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THE OWNERSHIP TRAP: ARTICLE VIII OF THE OUTER SPACE TREATY AND THE LEGAL OBSTACLES TO ACTIVE DEBRIS REMOVAL

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ABSTRACT

Active debris removal (“ADR”) technology has matured faster than the law meant to authorise its use. This article argues that the central legal obstacle to ADR is not the absence of a debris-specific treaty, but a structural feature of the Outer Space Treaty 1967 itself: Article VIII's rule that ownership of, and jurisdiction over, a space object is unaffected by its presence in orbit, however defunct that object has become. Unlike maritime salvage law, space law recognises no doctrine of abandonment, so a party wishing to remove another state's debris must first obtain that state's consent, even where the object is untracked, unidentifiable, or has been derelict for decades. Drawing on the design of the two ADR missions that have actually flown, the European Space Agency's ClearSpace-1 and the Japan Aerospace Exploration Agency's Commercial Removal of Debris Demonstration, this article shows how operators have so far avoided the consent problem entirely by targeting only debris they, or their sponsoring state, already own: a strategy that cannot scale to the multi-state debris field crowding low Earth orbit. It further argues that the fault-based liability standard in Article III of the Liability Convention 1972 compounds the problem by exposing prospective ADR operators to uncapped liability for damage caused during genuinely untested capture manoeuvres. The article concludes with a proposal for a COPUOS-negotiated framework combining a rebuttable, notice-based presumption of consent for long-dormant, unclaimed objects with a capped-liability safe harbour for licensed removal operators.

Keywords: Space debris; Outer Space Treaty; Article VIII; active debris removal; Liability Convention; Registration Convention; ClearSpace-1; space law.

I. INTRODUCTION

Space debris is no longer a hazard confined to the margins of treaty preambles; it is an operational constraint actively shaping how missions are designed. ESA estimates that more than one million objects larger than one centimetre, a size sufficient to disable an operational satellite on impact, are now in Earth orbit.¹ For most of the six decades since the Outer Space Treaty 1967 (“OST”) entered into force, states have responded to this hazard almost entirely through mitigation, rules that reduce the debris a new mission generates, rather than remediation, the physical removal of debris already in orbit. That balance is now changing. Two missions, the European Space Agency's ClearSpace-1 and the Japan Aerospace Exploration Agency's (“JAXA”) Commercial Removal of Debris Demonstration (“CRD2”), represent the first serious attempts to physically capture and deorbit an existing piece of debris.² Neither, however, targets a foreign object. Both were designed, quite deliberately, to remove debris that the sponsoring agency itself put into orbit.

This article argues that this design choice is not incidental. It is a direct response to a structural feature of the OST that has received far less attention in Indian student legal writing than the debris crisis itself: the rule, codified in Article VIII, that ownership of and jurisdiction over a space object survives indefinitely, regardless of the object's function, location, or the passage of time. Space law, in other words, recognises no doctrine of abandonment. Part II sketches the scale of the physical problem. Part III traces the legal architecture that produces the non-abandonment rule. Part IV explains why that rule creates a consent barrier to third-party removal. Part V shows how an identification gap in the Registration Convention 1975 and the fault-based liability standard in the Liability Convention 1972 compound the problem. Part VI examines how the two missions that have actually flown have adapted to, rather than solved, this barrier. Part VII surveys the soft-law response and its limits. Part VIII proposes a narrower, notice-based fix, and Part IX concludes.

II. THE SCALE OF THE PROBLEM

Since the 1957 launch of Sputnik 1, thousands of launches have placed debris-generating hardware into Earth orbit, and space surveillance networks now catalogue tens of thousands of trackable fragments, with untracked smaller debris numbering in the millions.³ Fragmentation

¹European Space Agency, ‘Twelve Countries Sign the Zero Debris Charter’ (ESA, 28 May 2024) accessed 2 September 2026.

²ESA, ‘ESA Purchases World-First Debris Removal Mission from Start-up’ (ESA, 2020); JAXA, ‘Commercial Removal of Debris Demonstration (CRD2)’ (JAXA, 2024) accessed 2 September 2026.

³United Nations Office for Outer Space Affairs, ‘Space Debris’ (UNOOSA) accessed 2 September 2026.

events, collisions, and anti-satellite weapons tests have multiplied this population considerably; the 2007 Chinese anti-satellite test against the Fengyun-1C weather satellite alone generated thousands of trackable fragments that remain in orbit today.⁴ ESA's own annual Space Environment Report has, in recent years, repeatedly flagged that the rate of debris-generating events in low Earth orbit is outpacing the rate of end-of-life compliance among operators, a trend the agency attributes chiefly to legacy hardware launched before modern mitigation guidelines existed and that therefore remains in orbit with no operator obligation, contractual or otherwise, to remove it.

