

The effectiveness of the Rome II Regulation in identifying orbital pollution as an environmental damage

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Abstract

Besides the numerous benefits offered by outer space, manned spaceflight has lead to some negative effects manifested by various forms of pollution when introducing terrestrial substances and materials. Considering the Rome II Regulation, Article 7 applies in cases of non-contractual obligations arising out of environmental damage or damage sustained by persons or property as a result of such damage. Giving particular emphasis on space-faring member states of the European Union and the European Space Agency in regards to the damage and/or the event giving rise to it may occur within an extraterrestrial environment, Rome II does not theoretically grasp the notion of orbital pollution due to it not being identified as an “environmental damage” in any legal source. When attempting to identify orbital pollution as an environmental damage by drawing a parallel to Rome II, two elements are analyzed: (a) specific Earth-orbits polluted with orbital debris; and (b) potential damages to persons and spacecrafts resulting from space-faring nations’ failure to mitigate domestic orbital debris; this critical analysis, hence, examines whether Rome II does justice for extraterrestrial environmental damages and further argues that the extraterrestrial environment – along with persons and property within – is just as equally endangered as the terrestrial environment.

Keywords: environmental damage; orbital pollution; Rome II Regulation; space law; international private law.

JEL Classification: K32, K33

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1. Introduction

Over the last thirty years or so, the protection of the natural environment has come to occupy a very much more prominent place on the international agenda, which expectedly lead to an ever-increasing array of environmental issues becoming the focus of regulation at the national, regional and or global levels.⁴ Within the European Union (hereinafter, “EU” or “Union”), the EC Regulation

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⁴ Michael Bowman, “The Definition and Valuation of Environmental Harm: An Overview,” in *Environmental Damage in International and Comparative Law: Problems of Definition and Valuation*, ed. Michael Bowman and Alan Boyle (Oxford: Oxford University Press, 2022), 1.

No.864/2007 of 11th July 2007 on the Law Applicable to Non-Contractual Obligations (hereinafter “Rome II”) treats environmental damage in a manner which, unfortunately, does not give much thought of areas of international jurisdiction per common heritage of mankind, which could also be subjected to contamination and pollution. The treatment of environmental damage within Rome II is primarily manifested in Article 7 – *Environmental Damage*⁵ – which stipulates the following: “the law applicable to a non-contractual obligation arising out of environmental damage or damage sustained by persons or property as a result of such damage shall be the law determined pursuant to Article 4(1), unless the person seeking compensation for damage chooses to base his or her claim on the law of the country in which the event giving rise to the damage occurred.”

The wording of Article 7 seems to assume that the damage and/or the event giving rise to the damage can be localized in a country or countries having legal systems that can be applied. However, the damage and/or the event giving rise to it may occur on, for example, the high seas, in the Antarctic or even in the outer space. It is submitted that under such circumstances whenever possible the national registration (“flag”) of the ship, aircraft, spacecraft, etc. involved should be used as the relevant connecting factor. If there is no such factor, the law of the most closely connected country (analogical use of Article 4(3)) or the *lex fori* may have to be applied as the last resort.⁶ In other words, when dealing with the issue of choice of law, the common solution is to apply *lex fori*, which could mean *lex loci injuria* (also called the homeward trend). It is considered to be favourable to the plaintiff. The alternative is to apply *lex loci actus (delicti)*, the law of the place of the act.⁷ When particularly considering the damage and/or the event giving rise to it may occur within an extraterrestrial environment, with particular emphasis on space-faring member states of the Union and the European Space Agency (hereinafter “ESA”) in relation to orbital pollution, Rome II does not seem to theoretically grasp such concepts due to orbital pollution not being identified as an “environmental damage” in any legal source, as well as other crucially defining circumstances concerning orbital debris. This critical analysis, hence, examines whether Rome II does justice for environmental damages occurring in outer space and further argues that the extraterrestrial environment – along with persons and property within – is just as equally endangered as the terrestrial environment.

