
**ESTABLISHING A NEW INTERNATIONAL SPACE
COOPERATION MECHANISM FOR PROTECTING
WORLD HERITAGE SITES**

by

Sandra Cabrera Alvarado* and Sara M. Langston*

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* Sandra Cabrera Alvarado is a space policy consultant and works with the Mexican Space Agency. She holds a BA degree in International Relations from the Americas University, a M.Sc. in Space Studies from the International Space University, and a Master in Space and Telecommunications Law from Paris XI.

* Sara M Langston is an aerospace lawyer and consultant. Ms. Langston received her B.S. at Woodbury University, her J.D. at Golden Gate University School of Law, and her LL.M. from Leiden University. She also holds a Space Studies Certificate from the International Space University and is a member of the New York Bar.

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A B S T R A C T

International agreements and conventions are a traditional source of international law that can be applied effectively to enhance peaceful cooperation among States. Individual States negotiate these agreements based on national policies and existing international frameworks with the objective of securing political promises for conforming State conduct on certain issues. International organisations, such as UNESCO, also utilise and apply these political strategies in order to fulfil their missions. A new trend is emerging, however, toward creating soft law agreements and volunteer partnerships – something that is becoming more evident especially in the space sector. Significantly, these new flexible frameworks for space agreements on space technology and data exchange are pushing international cooperation even further, to include both State and non-State partners.

The Open Initiative is one prototype space framework that successfully works to expand the scope and network of space actors while equalising the value and status of partners and contributions. In the Open Initiative, UNESCO has undertaken the unique role of a nexus, optimising resources by bringing together existing global networks for expertise, technology, and cooperation in accordance with the principles of the 1996 Space Benefits Declaration. In so doing, UNESCO is increasing awareness of both World Heritage sites and the application of existing space technologies for conservation efforts. At the same time, the Open Initiative iterates, in practice, the primary principles of the 1967 Outer Space Treaty and the 1986 Remote Sensing Principles on using space for peaceful purposes and for the benefit of all countries. The contribution of the Open Initiative to the space law and policy field is an innovative "soft law" negotiation and agreement making process with a targeted purpose of creating a specialised space network to reach a specific Earth-based objective.

R É S U M É

Les accords internationaux et les conventions sont une source traditionnelle du droit international, qui peuvent être appliqués de manière efficace, dans le but d'améliorer la coopération pacifique entre les États. Chaque État négocie ces accords en se basant sur ses propres politiques nationales et sur les cadres internationaux existants, dans le but de garantir des promesses politiques afin de normaliser la conduite des États sur certains sujets. Les organisations internationales, telles que l'UNESCO, utilisent et appliquent ces politiques stratégiques, dans le but de remplir leurs missions. Une nouvelle tendance émerge, cependant, vers la création d'accords non-contraignants et de partenariats volontaires--ce qui devient plus commun, notamment dans le secteur spatial. Ces nouveaux cadres flexibles, pour les accords spatiaux relatifs aux technologies spatiales et l'échange de données, poussent de manière substantielle un peu plus en avant la coopération internationale, en incluant comme partenaires à la fois des États et des organismes non-étatiques.

Le Partenariat Ouvert est un prototype de cadre spatial, qui fonctionne de manière effective pour étendre la capacité et le réseau des acteurs spatiaux, tout en équilibrant la valeur et le statut des partenaires et contributeurs. Dans le Partenariat Ouvert, l'UNESCO joue le rôle unique de catalyseur, optimisant les ressources en réunissant les réseaux existants d'expertise, de technologie et de coopération, conformément aux principes de la Déclaration sur la coopération internationale en matière d'exploration et d'utilisation de l'espace au profit et dans l'intérêt de tous les États, de 1996. Ce faisant, l'UNESCO augmente l'attention portée à la fois aux sites du patrimoine mondial, et à l'application de technologies spatiales existantes dans la lutte pour la conservation. De la même façon, le Partenariat Ouvert réitère, en pratique, les principes fondateurs du Traité de l'espace, de 1967, et les Principes sur la télédétection sur l'usage de l'espace à des fins pacifiques et pour le bénéfice de tous les pays, de 1986. La contribution du Partenariat Ouvert au droit spatial et à la politique de ce secteur sont des négociations et des accords non-contraignants innovants, ayant pour but de créer un réseau spatial spécialisé pour atteindre un objectif terrestre spécifique.

