Nuclearity in Orbit: Prohibitions, Silences, and Effectiveness between Hard Law and Soft Law

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Abstract

This article examines how international law applies to nuclear weapons that enter or remain in outer space without conventional orbital basing. It focuses on Article IV of the Outer Space Treaty (OST), read alongside the Partial Test Ban Treaty, State practice, customary international law, and later arms-control agreements. The Soviet Fractional Orbital Bombardment System (FOBS), depressed-trajectory ICBMs, and multiple-orbit bombardment systems (MOBS) expose a central distinction between the legal classification of a system's spatial status and the separate problem of establishing its payload. The article argues that Article IV has a clear core but an unsettled fractional margin: completed orbital placement is readily covered, ordinary ballistic transit is not, while controlled orbital insertion followed by de-orbit remains contested. SALT I, the ABM Treaty, SALT II, and START I show how later instruments adopted increasingly specific systems and verification rules without authoritatively interpreting Article IV. The resulting difficulty is therefore both legal and evidentiary. Existing registration, information-sharing, consultation, and voluntary verification mechanisms can improve compliance assessment, but cannot alter treaty meaning or substitute for negotiated arms control.

Keywords: Outer space; nuclear weapons; orbital bombardment; Article IV; verification

1 Introduction

Recent allegations have returned Article IV of the OST to strategic debate. In 2024, United States officials linked the Russian satellite Kosmos 2553, itself not alleged to carry a nuclear weapon, to development of a nuclear counter-space capability. The 2026 United States intelligence assessment renewed that allegation; Russia rejected it and invoked the OST. The assessment renewed a dispute that had already reached the United Nations in 2024. Russia had rejected the earlier allegation and invoked its compliance with the OST. Two draft resolutions then failed in the Security Council, and General Assembly Resolution 79/18 subsequently reaffirmed the existing prohibition. None of those proceedings established that a nuclear weapon had been placed in orbit or disclosed the alleged system's configuration. The controversy nevertheless shows why Article IV is difficult to apply when presence in outer space may be brief, fractional, or concealed.[1]

[1] Office of the Director of National Intelligence, "DNI Gabbard Opening Statement as Delivered to HPSCI on 2026 Annual Threat Assessment of the U.S. Intelligence Community" (19 March 2026), online: <odni.gov/12676/dni-gabbard-opening-statement-as-delivered-to-hpsci-on-2026-annual-threat-assessment-of-the-u-s-intelligence-community/>; Raoul Cardellini Leipertz, "Passing Through or Power Play? The Verification Gap in the Space–Nuclear Nexus" (18 December 2025), online: <vespotec.rwth-aachen.de/2025/12/18/passing-through-or-power-play-the-verification-gap-in-the-space-nuclear-nexus-/5423/>; Peter A Garretson & Richard M Harrison, *Space Nuclear Weapons Analysis* (Washington, DC: American Foreign Policy Council, April 2026) at 34–37, online: <afpc.org/uploads/documents/Special_Report_-_Space_Nuclear_Weapons_Analysis_and_Impacts_for_U.S.*National_Security*-_4.24.26_Final.pdf>; Permanent Mission of the Russian Federation to the United Nations, "Remarks to the Press by Permanent Representative Vassily Nebenzia with Regard to the US-Proposed Draft Resolution on Nuclear Weapons in Outer Space" (11 April 2024), online: <russiaun.ru/en/news/stakeout_110424>; UNSC, 79th Year, UN Doc S/PV.9616 (2024) 9616th Mtg [UNSC 9616th Mtg]; UNSC, 79th Year, UN Doc S/PV.9630 (2024) 9630th Mtg [UNSC 9630th Mtg]; *Weapons of Mass Destruction in Outer Space*, UNGA, 79th Sess, UN Doc A/RES/79/18 (2024) GA Res 79/18 [Resolution 79/18].

The legal questions are easy to conflate. Article IV addresses placement and stationing; Article I of the PTBT addresses nuclear explosions in specified environments. A weapon may traverse outer space without being placed there, while a detonation can engage the PTBT even if the preceding trajectory falls outside Article IV.[2]

This article asks how far existing law reaches when a nuclear payload follows a trajectory unlike conventional orbital basing, and how compliance can be assessed when decisive facts are hidden. I use "orbital nuclearity" for the legal condition created when nuclear explosive capability is present in, or passes through, outer space and engages rules on placement, stationing, or detonation. Article IV itself speaks of nuclear weapons and other Weapons of Mass Destruction (WMDs); "nuclear explosive device" is used only where another instrument or the evidentiary inquiry is broader. Spatial status and payload character must remain separate. Some transitory configurations leave the first disputed; payload opacity can leave the second unresolved even where the law is clear. Peaceful nuclear power and propulsion matter only because they complicate identification.[3]

The OST is interpreted according to the customary rules reflected in Articles 31 and 32 of the VCLT. Governmental, diplomatic and technical materials are used according to their respective evidentiary weight.[4]

FOBS and MOBS provide paired historical tests. FOBS separates orbital insertion from completion of a revolution; MOBS contemplates one or more completed revolutions before delivery. An armed MOBS falls more readily within orbital placement, while an unarmed MOBS test still does not establish prohibited carriage. The United States record shows that officials recognised both points while disagreeing over FOBS. SALT II later regulated fractional-orbital missiles in more specific systems language, but it never entered into force and cannot authoritatively interpret Article IV.[5]

The treaty text, FOBS history, and verification problem are best read together. Section 3 traces the movement from Resolution 1884 through fractional-orbit systems to later arms-control instruments; Section 6 addresses the distinct problem of proving compliance through existing OST mechanisms and voluntary verification.

2 Article IV: Placement, Stationing and Detonation

Article IV contains the main multilateral restraint on nuclear weapons in outer space. Its first paragraph requires States Parties "not to place in orbit around the Earth any objects carrying nuclear weapons or any

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[2] *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies*, 27 January 1967, 610 UNTS 205, art IV (entered into force 10 October 1967) [*OST*]; *Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space and Under Water*, 5 August 1963, 480 UNTS 43, art I (entered into force 10 October 1963) [*PTBT*].

[3] Mallory Stewart et al, *Verifying the Prohibition on the Placement of Nuclear Weapons in Outer Space: Legal, Technical, and Policy Pathways* (Council on Strategic Risks, Geneva Centre for Security Policy & Secure World Foundation, June 2026) at 1–4, online: <gcsp.ch/news/verifying-prohibition-placement-nuclear-weapons-outer-space>.