2. Legal analysis of identifying the notion of orbital pollution

Besides the benefits offered by space activities, there are also considerable negative effects resulting from spaceflight. Given the vast dimension of the space environment, one might assume that concerns about polluting it would be fairly

⁵ EC Regulation No.864/2007 of 11th July 2007 on the Law Applicable to Non-Contractual Obligations, Article 7.

⁶ Michael Bogdan, “The Treatment of Environmental Damage in Regulation Rome II,” in *The Rome II Regulation on the Law Applicable to Non-Contractual Obligations: A New International Litigation Regime*, ed. John Ahern and William Binchy (Leiden/Boston: Martinus Nijhoff Publishers, 2009), 221.

⁷ Marie-Louise Larsson, *The Law of Environmental Damage: Liability and Reparation* (The Hague/London/Boston: Kluwer Law International, 1999), 601.

irrelevant. However, human activities in outer space have led to various forms of pollution and undesirable effects, where introducing terrestrial substances and materials into outer space, in particular, can have adverse effects on the space environment.⁸ While the scope of environmental damage, pursuant to Rome II, is considerably broad,⁹ it has been established that Article 7 applies in cases of non-contractual obligations arising out of environmental damage or damage sustained by persons or property as a result of such damage. Following the European Parliament's proposal, the notion "environmental damage" is defined in Recital 24: it should be understood as meaning: "*adverse change in a natural resource, such as water, land or air, impairment of a function performed by that resource for the benefit of another natural resource or the public, or impairment of the variability among living organisms.*"¹⁰

However, it has already been established that the material scope of Article 7 not only encompasses environmental damage in a strict sense but also the damage sustained by persons or property as a result of such damage.¹¹ A more detailed definition can be found in Article 2 of the Directive on Environmental Liability¹², even though both definitions theoretically assume strictly terrestrial-bound characteristics. It can, nevertheless, be observed that Article 7 of Rome II covers two types of damages:

- *First*, it covers damage to the environment itself; and
- *Second*, it covers both damage to persons and property if they are the result of the damage to ecology and consequence of human activity.

The latter is to say, that personal injuries, damages to property and private economic losses are included in Article 7 if, and only if, they result from damages to the environment.¹³ When attempting to identify orbital pollution as an environmental damage by drawing a parallel to the abovementioned types of damages covered by Rome II, it is necessary to consider two elements:

- a) The specific Earth-orbits that are significantly polluted with orbital debris; and
- b) The potential damages to persons and spacecrafts as a result of orbital pollution and consequence of space-faring nations' failure to mitigate

⁸ Peter Stubbe, *State Accountability for Space Debris: A Legal Study of Responsibility for Polluting the Space Environment and Liability for Damage Caused by Space Debris* (Leiden/Boston, Brill Nijhoff, 2017), 13-14.

⁹ Solveig Gasche, *Responsible Trading in Raw Materials: Regulatory Challenges of International Trade in Raw Materials* (Tübingen: Mohr Siebeck Verlag, 2023), 306.

¹⁰ EC Regulation No.864/2007 of 11th July 2007 on the Law Applicable to Non-Contractual Obligations, Article 7.

¹¹ Peter Gailhofer, "National Civil Liability and Transboundary Environmental Damage," in *Corporate Liability for Transboundary Environmental Harm: An International and Transnational Perspective*, ed. Peter Gailhofer, David Krebs, Alexander Proelss, Kirsten Schmalenbach and Roda Verheyen (Cham: Springer Nature, 2022), 197.

¹² Directive 2004/35/CE of the European Parliament and of the Council on Environment Liability with regard to the Prevention and Remedying on Environmental Damage; See also: Peter Huber, *Rome II Regulation: Pocket Commentary* (Berlin: Walter de Gruyter, 2011) 211.

¹³ Peter Huber, Peter, *Rome II Regulation: Pocket Commentary* (Berlin: Walter de Gruyter, 2011), 212.

orbital debris of domestic origin.

