

# The Case of Overlapping Safety Zones on the Moon: Delimitation of Space, Rights and Obligations

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## Abstract

As space-faring States are preparing their return to the Moon, the concept of ‘safety zones’ has made its appearance, invoking heated discussions among the members of the legal community. In this context, the present paper aims to focus on a necessary balance between the rights of access and use under Article I OST and the obligations of due regard and avoidance of harmful interference under Article IX OST on the other. Particularly, the authors assume that the scenario of overlapping safety zones on the Moon is inevitable, especially with respect to favorable lunar locations. Accordingly, the authors will attempt to suggest realistic and efficient legal solutions for the delimitation of overlapping safety zones based on an analogy with delimitation rules applicable in air law and the law of the sea, where safety zones have by far been regulated. In this aim the Artemis Accords of 2020 will be taken into particular consideration in order to comprehend the notion of celestial safety zones as perceived by major space-faring States.

## Introduction

The success of recent space programs, such as the landing of India’s Chandrayaan-3 on the lunar south pole region,<sup>1</sup> and the planning of

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1 LVM3-M4-Chandrayaan-3 Mission: Chandrayaan-3 Mission Soft-landing Video, <https://www.isro.gov.in/Chandrayaan3.html> last visit 6/9/2023 at 4:27 p.m.

ambitious future space programs, such as NASA's Artemis program<sup>2</sup> signify a new era for space exploration and much likely the commencement of a modern 'Moon Race'. It is in this context that NASA and other associating agencies have concluded the infamous Artemis Accords of 2020,<sup>3</sup> as a political statement governing their cooperation. Among other reasons that make these Accords worthy of discussion, is the highly contested provision about the establishment of safety zones on the moon.

The present paper aims to discuss the legality of such safety zones on the moon and to address delimitation issues pertaining to overlapping safety zones. Given the lack of any provisions on safety zones in space law, the authors will attempt to define the concept of safety zones and the associated rights and obligations by comparative analysis with other similar zones in the various international law fields (under Section I). Subsequently, based on the conclusions of the aforementioned comparative analysis, the authors will examine the applicable legal regime in space (under Section II) and will seek to provide answers on the legality of safety zones on the moon and their proper delimitation.

## **I. Safety Zones and Their Delimitation Examined Comparatively under International Law**

The concept of safety zones is not established in a uniform manner in international law. In general, safety zones (and/or other areas of a similar legal status) signify an area around pivotal installations, where the State which owns that kind of assets exercises some kind of power, mainly in the form of jurisdiction and control, in order to prevent potential threats for its asset. The following analysis aims to provide a more detailed point of view on what a safety zone is and on how the delimitation of such zones is carried out in the various fields of international law; namely under the law of the sea (I.A.), air law (I.B.), the Antarctic Treaty System (I.C.) and intergovernmental agreements between space actors (I.D.).

### **I.A. Safety Zones in the Law of the Sea**

Safety zones are primarily the offspring of ILC's work for the codification of international law of the sea.<sup>4</sup> These zones are inextricably linked with the

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2 Artemis Accords, <https://www.nasa.gov/specials/artemis-accords/index.html> last accessed 10/9/2023.

3 The Artemis Accords: Principles for Cooperation in the Civil Exploration and Use of the Moon, Mars, Comets, and Asteroids for Peaceful Purposes', National Aeronautics and Space Administration (13 October 2020) ('Artemis Accords').

4 Regime of the High Seas, Deuxième rapport sur la haute mer par J. P. A. François, rapporteur special (1951) Yearbook of the International Law Commission Vol. n1, 75-103, at p. xoo; Art. 71, para. 2, ILC Articles concerning the Law of the Sea (n 19) at p. 264.

protection of pivotal marine installations from hostile acts, such as terrorist attacks, piracy etc., with potential catastrophic consequences for the economy, the environment and the safety of navigation at sea.<sup>5</sup> In this light, closely modeled to the previous Geneva Convention, the UNCLOS provides in its Articles 60, 80 and 260 the ability to establish safety zones around marine installations in three areas; the EEZ, the Continental Shelf and the International Seabed, *i.e.* the Area.

