MANFRED LACHS SPACE LAW MOOT COURT COMPETITION 2021

TEAM NO.5

IN THE INTERNATIONAL COURT OF JUSTICE

AT THE

PEACE PALACE, THE HAGUE

Case Concerning Mega-Constellations, Autonomous Space Operations and Freedom of Scientific Investigation

Proclivia

v.

Asteria

ON SUBMISSION TO THE INTERNATIONAL COURT OF JUSTICE

MEMORIAL FOR THE RESPONDENT

ASTERIA

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QUESTIONS PRESENTED

- I -

Whether ASTERIA violated international law by not authorising and continuously supervising the space activities of CUSKO?

- II -

Whether ASTERIA is liable under international law for the loss of the D.A.M.E.-7T satellite?

Whether PROCLIVIA is liable under international law for the loss of the CUSKO satellite?

- III -

Whether ASTERIA is internationally responsible for impeding PROCLIVIA's exercise of the freedom of scientific investigation?

STATEMENT OF FACTS

THE BACKGROUND

ASTERIA is a newly independent state. On the other hand, PROCLIVIA is a much larger, and highly industrialised state. The privately-owned CUSKO (Consortium Utilizing Satellites in Key Orbits) entity was first registered in PROCLIVIA. In early 2025, it announced its plan to deploy the *CUSKO-E-TM* constellation. The constellation featured two revolutionary technologies: it was *monostazine*-propelled, and employed an autonomous attitude and orbit control system (AOCS). The SARASTRO (Satellite Autonomy enabling Revolutionary ASTROnautics) software was programmed to automatically execute orbital manoeuvres on the basis of background surveillance data.

In April 2025, CUSKO filed for a license under the PROCLIVIAN Space Act, requesting authorisation to launch and operate the CUSKO-E-TM constellation. Under the Space Act, CUSKO was subjected to comprehensive operational risk assessment, a safety plan and an environmental impact assessment. The PROCLIVIAN authorities declined CUSKO's licensing request because of the novel automated operations concept, the novel propellant and the uncertainties associated with a self-operating fleet of satellites.

Disappointed by PROCLIVIA's opposition to innovation, CUSKO turned to ASTERIA. The ASTERIAN authorities invited CUSKO to relocate to ASTERIA. In December 2025, CUSKO officially registered the company in ASTERIA and relocated its head office to the ASTERIAN capital, Hayden. However, the satellite manufacturing plant and mission support centre remained in PROCLIVIA.

THE LAUNCH AND DEPLOYMENT OF CUSKO-E-TM

In June 2026, CUSKO launched and deployed the first CUSKO-E-TM satellites from its own ORAMI (Operational Rocket Ascent Management Infrastructure) platform. The ORAMI platform, originally a PROCLIVIAN oil rig, was converted by CUSKO into a floating launch pad towed to, and anchored in, the exclusive economic zone of ASTERIA in January 2026. By December 2026, the CUSKO-E-TM constellation was declared operational, and ASTERIA issued a commemorative coin to celebrate what it termed "a safe eco-logical spaceflight revolution".

THE DECLARATION OF THE SAFETY ZONE

In February 2027, *The Discovery Journal*, reported concerns regarding the functioning of the *monostazine*-propelled engines and the SARASTRO system. Allegedly, several satellites had been lost within weeks after their deployment, and at least one unplanned close conjunction event occurred. These concerns prompted the CUSKO management to issue a press release. While CUSKO did not deny the allegations, it reiterated that the constellation continues to operate in good health.

Concerned by CUSKO's response, the ASTERIAN government, among other actions, publicly declared a 'safety zone' at the orbital altitude of the constellation, and requested space actors intending to enter or cross that zone to submit advance information of their plans so as to avoid risk of collision. Pertinently, no further technical problems were reported on the CUSKO-E-TM constellation.

PROCLIVIA'S NON-COOPERATION

ASTERIA was not satisfied by the depth of information supplied by CUSKO. Wishing to better understand possible risks of operating a large constellation, ASTERIA turned to PROCLIVIAN authorities. ASTERIA requested, via a diplomatic note at the margins of the June 2027 COPUOS session, a copy of all technical documentation that CUSKO had originally provided in April 2025 as part of the PROCLIVIAN licensing process. However, the PROCLIVIAN authorities did not respond.

THE LAUNCH AND DEPLOYMENT OF D.A.M.E.-7T

In September 2028, PROCLIVIA launched and subsequently registered the newest generation of its governmental *Discovery of the Antarctic and Maritime Explorer* (D.A.M.E.) satellites into outer space: D.A.M.E.-7T. The D.A.M.E.-7T was equipped with the *Waltzing Wizard*: a ground-breaking collision avoidance system that, on the basis of background surveillance data, would automatically calculate the best possible trajectory. Despite the "safety zone" declaration, PROCLIVIA did not inform ASTERIA of the exact satellite trajectory of D.A.M.E.-7T nor of its novel collision avoidance system.

THE COLLISION

In order to reach its designated orbit, the D.A.M.E.-7T had to cross the orbital altitude of the CUSKO-E-TM constellation. As the D.A.M.E.-7T approached the satellite constellation in September 2028, the two software systems executed conflicting emergency escape manoeuvres. Ultimately, this resulted in an on-orbit collision. Several large fragments of the D.A.M.E.-7T were propelled to a perigee of 400km.

THE AFTERMATH

In 2033, a plutonium battery of the D.A.M.E.-7T re-entered the Earth's atmosphere, and eventually crashed into Antarctica. The resultant radioactive pollution brought an abrupt end to PROCLIVIA's decades-long scientific investigations in Antarctica. In the wake of the crash, CUSKO lost hundreds of customers.

JOINT INVESTIGATION

Following the spacecraft collision, PROCLIVIA and ASTERIA initiated discussions through diplomatic channels, and agreed to undertake a joint technical investigation. The investigation was completed in early 2030, and ASTERIAN and PROCLIVIAN experts: (a) agreed that all background surveillance data had been accurate, and was not a factor in the collision; but (b) failed to agree on the exact circumstances leading to the collision. Unable to resolve their dispute, PROCLIVIA and ASTERIA have agreed to present their case before the International Court of Justice.

THE RELEVANT TREATIES

ASTERIA and PROCLIVIA are both parties to the UN Charter and the Antarctic Treaty. While PROCLIVIA is a party to all five UN space treaties, ASTERIA has only signed (but not ratified) the Outer Space Treaty. The *Orokanga Accord* is a non-legally binding "Declaration of Friendly Relations, Good Neighbourliness and Scientific Cooperation" between ASTERIA and PROCLIVIA, in 1998.

TIMELINE OF EVENTS

Early 2025	CUSKO publicly announced CUSKO-E-TM
April 2025	CUSKO's license rejected by PROCLIVIA
December 2025	CUSKO officially registered in ASTERIA and its head office relocated
June 2026	First CUSKO-E-TM satellite launched and deployed
December 2026	150 CUSKO satellites successfully deployed
February 2027	Concerns regarding *monastazine*-propelled engines and the SARASTRO software raised among the mission support experts of CUSKO
June 2027	ASTERIA requested PROCLIVIAN authorities for a copy of technical documentation of CUSKO
1 June 2027	UNCOPUOS session; ASTERIA announced that it had become a State Party to the Liability Convention, and repeated the request for advanced information of plans to enter "safety zone" at the orbital altitude of CUSKO-E-TM
September 2028	PROCLIVIA launched D.A.M.E.-7T
15 September 2028	D.A.M.E.-7T collided with a CUSKO-E-TM satellite
Early 2030	Joint Technical Investigation completed

SUMMARY OF ARGUMENT

[I] PROCLIVIA VIOLATED INTERNATIONAL LAW BY NOT COOPERATING AND EXCHANGING INFORMATION THAT WOULD HAVE ENABLED ASTERIA TO ASSESS THE RISKS POSED BY A MEGA-CONSTELLATION

As a measure of due diligence, ASTERIA sent a diplomatic note to the PROCLIVIAN authorities requesting for information regarding CUSKO-E-TM. PROCLIVIA failed to cooperate and share the requested information. Further, it also did not comply with the safety zone requirement. It did not inform ASTERIA about the satellite trajectory and novel collision avoidance system of D.A.M.E.-7T. As a consequence, PROCLIVIA violated its duty of international cooperation under the OST and under general international law. PROCLIVIA owed a duty to cooperate under Article I of the OST, elaborated by the 'Space Benefits Declaration'. As a developed nation, PROCLIVIA's duty extended to sharing the information that would facilitate the space program and scientific development of a developing nation such as ASTERIA. Further, it owed this duty under the U.N. Charter and under general international law.

PROCLIVIA also violated its duty to consult ASTERIA. This obligation flows from pre-existing customary rules, further codified in Article IX of the OST. It had a reason to believe that its activities would cause harmful interference with ASTERIA's activities and therefore, it had an obligation to consult ASTERIA, which it breached. This obligation necessarily involves the exchange of information which would be sufficient to prevent any probable harmful interference.

PROCLIVIA is also obligated to pay due regard to ASTERIA's interests, under general International Law, further codified under Article IX of the OST. By not providing he requested information, PROCLIVIA did not take all steps required to avoid harm to ASTERIA's interests. Therefore, it did not pay due regard to ASTERIA's interests.