At this point, we make a differentiation between the notions “orbital pollution” and “orbital debris”, where *orbital pollution* represents the damage to the extraterrestrial environment itself within Earth orbits, where orbital debris exists mostly in two types of orbits – lower Earth orbit (“LEO”) and Geostationary Earth orbit (“GEO”).¹⁴ On the other hand, *orbital debris* is a direct consequence of human activities in outer space. Such activities always involve the transfer of man-made objects beyond the limits of the Earth’s atmosphere into outer space. After these objects have fulfilled their purpose, which may occur after different periods of time, they turn into non-functional space (orbital) debris.¹⁵ In the Space Debris Mitigation Guidelines of the Committee on the Peaceful Uses of Outer Space (the Guidelines), “space debris” is defined as: “*all man-made objects, including fragments and elements thereof, in Earth orbit or re-entering the atmosphere, that are non-functional.*”¹⁶ While the Scientific and Technical Subcommittee of the United Nations Committee on the Peaceful Uses of Outer Space (UNCOPUOS) only generated this definition for use in a nonbinding document, most nations have adopted the definition of space debris from the guidelines in their domestic law.¹⁷ This definition thus reflects the most current accepted definition of space debris internationally¹⁸, which is necessary to further inspect the occurrence of damage caused by orbital debris and environmental liability.

3. Orbital pollution as a requisite for environmental liability

Considering that the occurrence of damage is the central requisite for liability, the Liability Convention, unlike the Outer Space Treaty (OST), contains a definition of the term in Article I literal (a) of the Liability Convention. Damage is accordingly defined therein as: “*loss of life, personal injury or other impairment of health; or loss or damage to property of States or of persons, natural or juridical, or property of international intergovernmental organizations*”.

The definition covers two types of damages: *injury to persons* and *material damage*. This concept corresponds to the understanding of injury under the law of responsibility, which covers material and moral damages equally. With respect to

¹⁴ Luke Punnakanta, “Space Torts: Applying Nuisance and Negligence to Orbital Debris,” *Southern California Law Review* 86, No.1 (2012) 168.

¹⁵ Peter Stubbe, *State Accountability for Space Debris: A Legal Study of Responsibility for Polluting the Space Environment and Liability for Damage Caused by Space Debris* (Leiden/Boston: Brill Nijhoff, 2017) 15.

¹⁶ Rep. of the Comm. on the Peaceful Uses of Outer Space to the General Assembly (UNCOPUOS), U.N. GAOR 62nd Sess., Supp. No. 20, Annex (June 15, 2007) [hereinafter Debris Mitigation Guidelines].

¹⁷ Marc Carns, “Consent Not Required: Making the Case that Consent is Not Required under Customary International Law for Removal of Outer Space Debris Smaller than 10CM,” *The Air Force Law Review* IAC-17,A6,8,8,x37342 (2017): 189.

¹⁸ Chelsea Muñoz-Patchen, “Regulating the Space Commons: Treating Space Debris as Abandoned Property in Violation of the Outer Space Treaty,” *Chicago Journal of International Law* 19, No.1 (2018) 238.

personal injury, the damage covered consists of death, injury or impairment of health. Death describes a clear instance, as does physical injury and illness resulting from direct impact of a space object.¹⁹ Orbital debris primarily endangers astronauts, given that a 1 cm piece of debris can penetrate the crew compartment of a spacecraft. Because these compartments are pressurized, a puncture could kill astronauts inside and destroy the spacecraft. A 0.5 mm piece of debris can puncture an astronaut's spacesuit²⁰, and even a paint chip can kill an astronaut outside a spacecraft.²¹ Because of these dangers, the International Space Station (ISS) maneuvers around debris when a possible collision is identified. Even more dangerous is when debris is not detected in time to maneuver the Space Station. When this occurs astronauts may have to move to other spaceships attached to the Station so that they can close hatches and maintain pressure if the Space Station is punctured.²² Whether non-physical injury or mental suffering is also covered by the definition is another question.²³ Furthermore, as it was previously assumed that whenever possible the national registration ("flag") of the spacecraft involved should be used as the relevant connecting factor, such circumstances cannot be provided considering that orbital debris significantly varies in size, indicating that some pieces are so small that it is nearly impossible to identify their country of origin, as Article VI of the 1974 Registration Convention stipulates the following: *"Where the application of the provisions of this Convention has not enabled a State Party to identify a space object which has caused damage to it or to any of its natural or juridical persons, or which may be of a hazardous or deleterious nature, other States Parties, including in particular States possessing space monitoring and tracking facilities, shall respond to the greatest extent feasible to a request by that State Party, or transmitted through the Secretary General on its behalf, for assistance under equitable and reasonable conditions in the identification of the object. A State Party making such a request shall, to the greatest extent feasible, submit information as to the time, nature and circumstances of the events giving rise to the request. Arrangements under which such assistance shall be rendered shall be the subject of agreement between the parties concerned."*²⁴

