

**ARTIFICIAL INTELLIGENCE AS A COMMON HERITAGE OF
MANKIND: INTERPLAY BETWEEN ARTIFICIAL INTELLIGENCE,
COPYRIGHT LAW AND COMMON HERITAGE PRINCIPLE IN
OUTER SPACE**

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ABSTRACT

Artificial Intelligence (AI) has been engaged in the transformation of the dynamic landscape of outer space exploration and utilization. Since AI is playing a role in space exploration hence questions arise about data ownership, technology sharing and application of the Common Heritage of Mankind (CHM) principle to space-related discoveries. This paper is going to delve into the analysis of legal, economic, ethical and technological perspectives for examination of the applicability of copyright law towards effective management of implications of AI in outer space. This paper shall highlight the technological landscape of AI in outer space, then move to point out the inadequacy of copyright law in addressing AI-related issues. The paper will explore the ethical and economic dimensions of copyright law and its connection with AI while incorporating the basic principles of accountability, transparency, and equitable distribution of benefits in outer space. Since ensuring equitable access to AI and its benefits is a common concern of humanity, towards the end of the paper, the paper shall strike a reconciliatory note between the CHM principle and copyright law in ensuring equitable access to AI in outer space through international cooperation and governance.

Keywords: Artificial Intelligence - Outer Space - Copyright Law - Common Heritage of Mankind – Ethics

1. INTRODUCTION

Artificial Intelligence (AI) is engaged in the rapid transformation of the space sector. Space exploration is seen as a trillion-dollar industry by space-faring nations for the enhancement of mission effectiveness and scientific discovery. There are challenges associated with AI systems like data transmission and processing, ethical implications and robustness and reliability. AI has advanced from the adaptation of Machine Learning (ML) in learning from data training sets for improvement of performance over some time. This offers AI the ability to gain autonomy over the actions it is seeking to perform, for example, analysis of images which has been captured by space telescopes. Deep Learning (DL) is another aspect of AI and a subset of ML using Artificial Neural Networks (ANN) for the analysis of huge data sets in enabling the analysis of patterns by recognizing the patterns and making decisions on the recognized patterns. AI allows spacecrafts and rovers with autonomy which allows them to perform designated tasks on the celestial body thus being important for missions in outer space. AI in outer space has various applications associated with autonomous navigation and operations, scientific discovery, spacecraft design and optimization, and AI can help in the optimization of resource utilization on spacecraft and on future lunar Martian bases by managing power, oxygen, and other vital resources. Copyright law grants creators rights to their original works by allowing them to profit from their own authored works. In the context of AI-generated text authorship and ownership become a complex issue to tackle. The CHM principle is rooted in the Agreement Governing the Activities of States on the Moon and Other Celestial Bodies (“Moon Agreement”) and this principle states that some resources belong to humanity as a whole thus national ownership of such resources is not possible at all since these resources ought to be used for the benefit of present and future generations. This principle supports equitable access to common property on a global scale. The tension between copyright and CHM is that copyright is like an exclusionary right by limiting access to knowledge and resources whereas the CHM principle seeks shared ownership and benefit. Applying the CHM principle of intangible property like copyright, especially in the case of AI technology raises difficult questions like which aspects of usage of AI in outer space are subject to copyright and which aspects of AI-derived benefit are subject to the CHM principle.

2. TECHNOLOGICAL USES OF ARTIFICIAL INTELLIGENCE IN SPACE

AI is developing at a fast pace, in space technology AI is being used in aspects of guidance, navigation and control.¹ AI helps in the adjustment of trajectory and performing complex operations with an extremely small amount of human intervention. AI enables the spacecraft to dock at space stations and analyze sensor data to avoid hazards during the landing process on celestial bodies.² In areas of scientific discovery AI helps in data analysis and pattern recognition which can skim through huge amounts of data sets to identify patterns and anomalies.³ AI helps in spacecraft design and optimization during the fault detection and recovery process and is especially helpful with resource management. Future applications of AI include self-replicating systems and interstellar travel.

3. OPPORTUNITIES AND CHALLENGES OF ARTIFICIAL INTELLIGENCE USAGE IN OUTER SPACE

The opportunities which are offered by AI are expanding scientific horizons when AI analyses massive data from telescopes and planetary probes to uncover hidden patterns and accelerate discoveries.⁴ AI allows human exploration and enhancement of mission efficiency and safety for building a sustainable future for spacefaring nations. AI helps in real-time guidance and decision-making for astronauts thus enabling human exploration and engages in management of tracking, mitigation and management of space debris by contributing to the development of habitats on other planets.⁵ The challenges associated with AI systems becoming autonomous are ethical issues regarding the decision-making process, data transmission and processing and legal challenges.⁶ The legal and regulatory challenges include the usage of AI in space regarding liability, copyright and militarization of space. Thus, there is a gap occurring in ensuring the responsible use of AI development and deployment in outer space.

