIZED ARMED CONFLICTS IN INTERNATIONAL LAW 14–17 (2018).

75. INTERNATIONAL COMMITTEE OF THE RED CROSS, COMMENTARY ON THE FIRST GENEVA CONVENTION: CONVENTION (I) FOR THE AMELIORATION OF THE CONDITION OF THE WOUNDED AND SICK IN THE ARMED FORCES IN THE FIELD ¶¶ 229–30 (2016).

76. *See generally* SANDESH SIVAKUMARAN, THE LAW OF NON-INTERNATIONAL ARMED CONFLICT (2012); ANTHONY CULLEN, THE CONCEPT OF NON-INTERNATIONAL ARMED CONFLICT IN INTERNATIONAL HUMANITARIAN LAW (2010).

future."[77] The act of violence in the *jus in bello* is therefore determined by the consequences of an operation, rather than the nature of the act.[78] As such, it encompasses any interference with a satellite that causes physical damage, including permanent loss of functionality (for example, by taking full control of the satellite on a permanent basis),[79] and death or injury to persons irrespective of their location.[80] Accordingly, the temporary nature of the loss of functionality caused, for example by jamming radio signals, is not material to the determination of its legal characterization when, for example, it is reasonably expected to cause collision of ships or disruption of an emergency rescue operation.

This broad understanding of the notion of "attack" is pivotal to the effective regulation of armed conflicts engaged through military operations in space. It ensures that the "cardinal principles" of international humanitarian law, such as the principle of distinction, proportionality, and the duty to exercise feasible precautions, apply to military operations conducted against satellites causing violent consequences in the terrestrial environment. Consider, for example, regional denial of the positioning, navigation, and timing signal by jamming over enemy territory in a situation where it is reasonably expected to cause an unidentifiable number of civilian self-driving vehicles to collide. Such an operation would be considered as an indiscriminate attack, in breach of the principle of distinction,[81] by virtue of its terrestrial effects that are incapable of being limited or controlled as required by the law of armed conflict.[82] This is so even if the jamming was directed at the

77. Nuclear Weapons Advisory Opinion, *supra* note 21, ¶ 86.

78. TALLINN MANUAL 2.0, *supra* note 42, r. 92, ¶¶ 3–4; OSLO MANUAL, *supra* note 22, r. 8, ¶ 6.

79. *See* Michael Schmitt & Kieran Tinkler, *War in Space: How International Humanitarian Law Might Apply*, JUST SECURITY (Mar. 9, 2020), https://www.justsecurity.org/68906/war-in-space-how-international-humanitarian-law-might-apply/.

80. Schmitt, *supra* note 11, at 117–18.

81. Additional Protocol I, *supra* note 48, arts. 48, 51(4); ICRC CUSTOMARY IHL STUDY, *supra* note 48, rr. 11–12.

82. AUSTRALIAN LOAC MANUAL, *supra* note 74, ¶ 5.2; CHIEF OF THE GENERAL STAFF (CANADA), B-GJ-005-104/FP-021, LAW OF ARMED CONFLICT AT THE OPERATIONAL AND TACTICAL LEVELS § 416 (2001) [hereinafter CANADIAN LOAC MANUAL]; DANISH MILITARY MANUAL, *supra* note 74, at 358; GERMAN LOAC MANUAL, *supra* note 74, ¶ 403; NEW ZEALAND LOAC MANUAL, *supra* note 74, §§ 8.5.15.–8.5.16; U.K. LOAC MANUAL, *supra* note 72, § 5.23.1.

positioning, navigation, and timing satellites that qualified as legitimate military objectives.[83] It would be manifestly absurd if the loss of civilian lives or damage to civilian objects was prohibited only when physical force was directed against them, but not when the employment of a non-physical means caused the same effects on the basis that it did not rise to the level of an attack.

On the other hand, in cases where the incidental effects can be limited or controlled, the attack will not necessarily be considered indiscriminate. Consider, for example, a kinetic destruction of a satellite by an anti-satellite missile generating a large cloud of debris around the Earth orbit.[84] While its impact is comparable to other indiscriminate attacks due to technical difficulties in accurately predicting the risk of collision with other satellites,[85] the incidental effects are expected to be more limited in circular orbits below five hundred kilometers altitude due to orbital decay.[86] Likewise, the terrestrial effects of interference with a satellite can be controllable, for example, in the case of jamming a region where the number of civilian aircraft or ships at risk of collision is expected to be limited.[87] In such circumstances, all feasible precautions must be exercised to avoid or minimize incidental civilian harm.[88] Yet, the attack could nonetheless be prohibited if the reasonably expected level of an incidental loss of civilian life and damage to civilian objects was assessed to be excessive in relation to the concrete and direct military advantage anticipated.[89] There is no difference in the application of these rules, whether these violent consequences arise directly by means of kinetic force or as a result of non-physical interference with the satellite.

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83. Additional Protocol I, *supra* note 48, art. 52(2); ICRC CUSTOMARY IHL STUDY, *supra* note 48, r. 8; U.S. DOD LAW OF WAR MANUAL, *supra* note 48, § 5.6.

84. *See* Schmitt & Tinkler, *supra* note 79; Corn et al., *supra* note 71, at 519–21.

85. Koplow, *supra* note 10, at 1262–63; Blount, *supra* note 11, at 18–20. *Cf.* OSLO MANUAL, *supra* note 22, r. 11, ¶ 2.