Further, PROCLIVIA violated Article XI of the OST. Under Article XI, states are obligated to inform the public of the nature of their activities, including information like the trajectory details. PROCLIVIA did not inform regarding the trajectory or the autonomous system on D.A.M.E.-7T.

[IIA] PROCLIVIA IS LIABLE FOR THE LOSS OF THE CUSKO-E-TM SATELLITE

By failing to notify ASTERIA about D.A.M.E.-7T's satellite trajectory and novel collision avoidance system, PROCLIVIA breached the requirement of due diligence. Due diligence requires every state to take best possible measures to prevent damage. By ignoring ASTERIA's safety zone requirement, PROCLIVIA failed to take the best possible measures it could and therefore is at fault.

The space collision was a result of the uncoordinated emergency manoeuvre which was conducted in the absence of any pre-programmed information. This would not have been the case if PROCLIVIA had submitted detailed information to ASTERIA pertaining to D.A.M.E.-7T. Therefore, PROCLIVIA's non submission of information caused the space collision. This satisfies the test of proximate causation; hence PROCLIVIA will be liable under Article III, LIAB

Since PROCLIVIA is the launching state of D.A.M.E.-7T and there is proximate causation, PROCLIVIA will also be liable under Article VII, OST.

In international law, liability is fault-based and arises from violation of a duty by a state. PROCLIVIA violated its international law obligation of international cooperation, consultation and due regard. Hence, PROCLIVIA will be liable under general international law.

[IIB] ASTERIA IS NOT LIABLE FOR THE LOSS OF THE D.A.M.E.-7T SATELLITE

ASTERIA's actions do not constitute breach of article VI, OST or negligence. Article VI, OST mandates states to authorize and supervise their space activities. However, the OST does not provide any minimal standards or procedures to satisfy this requirement. There is no necessity of a national space legislation. Therefore, ASTERIA's non-enactment of a national space law does not violate the treaty obligation. Further, the standard of due diligence that has to be observed is determined on a case-to-case basis. In the present case, ASTERIA has exercised due diligence and is not negligent.

ASTERIA took all possible measures to prevent reasonably foreseeable damage. By ensuring that: (i) CUSKO was PAMINA compliant; (ii) by asking CUSKO to re-asses their satellites and; and (iii) by declaring a "safety zone", ASTERIA took the best possible practicable measures it could. Since there is no negligence, there is no fault. Hence, ASTERIA is not liable under Article III, LIAB.

Further, there is no proximate causation as PROCLIVIA's non-submission of information was the intervening event in the chain of causation. Since no causal link can be established between any alleged negligence on ASTERIA's part and the space collision, ASTERIA is not liable under Article VII, OST or general international law either.

[III] ASTERIA IS NOT INTERNATIONALLY RESPONSIBLE FOR ANY ALLEGED INTERRUPTION OF PROCLIVIA'S EXERCISE OF THE FREEDOM OF SCIENTIFIC INVESTIGATION

Article I of the Outer Space Treaty is declaratory of customary international law, and enshrines the freedom of scientific investigation in outer space. PROCLIVIA and ASTERIA are party to the Antarctic Treaty. Article II of the Antarctic Treaty guarantees the "freedom of scientific investigation and cooperation toward that end." However, neither of the aforementioned freedoms are absolute. The freedom of scientific investigation is part of the broader freedom of exploration enshrined in Article I of the Outer Space Treaty, and subject to limitations.

ASTERIA's national activities are lawful limitations on PROCLIVIA's freedom of scientific investigation. The orbital positioning of the CUSKO-E-TM satellite constellation is lawful use of outer space. The satellite constellation is protected by both the Outer Space Treaty and the International Telecommunication Union. Therefore, it does not amount to national appropriation of outer space.

The declaration of a safety zone is a reinforcement of the customary international law principle of due regard. In light of the potential for harmful interference, ASTERIA's safety zone furthers its duty to observe due regard. Admittedly, any declared safety zone must meet the criteria of reasonableness. The extent, duration, and reality of the threat of collision cement the reasonableness of ASTERIA's safety zone. Therefore, ASTERIA has not impaired PROCLIVIA's exercise of the freedom of scientific investigation.

Article IX of the Outer Space Treaty, the Antarctic Treaty system, and principles of general international law oblige states to prevent transboundary harm. As previously submitted, there

is no causal link between ASTERIA's activities and the collision. Therefore, ASTERIA's national activities have not caused harmful contamination of either outer space or Antarctica.

International responsibility is established between states when an unlawful international act can be attributed to a state. In the absence of any unlawful conduct imputable to ASTERIA, international responsibility cannot be established. The orbital positioning of the CUSKO-E-TM and the safety zone declaration are lawful limitations on PROCLIVIA's exercise of the freedom of scientific investigation. Furthermore, there is no causal link between ASTERIA's activities and environmental damage to outer space and Antarctica. Therefore, ASTERIA is not internationally responsible.

ARGUMENT

[I] PROCLIVIA VIOLATED INTERNATIONAL LAW BY NOT COOPERATING AND EXCHANGING INFORMATION THAT WOULD HAVE ENABLED ASTERIA TO ASSESS THE RISKS POSED BY A MEGA-CONSTELLATION

In order to improve safety, ASTERIA requested the CUSKO management to clarify the potential risks of the deployment and operation of the CUSKO-E-TM constellation.[1] In order to understand and mitigate the risks even better, ASTERIA requested the PROCLIVIAN authorities for a copy of all the technical documentation that CUSKO had provided them. However, this request remained unanswered.[2]

As a measure of further due diligence, ASTERIA requested the space actors to submit advanced information of their plans before entering a "safety zone" at the orbital altitude of CUSKO-E-TM constellation.[3] In September 2028, PROCLIVIA launched the D.A.M.E.-7T,[4] which had to cross the orbital zone utilized by the CUSKO-E-TM constellation.[5] PROCLIVIA did not inform ASTERIA of the exact satellite trajectory of D.A.M.E.-7T, nor about its novel collision avoidance system.[6]

ASTERIA submits that PROCLIVIA failed to exchange information and cooperate with ASTERIA, on these two accounts. Firstly, by not sharing the requested information regarding

[1] *Compromis* ¶8.
[2] *Compromis* ¶9.
[3] *Compromis* ¶8.
[4] *Compromis* ¶10.
[5] *Compromis* ¶11.
[6] *Compromis* ¶13.

CUSKO-E-TM. Secondly, by not sharing information regarding D.A.M.E.-7T before entering the safety zone. By doing so, PROCLIVIA violated its duty of international cooperation [1]; its duty to consult ASTERIA [2]; its duty to pay due regard to the interests of other states [3]; Article XI of the OST [4].

[1] PROCLIVIA violated its duty of international cooperation

PROCLIVIA did not cooperate in assisting ASTERIA with information that would have helped it assess the risks involved in a mega-constellation. Further, this information could have helped mitigate this risk. By doing so, PROCLIVIA violated international law by not cooperating as it has a duty to cooperate under both, the OST [1.1]; and under general international law [1.2].

[1.1] PROCLIVIA violated its obligation of international cooperation under the OST

Article I of the OST establishes the obligation to "facilitate and encourage international cooperation" in the scientific investigation of outer space.[7] The importance of international cooperation is also reaffirmed in the preamble of the OST.[8] This right of receiving cooperation extends to all states without discrimination, including states that are not party to the OST,[9] such as ASTERIA.[10]

[7] Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and other Celestial Bodies art. I, Oct. 10, 1967, U.S.T. 2410, 610 U.N.T.S. 205 [hereinafter OST].
[8] Preamble, OST.
[9] Article 36(1), Vienna Convention on the Law of Treaties, *opened for signature* May 23, 1960, 1155 U.N.T.S.[hereinafter VCLT].; Steven Freeland & Ram Jakhu, *The Relationship Between The United Nations Space Treaties And The Vienna Convention On The Law Of Treaties*, 55 I.I.S.L. Proc. 375 (2013).
[10] *Compromis* ¶19.

As a state with advanced space capabilities, PROCLIVIA has a higher duty to further international cooperation.[11] International cooperation and assistance can act as a tool to build confidence in the states with lesser space capabilities by reducing the disparity in the availability of space-based information.[12] The principle of common heritage of mankind enshrined in Article I can only effectively be realised by increasing transparency.[13]

The 'Space Benefits' Declaration was unanimously adopted by a resolution of the UNGA, specifically for the purpose of interpreting Article I of the OST.[14] It is a subsequent agreement between the parties regarding the interpretation of Article I. Thus, according to Article 31 of the VCLT,[15] which is custom,[16] the declaration forms the context for the interpretation of Article I of the OST. It acts as an authoritative interpretation of the Article I cooperation principle.[17]

The Declaration emphasises on the need for countries with relevant space capabilities to contribute towards the benefit and interest of "countries with incipient space programmes".[18] They should extend technical assistance with the goals of "promoting the development of space

[11] Sergio Marchisio, *Article IX, in* I COLOGNE COMMENTARY ON SPACE LAW 551, 556 (Stephan Hobe et al. eds. 2009).
[12] Rep. of the G.A., at, U.N. Doc. A/68/189 (2013).
[13] Mike Manor and Kurt Neuman, *Space Assurance* in SECURING FREEDOM IN THE GLOBAL COMMONS (Scott Jasper ed., 2010); Ksenia Shestakova, *The Dichotomy Between The Duty To Provide Information And Security Concerns Of A State*, 55 I.I.S.L. PROC. (2012).
[14] Marietta Benkii & Kai-Uwe Schrogl, *History and impact of the 1996 UN Declaration on 'Space Benefits'* 13(2) SPACE POLICY 139, 143 (1997); Elena Carpanelli & Brendan Cohen, *A Legal Assessment of the 1996 Declaration on Space Benefits on the Occasion of Its Fifteenth Anniversary*, 38 JOURNAL OF SPACE LAW 1 (2012).
[15] Article 31(3)(a), VCLT.
[16] Territorial Dispute (Libya v. Chad), 1994 I.C.J. 7, at 41; LaGrand (Germany v. United States of America), 2001 I.C.J. 466, at 99.
[17] Benkii & Schrogl, *supra* note 14, at 143.
[18] G.A. Res. 51/122, Space Benefits Declaration, ¶3 (Feb. 4, 1997) [Hereinafter Space Benefits Declaration].

science and technology" and the "development of relevant and appropriate space capabilities in interested States".[19]

PROCLIVIA is a highly industrialised state,[20] with space capabilities to launch the "world's most advanced, complex and expensive governmental Earth observation satellite ever built".[21] Meanwhile, ASTERIA is a young independent state, dealing with space activities for the first time.[22] Therefore, PROCLIVIA bears the obligation to cooperate with and assist ASTERIA.