[4] *Vienna Convention on the Law of Treaties*, 23 May 1969, 1155 UNTS 331, arts 4, 31–33 (entered into force 27 January 1980) [*VCLT*]; *Maritime Dispute (Peru v Chile)*, Judgment, [2014] ICJ Rep 3 at para 57; International Law Commission, "Draft Conclusions on Subsequent Agreements and Subsequent Practice in Relation to the Interpretation of Treaties, with Commentaries" and "Draft Conclusions on Identification of Customary International Law, with Commentaries", in *Report of the International Law Commission*, UNGAOR, 73rd Sess, Supp No 10, UN Doc A/73/10 (2018), chs IV–V [ILC Custom Conclusions].

[5] Stephen Buono, "'This Grim Game': Kennedy and Arms Control for Outer Space" (2019) 43:5 Diplomatic History 840 at 849–50, DOI: <10.1093/dh/dhz036>; Bleddyn E Bowen, *Original Sin: Power, Technology and War in Outer Space* (London: C Hurst & Co, 2022) at 273–75; Michael J Listner, "FOBS, MOBS, and the Reality of the Article IV Nuclear Weapons Prohibition", *The Space Review* (17 October 2022), online: <thespacereview.com/article/4466/1>; Taunton Paine, "Bombs in Orbit? Verification and Violation under the Outer Space Treaty", *The Space Review* (19 March 2018), online: <thespacereview.com/article/3454/1>; *Treaty Between the United States of America and the Union of Soviet Socialist Republics on the Limitation of Strategic Offensive Arms*, 18 June 1979, art IX(1)(c), reproduced in United States Department of State, *Foreign Relations of the United States*, 1969–1976, vol XXXIII, SALT II, 1972–1980, Doc 241, online: <history.state.gov/historicaldocuments/frus1969-76v33/d241> (never entered into force) [*SALT II*].

other kinds of weapons of mass destruction, install such weapons on celestial bodies, or station such weapons in outer space in any other manner". Grammatically, it distinguishes placing an object carrying the prohibited weapon in orbit from installing or stationing the weapon itself. Article IV does not define "nuclear weapon". That omission matters at the evidentiary margin: proof of nuclear material, or even of a device capable of nuclear explosion, does not automatically establish an Article IV violation. Other nuclear instruments use related but not identical formulas, including the NPT's reference to "nuclear weapons or other nuclear explosive devices". The paragraph is concerned with forms of presence. It says nothing about the later act of detonation.[6]

The easy case is deliberate orbital placement. Short-lived and non-circular trajectories are harder. To "place in orbit" is to insert an object carrying the prohibited payload into an orbital condition; the treaty does not say that the object must remain there permanently or complete a revolution. "Station" points to a different idea, as it suggests that the weapon has been assigned a position from which it remains available for a purpose. Operational availability therefore bears most directly on stationing; it should not be turned into an additional requirement for the first limb. The final words, "in any other manner", keep the prohibition from ending with Earth orbit and celestial bodies, but they do not convert every passage through outer space into stationing. Trajectory, duration, control, and operational function may help distinguish a route from a position without replacing the treaty text.[7]

Context reinforces that reading, as the OST preamble expressly recalls General Assembly Resolution 1884 (XVIII), adopted unanimously in 1963, which called on States to refrain from placing in orbit around the Earth objects carrying nuclear weapons or other weapons of mass destruction and from installing such weapons on celestial bodies. Article IV retained that core and added the prohibition on stationing such weapons in outer space "in any other manner". The textual expansion does not answer the transit question, but it makes the residual stationing clause difficult to treat as redundant. The first paragraph of Article IV nevertheless remains a specific weapons-of-mass-destruction restraint in Earth orbit and elsewhere in outer space. The second paragraph goes further on the Moon and other celestial bodies, where it requires demilitarisation. Earth orbit was never generally demilitarised. The preamble and Articles I and III cannot enlarge the negotiated weapons clause, though they favour a reading that gives each of its operative verbs some work to do.[8]

Article III brings the UN Charter and other applicable law into the picture without doing Article IV's work. A system outside the placement prohibition may still be threatened or used unlawfully, while a defensive label cannot cure prohibited placement. The ICJ confirmed that Charter rules apply regardless of the weapon employed and did not recognise a general prohibition on nuclear weapons as such.[9]

The PTBT instead turns on whether a nuclear explosion occurred in a prohibited environment. Its article I bars a party from conducting, permitting, or participating in "any nuclear weapon test explosion, or any other nuclear explosion" in the atmosphere, beyond its limits including outer space, or underwater. The first

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[6] *OST*, *supra* note 2, art IV; *Treaty on the Non-Proliferation of Nuclear Weapons*, 1 July 1968, 729 UNTS 161, arts I–II (entered into force 5 March 1970) [*NPT*].

[7] *Oxford Advanced Learner's Dictionary*, sub verbo "station", online: <oxfordlearnersdictionaries.com/definition/english/station_2>; Jack Beard & Dale Stephens, eds, with David Koplow, *The Woomera Manual on the International Law of Military Space Operations* (Oxford: Oxford University Press, 2024) at 72–73, paras 2–3, DOI: <10.1093/law/9780192870667.001.0001>; Michel Bourbonnière & Ricky J Lee, "Legality of the Deployment of Conventional Weapons in Earth Orbit: Balancing Space Law and the Law of Armed Conflict" (2007) 18:5 Eur J Intl L 873 at 879–84, DOI: <10.1093/ejil/chm051>; *Treaty on the Prohibition of the Emplacement of Nuclear Weapons and Other Weapons of Mass Destruction on the Sea-Bed and the Ocean Floor and in the Subsoil Thereof*, 11 February 1971, 955 UNTS 115, art I (entered into force 18 May 1972); Listner, *supra* note 5.

[8] *OST*, *supra* note 2, preamble, arts I, III–IV; *Question of General and Complete Disarmament*, UNGA, 18th Sess, UN Doc A/RES/1884(XVIII) (1963) GA Res 1884 (XVIII) [Resolution 1884]; Bourbonnière & Lee, *supra* note 7 at 879–85.