Before proceeding to the specific provisions of the UNCLOS about safety zones, two important points must be addressed in advance in order to comprehend the legal status of the areas in which safety zones are allowed to be established:

(a) In contrast with the moon, which constitutes *res communis omnium*, in the EEZ and the Continental Shelf, according to Article 60 UNCLOS the coastal State has the '*exclusive right*' to construct and to authorize and regulate the construction, operation and use of artificial islands, installations and structures. The powers of the coastal State are exclusive in the sense that no other State is entitled to construct and to authorize and regulate the construction, operation and use of artificial islands, installations and structures in the EEZ without the coastal State's consent.<sup>6</sup> Besides, within its EEZ and Continental Shelf, the coastal State exercises exclusive sovereign rights.<sup>7</sup> Contrarily, on the lunar surface States are not entitled to any kind of sovereignty, sovereign or exclusive rights; all States have an equal right to access and use all lunar areas.

(b) The Area, also known as International Seabed, constitutes the common heritage of mankind according to Article 136 UNCLOS. Consequently, as per Article 137(3) UNCLOS no State or natural or juridical person shall claim, acquire or exercise rights with respect to the minerals recovered from the Area except in accordance with Part XI UNCLOS and under close supervision by the International Seabed Authority, otherwise, no such claim, acquisition or exercise of such rights shall be recognized. Hence, Article 260 UNCLOS only refers to safety zones around *scientific research* installations.

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5 Efthymios D. Papastavridis, Protecting Offshore Energy Installations under International Law of the Sea, in II Natural Resources and the Law of the Sea - International Law Institute Series on International Law, Arbitration and Practice, p. 197-213.

6 Florian H. Th. Wegelein, Marine Scientific Research: The Operation and Status of Research Vessels and Other Platforms in International Law (2005), 150.

7 Alexander Proells, *Part V: Exclusive Economic Zone Art. 56*, in The United Nations Convention on the Law of the Sea: A Commentary, Bloomsbury Publishing (2017), p. 424.

Having, thus, outlined the legal status of the EEZ, the Continental Shelf and the Area, beginning with safety zones in the EEZ, Article 60 UNCLOS, provides that:

“4. The coastal State may, where necessary, establish reasonable safety zones around such artificial islands, installations and structures in which it may take appropriate measures to ensure the safety both of navigation and of the artificial islands, installations and structures.”

Additionally, para. 6 of Article 60 UNCLOS explicitly provides the duty of all ships to respect these safety zones and comply with generally accepted international standards for navigation in these areas.

Therefore, the coastal State may take appropriate measures within its safety zone in order to end the presence of vessels that constitute a danger for its installation, including the exercise of prescriptive and enforcement jurisdiction over such vessels<sup>8</sup> for boarding, searching and seizing them (Article 55 in conjunction with Article 56 UNCLOS). Besides, as pointed out in the *Arctic Sunrise* award, a coastal State may even pursue a vessel involved in illegal activities within its safety zone.<sup>9</sup>

In this respect, the relative IMO Resolution A.671, adopted on 19 October 1989, states in its Article 16 that the coastal State should also notify the flag State of any alleged infringement in its safety zone and provide relevant factual evidence.<sup>10</sup> It follows, that breaching the safety zone of the coastal State without authorization is a violation of the coastal State's sovereign rights and the flag State cannot invoke the freedom of navigation to justify this infraction.<sup>11</sup>

However, Article 60 UNCLOS does not only provide the coastal State with rights concerning its safety zone, but also with important obligations. Specifically, Article 60 UNCLOS directly provides that safety zones must be designed in a manner reasonably linked to the nature and function of the installations they serve and shall not exceed the breadth of 500 meters around said installations, except as authorized by the IMO following internationally accepted standards. The coastal State is, also, obliged to provide due notice for the establishment of such installations. Last but not least, it is worth mentioning that both Article 60 UNCLOS and Article 147

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8 Sebastian tho Pesch, ‘Coastal State Jurisdiction around Installations: Safety Zones in the Law of the Sea’ (2015) 30 Int'l J Marine & Coastal L 512-532.

9 The Arctic Sunrise Arbitration (Netherlands v Russia), (Merits) (n 10) [272].

10 Recommendations on Safety Zones and Safety of Navigation around Offshore Installations and Structures, Annex to IMO Resolution, A.671(16), para. 3.1 (1989), available <http://www.imo.org/blast/blastDataHelper.asp?data-id=22502&filename=A671.pdf>; accessed 4 May 2015.