While states are free to determine their commitment to international cooperation,[23] PROCLIVIA has affirmed its intention to extend scientific cooperation to ASTERIA in the *Orakanga Accord*.[24] Further, constraints posed by intellectual property rights might make the sharing of information unreasonable[25] and impracticable.[26] However, the lack of such constraints is proved by PROCLIVIA providing CUSKO's assessments to *Endeavour Enterprise*.[27] Therefore, the defence of impracticability of sharing the information due to intellectual property constraints would not be viable.

The Declaration also underlines the role of COPOUS "as a forum for the exchange of information on national and international activities in the field of international cooperation in the exploration and use of outer space".[28] Importantly, ASTERIA did make an attempt to use

[19] Space Benefits Declaration ¶5.
[20] *Compromis* ¶3.
[21] *Compromis* ¶10.
[22] *Compromis* ¶3.
[23] Space Benefits Declaration ¶2.
[24] *Compromis* ¶19.
[25] Space Benefits Declaration ¶ 2.
[26] Jean-François Mayence & Thomas Reuter, *Article XI* in I COLOGNE COMMENTARY ON SPACE LAW 609, 633 (Stephan Hobe et al. eds. 2009).
[27] *Compromis* ¶12.
[28] Space Benefits Declaration ¶ 7.

this forum via a diplomatic note to request for assistance through technical information regarding CUSKO.[29] Therefore, PROCLIVIA had the duty to exchange the information requested.

ASTERIA's request for information was in order to better understand the possible risk of operating a large satellite constellation. Responding to this request would have assisted the safe development of ASTERIA's space program. Therefore, by ignoring the request, PROCLIVIA violated its duty to cooperate under the OST.

[1.2] PROCLIVIA violated its obligations of international cooperation under general international law

International cooperation is a general principle embedded in the very notion of law-making.[30] Moreover, the UN Charter underlines the need for international cooperation in solving problems of an international character.[31] PROCLIVIA is a party to the UN Charter.[32] Further, Article III of the OST also extends the obligation of carrying space activities in accordance with the UN charter, in the interest of international cooperation.[33] The duty to cooperate under the Charter extends to the field of science and technology.[34] The specific obligation of exchanging information that helps understand and assess the possible effects of a hazardous activity is also recognised as part of the principle of cooperation under various other

[29] *Compromis* ¶9.
[30] MANFRED LACHS, THE LAW OF OUTER SPACE: AN EXPERIENCE IN CONTEMPORARY LAWMAKING 27 (Brill 2010).
[31] Article 1(3), Charter of the United Nations, 26 June 1945, 1 U.N.T.S. XVI.
[32] *Compromis* ¶19.
[33] Article III, OST.
[34] G.A. Res. 2625(XXV), Friendly Relations Declaration (Oct. 24, 1970).

instruments governing the global commons, such as the Ozone Convention[35] and the Antarctic Protocol.[36]

PROCLIVIA reaffirmed its commitment towards this duty to cooperate with PROCLIVIA in the *Orokanga Accord* which declares "Friendly Relations, Good Neighbourliness and Scientific Cooperation" between the two states.[37] Even though it is a non-legal agreement, it can have legal implications as it is based on existing sources and rules of international law.[38] The Accord, along with the close relations maintained between the states,[39] reflects their conduct and confirms their recognition of these general obligations.

Therefore, by failing to cooperate with ASTERIA, PROCLIVIA also violated its obligations under international law, specifically as established under the U.N. Charter.

[2] PROCLIVIA violated its obligation to undertake consultation

Under general international law, there is a customary obligation to consult potentially affected states when conducting risky activities.[40] This duty to consult in order to avoid a likely conflict can also be inferred from the *bona fides* principle guiding the relationship between states.[41]

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[35] Vienna Convention for the Protection of the Ozone Layer, adopted on March 22, 1985, 1513 UNTS 293, 2(2).
[36] Protocol on Environmental Protection to the Antarctic Treaty, opened for signature Oct. 4, 1991, 6(1)(c) ATSCM/2/3/2.
[37] *Compromis* ¶19.
[38] Philippe Gautier, *Non-Binding Agreements* in 7 MAX PLANCK ENCYCLOPEDIA OF PUBLIC INTERNATIONAL LAW 706, 710 (R. Wolfrum ed., 2012).
[39] *Compromis* ¶3.
[40] Lake Lanoux Arbitration (Fr. v. Spain), 12 R.I.A.A. 281 (1957); Construction of a Road in Costa Rica along the San Juan River (Nicaragua v. Costa Rica), [2015] ICJ Rep. A/71/4.
[41] GEORGE T. HACKET, SPACE DEBRIS AND THE CORPUS IURIS SPATIALIS 66 (Editions Frontières 1994).

In the specific realm of outer space law, this pre-existing duty to consult has been codified under Article IX of the OST. Article IX puts an obligation on state parties to "undertake appropriate international consultations" before proceeding with any space activity that they have a "reason to believe" would cause "potentially harmful interference with activities of other states in the peaceful exploration and use of outer space".[42] While the treaty does not define consultation, it is accepted that the obligation includes at least contacting the potentially affected party and providing them with information sufficient to prevent any probable harmful interference.[43] Transparent exchange of information is especially crucial in order to avoid harmful consequences involving autonomous system, such as in this case.[44]

PROCLIVIA did not contact ASTERIA or provide information regarding the exact satellite trajectory and novel collision avoidance system of D.A.M.E-7T.[45] It also did not provide ASTERIA with the technical documentation of CUSKO as requested by ASTERIA.[46] This information can reasonably be considered to amount to sufficient information required to be exchanged under the consultation obligation enshrined in Article IX. This is because ASTERIA had declared that this would help understand and mitigate the risk of harm.

ASTERIA submits that refraining to share this information amounts to a violation of PROCLIVIA's obligation to consult. This is on the grounds that it had a reason to believe that

[42] Article IX, OST.
[43] Micheal Mineiro, *Principles of Peaceful Purpose and the Obligation to Undertake Appropriate International Consultation in Accordance with Article IX of the Outer Space Treaty*, 5TH EILENE GALLOWAY SYMPOSIUM ON CRITICAL ISSUES IN SPACE LAW, WASHINGTON DC 2 (2010).
[44] Jeff Foust, *Keeping satellites from going bump in the night*, THE SPACE REVIEW (September 23, 2019), https://www.thespacereview.com/article/3800/1.
[45] *Compromis* ¶13.
[46] *Compromis* ¶9.

the space activities of D.A.M.E.-7T would harmfully interfere with the activities of CUSKO-E-TM [2.1]; and the onus to undertake consultation was on PROCLIVIA [2.2].

[2.1] PROCLIVIA had "reason to believe" that the activities of D.A.M.E.-7T would cause potentially harmful interference with ASTERIA's space activities

Having a "reason to believe" that a harmful interference would take place is a condition precedent for the obligation to consult.[47] To determine if there is a reason to believe that the activities of a state will harmfully interfere with others', it needs to be assessed whether they had such knowledge that proves such an assertion.[48] In the present case, ASTERIA had publicly announced a "safety zone" at the orbital altitude of CUSKO-E-TM constellation. Consequently, PROCLIVIA was aware of this orbital altitude. ASTERIA had also publicly requested space actors intending to enter the zone to submit advanced information to avoid a risk of collision. As a communications satellite,[49] the activities of CUSKO-E-TM were for the peaceful use of outer space.

Thus, PROCLIVIA had the knowledge and the "reason to believe" that entering the zone without informing before-hand could lead to a risk of collision. Consequently, it had a reason to believe that it could lead to a harmful interference with ASTERIA's peaceful space activities.