¹ Larysa Soroka & Kseniia Kurkova, *Artificial Intelligence and Space Technologies: Legal, Ethical and Technological Issues*, 3 *Journal of Advanced Space Law* (2019), <https://doi.org/10.29202/asl/2019/3/11> (last visited Nov 12, 2025).

² George Anthony, Gal et al., *Artificial Intelligence in Space*, (2020), <https://doi.org/10.48550/arXiv.2006.12362> (last visited Nov 12, 2025).

³ Anne-Sophie Martin & Steven Freeland, *The Advent of Artificial Intelligence in Space Activities: New Legal Challenges*, 55 *Journal of Space Policy* 101408 (2021), <https://doi.org/10.1016/j.spacepol.2020.101408> (last visited Nov 12, 2025).

⁴ Guglielmo S. Aglietti, *Current Challenges and Opportunities for Space Technologies*, 1 *Frontier in Space Technology* 1 (2020), <https://doi.org/10.3389/frspt.2020.00001> (last visited Nov 12, 2025).

⁵ Max Ghiglione & Vittorio Serra, *Opportunities and Challenges of AI on Satellite Processing Units*, in *Proceedings of the 19th ACM International Conference on Computing Frontiers* 221 (2022), <https://doi.org/10.1145/3528416.3530985> (last visited Nov 12, 2025).

⁶ *Ibid.*

4. GLOBAL PERSPECTIVE ON APPLICABILITY OF COPYRIGHT LAW TO AI INNOVATIONS: COMPARATIVE ANALYSIS OF LIMITATIONS ACROSS INDIA, US AND UK

A. INDIA

In India, S. 2(d) of the Copyright Act, of 1957 gives a clear definition of the term “author” (attributable to a person engaging in the creation of work). S. 13 deals with works which are eligible for copyright protection, furthermore S. 14 defines the rights of authors, the inherent limitation of Indian law is that it is not clear on aspects of AI-generated authorship as to whether the human creator or owner of the AI system becomes the copyright holder. The level of originality of AI-generated content has not been tested by courts. The Indian Copyright Office had rejected an application of AI (RAGHAV) for authoring an artistic work.⁷ However the Copyright Office granted the application to the natural person who co-authored along with the AI-based creation subsequent to a withdrawal notice).⁸ The said withdrawal notice was appealed, and the case is still pending. The closest case is the *Nova Productions Case*⁹ where the English court was asked for a determination of the authorship of a given display in a video game which depends on the way the game is being played. The court held that the input of a player is not “*artistic with no contribution of skill, labour of any artistic kind*”.¹⁰ This ratio can be compared to the input given to an AI system where the input given to any AI system by a human is not of an artistic kind, hence no copyright can be granted.

B. UNITED STATES

In the United States, the Copyright Act of 1976 especially the 17 USC § 101 et seq. here the 17 USC § 102(a) lists the kind of work, which is being protected by copyright, 17 USC § 201 defines ownership, and the Compendium states the works which are produced by AI without any “creative” input by a human being cannot be granted copyright protection.¹¹ The limitations associated with the approach in the US are that if AI-generated works lack “creative” input cannot be granted copyright protection but what amounts to a “creative” input has not been

⁷ Rohin Dubey, *Rise of the Machines: AI and Copyright, Bar and Bench - Indian Legal news* (2023), <https://www.barandbench.com/columns/rise-of-the-machines-ai-and-copyright> (last visited Nov 12, 2025).

⁸ Nayantara Sanyal, Nihal Shah and Sheetal Mishra, *Intersection of Intellectual Property Rights and AI-Generated Works – Part I, Bar and Bench - Indian Legal news* (2024), <https://www.barandbench.com/law-firms/view-point/intersection-intellectual-property-rights-ai-generated-works-part-i> (last visited Nov 12, 2025).

⁹ *Nova Productions v. Mazooma Games Ltd and Ors*, [2006] EWHC 24.

¹⁰ *Ibid*

¹¹ *Thaler v Vidal*, 43 Federal Court of Appeals, 4th District, 1207 (2022). The court stated in this case that the AI System “DABUS” is an inventor in patent law. A similar analogy might be argued for grant of copyright protection to AI-generated content as well.

tested by the court.¹² Case laws in the US have been more focused on the human intervention angle.

C. UNITED KINGDOM

In the UK, the Copyright, Designs and Patents Act 1988 (CDPA) covers the definition of the term “author” defines the types of works which are protected by copyright and addresses the first ownership of copyright. The limitations which are observed in the CDPA are that authorship has to be owed to a natural person, and the originality threshold is comparatively lower in the US whereas the courts are yet to test the originality doctrine to AI-generated content.¹³ The *Infopaq International Case* has discussed the originality requirement for automated processes whereas the *SAS Institute Case* further touched on what constitutes “original” in case of an “automated creative process”.¹⁴ But no case law specifically deals with AI-algorithm-based automation.