Two features of this population matter for the argument that follows. First, most catalogued debris was launched by, and therefore remains under the continuing jurisdiction of, a comparatively small number of spacefaring states, so that any workable removal regime must, as a practical matter, secure the cooperation of a relatively concentrated set of actors. Second, a much larger population of smaller, uncatalogued fragments generated by collisions and break-ups cannot be reliably attributed to any single launching state at all, a fact that resurfaces in Part V.

III. THE LEGAL ARCHITECTURE OF NON-ABANDONMENT

Article VIII of the OST provides that a state party “on whose registry an object launched into outer space is carried shall retain jurisdiction and control over such object... while in outer space”, and that “ownership of objects launched into outer space... is not affected by their presence in outer space... or by their return to the Earth.”⁵ The Convention on Registration of Objects Launched into Outer Space 1975 gives this rule administrative teeth, requiring each launching state to maintain a national registry and to furnish the United Nations with basic identifying data (function, orbital parameters, general purpose) for every object it registers.⁶

The combined effect is that a space object, however non-functional, remains the property of, and under the continuing jurisdiction of, its registering state for as long as it exists. This stands in sharp contrast to maritime law, where an owner's rights over a vessel or cargo can lapse through abandonment, opening the object to the law of finds or the law of salvage, and

⁴Brian Weeden, ‘2007 Chinese Anti-Satellite Test Fact Sheet’ (Secure World Foundation, 2010) accessed 2 September 2026.

⁵Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies (adopted 27 January 1967, entered into force 10 October 1967) 610 UNTS 205, art VIII.

⁶Convention on Registration of Objects Launched into Outer Space (adopted 12 November 1974, entered into force 15 September 1976) 1023 UNTS 15, arts II–IV.

permitting a third party to acquire rights over genuinely derelict property.⁷ No equivalent doctrine exists in space law. Article II of the OST bars the sovereign appropriation of celestial territory, but nothing in Article II, and nothing in Article VIII, extinguishes a state's title to an object it has registered merely because that object has ceased to function. The drafters' evident purpose was protective: Article VIII's final sentence, requiring the return of an object "found beyond the limits of the State Party... on whose registry [it] is carried", was written with terrestrial debris such as the 1978 Cosmos 954 re-entry over Canada in mind.⁸ But the text draws no distinction between an object found on foreign soil and an object still in orbit, and it has been read, consistently, to extend the non-abandonment rule to orbital debris as well.

IV. THE CONSENT PROBLEM FOR ACTIVE DEBRIS REMOVAL

The practical consequence of Article VIII is that no state, and no private operator, may lawfully capture, interfere with, or deorbit another state's registered object without that state's consent. To do so would trespass on the registering state's retained jurisdiction and control, and would interfere with property rights that Article VIII expressly preserves regardless of the object's condition. This is not merely a theoretical reading. The Inter-Agency Space Debris Coordination Committee ("IADC"), a technical forum of the major space agencies, has consistently framed active debris removal of foreign objects as requiring prior authorisation from the owning state, precisely because Article VIII forecloses any unilateral alternative.⁹ In practice, this means an ADR operator has no lawful basis for capturing and deorbiting a foreign-owned defunct satellite or rocket body absent a bilateral consent agreement, a commercial contract, or a licence from the owning state; the object's physical uselessness is legally irrelevant.

The consent norm is visible even outside the debris context, in arrangements governing objects that remain functional. The International Space Station, whose modules are owned by five different partners, operates under a dense web of bilateral and multilateral agreements precisely because Article VIII vests each partner with continuing jurisdiction over its own modules, jurisdiction that cannot be exercised by another partner without express authorisation.¹⁰ If

⁷See generally the customary international law principles reflected in national salvage statutes and, by analogy, the abandoned shipwreck doctrines discussed in the Convention on Salvage (adopted 28 April 1989, entered into force 14 July 1996) 1953 UNTS 165.

⁸See the settlement in Protocol Between the Government of Canada and the Government of the Union of Soviet Socialist Republics (2 April 1981), arising from the Cosmos 954 re-entry of 24 January 1978.

⁹Inter-Agency Space Debris Coordination Committee, 'IADC Space Debris Mitigation Guidelines' (IADC-02-01, Rev 2, 2020) sec 5.

¹⁰Agreement Among the Government of Canada, Governments of Member States of the European Space Agency, the Government of Japan, the Government of the Russian Federation, and the Government of the United States of

jurisdictional consent is required for routine operational cooperation on a functioning station, there is little basis to infer that Article VIII relaxes that requirement merely because an object has become defunct; nothing in the text ties the retention of jurisdiction and control to the object's continued usefulness.