Simply put, tracking limitations make identifying who put debris into

¹⁹ Peter Stubbe, *State Accountability for Space Debris: A Legal Study of Responsibility for Polluting the Space Environment and Liability for Damage Caused by Space Debris* (Leiden/Boston: Brill Nijhoff, 2017) 369.

²⁰ Lawrence D. Roberts, "Addressing the Problem of Orbital Space Debris: Combining International Regulatory and Liability Regimes," *Boston College International and Comparative Law Review* 15 (1992) 55.

²¹ James P. Lampertius, "The Need for an Effective Liability Régime for Damage Caused by Debris in Outer Space," *Michigan Journal of International Law* 13, No.2 (1992) 447, 450.

²² Kathy Jones, Krista Fuentes and David Wright, "A Minefield in Earth Orbit: How Space Debris is Spinning Out of Control [Interactive]," *Scientific American*, February 1, 2012, <https://www.scientificamerican.com/article/how-space-debris-spinning-out-of-control/>

²³ Peter Stubbe, *State Accountability for Space Debris: A Legal Study of Responsibility for Polluting the Space Environment and Liability for Damage Caused by Space Debris* (Leiden/Boston: Brill Nijhoff, 2017) 369.

²⁴ The 1974 Convention on Registration of Objects Launched into Outer Space, Article VI.

space difficult. The 1975 Convention on Registration of Objects Launched into Outer Space (“Registration Convention”) requires that states must register the objects they launch into space with the United Nations (UN).²⁵ When an object launched into space is registered and continuously tracked, the source of the object and any debris it creates can be identified. Even if the source of debris that causes damage cannot be easily determined, other parties tracking debris are required to help determine the source. The party responsible for putting the debris into space can then potentially face liability. But many launches go unregistered, demonstrated by the fact that no launch has ever been registered with a military purpose. And even if a space object that causes debris is registered, the source of debris that is too small to track may still not be identifiable.²⁶ And if such is the case, it is only presumed that the law of the most closely connected country (analogical use of Article 4(3)) or the *lex fori* may have to be applied as the last resort. Be that as it may, it is important to emphasize the rule regarding purpose of the launch and its registration, which is simultaneously in compliance with Article 1 of Rome II which stipulates that: “*this Regulation shall apply, in situations involving a conflict of laws, to non-contractual obligations in civil and commercial matters. It shall not apply, in particular, to revenue, customs or administrative matters or to the liability of the State for acts and omissions in the exercise of State authority (acta iure imperii).*”²⁷

This means that the claims of States or environmental protection organizations for pure ecological damage without an economic dimension will most likely not fall under the Regulation, notwithstanding the fact that the Regulation itself, in no. 24 of the introductory considerations, defines “environmental damage” as a mere impairment of the normal functioning of the interplay of natural resources.²⁸ Concerning essentially pure ecological damage, in a context where Nature – or in our case Outer Space – as such has no legal personality, its compensation raises the problem of States entitled to bring a legal action and the problem of admissibility of such actions.²⁹ Moreover, the term “civil and commercial matters” is not defined in Rome II, meaning that it would likely be given an autonomous interpretation according to the jurisprudence of the European Court of Justice (ECJ). The argument of interpreting “civil and commercial matters” in the light of EU environmental law seems to be even more valid in the context of Rome II and Recital 25 explicitly refers to Article 174 of the

²⁵ Convention on the Registration of Objects Launched into Outer Space, opened for signature Jan. 14, 1975, 28 U.S.T. 695 [hereinafter Registration Convention].