D. COMPARATIVE ANALYSIS

On comprehensive analysis, it can be observed that there are some common limitations across various jurisdictions. No clear authorship regarding AI-generated content has been established across any jurisdiction, “authorship” is always discussed in conjunction with the ‘originality threshold’ of the work. There is legal uncertainty because no case law clearly lays down jurisprudence related to copyright issues in AI-generated content. Regulations have failed to attribute liability in the case of AI-algorithm-based automated objects and connected multimedia content.

5. ANALYSIS OF COPYRIGHT LAW AND ITS INTERACTION WITH ARTIFICIAL INTELLIGENCE IN SPACE-RELATED CONTEXT

¹² *Naruto v. David Slater*, United States Court of Appeals for the Ninth Circuit, No. 16-15469. This case focuses on the authorship of animals and highlights that human input is crucial. See further *Authors Guild Inc. v. Google Inc.*, United States Court of Appeals for the Second Circuit, No. 13-4829-cv. This case highlights the fair use in case digital books which may in an indirect manner influence the considerations for the AI system. In the case of copyright, it is relevant to argue that it is the materials which are input into the AI system that will enable content generation.

¹³ Ronan Deazley, *Legislation and Reports: Copyright and Parody: Taking Backward the Gowers Review? Copyright and Parody*, 73 *The Modern Law Review* 785 (2010), <https://doi.org/10.1111/j.1468-2230.2010.00818.x> (last visited Nov 12, 2025).

¹⁴ *Infopaq International A/S v. Danske Dagblades Forening*, Case C-5/08, CUEJ, ECLI:EU:C:2009:465. This case discusses the originality requirement in automated processes. See further *SAS Institute Inc. v. World Programming Ltd.*, United States Court of Appeals for the Federal Circuit, Case No. 21-1542. (2023). This case discussed the concept of originality in the automated creative process but was limited in its application to software copyright.

The Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies (“Outer Space Treaty” or “OST”) is the most basic foundational document in space law and does not discuss anything about intellectual property rights.¹⁵ The OST has been successful in the establishment of principles such as the “non-appropriation of outer space by any State” and further lays down an absolute responsibility on States for the activities which are being conducted by their nationals.¹⁶ On a *prima facie* basis a simple view can be taken that the State is responsible for any copyright infringement which is taking place by its nationals in outer space, hence showing that there is a degree of connectivity between the national copyright laws and international space law.

The Convention on International Liability for Damage Caused By Space Objects (“Liability Convention”) amplifies the OST by establishing a liability framework for the damages being caused by space objects, the relevant issue to note that the Liability Convention (Article XII of the Liability Convention deals with compensation, damages, and its determination) can be applied to the damages which are arising out of the infringements by AI systems in space, by holding States accountable for the actions of AI in a similar context to the physical damage being caused by space objects.¹⁷

One of the important critical issues surrounding the works which are AI-generated is that they are even eligible for copyright protection because, on a fundamental level, copyright law has been designed to work on creativity which is being expressed by a human being.¹⁸ The issue with AI systems is that they are capable of autonomous creation thus challenging the “human creativity” objective of copyright on a very fundamental level.¹⁹ The United Kingdom has a solution to this aspect as its common law contains provisions for “computer-generated works” where the person who is arranging the creation of work is considered as the “author” whereas the approach taken by the US does not have a clear definition of “author” with respect to works which are computer generated (17 U.S. Code § 201 discusses the ownership of copyright).²⁰ In

¹⁵ Yun Zhao, *Intellectual Property Protection in Outer Space: Reconciling Territoriality of Intellectual Property with Non-Territoriality in Outer Space*, 7 QMJIP 137 (2017), <http://dx.doi.org/10.4337/qmjip.2017.02.01> (last visited Nov 15, 2025).

¹⁶ Ioana Bratu, Arno Lodder & Tina Van Der Linden, *Autonomous Space Objects and International Space Law: Navigating the Liability Gap*, 18 IJIL (2021), <https://doi.org/10.17304/ijil.vol18.3.818> (last visited Nov 15, 2025).

¹⁷ Ibid.

¹⁸ World Intellectual Property Organization, *Introduction to Intellectual Property: Theory and Practice*. (2 ed.), pg. no- 97, 101 and 102. <https://tind.wipo.int/record/27895?ln=en>. (last visited Nov 15, 2025).