86. NATIONAL RESEARCH COUNCIL, COMMITTEE ON SPACE DEBRIS, ORBITAL DEBRIS: A TECHNICAL ASSESSMENT 157 (1995).

87. *Cf.* Christopher Woody, *Finland and Norway Are Telling Airline Pilots to Be Ready to Fly without GPS, and Some Think Russia is up to Something*, BUSINESS INSIDER (Nov. 9, 2018), https://www.businessinsider.com/finland-norway-tell-pilots-to-fly-without-gps-and-some-blame-russia-2018-11?r=US&IR=T.

88. Additional Protocol I, *supra* note 48, art. 57(2)(a)(ii); ICRC CUSTOMARY IHL STUDY, *supra* note 48, r. 17; U.S. DOD LAW OF WAR MANUAL, *supra* note 48, § 5.11.

89. Additional Protocol I, *supra* note 48, arts. 51(5)(b), 57(2)(a)(iii); ICRC CUSTOMARY IHL STUDY, *supra* note 48, r. 14; U.S. DOD LAW OF WAR MANUAL, *supra* note 48, § 5.12.

IV. THE LEGAL STATUS OF THE SATELLITE

The involvement of multiple States in the operation of a satellite and the use of its services adds the second complication to the legal assessment of targeting. The operation of a satellite is often a multinational endeavour, involving multiple States and non-State entities in the launch or its procurement. Unlike ships under the law of the sea,[90] there is no nationality attached to a satellite based on registration.[91] Rather, its legal status is attributed to different States for different purposes under international space law:

—Each State bears international responsibility for national activities in outer space, including satellites operated by non-governmental entities that are subject to the State's jurisdiction or control;[92]

—Liability for damage caused by a space object, such as a satellite, is attributed to the launching States that are involved in launching or procuring the launch of the space object or from whose territory or facility the space object is launched;[93]

—Jurisdiction and control over the space object, such as a satellite, is attributed to the State of registry, which is either the launching State or one of the launching States.[94]

The multiplicity of States that may be involved in the launch, procurement, and operation of a satellite, or as the user of a payload hosted therein, complicates the determination of which State is targeted by hostile action against that satellite. In the *jus ad bellum* this problem translates into the question of which State is the injured State and whether it is entitled to exercise the right of self-defense. In the *jus in bello*, the problem concerns the identification of a belligerent party to the international armed conflict.

90. United Nations Convention on the Law of the Sea arts. 91–92, Dec. 10, 1982, 1833 U.N.T.S. 397.

91. COLOGNE COMMENTARY, *supra* note 39, at 495, 520–21.

92. Outer Space Treaty, *supra* note 12, art. 6.

93. Liability Convention, *supra* note 16, art. 1(c).

94. Outer Space Treaty, *supra* note 12, art. 8; Registration Convention, *supra* note 17, art. 2.

A. The Determination of an Injured State in the Jus ad Bellum

The prohibition of the use or threat of force is a collective obligation arising under the UN Charter—a multilateral treaty—as well as customary international law. As such, any use or threat of force in breach of this prohibition affects the legal interest of the whole group of States bound by the same obligation, but that does not necessarily mean that every State qualifies as an injured State that is entitled to invoke the responsibility of the offending State or, in the event that the satellite targeting amounts to an armed attack, to exercise the right of self-defense.

According to the International Law Commission, a State is injured if it is "specially affected" by the violation of a collective obligation.[95] The idea draws on Article 60(2)(a) of the 1969 Vienna Convention on the Law of Treaties as a ground for suspending or terminating a treaty,[96] but does not set out necessary conditions for a State to be considered specially affected. Rather, it must be assessed on a case-by-case basis, "having regard to the object and purpose of the primary obligation breached and the facts of each case."[97] The Commission noted, however: "For a State to be considered injured, it must be affected by the breach in a way which distinguishes it from the generality of other States to which the obligation is owed."[98]

This broad understanding of an injured State suggests that it is not limited to situations where the use of force is directed against an armed force of the State, such as a warship, as an "expression of the sovereignty."[99] Indeed, in *Guyana v. Suriname*, the arbitral tribunal determined that the intimidation used by the Surinamese navy against the CGX exploratory oilrig and drill ship *C.E. Thornton* amounted to a threat of force against Guyana when these vessels were operating under licenses issued by Guyana for oil exploration in the disputed area of the continental shelf.[100] This is despite the fact that CGX Resources, Inc., was a Canadian company and *C.E. Thornton* was sailing

95. Int'l Law Comm'n, *Draft Articles on Responsibility of States for Internationally Wrongful Acts, with Commentaries*, at 119, 56 U.N. GAOR Supp. No. 10, U.N. Doc. A/56/10 (2001) [hereinafter ILC Commentaries].