[9] *UN Charter*, 26 June 1945, Can TS 1945 No 7, arts 2(4), 42, 51; *Legality of the Threat or Use of Nuclear Weapons*, Advisory Opinion, [1996] ICJ Rep 226 at paras 39, 52–63 [*Nuclear Weapons Advisory Opinion*].

phrase plainly covers weapon tests. Contemporary interpretation treated the second as extending the ban to peaceful nuclear explosions. Wartime employment was left outside the treaty as then understood, and the ICJ later described the test-ban instruments as restraints on testing. The better conclusion is therefore limited. For its parties, the PTBT clearly prohibits nuclear weapon test explosions and peaceful nuclear explosions in outer space; its application to wartime detonation remains contested. The prohibition may apply even when the preceding trajectory never amounted to placement or stationing under Article IV.[10]

The CTBT would prohibit nuclear weapon test explosions and other nuclear explosions in every environment, but it has not entered into force. Article 18 of the VCLT may constrain a signatory that has not made clear an intention not to become a party, without making the CTBT generally binding. The TPNW goes further for its parties by regulating development, possession, stationing, threat, and use; the nuclear-armed States central here are not parties.[1112]

An object carrying a nuclear weapon through one or more completed Earth orbits presents a strong case of placement; deliberate orbital stationing is clearer still. The disputed interval is orbital insertion followed by controlled de-orbit before a completed revolution, the configuration exposed by FOBS.

3 FOBS, MOBS and the Boundary of Orbital Placement

ICBM, DICBM, FOBS, MOBS, NABS, and HGV are technical or strategic labels, not legal categories used by Article IV. They describe flight profiles and weapons architectures whose factual characteristics must be mapped onto the treaty's verbs. An ordinary intercontinental ballistic missile (ICBM) follows an Earth-intersecting ballistic trajectory after boost. A depressed-trajectory ICBM (DICBM) flattens that arc, lowering its apogee and shortening radar warning without acquiring an orbital trajectory. FOBS crosses the technical boundary by inserting its payload vehicle into a low orbit-capable path and then using a retrorocket to force re-entry before a revolution is complete. A multiple-orbit bombardment system (MOBS), sometimes described in historical literature as a nuclear-armed bombardment system (NABS), proceeds further by retaining the payload through one or more complete revolutions before de-orbit. Historical descriptions of MOBS ranged from a few circuits or days to longer-duration or eccentric orbits from which a payload might later be retargeted. A hypersonic glide vehicle (HGV), by contrast, describes a manoeuvrable vehicle and does not by itself answer whether the preceding architecture entered orbit. FOBS's strategic attraction was partly that a low, potentially southward approach could complicate the northern warning geometry of the Ballistic Missile Early Warning System (BMEWS), trading payload and accuracy for reduced warning. The labels help describe the engineering. They do not decide whether a particular flight constituted placement or stationing, and the payload question remains separate.[13]

Soviet development also shows why the labels should not be treated as facts observable from a launch alone. Work on global and fractional bombardment began in 1962. Early flights in 1965 and 1966 included suborbital or depressed profiles before the programme moved to very low orbital tests. An October 1967 United States memorandum treated the observed one-orbit operations as compatible with several

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[10] *PTBT*, *supra* note 2, art I; Egon Schwelb, "The Nuclear Test Ban Treaty and International Law" (1964) 58:3 Am J Intl L 642 at 643–46, DOI: <10.2307/2196663>.

[11] *Comprehensive Nuclear-Test-Ban Treaty*, 10 September 1996, UN Doc A/50/1027, arts I, XIV and Annex 2 (not in force) [*CTBT*]; Masahiko Asada, "CTBT: Legal Questions Arising from Its Non-Entry-Into-Force" (2002) 7:1 J Confl & Sec L 85, DOI: <10.1093/jcsl/7.1.85>.

[12] *Treaty on the Prohibition of Nuclear Weapons*, 7 July 2017, 3370 UNTS 3, arts 1, 15 (entered into force 22 January 2021) [*TPNW*].

[13] Buono, *supra* note 5 at 849–50; Bowen, *supra* note 5 at 273–75; Bourbonnière & Lee, *supra* note 7 at 875–76; Asif A Siddiqi, "The Soviet Fractional Orbiting Bombardment System (FOBS): A Short Technical History" (2000) 7:4 Quest 22 at 22–26; United Nations Institute for Disarmament Research, *Disarmament: Problems Related to Outer Space* (New York: United Nations, 1987) at 114; GlobalSecurity.org, "Fractional Orbiting Bombardment Systems (FOBS)" (last visited 9 August 2026), online: <globalsecurity.org/wmd/world/russia/fobs.htm>; Listner, *supra* note 5.

possibilities: fractional orbital bombardment, a low-altitude ballistic missile, penetration-aid or warhead re-entry development, and lunar-return testing. The classification problem therefore preceded the legal one. Analysts first had to infer what kind of trajectory and mission they were observing. The R-36O was formally accepted for service in November 1968 and entered combat duty in August 1969; eighteen launchers were eventually deployed at Tyura-Tam. Siddiqi reports that the test vehicles carried no nuclear warheads. The same missile architecture could therefore generate legally different cases according to the profile actually flown. System capability, operational deployment, and actual carriage of a prohibited payload must remain distinct.[14]

United States officials did not speak with one voice. At his press conference on 3 November 1967, Robert McNamara said that the Soviet tests did not violate the OST because the system followed a fractional rather than a full orbit. Pressed on whether the same vehicle could remain aloft for several revolutions, he accepted that it could but said that doing so would violate the agreement; later he described the Soviet commitment as one not to place warheads in "full orbit". A subsequent internal draft supplied a broader rationale: Article IV prohibited the carriage of nuclear weapons, not the development or unarmed testing of delivery systems, and there was no evidence that the Soviet tests had carried nuclear weapons.[15]

Edward C Welsh rejected the completed-revolution premise in a memorandum to Walt Rostow the following day. In Welsh's view, a vehicle entered orbit once it had attained the altitude and velocity needed to complete a revolution, even if a retrorocket brought it down earlier. Spurgeon M Keeny Jr later accepted the force of the technical point but rejected its legal consequence, treating FOBS as an extension of the ICBM problem. Keeny also warned that officials had drawn FOBS and MOBS too sharply. Because the Soviet system was capable of multiple orbits, a MOBS firing would still not establish a breach without evidence that it contained a nuclear warhead. That observation is persuasive as to an unarmed test. The further suggestion in the internal reasoning that an armed multiple-orbit weapon used only in wartime would necessarily fall outside Article IV is harder to reconcile with the unqualified prohibition on placing an object carrying a nuclear weapon in Earth orbit. The disagreement therefore concerned both orbital classification and payload.[16]