11 Maria Chiara Noto, The Arctic Sunrise Arbitration and Acts of Protest at Sea, in 2 MarSafeLaw Journal 2, p. 14 (2016).

UNCLOS provide that safety zones may not be established, when they are capable of causing interference to international sea lanes of navigation. In fact, Article 147(c) UNCLOS dictates that the configuration and location of safety zones in International Seabed shall not be such as to form a belt impeding the lawful access of shipping to particular maritime zones or navigation along international sea lanes.

However, the UNCLOS remains silent as to specific rules about the delimitation of potentially overlapping safety zones. In fact, the UNCLOS only contains provisions with respect to the delimitation of the territorial sea and the EEZ and Continental Shelf of States with opposite or adjacent coasts. Indicatively, concerning the delimitation of territorial sea Article 15 UNCLOS provides for delimitation based on a median line that can be adjusted based on the relevant circumstances of each case. With respect to the EEZ and Continental Shelf, Articles 74 and 83 UNCLOS, which contain the relevant provisions,<sup>12</sup> dictate that States with opposite or adjacent coasts shall conclude an agreement on the basis of international law, as referred to in Article 38 of the Statute of the International Court of Justice, in order to achieve an equitable solution. On this basis in the seminal *Black Sea* case<sup>13</sup> the ICJ recapitulated the three stages of judicial delimitation for the EEZ and Continental Shelf: (a) the drawing of a provisional median line, (b) the adjustment of said line based on the relevant circumstance (historic, geographic or others) of each case and (c) a disproportionality test based on the respective length of the relevant coasts of the two States.

From the aforementioned delimitation processes, it derives that delimitation of maritime zones in the law of the sea is heavily based on the drawing and adjustment of a provisional median line as a first step. Nevertheless, it is important to note that these delimitation provisions of the UNCLOS only apply with respect to the delimitation of the territorial sea, where States exercise sovereignty, and with respect to the EEZ and Continental Shelf, where States do not exercise sovereignty in its absolute expression, however, they do exercise certain sovereign and exclusive rights.

In conclusion, it appears that although recourse can be made to the law of the sea in order to shed some light on the content of the term 'safety zone', the provisions of the UNCLOS concerning delimitation of maritime zones do not constitute an appropriate analogy for the delimitation of overlapping safety zones on the moon, given that in the latter space no sovereignty and no exclusive rights can be claimed under Article II of the Outer Space Treaty.

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12 Natalie Klein, *Resolving Disputes under UNCLOS When the Coastal and User States are Disputed*, in Nong Hong and Gordon Houlden (eds), *Maritime Order and the Law in East Asia*, Routledge (2018), UNSWLRS 32, p. 8 (2019).

13 *Black Sea case (Romania v. Ukraine)*, (Judgment) 2009 I.C.J. 61 (Feb. 3).

## **I.B. Safety Zones in Air Law**

In contrast with the law of the sea, air law appears to be a more suitable analogy with respect to the delimitation of safety zones on the moon.

Particularly, in air law the coordination and management of air traffic for purposes of avoiding harmful interferences and collisions, is carried through the establishment of Flight Information Regions, shortly 'FIRs'. More specifically, global airspace, both national and international, is divided into nine "Air Navigation Regions", each of which is divided into "Flight Information Regions" (FIRs), on the basis of a "Regional Air Navigation Plan" (RAN Plan), agreed by the States of the corresponding Region.<sup>14</sup> Within these regions States exercise solely functional control through their Flight Information Centers with the aim of ensuring the safety of air flights as aforementioned. In this vein, the scheme of FIRs as an internationally agreed upon coordination system, where no State exercise any sovereignty or sovereign rights, seems to be a more appropriate analogy to safety zones on the moon.

Additionally, contrary to the situation in outer space, the unilateral declaration of zones is quite frequent in air space, not to say obligatory, in many cases. The provision of Article 9 par. 1 of the 1944 Convention on International Civil Aviation,<sup>15</sup> which allows States to declare prohibited areas in the national airspace for security reasons, is exemplary of the need to define control zones in air space.<sup>16</sup> In this connection, the cases where the extension of the jurisdiction of States in airspace is not compatible with international regulations should be examined.