¹⁹ Chapter 4: *The application of copyright law to outer space activities*, in “*The Protection of Intellectual Property Rights in Outer Space Activities*” Edward Elgar Publishing 101 (1 ed. 2017), <https://doi.org/10.4337/9781785369629.00008> (last visited Nov 15, 2025).

²⁰ Ibid.

the UK, Section 9 of CDPA states that the copyright vests in “author” engaged in the creation of work, the word “author” can be interpreted synonymous to mean “computer-generated works” which has been mentioned in S. 9(3) of the CDPA. The practical application of this interpretation means that the author of a satellite image will be the one who is undertaking the arrangement for the creation thus “author” word (S. 3(3) UK CDPA defines an author as the “one who creates it”) will effectively mean that the person who is arranging or programming the satellite equipment for capturing the images, without those arrangements being made at the space station on earth or space station present in outer space.

There is an interplay involved between the territorial and non-territorial nature of copyright law being applied in outer space. In outer space, no country can exercise sovereignty, thus which country’s copyright law will apply to the AI system is unclear.²¹ In case of copyright infringement in outer space, there is an Intergovernmental Agreement (IGA) regarding the International Space Station (ISS) which established the principle of quasi-territoriality for handling intellectual property management onboard the ISS.²² Under the IGA if an invention takes place in the segment of a registered country that particular country will have jurisdiction over that subject matter.²³ This solution in the IGA has a limitation, what if copyright infringement takes place on the surface of the moon or any other celestial body because, on the celestial body, the “non-appropriation” principle will apply.

One of the proposed solutions to the copyright conundrum can be the following of the Berne convention with a major part of the convention being completely focused on principles of “national treatment” and granting minimum standards of copyright protection.²⁴ This could offer a point for starting the addressal of copyright issues in outer space. The National Treatment principle under the Berne Convention ensures that the works which originate from other States are going to receive the same level of protection on a similar level to the works which have been produced domestically.²⁵ Just like domestic laws and international conventions, the Berne Convention does not completely deal with the challenges which are

²¹ K. De La Durantaye, S. J. Golla & L. Kuschel, “*Space Oddities*”: *Copyright Law and Conflict of Laws in Outer Space*, 9 Journal of Intellectual Property Law & Practice 521 (2014), <http://dx.doi.org/10.1093/jiplp/jpu075> (last visited Nov 15, 2025).

²² Rochus Moenter, *The International Space Station: Legal Framework and Current Status*, 64 Journal of Air Law and Commerce 1033 (Fall 1999).

²³ Ibid.

²⁴ Sedef Ayalp, *Lost in Space: The Copyright Dilemma*, 7 (2) Intellectual Property Brief, American University Washington College of Law 86-112 (2020).

²⁵ Ruwantissa Abeyratne, *The Application of Intellectual Property Rights to Outer Space Activities*, in *Space Security Law* 83 (2011), https://doi.org/10.1007/978-3-642-16702-7_8 (last visited Nov 15, 2025).

being presented by AI in outer space but makes a good starting point for copyright regulation in AI technology-based space objects.

6. ETHICAL AND ECONOMIC IMPLICATIONS OF ARTIFICIAL INTELLIGENCE USAGE IN OUTER SPACE

With the rise in private space activities, there is a complex layer added to the application of copyright law to autonomous space objects.²⁶ The biggest research gap is that private companies are now engaging in space activities thus questions arise regarding the extent to which they are bound by the international space law treaties which contain provisions regarding State obligations only.²⁷ Some sources note that the balancing of interests regarding private companies along with the Common Heritage of Mankind (CHM) principle is the need of the hour for sustainable space exploration. Addressing the copyright issues which arise from the usage of AI in space activities requires a multifaceted approach where the legal, technological, ethical and economic factors are also involved to a great extent.²⁸ For example, ensuring that there is transparency and explainability of the AI Systems in outer space which may be able to contribute to responsible and equitable usage of copyright law across technological inventions.

There are ethical implications for AI usage in outer space and these implications are also involving points of copyright law. The following are the ethical considerations:

A. Accountability and Transparency

There is a need for clear guidelines regarding the ethical development and usage of AI in space. This is inclusive of the concerns with regard to bias in AI algorithms for ensuring that human oversight is maintained in AI-driven decision-making.²⁹ There is a potential possibility of false positives and false negatives being generated by AI. The concern which has mostly arisen is whether the user, developer or the launching state is responsible for the actions of the AI-driven space object.³⁰ There are discussions by scholars and some scholars have proposed the test of “meaningful human control” (MHC) which emphasizes there should be a degree of human

²⁶ Hanneke L. Van Traa-Engelman, *Commercialization of Space Activities: Legal Requirements Constituting a Basic Incentive for Private Enterprise Involvement*, 12 Journal of Space Policy 119 (1996), [https://doi.org/10.1016/0265-9646\(96\)00003-3](https://doi.org/10.1016/0265-9646(96)00003-3) (last visited Nov 15, 2025).