²⁶ Luke Punnakanta, “Space Torts: Applying Nuisance and Negligence to Orbital Debris,” *Southern California Law Review* 86, No.1 (2012) 172-173.

²⁷ EC Regulation No.864/2007 of 11th July 2007 on the Law Applicable to Non-Contractual Obligations, Article 1.

²⁸ Sarah Fiona Gahlen, *Civil Liability for Accidents at Sea* (Heidelberg: Springer-Verlag GmbH, 2015), 346.

²⁹ Oliviera Boskovic, “The Law Applicable to Violations of the Environment – Regulatory Strategies,” in *The Regulatory Function of European Private Law*, ed. Fabrizio Cafaggi and Horatia Muir Watt (Cheltenham/Northampton: Edward Elgar, 2009), 201.

EC Treaty (Article 191 TFEU), which includes the “polluter pays principle”. This makes sense when concerning the environmental damage’s main aim, which is to raise the overall level of environmental protection and of making the polluter pay,³⁰ as is states in the Regulation itself: “Regarding environmental damage, Article 174 of the Treaty, which provides that there should be a high level of protection based on the precautionary principle and the principle that preventive action should be taken, the principle of priority for corrective action at source and the principle of discriminating in favour of the person sustaining the damage”³¹

It is therefore consistent to contend that Article 7 should be construed so as to contribute to this fundamental principle of environmental protection. Following the argument that Article 7 (with regard to Recital 24) covers not only damage to private property, but also damage to the environment itself, it was argued that claims for pure environmental harm, mainly claims brought by public authorities, are to be regarded as “civil matters”. Professor Kadner Graziano, in arguing that Rome II applies to actions by public authorities to recover clean up costs relies strongly on the fact that Article 7 draws a distinction between ‘environmental damage’ and ‘damage sustained by persons and property as a result of such damage’, and submits that (a) currently, individuals can bring claims for pure environmental damage only in certain cases and, on a European-wide level, only to a limited extent, and (b) the Environmental Liability Directive only grants the right to recover damages for pure environmental harm exclusively to public authorities. He infers from this that the Regulation was intended to apply to public authority environmental claims. The Directive, however, does not affect civil liability regimes.³² However, the concept of “civil and commercial matters” in Article 1 is set out not only for Rome II, but also for other instruments regarding civil justice (e.g. Brussels I Regulation). Therefore, it should not be given a broader interpretation for matters falling within one single provision than for other matters. Whether the subject matter falls within the scope of application of Rome II must be answered positively before a special conflict of law rule of the Regulation applies.³³ We attempt to, hence, draw the inference which concerns the general approach to economic and commercial space activities, from the perspective of jurisdiction, applicable law and dispute settlement: not to treat them any differently from other economic and commercial activities. Not even the much more fundamental likelihood of international involvement and complications here, of international state responsibility and/or liability being at issue, of security and other strategic interests being at stake, or indeed of the involvement of European organizations, were seen as calling for a special treatment. No doubt, such an

³⁰ Liesbeth Enneking, “Judicial Remedies: The Issue of Applicable Law,” in *Human Rights in Business: Removal of Barriers to Access to Justice in the European Union*, ed. Juan Jose Alvarez Rubio and Katerina Yiannibas (London/New York: Routledge, 2017), 54.

³¹ EC Regulation No.864/2007 of 11th July 2007 on the Law Applicable to Non-Contractual Obligations, Recital 25.

³² Andrew Dickinson, *The Rome II Regulation: The Law Applicable to Non-Contractual Obligations* (Oxford: Oxford University Press, 2010), 69.