V. THE IDENTIFICATION GAP AND THE LIABILITY CONVENTION'S FAULT STANDARD

Two further difficulties compound the consent problem. The first is identification. Compliance with the Registration Convention has never been complete: a meaningful share of launched objects, and virtually all fragmentation debris generated by collisions or break-ups after launch, are never individually registered, since the Convention contemplates registration of discrete launched objects rather than the pieces such objects later shed.¹¹ An operator that cannot identify the registering state of a given fragment has no one from whom to seek Article VIII consent in the first place, a gap that neither the OST nor the Registration Convention addresses. The second difficulty is liability. The Convention on International Liability for Damage Caused by Space Objects 1972 (“Liability Convention”) imposes absolute liability on a launching state for damage its space object causes on the Earth's surface or to aircraft in flight, but only fault-based liability for damage caused in outer space to another state's space object or its contents.¹² An ADR operator that damages a third party's object while attempting a rendezvous, capture, or de-spin manoeuvre on a tumbling, uncooperative target, manoeuvres that remain genuinely experimental, could itself become exposed to a fault-based claim under Article III. Because no binding technical standard yet exists against which “fault” in a capture attempt could be measured, this exposure is open-ended, and it creates a real disincentive for any operator to attempt removal of an object it does not already own or control, over and above the consent barrier described in Part IV.

VI. HOW MISSIONS HAVE ADAPTED: DOMESTIC-OBJECT TARGETING AS A WORKAROUND

The design of the only two ADR missions to have flown illustrates how operators have responded to this legal architecture, by simply avoiding it. ESA's ClearSpace-1, contracted to

America Concerning Cooperation on the Civil International Space Station (adopted 29 January 1998), art 5.

¹¹United Nations Office for Outer Space Affairs, ‘Status of International Agreements Relating to Activities in Outer Space’ (ST/SPACE/49, 2022).

¹²Convention on International Liability for Damage Caused by Space Objects (adopted 29 March 1972, entered into force 1 September 1972) 961 UNTS 187, arts II–III.

the Swiss start-up ClearSpace in 2020, targets VESPA, a 112-kilogram Vega Secondary Payload Adapter left in orbit after a 2013 Vega launch from ESA's Kourou spaceport.¹³ Crucially, VESPA is an ESA-owned object: the mission was structured from the outset around the removal of “ESA-owned object(s)”, sidestepping any need for third-party consent under Article VIII because the registering and consenting party are one and the same.¹⁴

JAXA's CRD2 programme follows an identical logic. Its demonstration spacecraft, ADRAS-J, developed and operated by Astroscale Japan, was designed to rendezvous with and inspect the upper stage of an H-IIA rocket launched by Japan in 2009, an object manufactured by Mitsubishi Heavy Industries, which cooperated with JAXA in supplying the technical data needed for the mission.¹⁵ The follow-on mission, ADRAS-J2, will attempt to capture and deorbit the same domestically-launched rocket body. In neither programme has an operator attempted, or apparently even contemplated, the removal of a foreign-registered object without a prior bilateral arrangement.

This pattern is a rational response to Article VIII, but it cannot scale. Orbital debris does not respect the launching-state boundaries that Article VIII treats as legally decisive: a defunct rocket body registered to one state can threaten the operational satellites of a dozen others sharing the same congested altitude band, and the collision risk that motivates ADR in the first place is overwhelmingly a cross-jurisdictional one. A legal framework under which each state may only clean its own debris, while remaining powerless to address debris registered elsewhere without a bespoke consent agreement, addresses a small and self-selected subset of the problem that ADR technology now exists to solve.

VII. SOFT-LAW RESPONSES AND THEIR LIMITS

The principal international instruments addressing space debris are voluntary and non-binding, and none of them creates a consent-transfer or presumptive-abandonment mechanism capable of unlocking third-party removal. The IADC's Space Debris Mitigation Guidelines, first issued in 2002 and periodically revised, focus on preventing the creation of new debris through end-of-life disposal and passivation, not on authorising removal of existing debris belonging to another state.¹⁶ The twenty-one Guidelines for the Long-term Sustainability of Outer Space

¹³ESA, ‘ESA Purchases World-First Debris Removal Mission from Start-up’ (ESA, 2020) accessed 2 September 2026.

¹⁴European Space Policy Institute, ‘The ClearSpace-1 Mission: ESA and ClearSpace Team Up to Remove Debris’ (2021).

¹⁵JAXA, ‘Commercial Removal of Debris Demonstration (CRD2) Phase I Results’ (JAXA, 26 April 2024); Astroscale, ‘Astroscale Japan Selects Isar Aerospace to Launch ADRAS-J2’ (Astroscale, 2026).