In this light, in pursuit of objectives such as security, conservation of the resources of the Continental Shelf, and protection from pollution, many States have extended limited aspects of their sovereignty seaward.<sup>17</sup> Since 1950, this trend has included unilateral assertions by certain States of a limited right to control the airspace seaward from their coast.<sup>18</sup> These States have established Air Defense Identification Zones (ADIZ's) extending in some cases several hundred miles seaward, within which aircraft must identify themselves to the coastal State and follow specified procedures.

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14 Annex 11 to the Convention on International Civil Aviation, Air Traffic Services, 14th Edition, July 2016, 2.1.2. For a detailed analysis see George D. Kyriakopoulos, *Spaceplanes Operating in Airspace: In Search of a Regulatory Regime for Traffic Coordination*, in 64<sup>th</sup> Proc. L. Outer Space 331 (2017).

15 Chicago Convention on International Civil Aviation, entered into force Apr. 4, 1947, Ninth Ed. 2006, ICAO Doc. 7300/9 [hereinafter: Chicago Convention].

16 Annex 11, Chicago Convention.

17 Hollick, US. Oceans Policy: The Truman Proclamations, 17 Va. J. Int'l L. 23 (1977); O'Brien & Chapelli, The Law of the Sea in the "Canadian Arctic": The Pattern of Controversy (Part I), 19 McGmL L.J. 475 (1973).

18 Elizabeth Cuadra, Air Defence Identification Zones: Creeping Jurisdiction in the Airspace, 18 Va. J. Int'l L. 485 (1978).

Failure to comply may result in sanctions ranging from aerial interception by military aircraft to an escorted forced landing at an airfield of the coastal State, and even to aerial attack.<sup>19</sup>

Up to now, the USA, Canada, France and the former USSR have invoked and exercised the right to declare an ADIZ in international airspace and beyond the limit of their Flight Information Regions (FIRs). It is noteworthy that some of these zones overlap with other States' FIRs.<sup>20</sup>

These unilateral extensions of national jurisdiction through the declaration of an ADIZ, are in contrast not only with public international law, which accepts the right to exercise self-defense under very specific conditions, but also with the UNCLOS, which consolidates the right of overflight in international airspace and the Chicago Convention.<sup>21</sup>

The USA maintains perhaps the most comprehensive ADIZ system of any coastal state. The five ADIZs beyond the U.S. territorial sea were initially established in response to heightened tensions between the United States and the Soviet Union caused by the outbreak of the Korean War in 1950.<sup>22</sup> It is worth mentioning that the two U.S. continental ADIZs extend seaward of American coastlines by more than 300 nautical miles in some Atlantic areas and more than 400 nautical miles in southern California. Title 14, section 99.9 of the U.S. federal regulations states that no person may operate an aircraft into, or within an ADIZ unless the person files a DVFR [Defence Visual Flight Rules] flight plan containing the time and point of ADIZ penetration.”

The U.S. government bases its justification for these requirements on the need to ensure national security, to control illicit drug activities, to minimize unnecessary interception and search-and-rescue operations, and to decrease the risk of mid-air collisions and other public hazards.<sup>23</sup> Some international law scholars have concluded that these regulations reflect an American attempt to extend jurisdictional reach beyond national airspace.<sup>24</sup>

Overall, air law seems to promote multilaterally agreed solutions where control and coordination are necessary in areas that constitute global commons, as is the case with the FIRs in international airspace. In contrast,

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19 U.S. federal regulations define an Air Defence Identification Zone as “[airspace over land or water in which the ready identification, location, and control of all aircraft ... is required in the interest of national security.” 14 C.F.R. §99.3 (2009).

20 From 1956 to 1961, France had declared a zone of “responsibility and recognition”, parallel to the coastline of Algeria and at 70 miles distance from the coast, overlapping an FIR under the Italian responsibility.

21 C. Q. Christol, Unilateral claims for the use of ocean airspace, in J.K. Gamble (ed.), *Law of the sea: Neglected issues*, 1979, 122.

22 R. P. Anand, *Origin and Development of the Law of the Sea* 171 (1983).

23 Security Control of Air Traffic, 66 Fed. Reg. 49,819 (Sept. 28, 2001).

24 Peter A. Dutton, *Caelum Liberum: Air Defence Identification Zones Outside Sovereign Airspace*, 103 AM. J. INT'L L. 691 (2009). P. 699

air law does not appear to welcome the unilateral declaration by States of any zones beyond their national airspace that are not explicitly provided for in the law, such as the ADIZs.