³³ Peter Huber, *Rome II Regulation: Pocket Commentary* (Berlin: Walter de Gruyter, 2011), 209.

approach largely follows from the character of the space laws investigated, being by and large general framework laws taking care primarily of governmental worries that private space activities conducted under their control might cause trouble and/or at the same time need to be stimulated appropriately for the greater public - but still, essentially, national - benefit. Normal administrative law or similar procedures would still be able to handle any disputes in this context appropriately, even as they may much more frequently come to be confronted with the involvement of intergovernmental organizations enjoying a certain level of functional immunities and/or of private entities from other jurisdictions and licensed in those.³⁴ Moreover, in case of environmental liability, public authorities including states, are often involved against private parties, be it as claimant or defendant. Ordinarily, it is a matter of characterization to decide whether a State acts in a given case as a sovereign (*acta iure imperii*) or according to the rules of private law (*acta iure gestionis*), where the State as claimant will usually act as sovereign when it carries out a societal task and claims compensation for ecological damages.³⁵ Consequently, it is established that the environmental interests of member states belonging to both the EU and ESA³⁶ undoubtedly fall within the scope of Rome II's environmental policies. Pursuant to Article 3 of Rome II, its conflict rules, including Article 7, have universal application in the sense that "*any law specified by the Rome II Regulation shall be applied whether or not it is the law of a member state.*"³⁷ Regarding the applicable law we, hence, formulate the question of whether non-EU environmental interests also fall within the scope of Rome II's environmental policies. Such a narrow interpretation does not seem to be in line with Rome II's universal application, nor with the environmental damage rule's main aim, which is to raise the overall level of environmental protection and of making the polluter pay.³⁸ As it is stated in the

³⁴ Frans Von Der Dunk, Frans, "The Legal Framework for Space Projects in Europe: Aspects of Applicable Law and Dispute Resolution," in *Contracting for Space: Contract Practice in the European Space Sector*, ed. Lesley Jane Smith and Ingo Baumann (Farnham: Ashgate Publishing, 2011) 363.

³⁵ Peter Huber, *Rome II Regulation: Pocket Commentary* (Berlin: Walter de Gruyter, 2011) 210.

³⁶ ESA has 22 Member States: Austria, Belgium, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Luxembourg, the Netherlands, Norway, Poland, Portugal, Romania, Spain, Sweden, Switzerland and the United Kingdom. Latvia, Lithuania and Slovenia are Associate Members. Canada takes part in certain programs under a cooperation agreement. ESA has signed European Cooperating States Agreements with Bulgaria, Cyprus and Slovakia, and cooperation agreements with Croatia and Malta. By coordinating the financial and intellectual resources of its members, ESA can undertake programs and activities far beyond the scope of any single European country. ESA works closely with European industry, national space agencies and the European Union, and cooperates with space agencies worldwide; See also: "Current ESA Member States," European Space Agency, n.d., https://www.esa.int/Education/ESA_Member_States_Canada_Latvia_Lithuania_Slovakia_and_Slovenia.

³⁷ EC Regulation No.864/2007 of 11th July 2007 on the Law Applicable to Non-Contractual Obligations, Article 3.

³⁸ Liesbeth Enneking, "Judicial Remedies: The Issue of Applicable Law," in *Human Rights in Business: Removal of Barriers to Access to Justice in the European Union*, ed. Juan José Álvarez Rubio and Katerina Yiannibas (London/New York: Routledge, 2017), 54.

Regulation itself: “regarding environmental damage, Article 174 of the Treaty, which provides that there should be a high level of protection based on the precautionary principle and the principle that preventive action should be taken, the principle of priority for corrective action at source and the principle that the polluter pays, fully justifies the use of the principle of discriminating in favour of the person sustaining the damage.”³⁹

Whether and how the special rule on environmental damage may play a role in future foreign direct liability cases is a question that may eventually have to be answered by the ECJ, which has yet to render a decision on the interpretation and the scope of application of this rule.⁴⁰