[2.2] The onus to conduct consultation lies on PROCLIVIA and not on ASTERIA

Article IX states that the obligation of consultation arises when there is a reason to believe that activities "planned" by the state would cause potentially harmful interference. The ordinary

[47] Article IX, OST.
[48] Michael Mineiro, *FY-1C and USA-197 ASAT Intercepts: An Assessment of Legal Obligations under Article 9 of the Outer Space Treaty*34(2) JOURNAL OF SPACE LAW 321, 336 (2008).
[49] *Compromis* ¶1.

meaning[50] implies that the state which begins the obligation later in time has the obligation to consult.[51] While the OST does grant a right to request a consultation, it does not obligate states to do so.[52]

In this case, the activities of CUSKO-E-TM began in June 2026.[53] The "safety zone" was declared in 2027.[54] With this, the reason to believe that harmful interference with its activities would occur arose. D.A.M.E.-7T was launched after this, in September 2028.[55] Thus, the obligation to conduct the consultation was of PROCLIVIA. Therefore, PROCLIVIA violated this obligation by not consulting ASTERIA.

[3] PROCLIVIA violated its obligation to pay due regard to the corresponding interests of other states

As a rule of general international law, the legitimate interests of other states must be taken into consideration when a state exercises its rights.[56] The principle of "*sic utere tuo ut alienum non laedas*" obligates states to not allow its territory to be used contrary to rights of other states,[57] which was famously referred to in the *Trail Smelter* case.[58] The Court interpreted the principle to order not just reparation, but also measures to prevent future injury. Therefore, the principle

[50] Article 31, VCLT.
[51] J.G. Verplaetse, *International Consultation and the Space Law Treaties*, 11 I.I.S.L. PROC. 63, 65 (1968).
[52] Article IX, OST; Jerzy Sztucki, *International Consultation and Space Treaties*, 17 I.I.S.L. PROC. 147, 163 (1974).
[53] *Compromis* ¶5.
[54] *Compromis* ¶8.
[55] *Compromis* ¶15.
[56] Ram S Jakhu, *Legal Issues Relating to the Global Public Interest in Outer Space*, 32 JOURNAL OF SPACE LAW 31 (2006).
[57] Corfu-Channel Case (United Kingdom v. Albania), Judgement, 1949 I.C.J. Rep. 4 at 22.
[58] Trail Smelter Arbitration (U.S./Can.) 3 R.I.A.A. 1905 (1941).

extends to an obligation to take suitable preventive measures to avoid harm to the interests of the state,[59] which includes injury to property.[60]

In the specific context of outer space, this rule has been codified under Article IX of the OST. Article IX lays down the obligation to pay "due regard to the corresponding interests of all other States Parties." This lays down the obligation to ensure that the exercise of rights and freedoms in outer space does not interfere with, or compromise the safety of, space operations of other states.[61] Thus, states must prove beyond reasonable doubt that every possible step was undertaken to prevent harm to other states.[62]

ASTERIA had already declared that pre-notification of entering the safety zone must be provided to prevent a risk of collision. Therefore, PROCLIVIA was aware that its satellite will pass through this zone. It was also aware that doing so without a pre-notification will lead to a risk of collision. A collision with and consequent injury to ASTERIA's satellite would hinder ASTERIA's interests. By not providing required information, PROCLIVIA did not take all steps to avoid harm to ASTERIA's interests. Therefore, it did not pay due regard to its interests.

[2] PROCLIVIA violated Article XI of the OST

As a party to the OST, PROCLIVIA must comply with the obligation to "inform … the public, to the greatest extent feasible and practicable, of the nature" of space activities.[63] Any information that may influence the safety of outer space operations should be exchanged in a

[59] LOTTA VIIKARI, THE ENVIRONMENTAL ELEMENT IN SPACE LAW 152 (2008).
[60] *Id.*, at 155.
[61] Marchisio, *supra* note 11, 568.
[62] *Id.*, at 570
[63] Article XI, OST.

timely manner.[64] Technical information such as orbit positions and flight paths of the space object come under this ambit.[65] Further, despite the clause regarding feasibility and practicability, Article XI is regarded as a legally binding provision under public international law.[66] Although the provision allows discretion to the state, it must be exercised reasonably and with due regard to the interest of other states and in good faith.[67]

A useful analogy can be drawn to the ESA Convention,[68] which establishes a similar obligation and extends a more explicit definition of the interests that determine the appropriateness of the information to be shared.[69] It limits the extension of the obligation to "communication would be inconsistent with the interests of its own security or its own agreements with third parties, or the conditions under which such information has been obtained."[70]

It is unreasonable to share strategic information that concern military purposes and might jeopardise the security of the state.[71] In this instance, PROCLIVIA has announced that D.A.M.E.-7T is an observation satellite which is a part of its scientific programme in and around Antarctica.[72] It can reasonably be inferred that information regarding the trajectory and autonomous system of such a satellite does not carry any strategic or defence purposes.

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[64] U.N. Secretary-General, *Developments in the field of information and telecommunications in the context of international security*, at 18, U.N. Doc. A/66/152 (July 15, 2011); Comm. On the Peaceful Uses of Outer Space, Guidelines for Long-term Sustainability of Outer Space Activities, U.N. Doc. A/AC.105/C.2/2012/CRP.19.
[65] Mayence & Reuter, *supra* note 26, at 629.
[66] *Id.*, at 635.
[67] N. Atl. Coast Fisheries (U.K. v. U.S.), 11 R.I.A.A. 167, 196 (Perm. Ct. Arb. 1910); BIN CHENG, GENERAL PRINCIPLES OF LAW AS APPLIED BY INTERNATIONAL COURTS AND TRIBUNALS 133 (1953).
[68] Convention for the. Establishment of a European Space Agency, May 30, 1975, 1297 U.N.T.S. 186 [hereinafter ESA Convention]; Mayence & Reuter, *supra* note 26, at 632.
[69] Mayence & Reuter, *supra* note 26, at 632.
[70] Art III, ESA Convention.
[71] Mayence & Reuter, *supra* note 26, at 631.
[72] *Compromis* ¶10.

Competitive interests or intellectual property rights must also be considered when determining what can practicably be shared.[73] However, the information retained by PROCLIVIA was regarding the trajectory of the satellite and about its novel collision avoidance system.[74] The technical aspects of the satellite that might be protected by intellectual property rights were irrelevant. The requirement was a mere notification prior to entering the "safety zone" regarding the path of the satellite and the novel collision system on-board. This would have acted as a reasonable preventive measure.

PROCLIVIA did not inform the public regarding the trajectory and autonomous collision-avoidance system of D.A.M.E.-7T.[75] Security or commercial concerns did not act as an impediment to sharing this information. As this obligation is owed to the international community, ASTERIA can invoke its violation.[76] Therefore, PROCLIVIA violated Article XI by not sharing information regarding *Waltzing Wizard* and the trajectory of D.A.M.E.-7T.

[73] Mayence & Reuter, *supra* note 26, at 633.
[74] *Compromis* ¶11.
[75] *Compromis* ¶11.
[76] Article 42, Draft Articles on Responsibility of States for Internationally Wrongful Acts, G.A. Res. 56/83, U.N. Doc. A/RES/56/83 (Jan. 28, 2002) [Hereinafter ARSIWA].

[IIA] PROCLIVIA IS LIABLE UNDER INTERNATIONAL LAW FOR THE LOSS OF THE CUSKO-E-TM SATELLITE

At 02h56 UTC on 15 September 2028, as a result of two uncoordinated emergency manoeuvres, D.A.M.E.-7T collided with a CUSKO-E-TM satellite, causing the destruction of both spacecraft. ASTERIA submits that PROCLIVIA is liable under Article III, LIAB [1]; Article VII, OST [2]; and general international law [3] for the loss of the CUSKO-E-TM satellite

[1] PROCLIVIA is liable under Article III, LIAB

Launching states are held liable for damage caused to and by a space object in outer space under Article III, LIAB.[77] CUSKO and D.A.M.E.-7T are satellites and hence space objects.[78] The loss of CUSKO-E-TM constitutes damage and occurred in outer space.[79] PROCLIVIA is the launching state for the D.A.M.E.-7T satellite.[80] ASTERIA submits that PROCLIVIA is liable for the loss of the CUSKO-E-TM satellite because PROCLIVIA was at fault [1.1]; and the damage caused to the CUSKO-E-TM satellite was due to the fault of PROCLIVIA [1.2].

[1.1] PROCLIVIA was at fault

Liability under Article III of the LIAB is based on fault.[81] ASTERIA submits that PROCLIVIA's failure to comply with the requirements of the safety zone constitutes fault. "Fault" has not been defined in LIAB but we can take recourse to the *travaux* to interpret the

[77] Convention on International Liability for Damage Caused by Space Objects art. 3, entered into force Oct. 9, 1973, 24 U.S.T. 2389, 961 U.N.T.S. 187 [hereinafter LIAB].
[78] BIN CHENG, STUDIES IN INTERNATIONAL SPACE LAW, 464 (1997).
[79] Armel Kerrest & Lesley Jane Smith, *Article III, in* 2 COLOGNE COMMENTARY ON SPACE LAW, 139 (Stephan Hobe et al. eds. 2009).
[80] Article I(c), LIAB.
[81] Kerrest & Smith, *supra* note 79.

term.[82] According to the *travaux*, fault is constituted by negligence.[83] The standard for negligence is due diligence. For ultra-hazardous activities such as space exploration, this standard is especially high.[84] ASTERIA submits that PROCLIVIA has violated this requirement of due diligence and is therefore at fault.