²⁷ Ibid.

²⁸ Christopher C. Joyner, *Legal Implications of the Concept of the Common Heritage of Mankind*, 35 International and Comparative Law Quarterly 190 (1986), <https://doi.org/10.1093/iclqaj/35.1.190> (last visited Nov 15, 2025).

²⁹ Ugo Pagallo, Eleonora Bassi & Massimo Durante, *The Normative Challenges of AI in Outer Space: Law, Ethics, and the Realignment of Terrestrial Standards*, 36 Philos. Technol. 23 (2023), <https://doi.org/10.1007/s13347-023-00626-7> (last visited Nov 15, 2025).

³⁰ Supra Note 3.

intervention in AI systems especially in those systems in which there is a very high degree of autonomy.³¹ In the case of space objects which are highly autonomous especially those AI-driven objects which are used in space exploration do not yet have MHC over them.

B. Data Ownership and AI-driven Decision-Making

There is a need for the establishment of accurate guidelines for establishing data ownership and access to data in space especially in the area of space exploration. There is a lot of potential in AI for generating extremely valuable intellectual property, especially data which can be commercially exploited. This shows that there is a need for a framework which engages in the balancing of the rights of stakeholders which is inclusive of states, companies and international states. There are significant concerns regarding AI-driven decision-making leading to collisions or the use of AI in the area of resource allocation, thus ensuring that there is a significant amount of transparency and explainability in the reasoning process adopted by AI which is important for building trust and mitigating connected risks.

The economic implications involve the copyright and commercialization debate where the economic implications of the protection granted to copyrights in the space sector will incentivize the private sector to invest in the space sector and drive in the investment from the private sector.³² However, there is a need to balance these rights with the principle of CHM or “province of mankind” enshrined in the Outer Space Treaty. There are economic implications, such as a highly restrictive copyright regime, which could be a hurdle in the face of scientific progress and limit access to data being generated by AI systems in space.³³ Thus, there is a need to strike a balance between promotion and commercialization to ensure that there is access to the benefits of space exploration, which is an extremely critical challenge.

7. INTERNATIONAL COOPERATION FOR ENSURING EQUITABLE ACCESS TO BENEFITS

There is a need for a shared governance model to ensure that equitable access to the AI resources and benefits generated from out-of-space activities is distributed to the whole of mankind. This shared governance model needs to be an establishment of mechanisms for the sharing of data, research collaboration and transfer of technology which benefit the developing

³¹ Ibid.

³² Ram Jakhu & Paul Stephen Dempsey, *Routledge Handbook of Space Law* (1 ed.). Chapter 16- *Law Related to Intellectual Property and Transfer of Technology*, Yun Zhao, Pg No. 296 (2016).

³³ DL Burk, *Protection of Trade Secrets in Outer Space Activity: A Study in Intellectual Property Protection in Outer Space*, 23 (2) *Seton Hall Law Review* 139. <https://scholarship.shu.edu/shlr/vol23/iss2/7> (last visited Nov 15, 2025)

countries who are lacking the resources for engagement in space exploration.³⁴ The development of international cooperation is facing a huge amount of challenges in addressing nuances of AI-generated works within outer space which is non-territorial.³⁵ It is recommended that Transparency and Confidence-Building Measures (TCBM) be explored to foster cooperation and understanding. TCBMs can have sharing of information about the AI systems in establishing ethical guidelines and development mechanisms for dispute resolution.³⁶ It is necessary that capacity building in the area of space exploration should take place in developing nations which facilitates the technology transfer and thus ensures that data is being shared with all countries on an equitable basis.

8. COMMON HERITAGE OF MANKIND PRINCIPLE AND ITS INTERSECTION WITH AI & COPYRIGHT

The CHM principle is important in international law, it is an outcome arising from the interest between spacefaring nations and non-spacefaring nations. The CHM principle in space is an existence of international law which is open and still developing. The CHM principle as envisaged in the Moon Agreement is something which should be given a strict interpretation of the “nothing more and nothing less” standard.³⁷ CHM principle is a common thread which is derived from the analysis of the “non-appropriation”, “no property” and existence of an international regime during space resource exploitation.³⁸ This principle mainly promotes international collaboration for the management and utilization of resources and advocates for the equitable sharing of benefits which are being derived from the exploitation of such resources.³⁹

A. CHM AND RESOURCES IN OUTER SPACE

CHM is mainly applied to the Moon and its resources, as mentioned in the Moon Agreement. The Moon Agreement under Article 11 declares that the Moon and its resources are CHM, hence establishing a mandatory requirement that an international regime should be established

³⁴ N. Jasentuliyana, *Ensuring Equal Access to the Benefits of Space Technologies for All Countries*, 10 Space Policy 7 (1994), [https://doi.org/10.1016/0265-9646\(94\)90036-1](https://doi.org/10.1016/0265-9646(94)90036-1) (last visited Nov 16, 2025).