96. VCLT, *supra* note 31, art. 60(2)(a).

97. ILC Commentaries, *supra* note 95, at 119.

98. *Id.*

99. The "ARA Libertad" Case (Arg. v. Ghana), Provisional Measures, 2012 I.T.L.O.S. Rep. 332, ¶ 94.

100. In the Matter of an Arbitration between Guyana and Suriname (Guy. v. Surin.), Case No. 2004-04, Award, ¶¶ 425–47 (Perm. Ct. Arb. 2007).

under the U.S. flag.[101] In the *Oil Platforms* case, on the other hand, the International Court of Justice refused to characterize the attack on the *Texaco Caribbean* as an attack on the United States on the basis that, whatever its ownership, it was not flying a U.S. flag.[102]

A State may therefore consider itself injured by the targeting of a satellite rising to the level of a use of force despite the fact that there is no sovereign status attached to it and even if the State does not have any ownership over it or payloads therein. On the other hand, none of the regulatory links created under international space law for the purposes of international responsibility for national space activities and liability for the damage caused by the launch of a space object would be relevant to the status of an injured State. The link is too tenuous to claim a special impact arising from the use or threat of force when the State was merely involved in the launch of the satellite from its territory or the authorization and supervision of the space activities carried on by its nationals.

A State could claim a special impact when the satellite carried on its registry was targeted, on the basis that it is deprived of the right to exercise jurisdiction and control over the satellite. This view could indeed be favoured by those who adopt an instrument-based approach to the definition of the use of force as discussed in Section III(A). For them, it is the damage caused to the satellite itself or its components that controls the assessment of whether the act of targeting constitutes a use of force. As such, the factual relationship established through registration of the satellite can be considered sufficient evidence of a special impact on the State. Note, however, a satellite can be registered to an international organization when the organization has made a declaration to accept the rights and obligations under the Registration Convention, to which a majority of its States members are parties.[103] In such a case, it is the international organization on whose registry the satellite is carried rather than an individual member State that is entitled

101. *Guy. v. Surin.*, Guyana's Notification and Statement of Claim, ¶¶ 14, 17 (2004).

102. Oil Platforms (Iran v. U.S.), Judgment, 2003 I.C.J. 161, ¶ 64 (Nov. 6).

103. Registration Convention, *supra* note 17, art. 7. As of June 30, 2021, such a declaration has been made by the European Space Agency (Jan. 2, 1979, 1122 U.N.T.S. 388), the European Organization for the Exploitation of Meteorological Satellites (July 10, 1997), the European Telecommunications Satellite Organization (June 10, 2014), and the Intersputnik International Organization of Space Communications (July 10, 2018).

to bring a claim with respect to any direct loss, damage, or injury to it or its members.[104]

However, this approach has its limit due to loopholes in the international space object registration regime. A number of satellites currently in orbit are unregistered for a variety of reasons.[105] In the absence of registration, no State could be entitled to claim the responsibility of the offending State for the use of force against the satellite even when it has caused violent consequences on another State, for example as a result of the loss of communication signals relayed through that satellite. The same problem arises in cases where a State enjoys access to services provided by the satellite that is carried on another State's registry. An example is the military communication services provided to the Australian Defence Force through transponders hosted on the Intelsat-22 satellite, which is carried on the U.S. registry.[106] In these circumstances, non-registering States can only find a solution by embracing the view that violent consequences in the terrestrial environment form an integral part of the use of force triggered by the interference with a satellite.

This does not suggest that the effect-based approach be relied upon in lieu of the instrument-based approach as a means of identifying what constitutes a use of force. There are circumstances in which multiple States find themselves specially affected on different grounds, for example when the missile early warning capability of one State is disabled by a laser employed to neutralize its sensors hosted on a commercial communications satellite on the register of another State. The former State can claim an injury for the damage caused to the missile early warning system, whereas the latter State might consider the physical damage caused to the sensors on board the satellite as sufficient evidence of a special impact on it as the State of registry.

Despite the potential claim to an injury by multiple States affected by the damage caused to the satellite, it does not necessarily make them equally entitled to exercise the right of self-defense. Each State must assess its impact

104. Int'l Law Comm'n, *Draft Articles on the Responsibility of International Organizations, with Commentaries*, 2011 YEARBOOK OF THE INTERNATIONAL LAW COMMISSION, vol. 2, pt. 2, at 39, 84–85, U.N. Doc. A/CN.4/SER.A/2011/Add.1 (Part 2) (2011).

105. *See* Ram S. Jakhu, Bhupendra Jasani, & Jonathan C. McDowell, *Critical Issues Related to Registration of Space Objects and Transparency of Space Activities*, 143 ACTA ASTRONAUTICA 406, 409–13 (2018).

106. Note Verbale dated 26 July 2012 from the Permanent Mission of the United States of America to the United Nations (Vienna) Addressed to the Secretary-General, Annex III, U.N. Doc. ST/SG/SER.E/650 (Aug. 1, 2012).

individually in order to determine whether the "scale and effects" of the damage it has suffered reach the gravity threshold required for an armed attack.[107] This means that even an injured State may not be entitled to exercise the right of self-defense if the injury it suffers does not rise to the requisite level of gravity.

B. The Identification of Belligerent Parties in the Jus in Bello

The involvement of multiple States in the operation of a satellite and as the recipient of its services also has implications for the identification of belligerent parties involved in an international armed conflict, due to the broad understanding of what constitutes an attack launched through military operations in space. An attack launched against a satellite that hosts multiple payloads servicing different countries could affect the legal interests of multiple States at the same time. However, this does not necessarily mean that every State affected as a result becomes a belligerent party to the international armed conflict.

First, the law of targeting applies in the context of an armed conflict. An attack to which the law of targeting applies is therefore limited to the acts of violence committed against the adversary in the conduct of hostilities, as distinct from other acts of violence and destruction of property.[108] As such, no matter which State is identified as an adversary, there is an obligation to comply with targeting requirements so long as it is motivated to harm the adversary. The target State as an adversary at the commencement of hostilities is often evident in the geopolitical situation prevailing at the time. In any event, however, any State conducting military operations in response to the attack carries an obligation to comply with the law of armed conflict.