Due diligence requires every state to take adequate measures and exercise best possible efforts to prevent damage.[85] PROCLIVIA failed to share information with ASTERIA regarding D.A.M.E.-7T's satellite trajectory and novel collision avoidance system.[86] This was despite ASTERIA's explicit declaration of a safety zone and its request to space actors to submit advance information of their plans.[87] PROCLIVIA was cognizant of the possibility of a space collision and the resultant damage that could ensue. In order to prevent the damage, PROCLIVIA could have complied with the information requirement of ASTERIA's safety zone. By not doing so, PROCLIVIA failed to take adequate measures to prevent damage. Since it failed to comply with this obligation it violated the requirement of due diligence which amounts to fault.

Furthermore, in accordance with Article IX, OST, states must conduct all their activities in outer space with due regard to the interests of other states.[88] This lays down a duty of care on

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[82] Article 32, VCLT.
[83] Comm. on the Peaceful Uses of Outer Space, Legal Subcommittee, Report on its 8th Session, Jun. 9 -Jul. 4, 1969, at Annex II, 19, UN.Doc. A/AC.105/58(July 4, 1969); Comm. on the Peaceful Uses of Outer Space, Legal Subcommittee, Report on the 2nd part of its 3rd Session, Oct. 5-23, 1964, at Annex II, 20 UN.Doc. A/AC.105/21 (May 21, 1965).
[84] *Id.*
[85] Horst Blomeyer-Bartenstein, *Due Diligence*, *in* 10 ENCYCLOPEDIA OF PUBLIC INTERNATIONAL LAW 138, 141 (R. Dolzer et al. eds., 1981).
[86] *Compromis* ¶13.
[87] *Compromis* ¶8.
[88] Armel Kerrest & Lesley Jane Smith, *Article VII*, *in* 1 COLOGNE COMMENTARY ON SPACE LAW, 126, 142 (Stephan Hobe et al. eds. 2009).

states. Failure to exercise care constitutes fault.[89] PROCLIVIA did not provide the requisite information to ASTERIA, disregarding ASTERIA's interest. This breach of the duty of care constitutes fault under Article III, LIAB

[1.2] There was proximate causation between PROCLIVIA's space activities and the loss of the CUSKO satellites

To hold PROCLIVIA liable, a causal link must be established between its space activities and the loss of the CUSKO satellites.[90] Therefore, the damages must be reasonably foreseeable to the state party, and there must be proximate causation between the action of the state and the ultimate damage.[91] In the case of ultra-hazardous activities, damage is considered reasonably foreseeable if any risk of damage is present.[92] This standard of foreseeability is supported by the *travaux*.[93]

The risk of space collisions is inherent to space activities. Therefore, it is reasonably foreseeable damage. As evidenced from the declaration of the safety zone, both state parties were cognizant of this risk.

The space collision was a result of the uncoordinated emergency manoeuvre.[94] The uncoordinated emergency manoeuvre was conducted "in the absence of any available pre-

[89] Kerrest & Smith, *supra* note 79.
[90] H.L.A. HART & T. HONORE, CAUSATION IN THE LAW 114-121(1985); Glanville Williams, *Causation in Law*, 19 CAMBRIDGE LAW JOURNAL 62, 63 (1961).
[91] Administrative Decision No. II (U.S. v. Germany) 1930, 7 R.I.A.A 23;The "Naulilaa" (Portugal v. Germany) 1928 2 R.I.A.A 1011.
[92] Hardie Jr., *Foreseeability: A Murky Crystal Ball for Predicting Liability*, 23(2) CUMBERLAND LAW REVIEW 349 (1992-93).
[93] *Id*.
[94] *Compromis* ¶15

programmed or uploaded information".[95] Therefore, we can conclude that PROCLIVIA's non-submission led to the emergency manoeuvre and caused the collision. There is a causal link between the non-submission of information by PROCLIVIA and the ultimate loss of the CUSKO-E-TM satellite. We can reasonably infer that PROCLIVIA's failure to comply with the safety zone and submit information of its plans is sufficient to satisfy the test of proximate causation.

[2] PROCLIVIA is liable under ARTICLE VII, OST

PROCLIVIA might contend that LIAB is *lex specialis*, and that the principle of *lex specialis derogate legi generali* should apply. However, ASTERIA submits that Article VII OST is applicable in its own right, to the exclusion of the LIAB.[96] Since not all issues of liability fall within the LIAB, Article VII retains a separate role.[97]

Under Article VII, launching states are strictly liable for damage caused by its space objects in outer space.[98] It has been established that PROCLIVIA is the launching state of the D.A.M.E.-7T satellite[99] and that the damage to CUSKO-E-TM was caused by the D.A.M.E.-7T satellite.[100] Hence, PROCLIVIA is liable for damages under Article VII of the OST.

[3] PROCLIVIA is liable under general international law

The outer space regime does not exclude application of general international law to activities of humans in outer space. In international law, liability is fault-based[101] and arises from

[95] *Compromis* ¶14.
[96] Kerrest and Smith, *supra* note 88, at 142.
[97] *Id*.
[98] Kerrest and Smith, *supra* note 88, at 142.
[99] Submitted at IIA.
[100] Submitted at IIA[1][1.2]
[101] CHENG, *supra* note 78, at 231.

violation of a duty by a state.[102] This liability extends to all damages that were proximate consequences of the violation.[103] PROCLIVIA breached its international duty of cooperation, consultation and due regard.[104] The violation of these duties constitutes fault. Further, there is a causal link between PROCLIVIA's actions and the collision.[105] Therefore, PROCLIVIA is liable under general international law.

[102] Factory at Chorzow (Merits) (Ger./Pol.), Judgement 1928 P.C.I.J. (ser.A) No. 17. (Sept. 13).
[103] CHENG, *supra* note 78, at 253.
[104] Submitted at I[3].
[105] Submitted at IIA[1][1.2]

[IIB] ASTERIA IS NOT LIABLE UNDER INTERNATIONAL LAW FOR THE LOSS OF THE D.A.M.E.-7T SATELLITE

The loss of the CUSKO-E-TM satellite occurred as a result of the space collision between CUSKO-E-TM and D.A.M.E.-7T. ASTERIA submits that it is not liable under Article III, LIAB [1]; and Article VII, OST [2] for the loss of the D.A.M.E.-7T satellite.

[1] ASTERIA is not liable under Article III, LIAB

Under Article III, LIAB, the launching state of the space object is liable for damage caused in outer space. However, the state must be at 'fault'.[106] ASTERIA submits that it is not liable under Article III, LIAB because there was no fault on its part [1.1]; and there is no proximate causation between its actions and the loss of D.A.M.E.-7T [1.2]

[1.1] There was no fault on ASTERIA's part

PROCLIVIA may contend that ASTERIA failed to duly to authorize and supervise the CUSKO E TM satellite. This would amount to both a breach of an international obligation[107] and negligence which would constitute fault.

However, ASTERIA submits that it did adequately authorize and supervise the CUSKO-E-TM satellite. There was no breach of the Article VI duty of authorization and supervision [a] nor was their negligence [b]. Therefore, the Respondent is not at fault.

[A] No breach of the Article VI duty

[106] Article III, LIAB.
[107]Article VI, OST.

ASTERIA is not a party to the OST.[108] Therefore, any of its provisions, including Article VI, are not *per se* binding on ASTERIA.[109] However, assuming that the obligation enshrined in Article VI, has been accepted as custom, it would be binding on ASTERIA as well. Even if the Article VI duty is binding on ASTERIA, ASTERIA has not breached this obligation.

The Article VI obligation mandates states to exercise due diligence in authorizing and supervising their space activities.[110] However, the OST does not provide any minimal standards or procedures to satisfy this requirement.[111] Further, the OST does not mandate any formal structure for authorization and supervision.[112] States are free to determine the level and extent of their domestic laws.[113] It is not a mandatory requirement for states to enact a licensing regime for the purpose of granting authorisation.[114] Therefore, the non-enactment of national space legislation by ASTERIA[115] does not amount to a breach of the Article VI duty. Further, the due diligence standard to be observed under Article VI is subjective and is determined on a case-to-case basis.[116] ASTERIA submits that it has not been negligent in adhering to the same [B].

[B] ASTERIA was not negligent

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[108] *Compromis* ¶19.
[109] Article 34, VCLT.
[110] Article VI, OST.
[111] Ronald L. Spencer, Jr., *International Space Law: A Basis for National Regulation, in* NATIONAL REGULATION OF SPACE ACTIVITIES 8 (Ram S. Jakhu ed., 2010).
[112] Leslie I. Tennen, *Towards a New Regime for Exploitation of Outer Space Mineral Resources*, 88 NEBRASKA LAW REVIEW 794 (2010).
[113] Article III, OST; Paul Stephen Dempsey, *National Laws Governing Commercial Space Activities: Legislation, Regulation, & Enforcement*, NORTHWESTERN JOURNAL OF INTERNATIONAL LAW & BUSINESS, 36:1, 14 (2016).
[114] Spencer, *supra* note 111, at 7; Tennen, *supra* note 112, at 802.
[115] *Compromis* ¶4.
[116] Pheobe Okawa, STATE RESPONSIBILITY FOR TRANSBOUNDARY AIR POLLUTION IN INTERNATIONAL LAW 82 (2000).