³⁵ Ibid.

³⁶ Jana Robinson, *Transparency and Confidence-Building Measures for Space Security*, 37 Space Policy 134 (2016), <https://doi.org/10.1016/j.spacepol.2016.11.003> (last visited Nov 16, 2025).

³⁷ Guoyu Wang & Xinyi Huang, *On the Common Heritage of Mankind Principle in Space*, 211 Acta Astronautica 926 (2023), <https://doi.org/10.1016/j.actaastro.2023.07.002> (last visited Nov 16, 2025).

³⁸ Ibid.

³⁹ Anne-Sophie Martin, *Regulation of Outer Space: International Space Law and the State*, 150 (Claudia Cinelli ed., Routledge, 1st ed.) (2024).

for the exploitation of resources on the Moon.⁴⁰ The OST does not use the term “common heritage” but uses the word “province of all mankind” thus promoting that there should be a regime for the exploration and use of space resources to the benefit of all the spacefaring and non-spacefaring countries. The OST is focusing on the non-appropriation and equal access meanwhile the Moon Agreement is focused on benefit sharing. Hence there is a need to interpret “province of all mankind” and “CHM” regarding copyright since copyright is a legally protected right which is like a monopoly right over the “work”.

B. INTERPRETATIONAL DISCONNECT BETWEEN COPYRIGHT LAW AND CHM

The CHM principle mainly targets benefit sharing and discourages the conferment of ownership of resources on celestial bodies.⁴¹ This is contrary to the objective of copyright law which grants rights to creators. The principle of benefit sharing which is an inherent part of the CHM can clash with the copyright protections, especially in the case of AI, where the training data and algorithms of AI work on the “shared resources” belonging to celestial bodies.⁴² Since the objective of copyright law and the CHM principle are contrary to each other, there is a need for the creation of a legal framework where the harmonization of copyright protection and CHM can take place.

C. RESOLVING THE DISCONNECT BETWEEN COPYRIGHT LAW, COMMON HERITAGE OF MANKIND PRINCIPLE WITH SPECIAL REFERENCE TO ARTIFICIAL INTELLIGENCE

Alignment of the copyright law and CHM principle regarding equitable access to the space resources being mined by AI requires a legal framework. Compulsory Licensing is one of the approaches which allows the usage of copyrighted AI training, but fair and equitable conditions should be set regarding the royalty payment to the copyright holder.⁴³ This will help overcome the economic drawback of stifling innovation and instead compulsory licensing may

⁴⁰ Eleni-Anna Mavroeydi, *The Effectiveness and Applicability of the Moon Agreement in the Twenty-First Century: Will There Be a Future? in The Space Treaties at Crossroads* 35 (George D. Kyriakopoulos & Maria Manoli eds., 2019), https://doi.org/10.1007/978-3-030-01479-7_3 (last visited Nov 16, 2025).

⁴¹ Dr. Gabriella Catalano Sgroso, *Copyright and Intellectual Property in Outer Space: Legal Protection of Discoveries and Inventions made in Conditions of Microgravity*, International Institute of Space Law 131-142 (1994).

⁴² *Ibid* at 139.

⁴³ Enrico Bonadio & Henna Hingorani, *Compulsory Licensing of Intellectual Property*, in *Research Handbook on Intellectual Property Rights and Inclusivity* 440 (Cristiana Sappa ed., 2024).

incentivize innovation and give wider access to entrepreneurship and the creation of new inventions.

Open Access and Data Licensing can be encouraged by States following the models of Creative Commons for AI sources and especially those AI sources which have been developed through the help of public funding can be regarded as public property thus promoting sharing and collaboration.⁴⁴ There is a need for the development of new international agreements which are addressing copyrights in outer space thus providing a framework for balancing competing rights and their corresponding interests and ensuring common access to all the benefits derived from outer space.

On a comprehensive note, if a study is carried out on a successful benefit-sharing mechanism like that implemented by the International Seabed Authority under the aegis of the UNCLOS, it may offer insights into AI and space resources.⁴⁵

9. PROPOSING A LEGAL GOVERNANCE FRAMEWORK FOR ARTIFICIAL INTELLIGENCE AS A COMMON HERITAGE OF MANKIND

For proposing the major principles for AI governance in space, the principles of “accountability” can be followed by clearly demarcating the lines of liability for actions and outcomes which are achieved through the identification of actors which are involved in the development, operation and deployment of AI in space objects by outlining the ethical and legal obligations.⁴⁶ Article VI of the OST states that states have to bear international responsibility for their space activities thus the inclusion of authorization and supervision of non-governmental activities in AI-related space operations is mandatory. Article VII of the OST read with the Liability Convention states liability for the damage which has been caused by space objects, and rules should be made keeping in mind these articles when being applied to autonomous systems.