Second, a third State does not automatically become a belligerent party because of the damage it suffers as a result of the attack directed against a

107. *Oil Platforms*, *supra* note 102, ¶ 72; *Nicaragua*, *supra* note 53, ¶ 191. *Cf.* U.S. DOD LAW OF WAR MANUAL, *supra* note 48, § 1.11.5.2.

108. Prosecutor v. Bosco Ntaganda, Case No. ICC-01/04-02/06, Judgment, Annex 1, (Morrison, J., and Hofmański, J., separate opinions) ¶¶ 27–31 (International Criminal Court Appeals Chamber Mar. 30, 2021). *Cf.* Prosecutor v. Al Mahdi, Case No. ICC-01/12-01/15, Judgment and Sentence, ¶ 15 (International Criminal Court Trial Chamber VIII Sept. 27, 2016); *but see* William Schabas, *Al Mahdi Has Been Convicted of a Crime He Did Not Commit*, 49 CASE WESTERN RESERVE JOURNAL OF INTERNATIONAL LAW 75, 77–84 (2017).

satellite. It is established in the traditional law of war that the mere destruction of neutral property incidental to military operations during an armed conflict does not demand reparations.[109] Belligerent parties have an obligation under customary international law to respect the right of neutral States to be free from all acts of hostility and the belligerent use of their territory.[110] As will be discussed in Section V(B), there is serious doubt as to whether this obligation extends to space objects, such as satellites. Yet, even assuming it does, a third State does not lose its neutral status as a result of a mere violation of neutral rights or obligations.[111] The third State may well be entitled to reparation for damage caused as a result of the infringement of neutral rights by a belligerent party,[112] but this in itself falls short of establishing a belligerent relationship. The neutral status may be lost only when the third State is involved in a conflict, under its national policy, in a manner that is integral to the act of hostility undertaken by the belligerent party.

This does not mean that third States do not enjoy any legal protection in the conduct of hostilities between other States. Like neutral inhabitants and properties located in enemy territory,[113] space objects owned or used by a third State are accorded the same legal protection as any civilian objects under the law of armed conflict unless these objects are making an effective

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109. GEORG SCHWARZENBERGER, A MANUAL OF INTERNATIONAL LAW 183–84 (6th ed. 1976); 2 GEORG SCHWARZENBERGER, INTERNATIONAL LAW AS APPLIED BY INTERNATIONAL COURTS AND TRIBUNALS 582 (1968); ALMÁ LATIFI, EFFECTS OF WAR ON PROPERTY 37 (1909).

110. *See* AUSTRALIAN LOAC MANUAL, *supra* note 74, ¶ 11.8; CANADIAN LOAC MANUAL, *supra* note 82, §§ 805–7, 1304, 1309; DANISH MILITARY MANUAL, *supra* note 74, at 62; FRENCH LOAC MANUAL, *supra* note 74, at 66; GERMAN LOAC MANUAL, *supra* note 74, ¶¶ 1201, 1205; NEW ZEALAND LOAC MANUAL, *supra* note 74, §§ 16.3.1–16.3.3; NORWEGIAN LOAC MANUAL, *supra* note 74, § 1.44; U.K. LOAC MANUAL, *supra* note 72, §§ 1.42–1.43; U.S. DOD LAW OF WAR MANUAL, *supra* note 48, §§ 15.1.4, 15.3; SAN REMO MANUAL, *supra* note 23, § 15.1 & n.36.

111. *See* Dubsky v. Ireland [2005] IEHC 442, ¶ 89 (High Court of Ireland); U.S. DOD LAW OF WAR MANUAL, *supra* note 48, § 15.4.1. *See also* INTERNATIONAL COMMITTEE OF THE RED CROSS, COMMENTARY ON THE THIRD GENEVA CONVENTION: CONVENTION (III) RELATIVE TO THE TREATMENT OF PRISONERS OF WAR ¶ 1083 n.253 (2020); JAMES UPCHER, NEUTRALITY IN CONTEMPORARY INTERNATIONAL LAW 54–63 (2020); CHRISTINE CHINKIN, THIRD PARTIES IN INTERNATIONAL LAW 308 (1993).

112. *See, e.g.*, William Gerald Downey, Jr., *Claims for Reparations and Damages Resulting from Violations of Neutral Rights*, 16 LAW AND CONTEMPORARY PROBLEMS 487 (1951).

113. *See* CANADIAN LOAC MANUAL, *supra* note 82, § 1313; NEW ZEALAND LOAC MANUAL, *supra* note 74, §§ 16.3.14–16.3.16.

contribution to a belligerent's conduct of hostilities.[114] Belligerent forces are also required to take constant care to avoid damage to satellites carried on the registry of, or payloads used by, a third State, with due regard for the interest of third States in the exploration and use of outer space.[115] On the other hand, disabling or denying access to the transponders hosted on the satellite carried on the registry of a belligerent party can be deemed lawful as an exercise of the right of angary,[116] subject to the payment of compensation to the neutral State.