### **I.C. Safety Zones in the Antarctic Treaty System**

The Antarctic Treaty<sup>25</sup> and other related agreements are collectively known as the Antarctic Treaty System (ATS). Said regime constitutes a good analogy with respect to space law, since both outer space and Antarctica are inhospitable environments to humans and difficult to survive in, they lack permanent populations and are also isolated and not easily accessible.<sup>26</sup> The core principles of the ATS regime include *inter alia* the promotion of scientific investigation and cooperation as well as a freeze in the status of territorial claims.

Regarding the concept of “safety zones”, the specific term is not explicitly mentioned in any of the ATS treaties. However, there are provisions whose *ratio* is similar to the one of safety zones. Specifically, Annex V to the Protocol on Environmental Protection to the Antarctic Treaty<sup>27</sup> establishes the concept of “Specially Protected Areas” and “Specially Managed Areas”.<sup>28</sup> In more detail, the Antarctic Treaty Parties have declared a number of Antarctic Specially Protected Areas (ASPAs), whose goal is to protect outstanding environmental, scientific, historic, aesthetic or wilderness values, as well as ongoing or planned scientific research.<sup>29</sup> Accordingly, entry into the site, or the extraction of native flora, cannot be taken without a permit, and permits could only be issued for “compelling scientific purposes” and in accordance with the management plan for the protected area.<sup>30</sup> In any case, the permitted actions must not jeopardize the safety of the natural ecological system existing in that area.<sup>31</sup>

On the other hand, the ATS regime also establishes Antarctic Specially Managed Areas (ASMAs). In this case, the goal is to create a strong management plan with respect to ecologically important areas, buttressed by clear zoning so that core protected areas exist within a broader protected

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25 Antarctic Treaty *entered into force* June 23, 1961, 402 U.N.T.S.71.

26 JoAnne Clayton Townsend, *Property Rights and future Space Commercialization*, 42 Proc. L. Outer Space 159, 165 (1999).

27 Protocol on Environmental Protection to the Antarctic Treaty, entered into force January 14, 1998, 30 ILM 1461.

28 Jack Wright Nelson, *Safety Zones: A near-Term Legal Issue on the Moon*, 44 J. Space L. 604, 620 (2020).

29 Australian Antarctic Program, <https://www.antarctica.gov.au/about-antarctica/environment/protecting-and-managing-special-areas/>

30 Alexander Gillespie, *Defining Internationally Protected Areas*, 11 J. Int'l Wildlife L. & Pol'y 240, 248 (2008).

31 Agreed Measures for the Conservation of Antarctic Fauna and Flora, art. VIII(4)(b), Brussels 1964.



regime.<sup>32</sup> Accordingly, a buffer zone is created, within which all potentially hazardous activities need to be carefully planned and managed, in order not to detract from the values for which the area was designated.<sup>33</sup> However, ASMAs are freely accessed, meaning that a permit is not necessary, in order to enter or to conduct activities therein.

With respect to the issue of delimitation of ASPAs and ASMAs, the risk of overlapping is not prominent, since said zones are not designated unilaterally. Particularly, according to Article 5 of Annex V of the Environmental Protocol to the Antarctic Treaty, said zones are declared through the proposal of a Management Plan to the Antarctic Treaty Consultative Meeting.

In conclusion, under the Antarctic Treaty regime the imposition of restrictions on entry to some areas is possible. However, these restrictions cannot be imposed unilaterally. On the contrary, consent from an internationally recognized body is necessary.

#### **I.D. Safety Zones in Outer Space**

The concept of safety zones in outer space initially emerged during the Cold War era, as a means of coordination for the passage of space objects within designated areas. These areas were denoted as ‘keep-out zones’, ‘caution zones’, ‘safety zones’, ‘security zones’, or ‘self-defense zones’ and they were destined to surround critical space assets and space missions.<sup>34</sup> Subsequent to the atmosphere of the Cold War, the two prevailing space-faring nations, each presented proposals for the application of safety zones in outer space. Nevertheless, disparities emerged with respect to the purpose and prerequisites of these zones. Traditionally, the USA proposed the establishment of the so-called ‘keep-out zones’<sup>35</sup> and ‘self-defense zones’<sup>36</sup> focused on restricting the risk of ASATs and any disruption or attack against its spacecraft by foreign space objects. On the other hand, the Soviet Union mainly followed the reasoning of security zones around spacecraft and

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<sup>32</sup> *Supra* note 30, 257.