Negligence is based on a failure to exercise prudence that is considered reasonable in the given circumstances.[117] The standard for negligence is due diligence.[118] Due diligence is a subjective standard that is determined keeping in mind the best possible and practicable means available to the state.[119]

The CUSKO-E-TM satellite was compliant with the only international standard in existence for autonomous operation of transportation systems (PAMINA).[120] Acknowledging that the operation of the novel systems posed an exacerbated risk,[121] ASTERIA asked CUSKO to re-assess and reposition the satellites.[122] In order to avoid the possibility of collisions and exercise due diligence, ASTERIA also publicly declared a "safety zone", requesting space actors intending to enter or cross that zone to submit advance information of their plans so as to avoid risk of collision.[123] PROCLIVIA did not comply with the requirements of the "safety zone".[124] After ASTERIA had taken such measures, no further technical problems were reported on the CUSKO-E-TM constellation.[125]

ASTERIA submits that it exercised due diligence by ensuring that CUSKO was PAMINA-compliant, by asking CUSKO to re-asses their satellites, and by declaring a "safety zone". In determining the standard of due diligence considerations of the resources available to a state,

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[117] Richard Brown, Jr., *General Principles of Liability*, 51 TULANE LAW REVIEW 820, 826 (1976-1977).
[118] Comm. on the Peaceful Uses of Outer Space, Legal Subcommittee, Report on its 8th Session, Jun. 9 -Jul. 4, 1969, at Annex II, 19, UN.Doc. A/AC.105/58(July 4, 1969); Comm. on the Peaceful Uses of Outer Space, Legal Subcommittee, Report on the 2nd part of its 3rd Session, Oct. 5-23, 1964, at Annex II, 20 UN.Doc. A/AC.105/21 (May 21, 1965).
[119] Okawa, *supra* note 116; *see also* Article 194, UNCLOS.
[120] *Compromis* ¶7.
[121] *Compromis* ¶6.
[122] Okawa, *supra* note 116.
[123] *Compromis* ¶8.
[124] *Compromis* ¶13.
[125] *Compromis* ¶9.

the factual effectiveness of its control, and the nature of the activities in question may justify differing degrees of diligence.[126] In the present case, considering that it was a young, newly independent country conducting its first outer space activity,[127] ASTERIA submits that it did undertake due diligence in accordance with the best possible and practicable means available to it.

Further, negligence must be adjudged on the basis of the information ASTERIA possessed at the time of the collision.[128] With respect to collisions at sea, negligence is defined on the basis of the circumstances under which the person was operating.[129] The same definition can be used for collisions in outer space due to the parallels between collisions in outer space and the sea and the analogous requirement of fault.[130] No knowledge was supplied by PROCLIVIA regarding the D.A.M.E.-7T satellite despite ASTERIA's efforts to acquire such knowledge.[131] Therefore, an accident that resulted due to the deficiency of information would not constitute negligence. Hence, ASTERIA submits that it was not at fault under Article III, LIAB.

[126] Okawa, *supra* note 116, at 82.
[127] *Compromis* ¶3.
[128] The H.F. Dimock 177 F. 226, 229-30 (1st Cir. 1896).
[129] *Id.*
[130] Hamilton DeSaussure, *The Freedom of Outer Space and Their Maritime Antecedents, in* SPACE LAW: DEVELOPMENT AND SCOPE 1, 8 (Nandasiri Jasentuliyana ed., 1992); Vladmir Kopal, *Analogies and Differences in the Development of the Law of the Sea and the Law of Outer Space*, 25 I.I.S.L. PROC. 151 (1985); Lubos Perek, *Traffic Rules for Outer Space*, 25 I.I.S.L. PROC. 37 (1982); Paul Dembling, *International liability for Damages Caused by the Launching of Objects into Outer Space,* 11 I.I.S.L. PROC. 236, 242 (1968).
[131] *Compromis* ¶13.

[1.2] There is no proximate causation between ASTERIA's actions and the loss of D.A.M.E.-7T

Damages are recoverable when there is proximate causation between the launching state's activities and the alleged damage.[132] Proximate causation is adjudged on the basis of whether reasonably foreseeable damage was prevented or not.[133] Therefore, proximate causation cannot be established with respect to ASTERIA's actions. While the possibility of a space collision was reasonably foreseeable, ASTERIA declared a safety zone and requested state actors to provide information about their space objects to mitigate the risk of a collision.[134] ASTERIA took appropriate measures to prevent any reasonably foreseeable damage. Hence, ASTERIA cannot be held liable.

Further, there must be a causal link between the actions of the state and the ultimate damage. PROCLIVIA's non submission of information was the intervening event in the chain of causation. Therefore no causal link can be established between any alleged negligence on ASTERIA's part and the loss of the D.A.M.E.-7T satellite.

[2] ASTERIA is not liable under Article VII, OST

ASTERIA is not a party to the OST[135] and the principle of strict liability present in Article VII is not part of customary law.[136]

[132] Kerrest and Smith, *supra* note 79.
[133] Administrative Decision No. II (U.S. v. Germany) 1930, 7 R.I.A.A 23; The "Naulilaa" (Portugal v. Germany) 1928 2 R.I.A.A 1011.
[134] *Compromis* ¶8.
[135] *Compromis* ¶19.
[136] Kerrest and Smith, *supra* note 88, at 142.

Even if Article VII of the OST applied to the present issue, no causation can be established between ASTERIA's actions and the loss of the D.A.M.E.-7T satellite.[137] Hence, ASTERIA is not liable under Article VII, OST.

Since there is no causation between ASTERIA's actions and the loss of D.A.M.E.-7T, ASTERIA cannot be held liable under general internal law either.

[137] Submitted at IIB[1][1.2]

[III]ASTERIA IS NOT INTERNATIONALLY RESPONSIBLE FOR ANY ALLEGED INTERRUPTION OF PROCLIVIA'S EXERCISE OF THE FREEDOM OF SCIENTIFIC INVESTIGATION

With the launch of the CUSKO-E-TM constellation, ASTERIA pioneered a safe eco-logical spaceflight revolution.[138] To mitigate the risk of collision characteristic of all space activities of a certain size and complexity, ASTERIA declared a safety zone at the orbital altitude of the CUSKO-E-TM.[139] It is true that an unfortunate collision between a CUSKO satellite and the PROCLIVIAN D.A.M.E.-7T led to the destruction of both space objects.[140] However, it is imperative to note that the D.A.M.E.-7T was equipped with untested novel systems. Additionally, PROCLIVIA did not inform ASTERIA of either the satellite trajectory of the D.A.M.E.-7T or the presence of the *Waltzing Wizard.*[141]

ASTERIA submits that the freedom of scientific investigation is and subject to limitations [1]. ASTERIA further submits that its national activities are lawful limitations on PROCLIVIA's exercise of the freedom of scientific investigation [2]. ASTERIA has not harmfully contaminated the space environment or caused adverse changes to the Antarctic environment [3]. Finally, no international responsibility accrues to ASTERIA in the absence of unlawful conduct [4].

[1] The freedom of scientific investigation is subject to limitations.

[138] *Compromis* ¶5.
[139] *Compromis* ¶8.
[140] *Compromis* ¶15.
[141] *Compromis* ¶13.

The freedom of scientific investigation is part of the broader freedom of exploration enshrined in Article I of the OST.[142] It is accepted that Article I forms part of customary law, and is legally binding on the Respondent.[143] The *travaux preparatoires* of the OST reveal that the drafters understood "exploration" as an activity of a research and investigative nature.[144] The freedom of use and exploration is limited[145] and qualified[146] in nature. As the freedom of scientific investigation is part of the freedom of exploration, it logically follows that it is subject to the same set of limitations.

The freedom of exploration is subject to two kinds of limitations: general and specific.[147] Generally, the exploration and use of outer space must be "for the benefit and in the interests of all countries,"[148] "without discrimination of any kind,"[149] "on a basis of equality,"[150] "in accordance with international law"[151] and shall be "the province of all mankind."[152] Specific limitations include, *inter alia*, limitations on military use,[153] prohibition of national appropriation,[154] and avoidance of harmful contamination.[155]

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[142] Hamilton DeSaussure, *The Freedoms of Outer Space and their Maritime Antecedents, in* SPACE LAW: DEVELOPMENT AND SCOPE 3, 8 (Nandasiri Jasentuliyana ed., 1992).
[143] Ram Jakhu, *The Relationship Between the Outer Space Treaty and Customary International Law* 59 I.I.S.L. PROC. 1, 9 (2017); A/AC.105/C.2/2017/CRP.6, art. 5.1.
[144] UN.Doc. A/AC.105/C.2/SR.57
[145] Ram Jakhu, *Legal Issues relating to the Global Public Interest in Outer Space,* 32 JOURNAL OF SPACE LAW (2006).
[146] Manfred Lachs, *The International Law of Outer Space,* III RECUEIL DES COURS 105 (1964).
[147] Stephen Gorove, *Limitations of the Principle of Freedom and Exploration and Use in the Outer Space Treaty: Benefits and Interests,* 13 I.I.S.L. PROC. 74 (1971).
[148] Article I(1), OST.
[149] Article I(2), OST
[150] Article I(2), OST.
[151] Article I(2), OST.
[152] Article I(1), OST.
[153] Article IV, OST.
[154] Article II, OST.
[155] Article IX, OST.

Article II of the Antarctic Treaty provides for "freedom of scientific investigation and cooperation toward that end".[156] Both PROCLIVIA and ASTERIA are party to the Antarctic Treaty.[157] Textually, this freedom is limited to scientific activities and investigations pursued in the IGY. In practice, this limitation is not observed.[158]

Admittedly, a presumption lies in favour of the freedoms of outer space. If the meaning and scope of a limitation is ambiguous, the freedom principle prevails.[159] However, any interpretation of the freedom principle must be alive to the treaty system and the limitations enshrined therein. Therefore, ASTERIA bears the burden to establish that its activities do not extend beyond lawful limitations on the freedom of scientific investigation.