V. THE RIGHTS AND INTERESTS OF THIRD PARTIES

Targeting decisions must take into account the rights and interests of third States when the target satellite hosts payloads servicing multiple States and non-State entities of different nationalities. In cases where the targeting of a satellite involves a use of force or constitutes an attack in situations of armed conflict, it is not only against the target State that the action must be justified but also with respect to third States whose rights may be infringed as a result. The extent to which the rights and interests of third States are afforded legal protection depends on the legal justification for the use of force under the *jus ad bellum* and the applicability of the law of neutrality in space.

A. The Rights and Interests of Third Parties in the Jus ad Bellum

The targeting of a satellite, when it constitutes a use of force prohibited under customary international law, can nonetheless be justified if it is authorized by the UN Security Council under Chapter VII of the UN Charter,[117] or as an exercise of the right of individual or collective self-defense.[118] These options available under the *jus ad bellum* can not only justify a use of force against the target State but may also afford an excuse for violating the rights of a third State that qualifies as an injured State. As discussed in Section IV(A), other third States whose rights or interests may have been affected by

114. *See* OSLO MANUAL, *supra* note 22, r. 17, ¶ 4; Corn et al., *supra* note 71, at 517.

115. Outer Space Treaty, *supra* note 12, art. 9.

116. U.S. DOD LAW OF WAR MANUAL, *supra* note 48, § 15.11. The right of angary is a State's right in war to temporarily seize and use neutral merchant ships and aircraft located in its territorial waters and airspace. *Angary*, BLACK'S LAW DICTIONARY (11th ed. 2019).

117. U.N. Charter arts. 24, 39.

118. U.N. Charter art. 51; *Nicaragua*, *supra* note 53, ¶¶ 176, 193.

the targeting of a satellite (for example, their freedom in the peaceful exploration and use of outer space because of incidental damage to their satellites or payloads) are not entitled to invoke the responsibility of the offending State, although liability issues for damage sustained as a result could arise irrespective of its lawfulness under international law.[119]

Upon exercising its discretion to identify a threat to the peace, a breach of the peace, or an act of aggression,[120] the Security Council may authorize the disruption of communication satellites as part of a sanction,[121] with an authorization for the use of force to enforce it.[122] Military operations may also be conducted against a satellite as part of military enforcement action authorized under Chapter VII of the Charter within the scope of the mandate. In such circumstances, third States are under an obligation to render every assistance in carrying out these measures,[123] and their obligations under the UN Charter prevail over other international agreements, including space treaties.[124] Third States may well proclaim neutrality even when the Security Council has authorized military action but their rights and obligations as neutral States would be modified to the extent of any inconsistency with their obligations under relevant Security Council resolutions.[125]

It is also possible to justify the use of force against a satellite and an associated violation of space law obligations by invoking the right of self-defense. This is because self-defense not only justifies the use of force but also constitutes a circumstance precluding wrongfulness.[126] However, this

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119. *See supra* text accompanying notes 39–40.

120. U.N. Charter art. 39.

121. U.N. Charter art. 41 ("complete or partial interruption of . . . telegraphic, radio and other means of communication").

122. *Cf.* S.C. Res. 221, ¶ 5 (Apr. 9, 1966) (calling upon the British Government to prevent, by the use of force if necessary, the arrival at Beira of vessels reasonably believed to be carrying oil destined for Southern Rhodesia).

123. U.N. Charter arts. 2(5), 25, 48; Reparation for Injuries Suffered in the Service of the United Nations, Advisory Opinion, 1949 I.C.J. 174, 183 (Apr. 11).

124. U.N. Charter art. 103. This supremacy extends to decisions and authorizations of the Security Council. Johann Ruben Leiß & Andreas Paulus, *Article 103*, *in* THE CHARTER OF THE UNITED NATIONS: A COMMENTARY 2110, 2124–28 (Bruno Simma et al. eds., 3d ed. 2012).

125. *See* U.S. Department of Defense, *Final Report to Congress: Conduct of the Persian Gulf War Appendix O—The Role of the Law of War*, *reprinted in* 31 INTERNATIONAL LEGAL MATERIALS 615, 637–40 (1992).

126. Articles on Responsibility of States for Internationally Wrongful Acts art. 21, *in* G.A. Res. 56/83 (Dec. 12, 2002) [hereinafter Articles on State Responsibility].

justification is only available when the non-performance of an obligation is related to the use of force.[127] In other words, the non-performance in question must have been the consequence of a use of force, which necessarily impairs the defending State's ability to comply with associated obligations such as territorial sovereignty and the principle of non-intervention.[128]

Consider, for example, the disruption of the adversary's access to telemetry, tracking, and command ground stations located in a third State to deny its ability to conduct rendezvous and proximity operations against friendly satellites providing intelligence, surveillance, and reconnaissance capabilities for target acquisition. This action can be justified even if it involves a violation of the third State's territorial sovereignty and arguably its freedom in the exploration and use of outer space if it is completely deprived of access to space assets without telemetry, tracking, and command signals necessary to monitor and control them. The justifiability of such action depends on the lawfulness of the way in which the right of self-defense is exercised and without prejudice to the question of compensation for any material loss caused as a result.[129]

The violation of third States' rights and the degree of infringement are relevant considerations to the requirement of proportionality.[130] That includes their access to hosted payloads aboard the target satellite in the exercise of freedom in the exploration and use of outer space. However, third States may be required to resist the infringement of their rights, even by force, when they intend to maintain the status of neutrality in their relationship with belligerent parties.[131] As discussed in the next section, such an obligation is dependent upon whether the neutral right of a third State attaches to a space object under the law of neutrality.