<sup>33</sup> Fourteenth Antarctic Treaty Consultative Meeting, Rio de Janeiro, Brazil, 5-16 Oct. 1987, *Final Report*, par. 91-95.

<sup>34</sup> Ted A. Newsome, *The Legality of Safety and Security Zones in Outer Space: A Look To Other Domains and Past Proposals*, 15, 2016.

<sup>35</sup> US Congress, Office of Technology Assessment (OTA), *Anti-Satellite Weapons, Countermeasures, and Arms Control* (OTA – 1.S – 281) (Washington, DC: US Government Printing Office, September 1985) at 25 [OTA Report].

<sup>36</sup> US Congress, Commission on Integrated Long-Term Strategy, *Discriminate Deterrence: Report of the Commission on Integrated Long-Term Strategy* (January 1988) at 54, online: [http://usacac.army.mil/cac2/CSI/docs/Gorman/06\\_Retired/01\\_Retired\\_1985\\_90/26\\_88\\_IntegratedLongTermStrategy\\_Commission/01\\_88\\_DiscriminateDeterrence\\_Jan.pdf](http://usacac.army.mil/cac2/CSI/docs/Gorman/06_Retired/01_Retired_1985_90/26_88_IntegratedLongTermStrategy_Commission/01_88_DiscriminateDeterrence_Jan.pdf) [Discriminate Deterrence].

missions, as well as the permission for passage depending on the reason for the transit.<sup>37</sup>

Overall, States and scholars have acknowledged the necessity for an established system (often referred to as “rules of the road”) or Space Traffic Management in outer space.<sup>38</sup> The primary objective of such a system is to decrease the likelihood of collisions in orbit, the generation of space debris and potential military confrontations.

Nowadays, an analogous concept is the 200m ‘keep-out’ sphere around the International Space Station (ISS).<sup>39</sup> In this specific sphere, Providers of Commercial Orbital Transportation Services to NASA for resupply of the ISS are required to respect specified legal and technical requirements in order to ensure the safety of the mission.<sup>40</sup>

More recently, in the context of NASA’s Artemis Program<sup>41</sup> NASA and partner actors have agreed upon a political statement called the Artemis Accords, which *inter alia* provides in its Section 11 the right of the declaring parties to establish safety zones on the moon.

According to Section 11 of the Artemis Accords, the provisions on safety zones are arguably serving the purpose of Article IX OST. This intent of the contracting Parties is also evident by the wording of Section 11 of the Artemis Accords, which is very likely to that of Article IX OST.

Specifically, para. 7 of Section 11 of the Artemis Accords provides as follows:

‘In order to implement their obligations under the Outer Space Treaty, the Signatories intend to provide notification of their activities and commit to coordinating with any relevant actor to avoid harmful interference. The area wherein this notification and coordination will be implemented to avoid harmful interference is referred to as a ‘safety zone.’

Nonetheless, one can easily observe that the wording of the Artemis Accords is significantly vague concerning the exact breadth of such safety zones, the exact rights and obligations associated with them and any applicable delimitation rules. It is also important to note that the abovementioned Accords are merely a political statement with no legal effect whatsoever upon non-signatory States. Despite that, the Artemis Accords have already gained

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<sup>37</sup> Supra note 34, at. 20.

<sup>38</sup> *Ibid.*

<sup>39</sup> Diane S. Koons, Craig Schreiber, Francisco Acevedo, & Matt Sechrist, Risk Mitigation Approach to Commercial Resupply to the International Space Station, <https://ntrs.nasa.gov/archive/nasa/casi.ntrs.nasa.gov/20100014822.pdf>.

<sup>40</sup> *Ibid.*

<sup>41</sup> Artemis Program, <https://www.nasa.gov/artemisprogram> last accessed 15/9/2023.

signature by 27 States, some of which are also Parties and Signatory States of the Moon Agreement, which is examined below.

It is noteworthy that an analogous proposal has been suggested by the Hague International Space Resources Governance Workshop (the Hague Working Group) as a means to ensure the long- term sustainability of outer space.<sup>42</sup> Specifically, BuildingBlock 11.3 encourages the establishment of safety zones ‘to assure safety and avoid interference’ with space resource activities.