The legal weight of these materials differs. McNamara's press conference was public conduct attributable to the United States. The Welsh and Keeny memoranda record internal advice and cannot, by themselves, constitute subsequent practice establishing the agreement of the OST parties under Article 31(3)(b) of the VCLT. Keeny's treatment of MOBS is likewise evidence of an internal interpretive problem, not an agreed rule. The publicly available materials examined here disclose no Soviet legal statement treating completion of one revolution as decisive. Soviet work on fractional-orbital bombardment pre-dated the OST, so the system's original design should not be characterised as an attempt to evade Article IV. After the treaty entered into force, however, the FOBS–MOBS distinction became central to the United States interpretive debate.[17]

Other States said little, but the record is not empty. During consideration of the rescue and return agreement in December 1967, Japan told the Legal Subcommittee of the United Nations Committee on the Peaceful Uses of Outer Space (COPUOS) that an object intended primarily for a bombardment system should not have to be returned. Its intervention referred to fractional and non-fractional systems and invoked

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[14] Siddiqi, *supra* note 13 at 23–30; "Soviet One-Orbit Space Operations", memorandum to E C Welsh (17 October 1967), in Lyndon B Johnson Presidential Library, National Security File, Files of Charles E Johnson, box 11, folder "Bombs in Orbit - General (Ballistic Missiles in Orbit, FOBS, MOBS, etc.)" [LBJ FOBS File].

[15] LBJ FOBS File, *supra* note 14, News Conference of Secretary of Defense Robert S McNamara (3 November 1967) at 1–3, 8–13; Spurgeon M Keeny Jr, "Statement on FOBS" (November 1967), in the same file.

[16] E C Welsh, "FOBS", memorandum to Walt Rostow (4 November 1967); Spurgeon M Keeny Jr, "FOBS and the Outer Space Treaty", memorandum to Walt Rostow (8 November 1967), both in LBJ FOBS File, *supra* note 14; Listner, *supra* note 5.

[17] *VCLT*, *supra* note 4, art 31(3)(b); LBJ FOBS File, *supra* note 14; Buono, *supra* note 5 at 849–50.

Article IV. It treated both forms of orbital bombardment as legally relevant without making completion of a revolution dispositive. The wider silence cannot be treated as acquiescence unless States knew the relevant facts and the circumstances called for a legal response.[18]

FOBS next entered arms control less as a settled space-law category than as part of the strategic missile balance. The 1972 SALT I Interim Agreement did not expressly prohibit FOBS or fractional orbit; instead, it relied on national technical means, non-interference, limits on concealment, and the Standing Consultative Commission. The companion ABM Treaty addressed the defensive side by prohibiting the development, testing, or deployment of sea-, air-, space-, or mobile land-based ABM systems or components, backed by similar verification and consultation machinery. Until United States withdrawal in 2002, it supplied a specific systems rule for space-based missile defence without deciding what Article IV meant by placing a nuclear weapon in orbit.[19]

SALT II moved to an express systems rule. Article IX(1)(c) would have prohibited the development, testing, or deployment of systems for placing nuclear weapons or other weapons of mass destruction into Earth orbit, including fractional orbital missiles. START I later prohibited the production, testing, or deployment of systems, including missiles, for placing such weapons into Earth orbit or a fraction of an orbit. These bilateral controls were not agreed interpretations of Article IV, but their wording shows how expressly fractional orbit can be regulated when that is the intended object.[20]

Later arms-control instruments used increasingly specific and bespoke language for conduct beyond Article IV's express terms without proving either a loophole or an authoritative interpretation of its disputed margin. SALT I and the ABM Treaty regulated specified strategic and defensive systems; SALT II and START I expressly reached development, testing, deployment, and fractional orbit.

4 Transit, Temporary Presence and Operational Availability

In this article, "operational availability" means that a weapon is kept in outer space in a condition from which it can be controlled, activated, or employed. The Oslo Manual adopts a completed-orbit rule for the first limb of Article IV. The Woomera Manual draws a clearer line between full orbital placement and ordinary ballistic transit, while treating fractional and suborbital cases as unsettled. The McGill Manual restates the prohibition on placement, installation, and stationing without making a completed revolution the controlling criterion. Operational availability is particularly relevant to "stationing"; it is not a necessary condition of the separate first-limb prohibition once an object carrying a nuclear weapon has been placed in orbit.[21]

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[18] UN Committee on the Peaceful Uses of Outer Space, Legal Subcommittee, *Summary Record of the Eighty-Sixth Meeting*, UN Doc A/AC.105/C.2/SR.86 (1967) at 11; ILC Custom Conclusions, *supra* note 4, conclusion 10 and commentary.

[19] *Interim Agreement Between the United States of America and the Union of Soviet Socialist Republics on Certain Measures with Respect to the Limitation of Strategic Offensive Arms*, 26 May 1972, 944 UNTS 3, arts V–VI (entered into force 3 October 1972) [*SALT I Interim Agreement*]; *Treaty Between the United States of America and the Union of Soviet Socialist Republics on the Limitation of Anti-Ballistic Missile Systems*, 26 May 1972, 23 UST 3435, arts V(1), XII–XIII (entered into force 3 October 1972) [*ABM Treaty*]; United States, White House, "Statement by the President" (13 June 2002), online: <georgewbush-whitehouse.archives.gov/news/releases/2002/06/20020613-9.html>.

[20] *SALT II*, *supra* note 5, art IX(1)(c); *Treaty Between the United States of America and the Union of Soviet Socialist Republics on the Reduction and Limitation of Strategic Offensive Arms*, 31 July 1991, art V(18)(c), reproduced in United States Department of State, *Foreign Relations of the United States*, 1989–1992, vol XXXI, START I, 1989–1991, Doc 246 (entered into force 5 December 1994; expired 5 December 2009) [*START I*].

[21] Yoram Dinstein & Arne Willy Dahl, *Oslo Manual on Select Topics of the Law of Armed Conflict: Rules and Commentary* (Cham: Springer, 2020), rule 3, commentary para 2, DOI: <10.1007/978-3-030-39169-0>; Beard & Stephens, *supra* note 7 at 72–73, paras 2–3; Ram S Jakhu & Steven Freeland, eds, *McGill Manual on International Law Applicable to Military Uses of Outer Space: Volume I – Rules* (Montreal: Centre for Research in Air and Space Law, 2022), rule 145.