Transparency is another aspect of AI-based space objects which makes it necessary that accessibility and comprehensive decision-making processes, algorithms and data sets should be

⁴⁴ Timothy Vollmer, *16 Creative Commons and Open Access in an Academic Library: Implementation, Tools, Policy and Education*, in *Navigating Copyright for Libraries* 378 (Jessica Coates, Victoria Owen, & Susan Reilly eds., 2022).

⁴⁵ Zhou Ye, Xisheng Huang & Zhuojun Xie, *Sustainable Transformation of Global Ocean Governance: Can a Global Public Goods Approach Lead the Way?* 165 *Marine Policy* 106213 (2024).

⁴⁶ Themistoklis Tzimas, *Artificial Intelligence as Global Commons and the “International Law Supremacy” Principle*, 211 in *Advances in Social Science, Education and Humanities Research*, 83, <https://rais.education/wp-content/uploads/2018/11/25902732.pdf>. (last visited Nov 17, 2025)

employed ensuring that the stakeholders can understand the design and purpose of AI.⁴⁷ Article XI of the OST states that there should be information sharing about space activities in its scope to AI and there should be clarity regarding the scope and disclosure requirements. Equitable Distribution of the AI benefits in space regarding developing countries is important with the CHM principle intending the benefit to be concentrated in the hands of some selected parties.⁴⁸ Article I of the OST states that outer space is the “province of mankind” and supports equitable distribution.

International bodies like the United Nations (UN) and the Committee on the Peaceful Uses of Outer Space (COPUOS) are playing a crucial role towards the development and coordination of international space law. Guidelines can be framed by these international bodies for the governance of AI and copyright in outer space.⁴⁹

Proposed Principles to be followed for making AI a common heritage of mankind and for equitable access to AI and benefit sharing in AI are as follows:

1. Responsible AI in Outer Space⁵⁰- Since the OST is the most fundamental document in space law. If AI follows principles like “non-appropriation”, and “peaceful use”, and clearly established liability for damages is incorporated within the AI by its own design, this makes general AI into responsible AI.
2. Liability for AI-based space objects- A policy should be made in which there is a clear attribution of liability for damage caused by AI-based autonomous space objects. The ethical and legal question which arises is that if an AI system in outer space decides to make an autonomous decision, then the legal question is whether that AI system will need prior permission from the State authority governing space activities or take a decision and refrain from causing harm in outer space without taking permission.⁵¹
3. Compulsory Licensing- States may adopt a compulsory licensing regime where the copyrighted AI-generated content which is relevant to space exploration can be accessed by the State. By imposing fair conditions in the licensing of these technologies

⁴⁷ Ibid at Pg No. 84 and 86.

⁴⁸ Cullen O’Keefe et al., *The Windfall Clause: Distributing the Benefits of AI for the Common Good*, in Proceedings of the AAAI/ACM Conference on AI, Ethics, and Society 327 (2020), <https://dl.acm.org/doi/10.1145/3375627.3375842> (last visited Nov 17, 2025).

⁴⁹ Stanley Greenstein, *Preserving the Rule of Law in the Era of Artificial Intelligence (AI)*, 30 Artif Intell Law 291 (2022), <https://doi.org/10.1007/s10506-021-09294-4> (last visited Nov 17, 2025).

⁵⁰ Yichuan Wang, Mengran Xiong & Hossein Olya, *Toward an Understanding of Responsible Artificial Intelligence Practices* (2020), <https://doi.org/10.24251/hicss.2020.610> (last visited Nov 17, 2025).

⁵¹ Anna Hurova, *The Nuances of Responsibility of Artificial Intelligence for Irresponsible Space Activity*, 32 P&C (2024), <https://doi.org/10.29202/phil-cosm/32/2> (last visited Nov 17, 2025).

and giving good compensation to right holders, developing and non-space-faring nations are going to be able to benefit from the use of AI in space. One potential solution to overcome the territoriality issue in applying copyright to AI-driven space objects is to use the quasi-territorial jurisdiction principle control that may be granted over the flag state over the space object that has been registered, even though the scope is minimal.⁵²