[2] ASTERIA's national activities are lawful limitations on PROCLIVIA's exercise of the freedom of scientific investigation

It is accepted that the freedom of access is a logical extension of the freedom of scientific investigation.[160] It is elemental to the very notion of use and exploration.[161] In the absence of free access, the freedom of scientific investigation is rendered meaningless. However, only unlawful infringements of free access impede exercise of the freedom of scientific investigation.

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[156] Article II, The Antarctic Treaty, 402 U.N.T.S. 71, *entered into force* June 23, 1961 [hereinafter Antarctic Treaty].
[157] *Compromis* ¶19.
[158] SUSAN J. BUCH, THE GLOBAL COMMONS: AN INTRODUCTION (Island Press, 1998).
[159] HACKET, *supra* note 41, at 66.
[160] MANFRED LACHS, THE LAW OF OUTER SPACE: AN EXPERIENCE IN CONTEMPORARY LAWMAKING 45 (Brill 2010).
[161] DeSaussure, *supra* note 130, at 6.

ASTERIA submits that its national activities are lawful limitations on PROCLIVIA's exercise of the freedom of scientific investigation: the orbital positioning of the CUSKO-E-TM is protected by existing law [2.1]; the "safety zone" reinforces due regard to the corresponding interests of other states [2.2].

[2.1] The orbital positioning of the CUSKO-E-TM satellite constellation is protected by existing law

Outer space "is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means."[162] Enshrined in Article II of the OST, the non-appropriation principle is also part of the corpus of customary international law.[163] Terrestrial orbits are part of outer space. Therefore, orbital planes are repugnant to any appropriation.[164]

The CUSKO-E-TM satellite constellation inhabits 25 orbital planes between 790 and 810 km altitude.[165] These orbital planes are part of Low-Earth Orbit [LEO].[166] SpaceX's Starlink, Amazon's Project Kuiper, and OneWeb's Phase One are all satellite constellations operating in LEO.[167] The regulatory vacuum in LEO warrants reference to the geostationary orbit and the International Telecommunication Union.

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[162] Article II, OST.
[163] Fabio Tronchetti, *The Non-Appropriation Principle Under Attack: Using Article II of the Outer Space Treaty in Its Defence*, 50 I.I.S.L. PROC. 526, 530 (2007).
[164] Rep. of the ad hoc Comm. On the Peaceful Uses of Outer Space, U.N. GA A/4141.
[165] *Compromis* ¶1.
[166] LEO ECONOMY FAQS, https://www.nasa.gov/leo-economy/faqs (last visited Mar. 4, 2021); LEO, https://www.esa.int/ESA_Multimedia/Images/2020/03/Low_Earth_orbit (last visited Mar 4, 2021).
[167] See Amy Thompson, *Traffic Jams From Satellite Fleets Are Imminent- What It Means for Earth*, OBSERVER (Sep. 5, 2019, 3:39 PM), https://observer.com/2019/09/satellite-space-congestion-spacex-starlink-esa-aeolus/ ; Mathilde Minet, *The Space Legal Issues With Mega-constellations*, SPACE LEGAL ISSUES (Nov. 3, 2020), https://www.spacelegalissues.com/mega-constellations-a-gordian-knot/ ; Louis de Gouyon Matignon, *Project Kuiper, A Satellite*

In the geostationary orbit, the first-come, first-served principle applies to orbital positioning.[168] There is no formal acquisition of sovereignty, and thus no impairment of the non-appropriation principle.[169] Even if *de facto* appropriation occurs, it is protected by both the OST and ITU Law. Therefore, no challenge to the CUSKO-E-TM constellation satellite can be levelled on the basis of existing law.[170]

It follows that the orbital positioning of the CUSKO-E-TM satellites does not impair free access to outer space. The traditional system of distribution of access rights enables the rise of mega constellations. Therefore, the orbital positioning of the CUSKO-E-TM satellite constellation does not impede PROCLIVIA'S exercise of the freedom of scientific investigation.

[2.2] The "safety zone" is due regard to the corresponding interests of other states

Perturbed by concerning allegations, ASTERIA declared a "safety zone" at the orbital altitude of the CUSKO-E-TM satellite.[171] It is an "area-based safety measure… necessary to assure

Constellation by Amazon, SPACE LEGAL ISSUES (Sep. 24, 2019) https://www.spacelegalissues.com/the-future-space-legal-issues/ Louis de Gouyon Matignon, *Orbital Slots and Space Congestion*, SPACE LEGAL ISSUES (Jun. 8, 2019) https://www.spacelegalissues.com/orbital-slots-and-space-congestion/.

[168] Constitution and Convention of the International Telecommunication Union, *entered into force* Jul. 1, 1994, ATS(1994) 28, BTS 24 (1996).

[169] Mahulena Hofmann, *ITU Framework: A Model for an International Regime of Space Resources?*, 61 I.I.S.L. PROC. 459 (2018); LOUIS de Gouyon Matignon, *Satellite Constellations, A Race Is Engaged*, SPACE LEGAL ISSUES (May 26, 2019) https://www.spacelegalissues.com/satellite-constellations-a-race-is-engaged/.

[170] Amy Thompson, *Traffic Jams From Satellite Fleets Are Imminent- What It Means for Earth*, OBSERVER (Sep. 5, 2019, 3:39 PM), https://observer.com/2019/09/satellite-space-congestion-spacex-starlink-esa-aeolus/.

[171] *Compromis* ¶8.

safety and to avoid any harmful interference."[172] Article IX of the OST places an obligation on states to conduct their activities with "due regard to the interests of other states."[173] The provision acts as a limitation on the freedom of use, exploration, and scientific investigation.[174]

ASTERIA submits that its safety zone is reasonable and lawful, and furthers ASTERIA's customary international law duty to act with due regard to the corresponding interests of other states.

The declaration of a safety zone is not unlawful *per se*. However, any declared safety zone must meet the criteria of reasonableness. The size of the zone created and the restrictions imposed must both be reasonable.[175] The UNCLOS provides for the creation of reasonable safety zones around artificial islands, mining activities, and research facilities.[176] NASA's Artemis Accords provide detailed guidance on the establishment and operation of safety zones around lunar installations.[177] Section 11 of the Accords prescribes that the size of safety zones must be determined in a reasonable manner.[178]

The reasonableness of the measures undertaken is determined by balancing all variable contextual factors. Special emphasis is placed upon the realities of asserted threats.[179]

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[172] 11.3, Building Blocks for the Development of an International Framework on Space Resource Activities December 2019.
[173] Article IX, OST.
[174] Submitted at [III][1].
[175] MYERS S. MCDOUGAL, LAW AND PUBLIC ORDER IN SPACE 301-311 (1963).
[176] Article 60, United Nations Convention on the Law of the Sea, Dec. 10, 1982, 1833 U.N.T.S. 397 [hereinafter UNCLOS].
[177] Principles for Cooperation in the Civil Exploration and Use of the Moon, Mars, Comets, and Asteroids for Peaceful Purposes, Oct. 13, 2020 [hereinafter, Artemis Accords].
[178] Artemis Accords, Section 11.
[179] F. Kenneth Schwetje, *Protecting Space Assets: A Legal Analyis of "Keep-out Zones",* JOURNAL OF SPACE LAW 131, 141 (1987).

ASTERIA submits that the declared safety zone meets the criteria of reasonableness. The asserted threat of collision is a reality of space exploration, further exacerbated by the proliferation of satellites in LEO. [180] Further, the size of the safety zone does not extend beyond the orbital altitude of the mega constellation. The maintenance of distance to avoid harmful interference and collision is established practice in outer space.[181] ASTERIA's establishment of a safety zone is thus not violative of international law.

Moreover, ASTERIA's "safety zone" does not convey any rights. It is merely a standard of information transfer that allows other actors to make informed decisions.[182] There is no prohibition on entry, merely a warning of an exacerbated risk of collision.[183] Therefore, ASTERIA has not impaired PROCLIVIA's exercise of the freedom of scientific investigation. Instead, the safety zone is a reinforcement of the operational principle of due regard.

The principle of "due regard" is part of the corpus of customary international law.[184] The principle obligates a state to exercise a certain standard of care and prudence in its use of outer space.[185] Primarily, the exercise of "due regard" entails following obligations laid down in the OST. A state exercising due regard must have knowledge of potentially affected states and their interests.[186] Potential for harmful interference can be ascertained from the nature of activities.[187]

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[180] Larry F. Martinez, *The Legal Dimensions of Cyber-Conflict with Regard to Large Satellite Infrastructures and Constellations,* 67 I.I.S.L. PROC. (2016).
[181] CHENG, *supra* note 78, at 566.
[182] Christopher Johnson, *Space Law Context of the Artemis Accords,* LINKEDIN (May 19, 2020).
[183] Schwetje, *supra* note 179, at 135.
[184] Marchisio, *supra* note 11, at 175.
[185] *Id.*
[186] HACKET, *supra* note 41, at 91.
[187] D. Goedhius, *Legal aspects of the Utilisation of Space,* 17(1) NETHERLANDS INTERNATIONAL LAW REVIEW 25, 33 (1970).