An ordinary ICBM presents the easier case. After booster burnout, it may coast through outer space on an Earth-intersecting path towards a predetermined terrestrial target. A DICBM is deliberately flatter: its lower apogee can shorten flight time, reduce radar horizon, and exploit gaps in warning coverage, but it still does not acquire an orbital trajectory. The comparison matters because several strategic features associated with FOBS, including surprise and reduced warning, can be pursued without orbital placement. Warning time, altitude, and military purpose are therefore poor substitutes for the spatial acts used in Article IV. There is also no agreed legal boundary between airspace and outer space, so one should avoid saying that every ballistic missile necessarily enters outer space. Where it does, passage of this kind is not ordinarily placement or stationing.[22]

FOBS is harder because the orbital segment forms part of the delivery design. The vehicle enters an orbit-capable path, remains controllable, and then de-orbits on command. Those facts distinguish it from a normal ballistic arc, yet they do not answer the treaty question. What matters is whether the weapon was simply moving towards a fixed destination or had already been placed in orbit, or otherwise held in outer space as an instrument available for later employment.

MOBS lies on the clearer side of the boundary. If an object actually carrying a nuclear weapon completes one or more Earth orbits before deliberate de-orbit, the case for placement under the first limb of Article IV is substantially stronger. Historical MOBS concepts were not uniform. Some contemplated only a few revolutions or days; others envisaged longer-duration or eccentric orbits in which the payload was, in practical terms, held in space and might later be retargeted. Those variants matter chiefly to stationing and operational availability. They do not make completion of one revolution a constitutive treaty threshold. A FOBS may already have been placed in orbit before completing a circuit, while an unarmed MOBS can complete many circuits without violating Article IV. Duration, trajectory, control, and readiness help explain why "place" or "station" applies; they are not a free-standing test of functional equivalence.[23]

Elapsed time alone cannot decide whether temporary presence is transit. A nuclear device in a short-lived, elliptical, or manoeuvrable orbit may be stationed if it remains available there. Direct ascent for immediate employment is a weaker Article IV case when no period of orbital availability intervenes. Detonation must then be assessed separately under the PTBT, whose application to wartime use remains contested.[24]

Missile defence shows why purpose is a poor proxy for legal classification. A June 1967 State Department analysis reportedly treated a proposed nuclear-tipped orbital ABM as falling within Article IV because the weapon would be stationed in orbit despite its defensive mission. Project Excalibur presents the harder contrast: its proposed nuclear-pumped X-ray laser would have been launched for operation in outer space rather than pre-positioned there, pushing the issue towards transit while making the separate prohibition on nuclear explosions central. The ABM Treaty later regulated space-based ABM systems through an express systems prohibition, and the Reagan-era dispute over new physical principles shows that it carried much of the arms-control burden for SDI. The same distinction applies today: Golden Dome must be assessed by configuration, not by the label "defensive".[25]

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[22] United States Missile Defense Agency, "A System of Elements" (last visited 3 August 2026), online: <mda.mil/system/elements.html>; GlobalSecurity.org, *supra* note 13; Listner, *supra* note 5.
[23] Bowen, *supra* note 5 at 273–75; Bourbonnière & Lee, *supra* note 7 at 875–84; *OST*, *supra* note 2, art IV; GlobalSecurity.org, *supra* note 13; LBJ FOBS File, *supra* note 14.
[24] *PTBT*, *supra* note 2, art I; Schwelb, *supra* note 10 at 643–46; *Nuclear Weapons Advisory Opinion*, *supra* note 9 at paras 57–63.
[25] Paine, *supra* note 5; Listner, *supra* note 5; *ABM Treaty*, *supra* note 19, art V(1); United States Arms Control and Disarmament Agency, "Article V of the ABM Treaty and Future ABM Systems" (1985), reproduced in United States Department of State, *Foreign Relations of the United States*, 1981–1988, vol XLIV, pt 1, National Security Policy, 1985–1988, Doc 55; Louisa Handel-Mazzetti, "Space Defense or Space Weapon? Assessing the Legality of the Golden Dome Under International Law" (2026) Neth Intl L Rev at 8–10, 18–19, DOI: <10.1007/s40802-026-00300-7>.

The 2021 Chinese fractional-orbital test reinforces the same point: "hypersonic" is not a legal category, and an HGV's speed or manoeuvrability does not determine Article IV status; orbital insertion, trajectory, and payload do.[26]

Article IV supplies no mechanical test. Ordinary ballistic transit ordinarily falls outside placement or stationing; FOBS occupies contested ground; completed nuclear-armed orbits present a much stronger placement case; and continuing orbital basing may also constitute stationing.[27]

5 Custom and Contemporary Practice

A customary rule cannot be inferred merely from the existence of Article IV. Article 38(1)(b) of the Statute of the ICJ requires a general practice accepted as law, and the International Law Commission (ILC) keeps practice and *opinio juris* analytically distinct. Treaties, resolutions, and inaction can contribute to that inquiry. None is conclusive by its existence alone. Expert manuals are subsidiary teachings, not State practice.[28]

Practice concerning nuclear explosive tests cannot prove a customary placement rule, and evidence for Article IV's settled core says little about disputed fractional configurations. Each customary proposition therefore requires its own practice and *opinio juris*.

The testing proposition has the strongest record. United States and Soviet high-altitude experiments between 1958 and 1962 included Starfish Prime and Argus, while no publicly confirmed nuclear explosion in outer space has occurred since 1962. That abstention, PTBT participation, and broad CTBT signature matter, but satellite protection and strategic interests also explain restraint. Abstention, also, does not itself establish *opinio juris*. As the ICJ observed regarding nuclear non-use, strategic policy may explain restraint independently of legal conviction. Satellite protection and strategic interests provide comparable explanations here. The record therefore gives substantial, though inconclusive, support to a customary prohibition on nuclear explosive testing in outer space and much less concerning wartime detonation.[29]

The customary placement case is less secure because treaty compliance explains much of the same conduct. Resolution 1884 and Resolution 79/18 support the normative case, while the absence of publicly confirmed deployment is relevant practice. Its probative value nevertheless depends on whether States abstained from legal conviction or for strategic reasons.[30]

Practice by States capable of nuclear and orbital deployment may deserve particular attention because those States can perform the conduct at issue. That does not give them superior law-making authority. North Sea Continental Shelf referred to States whose interests were specially affected by the relevant practice, while the ILC Conclusions declined to adopt "specially affected States" as a separate formal test. A State that

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[26] United States Department of Defense, "Defense Intelligence Agency Briefing on Challenges to Security in Space – 2022" (12 April 2022), online: <defense.gov/News/Transcripts/Transcript/Article/2999083/defense-intelligence-agency-briefing-on-challenges-to-security-in-space-2022/>; Brian D Green, "Countering Space-Based Weapons of Mass Destruction" (2025), online: <tjaglcs.army.mil/Periodicals/The-Army-Lawyer/tal-2025-issue-1/Post/8018/Feature-Countering-Space-Based-Weapons-of-Mass-Destruction>.