## **II. Safety Zones on the Moon Examined under the Legal Regime Governing Space Activities on the Moon**

From the above analysis (under section I), it derives that safety zones as perceived in general under the various international law fields and as envisioned in the 2020 Artemis Accords, signify designated areas around State assets, within which States exercise rights, such as jurisdiction and control, in order to protect their assets and/or activities. Particularly, in safety zones the freedoms of access and use are restricted, since the State that controls a safety zone is usually entitled to demand information from other States wishing to enter the same area and generally to decide the terms of such entrance, including relevant sanctions in case of breach.

In the space realm, safety zones on lunar areas are not envisioned by any of the provisions of the five space treaties. Accordingly, there is no provision with respect to the delimitation of such areas either. Nonetheless, as a space activity, the establishment and delimitation of lunar safety zones is necessarily governed by the general principles of the OST, which govern all space activities and by the Moon Agreement as *lex specialis* concerning space activities on the moon. Thereupon, the authors will attempt to examine the legality and the delimitation of safety zones on the moon under the Moon Agreement (II.A.) and under the general principles of the OST (II.B.).

### **II.A. The 1979 Moon Agreement as *lex specialis***

When discussing lunar missions, reference to the Moon Agreement is inescapable. The preamble of the Moon Agreement underscores the significance of the moon for future exploration and the imperative of preventing the Moon from becoming a battleground for international conflicts.

According to Article 4 of the Moon Agreement, ‘the exploration and use of the moon shall be the province of all mankind and shall be carried out for the benefit and in the interests of all countries, irrespective of their degree of economic or scientific development’. Similarly, Article 11 of the Moon

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42 O Bittencourt Neto et al (eds), Building Blocks for the Development of an International Framework for the Governance of Space Resource Activities: A Commentary (Eleven 2020), 58 (Building Block 10).

Agreement establishes that '*the moon and its natural resources are the common heritage of mankind*'. Furthermore, said Article urges States Parties to establish an international regime for the exploitation of the natural resources of the Moon, but only when such exploration is about to become feasible.

Whilst at first glance the concept of safety zones appears rather irreconcilable with that of the common heritage of humankind, it is important to note that although the Moon Agreement entered into force in 1984, up to date it remains of limited applicability, since it has only been signed by 22 States and ratified by 18 States.<sup>43</sup> In fact, some of the signatory States of the Moon Agreement (such as France, India, the United Arab Emirates, Australia etc.) have already signed the Artemis Accords, whose content is largely controversial to that of the Moon Agreement. Indicatively, the United Arab Emirates have recently informed the Secretary General of the UN of their intent to draw their ratification of the Moon Agreement.

## **II.B. The General Principles of Articles I, II and IX OST**

According to Article I OST, outer space, including the moon and other celestial bodies, shall be free for exploration and use by all States without discrimination of any kind, on a basis of equality and in accordance with international law, and there shall be free access to all areas of celestial bodies. Article I OST further establishes that outer space, including the moon, shall be the province of all mankind and the freedoms of exploration and use exercised therein must be in the benefit and in the interests of all countries. In addition, States shall facilitate and encourage international cooperation in space mainly through the exchange of information.<sup>44</sup>

The aforementioned provision of the OST is complemented by Article II OST, which prohibits the appropriation of outer space, including the Moon, by claim of sovereignty by means of use, occupation or any other means.

These two provisions of the OST guarantee that outer space, including the moon and other celestial bodies, constitute *res communis omnium* governed by the freedoms of exploration, access and use. Consequently, all States enjoy equal rights to explore, access and use all lunar areas without doing so in an exclusive manner for other States Parties.<sup>45</sup> In this regard, with respect to locations that are particularly favorable for the conduct of certain activities,

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43 Status of International Agreements relating to Activities in Outer Space, <https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/status/index.html> last accessed 15/9/2023.

44 Jean-Francois Mayence & Thomas Reuter, Article XI, in I Cologne Commentary on Space Law, 202.

45 Fabio Tronchetti, *The Non-Appropriation Principle as a Structural Norm of International Law: A New Way of Interpreting Article II of the Outer Space Treaty*, Air & Space Law, vol. xxxiii/3, 295-300 (2008); Stephen Gorove, *Interpreting Article II of the Outer Space Treaty*, 37 Fordham L. Rev., 352 (1969).

it has even been suggested that States should be precluded from constructing permanent installations therein,<sup>46</sup> since the latter would deprive other States from activities highly dependent on the strategic importance of such areas.