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127. ILC Commentaries, *supra* note 95, at 74.

128. For detailed analysis, see FEDERICA PADDEU, JUSTIFICATION AND EXCUSE IN INTERNATIONAL LAW 192, 197–205 (2018).

129. Articles on State Responsibility, *supra* note 126, art. 27(b).

130. CHRIS O'MEARA, NECESSITY AND PROPORTIONALITY AND THE RIGHT OF SELF-DEFENCE IN INTERNATIONAL LAW 146–47 (2021); JUDITH GARDAM, NECESSITY, PROPORTIONALITY AND THE USE OF FORCE BY STATES 173–75 (2004).

131. AUSTRALIAN LOAC MANUAL, *supra* note 74, ¶ 11.4; CANADIAN LOAC MANUAL, *supra* note 82, § 1304(3); GERMAN LOAC MANUAL, *supra* note 74, ¶ 1206; NEW ZEALAND LOAC MANUAL, *supra* note 74, § 16.4.2; U.S. DOD LAW OF WAR MANUAL, *supra* note 48, §§ 15.3.2.2, 15.4.3; HARVARD MANUAL, *supra* note 20, rr. 168–69.

B. The Rights and Interests of Third Parties in the Jus in Bello

As summarized at the end of Part II, a belligerent party involved in an armed conflict must comply with targeting requirements, such as distinction, proportionality, and the duty to exercise feasible precautions, in cases where the targeting of a satellite constitutes an attack within the meaning of the law of targeting. However, additional considerations may be required when the target satellite hosts multiple payloads servicing different countries and therefore an attack on that satellite affects the rights and interests of a third State not party to the international armed conflict. The nature and range of such considerations would differ, depending on how the following two questions are resolved: first, whether the neutral right of a third State attaches to a space object under the law of neutrality; and second, whether a particular component of the satellite can be distinguished as a separate object for the purposes of complying with the principle of distinction.

During an international armed conflict, the law of neutrality protects the rights and interests of third parties as neutral States in their relationship with belligerent parties.[132] It provides conditions upon which neutral States may continue to maintain peaceful relations with belligerent parties, while preventing belligerent parties from interfering with the sovereignty of neutral States.[133] As such, this body of law regulates belligerent activities within the territory of neutral States or in relation to their assets and objects located outside neutral territory, such as government ships and military aircraft. Non-governmental entities, such as merchant ships and civilian aircraft, do not enjoy the same neutral rights and obligations, even if they are operating under a neutral State's jurisdiction or control.[134] Therefore, space objects

132. The status of belligerency extends to non-State entities that are recognized as such by other States. For details, see ROB MCLAUGHLIN, RECOGNITION OF BELLIGERENCY AND THE LAW OF ARMED CONFLICT (2020).

133. *See generally* Michael Bothe, *The Law of Neutrality*, *in* THE HANDBOOK OF INTERNATIONAL HUMANITARIAN LAW 602, 612–33 (Dieter Fleck ed., 4th ed. 2021); Upcher, *supra* note 111, ch. 3; ROBERT KOLB, INTERNATIONAL LAW ON THE MAINTENANCE OF PEACE: JUS CONTRA BELLUM ch. 10 (2018); Yoram Dinstein, *The Laws of Neutrality*, 14 ISRAEL YEARBOOK OF HUMAN RIGHTS 80, 91–98 (1984); R.W. Tucker, *The Law of War and Neutrality at Sea*, 50 INTERNATIONAL LAW STUDIES 3, 202–58 (1957).

134. Note that neutral merchant ships and civil aircraft are subject to special rules of protection from attacks and other repressive measures under the law of armed conflict. HARVARD MANUAL, *supra* note 20, rr. 51–57, 137–42; SAN REMO MANUAL, *supra* note 23, rr. 67–71, 146–58.

cannot be accorded neutral status under the law of neutrality merely on the ground that a neutral State is exercising jurisdiction and control over them.[135]

Customary international law in this area may nonetheless evolve through the development of State practice in space by claiming a neutral status, as Denmark does,[136] over a satellite carried on its registry. Such practice could be motivated by the legal protection that the neutral status provides for satellites, particularly those of military significance. However, caution must be exercised to see if this course of legal development truly yields a desired outcome.

First, the neutral State will only benefit from this legal protection when the targetable component of a satellite carried on its registry is clearly distinguishable as an "object" that qualifies as a legitimate military objective. The principle of distinction, in such a case, would require an attack to be directed against that specific component of the satellite. The attacking force would not only be required to avoid or minimize harm to other components of the satellite and cancel or suspend the attack if the incidental civilian harm is expected to be excessive in relation to the concrete and direct military advantage anticipated. It would also be held responsible for any damage that might be caused to the satellite itself, carried on the registry of a neutral State, should the neutral status be attached to it. Yet, this assumption can be challenged as it is also possible to identify the satellite and all components therein as a single object that qualifies as a legitimate military objective.[137] Indeed, a strong argument can be made for it, given that payloads aboard a satellite must rely on the metal or composite frame called the "bus" and its subsystems, such as an attitude control system and power source, in order to operate.[138] From this point of view, the neutral status of a satellite creates a problem of legal incoherence, because an object cannot logically be targetable under the law of armed conflict and, at the same time, enjoy legal protection under the law of neutrality.