[27] *OST*, *supra* note 2, art IV; Dinstein & Dahl, *supra* note 21, rule 3; Beard & Stephens, *supra* note 7 at 72–73, paras 2–3; Jakhu & Freeland, *supra* note 21, rule 145; Green, *supra* note 26.

[28] *Statute of the International Court of Justice*, 26 June 1945, Can TS 1945 No 7, art 38(1)(b) (entered into force 24 October 1945); ILC Custom Conclusions, *supra* note 4, conclusions 2–3, 6, 9–12, 14 and commentaries; *Military and Paramilitary Activities in and against Nicaragua (Nicaragua v United States of America)*, Merits, Judgment, [1986] ICJ Rep 14 at paras 183–207.

[29] National Aeronautics and Space Administration, "Space Weather Events Linked to Human Activity" (17 May 2017), online: <nasa.gov/solar-system/space-weather-events-linked-to-human-activity/>; Los Alamos National Laboratory, *Operation Fishbowl* (Technical Report LA-UR-22-31336, 25 October 2022), DOI: <10.2172/1896391>; *PTBT*, *supra* note 2, art I; *CTBT*, *supra* note 11, art I; UNSC, 71st Year, UN Doc S/RES/2310 (2016) SC Res 2310 at para 4; *Comprehensive Nuclear-Test-Ban Treaty*, UNGA, 79th Sess, UN Doc A/RES/79/77 (2024) GA Res 79/77; *Nuclear Weapons Advisory Opinion*, *supra* note 9 at paras 65–73.

[30] Resolution 1884, *supra* note 8; Resolution 79/18, *supra* note 1; *OST*, *supra* note 2, art IV.

lacks the capacity to deploy a nuclear weapon in orbit offers little evidence through abstention. Its expressed legal position remains relevant, and the nuclear space powers acquire no veto over the formation of custom.[31]

The transboundary consequences of nuclear weapons also caution against equating technological capacity with legal affectedness. The ICJ stressed that the destructive effects of nuclear weapons cannot be contained in either space or time and may affect future generations and the planetary environment. The humanitarian consequences recognised in later disarmament practice are similarly transboundary: the TPNW proceeds from the premise that nuclear risks concern the security of humanity as a whole and that their catastrophic effects transcend national borders. This does not mean that every State is "specially affected" in the technical sense sometimes attributed to North Sea Continental Shelf. It does mean that, for a putative customary rule concerning nuclear weapons in outer space, affectedness cannot sensibly be reduced to possession of the technological capacity to engage in the prohibited conduct. Nuclear-armed and space-capable States are especially probative with respect to operational practice; non-nuclear States remain directly relevant to the legal assessment of that practice and to the formation of *opinio juris*. The unusually diffuse consequences of nuclear weapons therefore could weaken, rather than strengthen, any claim that the views of a small group of nuclear space powers should dominate the customary-law inquiry.

The 2024 General Assembly resolutions should be read separately. Resolution 79/18, adopted by 167 votes to four with six abstentions, reaffirmed Article IV and called on States not to develop WMD specifically designed for orbital placement, language going beyond the treaty's verbs. Resolution 79/20 sought a political commitment on first placement of any weapon, while Resolution 79/51 promoted voluntary transparency and confidence-building. The first reinforces the existing WMD rule; the others evidence political or procedural restraint, not agreement on a wider substantive prohibition.[32]

The Security Council debates show the same disagreement. Russia vetoed the United States–Japan draft after affirming Article IV and objecting that it did not address all weapons in outer space. China abstained and called for a legally binding instrument. The joint amendment and later Russian draft each failed by seven votes to seven, with one abstention.[33]

None of these positions repudiated Article IV. Persistent objection cannot displace an accepted treaty obligation. Nor do later bilateral arms-control texts settle custom: SALT II and START I used treaty-specific language extending to systems, testing, and production. Their specificity cautions against treating them as *opinio juris* that Article IV, or general custom, already prohibits every fractional configuration.[34]

6 Verification, Article IX and the Limits of Soft Law

Verification must be separated into stages. States observe an object or event, characterise what was detected, and only then assess attribution and legality. SALT I relied on national technical means, non-interference, limits on concealment, and consultation around specified systems, but that architecture could not reveal an opaque spacecraft's contents. United States planners recognised the distinction in 1963: they could detect spacecraft in orbit but not determine whether a nuclear weapon was aboard. A 1967 intelligence

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[31] *North Sea Continental Shelf (Federal Republic of Germany/Denmark; Federal Republic of Germany/Netherlands)*, Judgment, [1969] ICJ Rep 3 at para 74 [*North Sea Continental Shelf*]; ILC Custom Conclusions, *supra* note 4, conclusion 8 and commentary; Kevin Jon Heller, "Specially-Affected States and the Formation of Custom" (2018) 112:2 Am J Intl L 191 at 200–08, DOI: <10.1017/ajil.2018.22>; *Nuclear Weapons Advisory Opinion*, *supra* note 9 at paras 35–36; *TPNW*, *supra* note 12, preamble.

[32] Resolution 79/18, *supra* note 1; *No First Placement of Weapons in Outer Space*, UNGA, 79th Sess, UN Doc A/RES/79/20 (2024) GA Res 79/20; *Transparency and Confidence-Building Measures in Outer Space Activities*, UNGA, 79th Sess, UN Doc A/RES/79/51 (2024) GA Res 79/51 [Resolution 79/51]; UNGA, 79th Sess, UN Doc A/79/PV.43 (2024) 43rd Plen Mtg.

[33] *Draft Resolution*, UNSC, 79th Year, UN Doc S/2024/302 (2024); UNSC 9616th Mtg, *supra* note 1; *Draft Resolution*, UNSC, 79th Year, UN Doc S/2024/383 (2024); UNSC 9630th Mtg, *supra* note 1.