4. Conclusions and recommendations

On a regional level the Rome II Regulation designates “the law of the country in which the damage occurs” as generally applicable to international torts, but knows also of more specific rules on product liability and environmental damage. Even though this regulation leaves unaffected the differences among European substantive tort laws, establishing only common conflict rules for non contractual obligations.⁴¹ In detailed analysis, Fraser J reviewed *inter alia* Article 7 Rome II: the tailor-made article for environmental pollution in the determination of *lex causae* for torts. For environmental pollution, a plaintiff has two choices under Article 7 Rome II: First, there is the *lex damni* (i.e. applying the law of the place where the damage occurred). Or, second, there is the *lex loci delicti commissi* (i.e. the law of the jurisdiction in which the harm was committed).⁴² Taking environmental torts into consideration for environmental damages, a plaintiff can elect either the law of the place of the first injury or the law of the country where “the event giving rise to the damage occurred.”⁴³ Such circumstance, by itself, leads toward the adoption of the “better law” approach, where two matters must be consequentially clarified. The first question is ‘what are the criteria to decide which law is better’, while the second question is ‘from among which legal systems can the court choose’. Here “better law” means the law more favorable to the claimant, and the choice is between the two laws mentioned above.⁴⁴ In relation to these

³⁹ EC Regulation No.864/2007 of 11th July 2007 on the Law Applicable to Non-Contractual Obligations, Recital 25.

⁴⁰ Liesbeth Enneking, “Judicial Remedies: The Issue of Applicable Law,” in *Human Rights in Business: Removal of Barriers to Access to Justice in the European Union*, ed. Juan José Álvarez Rubio and Katerina Yiannibas Yiannibas (London/New York: Routledge, 2017), 54.

⁴¹ Alfredo Roma, *Policy Aspects of Third Party Liability in Satellite Navigation: Preparing a Roadmap for Europe* (Vienna: ESPI European Space Policy Institute, 2009), 15.

⁴² Geert Van Calster, “Environmental Law and Private International Law,” in *The Oxford Handbook of Comparative Environmental Law*, ed. Emma Lees and Jorge E. Viñuales (Oxford: Oxford University Press, 2019), 1150.

⁴³ Michael M. Hoffheimer, *Examples and Explanations for Conflict of Laws* (Boston: Aspen Publishing, 2022), 391.

⁴⁴ Trevor C. Hartley, *International Commercial Litigation: Text, Cases and Materials on Private International Law, Second Edition* (Cambridge: Cambridge University Press, 2015), 610.

legal assumptions, it must be particularly emphasized that the general application of the law of the place where the damage occurred (*lex loci damni*) appears to be more commonly justified because it generally favours the victim, or at least does not favour the tortfeasor.⁴⁵ The treatment of environmental damage within Rome II, nevertheless, fails to cover outer space as an area of international jurisdiction per common heritage of mankind, which is heavily subjected to orbital pollution. Under such circumstances, it can be concluded that Rome II, nor any other international legal documentation for that matter, does not identify orbital pollution as an “environmental damage”. Action must be taken to reduce the space debris problem, and holding parties liable for damage their debris causes will internalize costs and discourage the creation of future debris. The development of new tracking technology that could help eliminate issues regarding the origin and identity of space debris, combined with the increased probability of debris-related collisions and damage in the future, means that more claims could be brought under the Liability Convention or other laws.⁴⁶ Fundamental pieces of EU legislation such as Regulation 44/1001/EC ('Brussels I') and Regulation 864/2007/EC ('Rome II') have shown the competence as well as the willingness of the EU institutions to harmonize the national regimes for private international law in several fundamental respects.⁴⁷

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⁴⁵ Siel Demeyere and Geert Van Calster, “Belgium,” in *Private International Law Aspects of Corporate Social Responsibility*, ed. Catherine Kessedjian and Humberto Cantu Rivera (Cham: Springer Nature, 2020), 143.

⁴⁶ Luke Punnakanta, “Space Torts: Applying Nuisance and Negligence to Orbital Debris,” *Southern California Law Review* 86, No.1 (2012), 192.

⁴⁷ Frans Von Der Dunk, “The Legal Framework for Space Projects in Europe: Aspects of Applicable Law and Dispute Resolution,” in *Contracting for Space: Contract Practice in the European Space Sector*, ed. Lesley Jane Smith and Ingo Baumann (Farnham: Ashgate Publishing, 2011), 363.

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