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135. *See* Wolff Heintschel von Heinegg, *Neutrality and Outer Space*, 93 INTERNATIONAL LAW STUDIES 526, 535 (2017). *Cf.* OSLO MANUAL, *supra* note 22, r. 18, ¶¶ 2–3.

136. DANISH MILITARY MANUAL, *supra* note 74, at 60 ("Nor is it permissible to attack, State-owned infrastructure of neutral States, even if the infrastructure is located in outer space").

137. *See* OSLO MANUAL, *supra* note 22, r. 14, ¶ 5.

138. Schmitt & Tinkler, *supra* note 79.

Second, the legal protection derived from a neutral status comes with an obligation to prevent a belligerent use of the satellite.[139] The neutral State responsible for the operation of the satellite, or on whose registry the satellite is carried, would have a duty to use the means at its disposal to prevent belligerent parties from using their payloads hosted therein even if it was launched or owned by a private company.[140] Under the traditional law of neutrality, there is an exception to this obligation with respect to the belligerent use of telegraph, telephone cables, and wireless telegraphy apparatus established before the commencement of hostilities when these are not used for purely military purposes or if these have been opened for public use.[141] This exception could have evolved into customary international law that encompasses all kinds of communication equipment and facilities that are used by modern military forces,[142] including cyber communication systems.[143] However, it is debatable whether this exception can be extended to space-based communication, navigation, and surveillance infrastructure and whether the transmission of signals and data qualifies as communication, as opposed to the export or transport of military supplies prohibited under the law of neutrality.[144] And this exception does not apply to communication equipment and facilities that are used for solely military purposes. The extension of neutral obligations to satellites would therefore bring the military value of hosted payloads into question if these become inaccessible during the time of hostilities.

A neutral State may consider that these problems can be circumvented by limiting its claim of neutral status to entirely State-owned infrastructure without any arrangement for hosted payloads. However, the leasing and sharing of bandwidth is common practice with the use of military satellite

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139. *Cf.* Convention No. V Respecting the Rights and Duties of Neutral Powers and Persons in Case of War on Land art. 5, Oct. 18, 1907, 36 Stat. 2310, T.S. No. 540 [hereinafter Hague Convention V]; Convention No. XIII Concerning the Rights and Duties of Neutral Powers in Naval War art. 8, Oct. 18, 1907, 36 Stat. 2415, T.S. No. 545.

140. Gutzman, *supra* note 5, at 135–40.

141. Hague Convention V, *supra* note 139, arts. 3(b), 8.

142. *See* GERMAN LOAC MANUAL, *supra* note 74, ¶ 1212; U.S. DOD LAW OF WAR MANUAL, *supra* note 48, § 15.5.3.1.

143. TALLINN MANUAL 2.0, *supra* note 42, r. 151, ¶ 4.

144. For a division of views in the cyber context, see TALLINN MANUAL 2.0, *supra* note 42, r. 151, ¶¶ 5–7. *See also* Hitoshi Nasu, *The Laws of Neutrality in the Inter-Connected World: Mapping the Future Scenarios*, *in* THE FUTURE LAW OF ARMED CONFLICT (Matthew Waxman & Thomas W. Oakley eds., 2022).

communication systems.[145] Such arrangement would also become difficult to maintain should a neutral status be attached to a State-owned satellite. The law of neutrality cannot only be extended to satellites as a matter of *lex lata* but it is also undesirable for *lex ferenda*.

In the absence of a neutral status afforded to satellites, the law of armed conflict governs satellite targeting operations even if that might affect the rights and interests of a third State. In cases where a specific component of the satellite is considered clearly distinguishable as the legitimate military objective, the law of targeting requires an attack to be directed against it and other components of the satellite would constitute incidental harm that must be considered in assessing whether it is expected to be excessive in relation to the concrete and direct military advantage anticipated. Even if the whole satellite is considered as a single object for the purposes of complying with the principle of distinction, the attacking forces are still required to consider incidental harm should they expect violent consequences against other space objects or those arising in the terrestrial environment.

The same consideration applies in situations where a neutral State's payloads are hosted on a satellite carried on the registry of a belligerent State involved in an international armed conflict. Even though the satellite itself can be a legitimate military objective due to its nature, use, purpose, or location,[146] the attacking force will be required to consider the damage to the neutral State's payloads and associated harm to civilians and civilian objects in the terrestrial environment as part of the proportionality assessment. As discussed in Part II, the obligation of due regard in the context of space law continues to apply in situations of armed conflict and must be implemented in conjunction with the duty to take constant care and feasible precautions to avoid or minimize incidental harm to civilians and civilian objects, including those of a third State.

145. *See, e.g.*, North Atlantic Treaty Organization, *NATO Begins Using Enhanced Satellite Services* (Feb. 12, 2020), https://www.nato.int/cps/en/natohq/news_173310.htm; de Shelding, *supra* note 6.

146. Gutzman, *supra* note 5, at 110. However, as stated *supra* in Section IV(B), neutral status is not at risk, even in cases where the neutral State uses these payloads to collect or transmit satellite imagery for a belligerent party, unless it is integral to the act of hostility.

VI. CONCLUSION

Satellites have increasingly become vulnerable targets due to a greater range of counter-space capabilities designed to disrupt, degrade, damage, or destroy them. The targeting of a satellite is regulated under the *jus ad bellum* and the *jus in bello*, with the general rules of international law operating in parallel to, and in harmony with, international space law as it applies to relevant parties. This effectively means that the general rules of international law governing the use of force and the conduct of hostilities in situations of armed conflict operate by and large in the same way as these rules are applied in the conventional terrestrial context. However, critical differences arise at the threshold as to how the targeting of a satellite is legally characterized, due to the unique characteristics of satellites.