[34] ILC Custom Conclusions, *supra* note 4, conclusions 4–6, 11, 15 and commentary; *SALT II*, *supra* note 5, art IX(1)(c); *START I*, *supra* note 20, art V(18)(c).

reassessment likewise judged FOBS, DICBM, and multiple-orbit MOBS tests identifiable while finding latent retrofit into deployed missile sites virtually impossible. START I shows what a bespoke verification regime looks like, combining telemetry exchange, data declarations, and on-site inspections with its substantive limits. Article IV contains nothing comparable. That affects demonstrability, not legal validity. The FOBS–MOBS comparison reproduces the same evidentiary divide: MOBS may make spatial status clear while leaving payload unknown; FOBS may leave both disputed.[35]

An explosion is easier to monitor than an intact payload. The CTBT International Monitoring System (IMS) combines seismic, hydroacoustic, infrasound, and radionuclide technologies to detect indications of a nuclear explosion. Radionuclides may help establish that an event was nuclear, and national technical means may add information about an exo-atmospheric event. Neither shows whether a device had previously been placed or stationed in orbit. The IMS monitors events, not Article IV payload compliance.[36]

An orbiting object presents the reverse problem. Tracking reveals trajectory, manoeuvres, launch association, and proximity behaviour, but usually says little about what is inside the object or whether it is ready for use. I call this gap "payload opacity". Nuclear material alone says too little: radioisotope power systems, fission reactors, and nuclear propulsion may all be lawful. Cosmos 954, a Soviet satellite that re-entered over Canada in 1978, carried a nuclear reactor, rather than a nuclear explosive weapon: this instance illustrates why a radiation signature may count as evidence but cannot by itself establish an Article IV payload. The absence of a signal would be weaker still, especially if shielding or an unfamiliar design were possible.[37]

Danagoulian proposes a specific way to narrow that uncertainty. The inspector would not emit protons. It would detect neutrons produced when naturally occurring protons with energies of about one gigaelectronvolt cause spallation in dense material associated with a thermonuclear device. Under the unshielded baseline, the model gives a detection time of roughly one week for a nine-unit CubeSat-sized platform at four kilometres. At one kilometre, the estimate falls to about one hour. Shielding degrades performance sharply. The study establishes conceptual feasibility under stated assumptions. Operational verification would require engineering work, agreed procedures, and corroborating evidence. A modelled material signature still falls short of identifying a complete device, and either finding would need further proof before a violation of Article IV could be established.[38]

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[35] Stewart et al, *supra* note 3 at 2–4; *SALT I Interim Agreement*, *supra* note 19, arts V–VI; United States Arms Control and Disarmament Agency, "A U.S.-Soviet Arrangement Concerning the Placing in Orbit of Weapons of Mass Destruction", ACDA-2043 (1 October 1963), in LBJ FOBS File, *supra* note 14 at 15–17 [ACDA-2043]; Paine, *supra* note 5; United States, Central Intelligence Agency, "Memorandum to Holders of SNIE 11–10–67: US Intelligence Capabilities to Monitor Certain Limitations on Soviet Strategic Weapons Programs" (2 March 1967), reproduced in United States Department of State, *Foreign Relations of the United States*, 1964–1968, vol X, National Security Policy, Doc 172; James A Baker III, "Letter From Secretary of State Baker to President Bush" (20 November 1991), reproduced in United States Department of State, *Foreign Relations of the United States*, 1989–1992, vol XXXI, START I, 1989–1991, Doc 247.

[36] Preparatory Commission for the Comprehensive Nuclear-Test-Ban Treaty Organization, "Monitoring Technologies" (last visited 3 August 2026), online: <ctbto.org/our-work/monitoring-technologies>; Preparatory Commission for the Comprehensive Nuclear-Test-Ban Treaty Organization, "Radionuclide Monitoring" (last visited 3 August 2026), online: <ctbto.org/our-work/monitoring-technologies/radionuclide-monitoring>.

[37] *Principles Relevant to the Use of Nuclear Power Sources in Outer Space*, UNGAOR, 47th Sess, Supp No 49, UN Doc A/47/49 (1992) 17, GA Res 47/68; Simone Courteix, "The Legal Regime of Nuclear Power Satellites: A Problem at the Cross-Roads of Nuclear Law and Space Law" (1992) 49 Nuclear L Bull 24 at 24–25; Joseph J MacAvoy, "Nuclear Space and the Earth Environment: The Benefits, Dangers, and Legality of Nuclear Power and Propulsion in Outer Space" (2004) 29:1 Wm & Mary Envtl L & Pol'y Rev 191; Stewart et al, *supra* note 3 at 2.

[38] Areg Danagoulian, "Verification of the Outer Space Treaty with Cosmic Protons" (2026) 655 Nature 585 at 589, fig 4, DOI: <10.1038/s41586-026-10783-2>; Areg Danagoulian, "Verification of the Outer Space Treaty with Cosmic Protons: Supplementary Information" (2026) at Supplementary Note 2, supplementary material accompanying "Verification of the Outer Space Treaty with Cosmic Protons".

The June 2026 Track 1.5 report reaches a similar conclusion across a wider set of methods. Remote observation can establish orbital conduct; radiation techniques may assist payload characterisation; direct examination requires cooperation or close access; declarations and shared data can fill gaps. A FOBS dispute may concern both trajectory and payload, while a MOBS case may turn mainly on payload. The report is policy analysis, not legal authority, and no method supplies sufficient confidence alone.[39]

Access can create its own danger. A close approach may threaten collision, expose sensitive technology, or resemble preparation for an anti-satellite operation. Johnson-era internal analysis considered close visual inspection and stronger protective steps where a prohibited weapon was suspected, but those views created no treaty entitlement. Article IX supplies consultation duties, not a unilateral inspection right. AFPC scenarios further show how uncoordinated approaches could create false alarms or compress decision time; they map possible pathways rather than predict outcomes.[40]

Procedure is the most immediately available contribution, not a substitute for substantive arms control. Soft law cannot amend Article IV or create access without consent. Russia's 2025 OEWG working paper continues to advocate a legally binding PAROS instrument, confirming that procedural measures remain politically contested and should be understood as complementary. A July 2026 OEWG working paper nevertheless treated notification, safe separation, points of contact, space situational awareness data, and consultation as a connected package for rendezvous and proximity operations.[41]

Article IX should carry the principal operational burden for verification-related proximity operations, but it sits within a wider and deliberately limited cooperation architecture. Article VIII of the OST preserves the registry State's jurisdiction and control over its space object. Article X envisages requests, on a basis of equality, to observe the flight of another State's space objects, but leaves the opportunity and conditions to agreement between the States concerned. Article XI requires States, to the greatest extent feasible and practicable, to inform the Secretary-General, the public, and the international scientific community of the nature, conduct, locations, and results of their space activities. Article XII creates an express reciprocal visitation regime for stations, installations, equipment, and space vehicles on the Moon and other celestial bodies. The pattern does not justify a rigid argument from silence, but it supports the conclusion that the OST contains no general unilateral entitlement to board or inspect satellites in Earth orbit. Article IX remains the relevant gateway where a close approach may cause potentially harmful interference. A non-consensual approach posing a credible risk of forced manoeuvre, disruption, or collision should ordinarily trigger prior consultation. If the target activity's status is disputed, the same no-surprise procedure should apply voluntarily even when the treaty threshold is uncertain. The information sought should match the dispute: trajectory and control may matter in a FOBS-type case, while a MOBS-type case may turn primarily on payload characterisation. The OEWG can state the security expectation; COPUOS can elaborate procedures

[39] Stewart et al, *supra* note 3 at 2–4; Geneva Centre for Security Policy, "Verifying the Prohibition on the Placement of Nuclear Weapons in Outer Space" (25 June 2026), online: <gcsp.ch/news/verifying-prohibition-placement-nuclear-weapons-outer-space>; ACDA-2043, *supra* note 35 at 16–17.