ASTERIA was aware that any space actor intending to enter or cross the orbital altitude of the CUSKO-E-TM satellite could be potentially affected by ASTERIA's activities.[188] This is evidenced by its declaration of a safety zone to mitigate the risk of collision.[189] The CUSKO-E-TM satellite constellation inhabits 25 orbital planes between 790 and 810 km altitude.[190] These orbital planes are part of Low-Earth Orbit.[191] The LEO is one of the most heavily-utilized parts of outer space,[192] and physical congestion of satellites in orbital space heightens the threat of collisions.[193]

In light of the potential for harmful interference, and the necessary knowledge of potentially affected space actors, the establishment of a safety zone furthers ASTERIA's duty to observe due regard.[194]

[3] ASTERIA has not harmfully contaminated the global commons

The 1941 *Trail Smelter* arbitration is the basis of the general rule of customary international law regarding environmental protection.[195] The widely recognized *Trail Smelter* principle establishes an obligation upon states to not allow the use of their territory in a manner that

[188] *Compromis* ¶8.
[189] *Id.*
[190] *Compromis* ¶1.
[191] LEO ECONOMY FAQS, https://www.nasa.gov/leo-economy/faqs (last visited Mar. 4, 2021); LEO, https://www.esa.int/ESA_Multimedia/Images/2020/03/Low_Earth_orbit (last visited Mar 4, 2021).
[192] Vladimir Kopal, *The Need for International Law Protection of Outer Space Environment Against Pollution of Any Kind, Particularly Against Space Debris,* 32 I.I.S.L. PROC. 107 (1989).
[193] STEPHEN GOROVE, DEVELOPMENTS IN SPACE LAW: ISSUES AND POLICIES 128 (Kluwer Academic Publishers 1991).
[194] Kiran Mohan Vazhapully, *Space Law at the Crossroads: Contextualizing the Artemis Accords and the Space Resources Executive Order,* OPINIOJURIS (Jul. 22, 2020).
[195] Trail Smelter Arbitration (U.S./Can.) 3 R.I.A.A. 1905 (1941).

causes damage in or to the territory of another state.[196] Principle 21 of the Stockholm Declaration, considered declaratory of customary international law, [197] obliges states to prevent environmental damage beyond the limits of national jurisdiction.[198] This protection of common spaces and resources extends to outer space and Antarctica.[199]

Article IX of the OST enshrines the general principle of the prevention of transboundary harm, and obligates states to "avoid ... harmful contamination [of outer space], and also adverse changes in the environment of the Earth resulting from the introduction of extraterrestrial matter".[200] The Article IX principle protects the value of the freedom of scientific research.[201] Therefore, ASTERIA is obligated to ensure that its activities do not harmfully contaminate the environment of Antarctica and outer space.

ASTERIA submits that it has neither harmfully contaminated outer space through the creation of space debris [3.1] nor caused adverse changes to the Earth's terrestrial environment [3.2].

[3.1] ASTERIA has not harmfully contaminated the space environment

PROCLIVIA might assert that ASTERIA has impeded its exercise of the freedom of scientific investigation through the creation of space debris. ASTERIA has previously submitted that it is not liable for the loss of the D.A.M.E.-7T satellite.[202] There is neither fault on ASTERIA's

[196] *Id.*
[197] He Qizhi, *Space Law and the Environment, in* SPACE LAW: DEVELOPMENT AND SCOPE 159 (Nandasiri Jasentuliyana ed., 1992).
[198] Report of the U.N. Conference on the Human Environment, U.N. Doc. A/CONF.48/14.
[199] Andrea Bianchi, *Environmental Harm Resulting from the Use of Nuclear Power Sources in Outer Space: Some Remarks on State Responsibility and Liability, in* INTERNATIONAL RESPONSIBILITY FOR ENVIRONMENTAL HARM 231, 262 (Francesco Francioni et al. eds., 1991).
[200] Article IX, OST.
[201] Bianchi, *supra* note 199.
[202] Submitted at [IIB][1].

part[203] nor a proximate causal link between its activities and the loss of the satellite.[204] Therefore, it is untenable to suggest that ASTERIA is internationally responsible for any creation of space debris.

International responsibility for the creation of space debris by a state is examined against appropriate measures taken by the state to preclude the impending risk.[205] In case of accidents, international responsibility accrues to a state when evidence indicates that the state should have been aware of the risk involved in the space activity and had the ability to avoid harmful contamination.[206]

In this case, ASTERIA was aware that the repositioning of the CUSKO-E-TM satellites could pose a risk of collision if other space objects enter its orbital zone without notice. ASTERIA was also aware that the satellite constellation poses risks akin to those of space activities of similar size and complexity.[207] To address the risk involved, ASTERIA ensured that the CUSKO satellites were PAMINA-compliant.[208] It also declared a safety zone to avoid any harmful interference. It is untenable to suggest that ASTERIA did not undertake appropriate measures to preclude the creation of space debris. Therefore, ASTERIA is not responsible for harmfully contaminating the space environment.

[203] Submitted at [IIB][1][1.1].
[204] Submitted at [IIB][1][1.2].
[205] HACKET, *supra* note 41, at 167.
[206] Daniel G. Partan, *The Duty to Inform in International Environmental Law*, 6 BOSTON UNIVERSITY INTERNATIONAL LAW JOURNAL 58 (1988).
[207] *Compromis* ¶8.
[208] *Compromis* ¶7.

[3.2] ASTERIA has not caused radioactive pollution in Antarctica

ASTERIA has previously submitted that neither was the loss of the D.A.M.E.-7T satellite ASTERIA's fault[209] nor is there any causal link between its activities and the loss of the satellite.[210] Therefore, the radioactive pollution on the Antarctic surface and the resultant shutdown of PROCLIVIA's research stations cannot be attributed to ASTERIA.

PROCLIVIA cannot contend an absence of due regard, because knowledge is a necessary precondition of the same.[211] ASTERIA was entirely unaware of the presence of a plutonium power source on PROCLIVIA's satellite. In the absence of notification of re-entry, ASTERIA also had no ability whatsoever to avoid any harmful contamination. Therefore, the radioactive pollution in Antarctica cannot be attributed to ASTERIA.

[4] In the absence of unlawful conduct, no international responsibility accrues to ASTERIA

Article VI of the OST enshrines the principle of international responsibility for "national activities" in outer space.[212] The provision functions as a limitation of the freedoms of exploration, use, and scientific investigation.[213] Furthermore, Article 1 of the ARSIWA states that every internationally wrongful act of a state entails its international responsibility.[214]

[209] Submitted at [IIB][1][1.1].
[210] Submitted at [IIB][1][1.2].
[211] HACKET, *supra* note 41, at 91.
[212] Article VI, OST.
[213] Michael Gerhard, *Article VI, in* 1 COLOGNE COMMENTARY ON SPACE LAW 373 (Stephan Hobe et al. eds. 2009).
[214] Article 1, ARSIWA.

There are two elements of state responsibility: imputability of a wrongful act to a certain state, and thereby arising legal consequences.[215] As a general principle of law, responsibility attaches to conduct, and not to events consequent to such conduct.[216] Conduct includes both act and omission.[217]

ASTERIA submits that it is not internationally responsible for any alleged interruption of PROCLIVIA's exercise of the freedom of scientific investigation because no unlawful conduct can be imputed to ASTERIA. As previously submitted, ASTERIA's activities are lawful limitations on PROCLIVIA's freedom.[218] The orbital positioning of the CUSKO-E-TM satellites and the declaration of the "safety zone" are not contrary to the treaty rights of PROCLIVIA.[219] There is no causal link between the creation of space debris and ASTERIA's activities.[220] ASTERIA was also unaware of the presence of power source on D.A.M.E.-7T.

Furthermore, even if it is accepted that ASTERIA did cause the creation of space debris, it is not an unlawful act. The utilization of space for a communications services is a legitimate act, and the creation of space debris is a harmful effect that cannot render the act itself unlawful.[221]

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[215] IAN BROWNLIE, 1 SYSTEM OF THE LAW OF NATIONS: STATE RESPONSIBILITY (Oxford University Press 1983).
[216] Katherine M. Gorove, *International Responsibility for Endangering the "Space Commons": Focus On A Hypothetical Case,* 33 I.I.S.L. PROC. (1990).
[217] Spanish Zone of Morocco Claims (1923), Rapport III (1924) 2 UNRI.
[218] Submitted at [III][2].
[219] *Id.*
[220] Submitted at [IIB][1][1.2].
[221] Bess C.M. Reijnen, *Pollution of Outer Space and International Law,* 32 I.I.S.L. PROC. 130, 133 (1989).

Consequently, no unlawful conduct can be imputed to ASTERIA. Therefore, ASTERIA is not internationally responsible for any alleged interruption of PROCLIVIA's exercise of the freedom of scientific investigation.

SUBMISSIONS TO THE COURT

For the foregoing reasons, ASTERIA, the Respondent, respectfully requests the Court to adjudge and declare that:

a. PROCLIVIA violated international law by failing to cooperate and exchange information with ASTERIA.

b. PROCIVIA is liable for the loss of the CUSKO satellite.

c. ASTERIA is not liable for the loss of the D.A.M.E.-7T satellite.

d. ASTERIA is not internationally responsible for any impediment to PROCLIVIA'S exercise of the freedom of scientific investigation.