4. Open Access and Licensing of Copyrighted Data- By promotion of Open Licenses for AI resources. And making AI tools accessible, especially in publicly funded ventures, will encourage knowledge sharing in the space sector and allow participation in AI-powered space exploration and research.
5. Technology Transfer- International initiatives can be taken to addressal of the copyright and AI in outer space will have to balance the creator rights with equitable access and benefit sharing. Such agreements can help in AI technology and knowledge transfer to developing countries thus contributing to the development of the space sector. Such programs involve training in AI-driven space technology, a research collaboration between the government sector and private sector, open-source AI tools, and the sharing of resources.⁵³
6. Transparency and Confidence-Building Measures (TCBMs)- Establishing the TCBMs for data sharing agreements and monitoring of AI mechanisms in space objects and space applications can be a way forward as it helps in building trust in the space sector and these programs involve a large amount of planning, training and joint research and cooperation amongst nations. TCBMs are gaining some traction in emerging technologies like AI.
7. Using Non-Binding and Soft Law for Regulation- Using non-binding guidelines, principles and codes can help in AI governance in outer space. Guidelines similar to the OECD Principles on Artificial Intelligence, EU Guidelines on Ethics in Artificial Intelligence, and Toronto Declaration emphasize human oversight, accountability, and data protection as the guiding light in the development of AI-based concrete legal frameworks in outer space.
8. Capacity Building and Education- There is a need for training of personnel regarding hands-on AI expertise and infrastructure development in the States. It is extremely

⁵² Biswanath Gupta & Raju Kd, *Understanding International Space Law and the Liability Mechanism for Commercial Outer Space Activities—Unravelling the Sources*, 75 *India Quarterly: A Journal of International Affairs* 555 (2019), <https://doi.org/10.1177/0974928419874553> (last visited Nov 17, 2025).

⁵³ Gordon Rausser, Elliot Choi & Alexandre Bayen, *Public-Private Partnerships in Fostering Outer Space Innovations*, 120 *Proc. Natl. Acad. Sci. U.S.A.* e2222013120 (2023).

important for equitable access to AI benefits in space exploration. This might engage in the development of educational programs, scholarships and funding for various development and research projects.

Though there are complex problems related to the governance of AI in space applications continuous implementation of innovation-based governance programs can help ensure accountability, transparency and equitable benefit sharing and sustainability in AI usage in outer space thus benefitting the whole of mankind.

10. POLICY RECOMMENDATIONS FOR AI, COPYRIGHT AND CHM ISSUES

To make a clear note there are some issues like unclear authorship of the AI-generated works in outer space, then jurisdiction debate which includes the territoriality v/s non-territoriality debate, non-territorial nature of the space is another issue and finally the icing on the cake is the private sector dominance along with the ethical and economic challenges being faced by AI in outer space in the wake of the CHM Principles are some of the summarized issues as discussed in this article.

S. No.	ISSUE	POLICY RECCOMENDATION
1.	No clear authorship for works generated by AI	The introduction of a compulsory licensing scheme for AI-generated content is recommended but fair compensation and equitable access must be given for AI-driven outer space resources.
2.	Jurisdiction	The quasi-territorial principles (E.g. Intergovernmental Agreement on the International Space Station model) may be applied to AI-connected copyright disputes in outer space.
3.	Non-territorial nature of outer space	International Treaties like the Berne Convention can be expanded for the inclusion of space activities and AI-driven space exploration.
4.	Private Sector Participation	The promotion of open-access licensing is one of the solutions for publicly funded ventures in outer space thus helping in the balancing of the private and public interest.
5.	Ethical and Economic Challenges	Implementation of the TCBMs can help in the responsible and equitable usage of AI.

TABLE 1: ISSUES AND POLICY RECOMMENDATIONS

11. SCOPE FOR FUTURE WORK: A WAY FORWARD TO THE DEVELOPMENT OF INCLUSIVE ARTIFICIAL INTELLIGENCE IN OUTER SPACE

The harmonization of international treaties and frameworks can take place for the development of treaties which are specific to AI-generated works and copyright in space. This will help in the development of the shared governance model between spacefaring and non-space-faring nations. Technological innovations may be explored with AI systems which are designed for transparency and more explainability in the AI decision-making can be introduced. Enhancement of the capacity-building measures for AI-driven space technologies can be there, especially in the case of developing nations. Establishment of the ethical AI frameworks along with autonomous systems in outer space with a keen focus on data sharing and data ownership models incorporating accountability and equitable benefit sharing is an area which can be worked upon by future researchers.

12. CONCLUSION

There is a fast integration of AI in space technologies which is generating legal, ethical and economic challenges, especially in the reconciling of copyright law and the common heritage of mankind principle. In addressing these complex relationships there is a multifaceted approach needed involving international law, governance framework and ethical safeguards.

The balance of interests of private entities, states and the global community under the CHM principle is important. Proposed measures like open access licensing, compulsory licensing and technology transfer are extremely important for the equitable distribution of benefits meanwhile there is a need to foster innovation. Shared Governance models can be implemented through international cooperation and capacity-building initiatives which ensure that the AI in outer space is serving as a shared resource which is contributing to the collective advancement of humankind.