[40] *OST*, *supra* note 2, art IX; Paine, *supra* note 5; ACDA-2043, *supra* note 35 at 15–17; Garretson & Harrison, *supra* note 1 at 36–37, 42; Green, *supra* note 26.

[41] *VCLT*, *supra* note 4, arts 31–32, 39; *Report of the Group of Governmental Experts on Transparency and Confidence-Building Measures in Outer Space Activities*, UNGA, 68th Sess, UN Doc A/68/189 (2013) at paras 24, 28, 32–33 [2013 TCBM Report]; Russian Federation, "Possible Substantive Elements of International Legally Binding Instrument on the Prevention of an Arms Race in Outer Space, Including, inter alia, Prevention of Placement of Weapons in Outer Space", UN Doc A/AC.297/2025/WP.1 (2025); Centre for International Governance Innovation, "Capabilities, Conduct and Cooperation: A Life Cycle Framework for PAROS Implementation" (2026), Working Paper, UNGA Open-ended Working Group on the Prevention of an Arms Race in Outer Space in All Its Aspects, 3rd Sess, UN Doc A/AC.297/2026/NGO/6 (8 July 2026) at paras 4–13.

without deciding whether the object is a weapon. Those procedures would govern how evidence is sought, not create an inspection right.[42]

There is already a limited model for object-specific disclosure. Article IV of the Registration Convention requires a space object's general function and permits additional information. A 2025 Secretariat paper records practice extending to payload type, mission, operations, and status changes, and treats Article XI and registration notifications as complementary. Nuclear-power-source practice is especially relevant: States have supplied pre-launch safety assessments and technical information on radionuclides, operation, safety characteristics, and testing. That practice cannot become a duty to reveal a military payload, but it shows that object-specific nuclear information can pass through existing UN mechanisms without a new inspection regime. Supplementary voluntary disclosure and demonstrations could build on that practice, although no such measure would amount to a complete compliance regime.[43]

7 Conclusion

Article IV has a clear core, but not a mechanical boundary. An object carrying a nuclear weapon that is deliberately placed in Earth orbit falls within the prohibition, and a weapon maintained in outer space for later employment may also be stationed there. Ordinary ballistic transit lies on the other side. The difficulty arises between those poles, where orbital insertion forms part of a delivery sequence without developing into conventional orbital basing.

FOBS exposes that margin particularly well. The 1967 debate shows why completion of a revolution cannot itself supply the legal test: McNamara, Welsh and Keeny disagreed over the significance of orbital insertion, while simultaneously confronting the separate problem of proving what the vehicle actually carried. MOBS clarifies the distinction from the opposite direction. Multiple completed revolutions make placement considerably easier to establish, but do not establish a violation where the prohibited payload itself remains unproven. Article IV therefore presents two analytically distinct problems: classification of the spatial act and proof of the payload.

Later arms-control agreements did not resolve that interpretive question for the OST parties. They instead demonstrate how States regulated the problem when greater specificity was desired. SALT I and the ABM Treaty addressed defined strategic systems through dedicated constraints and verification arrangements; SALT II and START I expressly extended regulation to fractional-orbit systems and to stages such as development, testing and deployment. Their specificity cannot be read backwards into Article IV, but neither can it be ignored when distinguishing the treaty's actual terms from broader forms of arms control.

Customary law does not convincingly close the remaining margin. Long abstention from nuclear testing and deployment in outer space is significant, but practice cannot be separated from its explanation. Treaty compliance, technological constraints, vulnerability, strategic utility and deterrence may account for conduct that might otherwise be attributed to *opinio juris*. The evidence is strongest for the settled core of the existing treaty restraints and considerably weaker for a broader customary prohibition encompassing every fractional configuration.

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[42] *OST*, *supra* note 2, arts VIII–XII; Centre for International Governance Innovation, *supra* note 41 at paras 7–13; 2013 TCBM Report, *supra* note 41 at paras 27(e), 30–33; Jakhu & Freeland, *supra* note 21, rules 148–149; ACDA-2043, *supra* note 35 at 16–17.

[43] *Convention on Registration of Objects Launched into Outer Space*, 14 January 1975, 1023 UNTS 15, art IV (entered into force 15 September 1976) [*Registration Convention*]; UN Committee on the Peaceful Uses of Outer Space, Legal Subcommittee, *Implementation of Article XI of the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies, and Article IV of the Convention on Registration of Objects Launched into Outer Space: Background Paper by the Secretariat*, UN Doc A/AC.105/C.2/L.338 (2025), as corrected by UN Doc A/AC.105/C.2/L.338/Corr.1 (2025), paras 7–10, 20–29; 2013 TCBM Report, *supra* note 41 at paras 27(d)–(e), 29–33; Resolution 79/51, *supra* note 32; Stewart et al, *supra* note 3 at 3–4.

The remaining weakness is therefore partly legal and partly evidentiary. Better surveillance can identify trajectories and behaviour, but an opaque spacecraft may disclose little about its payload. New detection methods can narrow that uncertainty without eliminating it. Existing rules on registration, information-sharing and consultation can likewise improve transparency, while Article IX provides a procedural route where verification-related proximity operations risk harmful interference. None creates a general inspection right, and none can amend Article IV.

Orbital nuclearity consequently cannot be reduced either to a treaty loophole or to a verification deficit. The law may be clear where the facts are hidden, and the facts observable where the law remains contested. Effective regulation depends on keeping those problems separate. Verification can make compliance more demonstrable; procedural measures can reduce uncertainty and escalation risk; further arms-control agreements can reach conduct beyond the OST's terms. None should be used to obscure what Article IV already prohibits, or to attribute to it rules that States did not place there.

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