Moreover, the provisions of Articles I and II OST are complemented by Article IX OST, which provides *inter alia* that States must pay due regard to the corresponding interests of other States while conducting space activities.<sup>47</sup> As pointed out in the *travaux préparatoires* of the OST,<sup>48</sup> said duty is linked to the principle of cooperation as per the preamble and Articles I, III and IX OST. In this context, under Article IX OST States must undertake appropriate international consultations before proceeding with any planned activity, which might cause harmful interference to the activities of other States.<sup>49</sup>

On this note, the authors presume that the balance of interests established by Articles I, II and IX OST in liaison, can only be achieved through international cooperation and by ensuring that the rights provided under the OST are exercised in good faith. Given that under Article III OST international law is directly applicable to space activities, the core principle of good faith should not be overlooked.

Overall, the rights and freedoms established in Article I OST are not to be exercised without limitations. As Bin Cheng has aptly pointed out,<sup>50</sup> “*the exercise of the right of free access is in certain cases subject to conditions*”. On the one hand, space actors indeed have the right to establish installations on the moon and protect them from any harmful interference. On the other hand, they shall not do so in a manner that excludes other States and space actors from their respective and equal right to access and use the same lunar areas.

Bearing in mind the above analysis, it appears that the legality of safety zones established on the moon is inextricably linked with the method of their delimitation and with the content of rights and obligations to be exercised therein. More specifically, following the example of air law, which is the most suitable analogy for space as previously mentioned, the establishment of safety zones on the moon based on an international agreement that would

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46 Ivan A. Vlasic, *The Space Treaty: A Preliminary Evaluation*, 55 Calif. L. Rev. 5012-513 (1967).

47 Neta Palkovitz, *Exploring the Boundaries of Free Exploration and Use of Outer Space - Article IX and the Principle of Due Regard, Some Contemporary Considerations*, 57 Proc. L. Outer Space, 101(2014).

48 Summary Record of the 68<sup>th</sup> Meeting of the UNCOPUOS, U.N. Doc.A/AC.105/C.2/SR 68, at 10 (1966).

49 Michael C. Mineiro, *Article IX's Principle of Due Regard and International Consultations: An Assessment in Light of the European Draft Space Code-of-Conduct*, 53 Proc. L. Outer Space, 677 (2010); National Space Policy of the United States of America, Goals, 5(Dec. 2020) (USA).

50 Bin Cheng, *Studies in International Space Law* 402 (1997).

provide States merely with functional jurisdiction for purposes of coordination and space traffic management, does not appear illegal *per se*. On the contrary, the establishment of a legal regime on the moon similar to that of the FIRs, would seem appropriate to further the goals of Article IX OST and ensure the safe conduct of space activities. This would mean that safety zones would be established and delimited by means of an international agreement among all States Parties to the OST. Henceforth, any potential overlapping among safety zones would be practically avoided *a priori*, since States Parties would have to agree upon specific lunar areas to exercise functional control over.

In opposite, the unilateral declaration of safety zones on the moon and the delimitation of overlapping zones based on a provisional median line *mutatis mutandis* with the law of the sea is an inappropriate analogy that does not fit well with the provisions of space law and with the regime of the moon as a global common.

### Concluding Remarks

Overall, although the legality of safety zones on the moon remains highly debated at present, the present paper suggests that it is not really the legality of safety zones as such that must be put under the lens of international law, but rather the content of rights and obligations to be exercised therein and the method that will be finally followed for their establishment and delimitation. Besides, given that a number of space faring States have already declared their intention to establish such zones on the moon, the scenario of overlapping safety zones remains a very realistic one.

Thereupon, in line with the legal regime of the moon as a *res communis omnium* the solution that will be adopted for the delimitation of safety zones must correspond to the general principles of the OST and must reflect efforts in good faith to conclude upon internationally agreed solutions.

In the same vein, the collective examination *mutatis mutandis* of the law of the sea, air law and the Antarctic Treaty System points towards the direction of a multilateral agreement in line with the letter, the object and purpose of the OST principles, that could establish specifically delimited areas of functional rights and obligations for the purposes of space traffic management and avoidance of harmful interference.

In this regard the authors adopt the view that safety zones could be legally established on the moon, so long as their method of establishment and delimitation aligns with the principles of the OST and reflects the consent of all States Parties to it.