The most significant point of difference this article has identified concerns the terrestrial impacts of hostile engagement with a satellite in the context of the *jus ad bellum*. States may consider that the temporary disruption of a satellite is lawful unless it causes physical damage to it as a use of force. Yet, the physical damage inflicted on the satellite alone may not constitute a coercive event that would be characterized as a use of force. Instead, the loss of life in the terrestrial environment caused by non-physical means of interference, such as jamming, is more likely to be seen as such. The disparity of understanding regarding this threshold issue creates a precarious situation. For example, the temporary disruption of a satellite with an intention to test its impact on the air defense system of a target State could escalate into an armed attack when it also caused casualties and damage in the terrestrial environment, triggering a forcible response in self-defense.

In cases where the target satellite hosts multiple payloads servicing different States, the need to consider the impact on their rights and interests is rather limited. This is because these States can only invoke the responsibility of the offending State when they qualify as an injured State due to the special impact on their rights. Even that option may not be available in cases where the satellite was targeted as part of collective enforcement action authorized by the Security Council or in the course of an exercise of the right of self-defense. When, on the other hand, there is no such justification, the offending State faces the risk that, contrary to its intention, third States might suffer violent consequences and decide to respond by force in the exercise of the right of self-defense. The offending State may also be held liable, as a launching State under space law, for any damage sustained as a result, irrespective of the legality of the satellite targeting.

These issues are unlikely to arise in the context of the *jus in bello* because of the broad understanding of the act of violence that triggers the obligations under the law of armed conflict, based on the consequences of an operation rather than the nature of the act. No matter which State is an intended adversary, the belligerent State is required to assess whether the planned operation qualifies as an attack, taking into account effects from the operation that are reasonably expected to arise in the terrestrial environment. If such effects are expected, then that State must comply with various legal requirements for targeting from the moment it is initiated. Its likely impact on third States when, for example, their payloads are hosted on the target satellite, is not material to the legality of the operation under the *jus in bello*. Nor does it suffice to establish a belligerent relationship, although they can become belligerent parties by choosing to respond with hostile action.

A third State may assert legal protection on the basis of its neutral status attached to the satellite operated as part of its national space activities or carried on its registry. However, it is legally problematic, and even undesirable, to extend a neutral status to space objects, due to the lack of sovereign status attached to them under international space law and the impracticality of respecting neutral rights or fulfilling neutral obligations during an armed conflict in space. Nevertheless, space objects owned or used by a third State are accorded the same legal protection as any civilian objects under the law of armed conflict unless these objects are making an effective contribution to a belligerent's conduct of hostilities. This means that the attacking force will be required to consider the damage to the satellite carried on the registry of, or payloads used by, the third State, as well as associated harm to civilians and civilian objects in the terrestrial environment as part of the proportionality assessment. There is also a duty to take constant care to avoid or minimize incidental harm to civilians and civilian objects, including those of third States, with due regard for their interest in the exploration and use of outer space.

It is thus found that in legally characterizing a military operation directed at a satellite, its terrestrial impact is likely to be a significant consideration under the *jus ad bellum* and more clearly so under the *jus in bello*. The terrestrial impact will also be a significant consideration in identifying injured or belligerent States. On the other hand, there is no need to afford special protection to the rights and interests of a third State that may be affected as a result of the targeting operation. This finding has strategic implications for spacefaring nations as they become more reliant on space-based assets and services or build counter-space capabilities.

States do not enjoy complete freedom to employ non-physical means of interference with satellites, such as signal jamming and laser dazzling, as a means of taking strategic advantage against their competitors. Even if a State forms the view that non-physical interference is not prohibited as a use of force or by any other basis under international law, other States could challenge such a position. No State can be oblivious to the potential casualties and damage that are reasonably expected to arise, as a result of the targeting of a satellite, in the terrestrial environment.

For States that are vulnerable to hostile space operations, the lack of special protection afforded under international law to their rights and interests from hostile action and the effect of hostilities is a cause for concern. These States may reconsider the benefits of hosted payloads or capacity lease arrangements, and instead invest in building or reinforcing defensive systems such as redundancy solutions, decoys, and "bodyguard" spacecraft,[147] or even "sovereignize" space assets by asserting a neutral status. However, caution must be exercised against drawing hasty conclusions. Even though the rights and interests of third States may not be afforded special protection under international law, their involvement nonetheless presents greater risks to the targeting of a satellite. These third States may orchestrate international condemnation against the attack, claim injury to invoke the responsibility of the offending State, or even justify forcible response in the exercise of the right of self-defense. The interconnected space infrastructure, with greater integration of military and civil services and complex multinational sharing arrangements, raises the political costs of hostile interference with a satellite.

147. *See, e.g.*, Exec. Order No. 13905, 85 Fed. Reg. 9359 (Feb. 12, 2020) (Strengthening National Resilience through Responsible Use of Positioning, Navigation and Timing Services); *France's New Space Defense Strategy*, SATELLITEOBSERVATION.NET (July 27, 2019), https://satelliteobservation.net/2019/07/27/frances-new-space-defense-strategy/.