¹⁶Inter-Agency Space Debris Coordination Committee, ‘IADC Space Debris Mitigation Guidelines’ (IADC-02-

Activities, adopted by consensus at COPUOS in June 2019 after nearly a decade of negotiation, similarly encourage states to consider debris mitigation and to share information, but stop short of addressing the ownership and consent barrier to remediation.¹⁷ ESA's Zero Debris Charter, unveiled in 2023 and since signed by more than a dozen states and over a hundred organisations, commits signatories to debris-neutral operations by 2030, but it too is framed around each actor's own missions rather than a shared mechanism for removing debris that belongs to someone else.¹⁸

Taken together, these instruments form a reasonably coherent mitigation regime. What they do not form is a remediation regime, and the gap between the two is precisely where Article VIII's non-abandonment rule continues to operate unmodified.

VIII. TOWARD A NARROWER FIX: NOTICE-BASED CONSENT AND CAPPED LIABILITY

A wholesale abandonment doctrine of the kind found in maritime salvage law is unlikely to command consensus among spacefaring states, since it would require states to accept the loss of jurisdiction over objects they may still wish to control, for strategic as much as commercial reasons. A narrower fix, addressed to the specific gap identified above, is more realistic and would not require amending Article VIII itself.

First, COPUOS could negotiate a protocol establishing a rebuttable presumption of consent to removal for objects meeting defined criteria: non-functional and non-responsive to contact attempts for a set period, such as five years; not subject to an active disposal plan filed with UNOOSA; and, critically, the subject of a public notice to the registering state through the UN Register, with no objection lodged within a fixed response window, for instance one hundred and eighty days. Such a “notice-and-non-objection” mechanism would preserve the registering state's sovereignty and its right to object, while removing the practical need for a bespoke bilateral agreement in every case of a long-dormant, unclaimed object, an approach with some precedent in the notice-based coordination procedures used for radio-frequency spectrum allocation at the International Telecommunication Union, where administrations must object within a defined window or a proposed frequency assignment proceeds by default.¹⁹ Applied

01, Rev 2, 2020).

¹⁷Committee on the Peaceful Uses of Outer Space, ‘Guidelines for the Long-term Sustainability of Outer Space Activities’ (2019) UN Doc A/74/20, Annex II.

¹⁸ESA, ‘Twelve Countries Sign the Zero Debris Charter’ (ESA, 28 May 2024).

¹⁹International Telecommunication Union, Radio Regulations (2020 edn), art 9 (procedure for effecting coordination with other administrations).

to debris, a registering state would remain free to object at any time before the window closes, and could do so simply by filing an updated disposal plan or asserting an intention to service the object itself, so the mechanism would operate as a default rule rather than a forced transfer of title.

Second, a capped-liability safe harbour should accompany any such consent mechanism. Operators acting under a validly obtained presumption of consent, and complying with agreed technical safety standards for rendezvous and capture, could be shielded from the open-ended fault exposure identified in Part V, with liability limited to cases of gross negligence or wilful misconduct. This would mirror the liability limitations found in some domestic environmental clean-up statutes, which similarly aim to encourage remediation of a hazard without discouraging responsible actors through unlimited exposure.

Third, neither reform is workable without fixing the identification gap described in Part V. A protocol requiring more granular, near-real-time status reporting to the UN Register, distinguishing active objects from controlled-defunct and uncontrolled-defunct objects, would let operators and the registering state itself know, well in advance, which objects are candidates for the notice-and-non-objection procedure, and would reduce the population of debris that is neither actively managed nor formally released for removal.

IX. CONCLUSION

The gap between what ADR technology can now do and what space law permits it to do is not, at bottom, a gap in debris-specific regulation. It is a consequence of Article VIII of the OST, a provision drafted to protect states from losing sovereignty over objects on their own registries, operating in a context its drafters could not have anticipated: a low Earth orbit environment crowded with defunct hardware that a growing commercial ADR industry is now technically capable of removing, but legally forbidden from touching without consent it frequently cannot obtain and sometimes cannot even identify whom to seek. The two missions that have actually flown, ClearSpace-1 and CRD2, confirm the diagnosis by their very design: both were built to remove only what their sponsoring agency already owned. That is a sound short-term strategy for individual missions, but it cannot address a debris population that, by its physical nature, ignores the jurisdictional lines Article VIII treats as permanent. A narrower, notice-based consent mechanism, paired with capped liability for compliant operators and stronger registration reporting, would let states retain the sovereignty Article VIII protects while finally opening the door to the cross-jurisdictional removal that the debris problem actually requires.