KEYWORDS

World heritage sites, Earth observation, international cooperation, Open Initiative, international law, space law, soft law, Remote Sensing Principles, space applications, satellite images

I. INTRODUCTION

Continual monitoring and conservation efforts of natural and manmade world heritage sites are an ongoing challenge for States and related international and nongovernmental organisations. World heritage properties are defined¹ by the United Nations' Educational Scientific and Cultural Organization (UNESCO) and span a range of ecological, geophysical, and historical features. In addition to the physical variances of the properties themselves which require customised expertise, these sites may also be located within the boundaries of one State or border several nations, thereby adding political complexity to the international coordination of preservation efforts. Moreover, the threats to these properties include both natural phenomena as well as human interference with the environment.² Continuity in monitoring these sites, therefore, plays an integral role in conservation and preservation efforts.

To assist in these efforts, advanced technologies are currently being created, adapted and implemented to facilitate targeted preservation and conservation efforts. The benefit of space applications, such as Earth observation satellite systems and navigational tracking applications, to international efforts is obvious. From monitoring issues like land erosion to the migration of endangered species, satellite imagery is indispensable to UNESCO's operational efforts. Obtaining these pertinent technological modalities remains an international voluntary collaboration between States, agencies, and organisations. Fostering this international cooperation is pivotal to UNESCO's overall mission and the success of each project. As a result, UNESCO introduced a new international cooperative mechanism, called the Open Initiative, which is paving the way for a new collaborative legal framework utilising space technologies for protecting world heritage.

¹ *Convention Concerning the Protection of the World Cultural and Natural Heritage*, 23 November 1972, 1037 UNTS 151, 27 UST 37, 11 ILM 1358 (1972) (entered into force 15 December 1975) [*World Heritage Convention*]. Article 1 defines "cultural heritage" as:

works of man or the combined works of nature and man, and areas including archaeological sites which are of outstanding universal value from the historical, aesthetic, ethnological or anthropological point of view.

Article 2 defines "natural heritage" as:

delineated natural areas of outstanding universal value from the point of view of science, conservation or natural beauty.

Note, as of August 2014, 191 States out of 193 have ratified the *World Heritage Convention*.

² *Ibid*, Preamble.

II. INTERNATIONAL COOPERATION

A. INTERNATIONAL COOPERATION UNDER INTERNATIONAL (SPACE) LAW

The legal definition for "international cooperation" is the "voluntary coordinated action of two or more countries occurring under a legal regime and serving a specific objective".³ The concept of international cooperation is a basic precept of international law, both in custom and in treaty law.⁴ Moreover, it is the voluntary adherence of States to a legal regime and specific purpose that underlies the very essence of international organisations. In fact, international organisations emerged in the 19th century as a result of international conferences and congresses. These conventions subsequently led to multilateral treaty-making, which is the legal framework for establishing international bodies.⁵ Thus, a treaty formalises the requirements of international cooperation and creates a binding agreement.

At the same time international cooperation continues to play a significant role in the development of other non-legally binding agreements, such as United Nations (UN) principles, resolutions, and memoranda of understanding (MOUs). In addition, even non-binding agreements by intergovernmental bodies can arguably establish uniformity and continuity of practice so as to create "soft law"⁶ and, eventually, potentially crystallise into customary international law.⁷ The flexibility afforded by soft law is frequently utilised in establishing international norms for space as well as economics, the environment and other regulatory fields.⁸ Here, soft law refers to non-binding legal

³ *Blacks Law Dictionary*, 9th ed, *sub verbo* "international cooperation".

⁴ See e.g. UNGA, *Declaration on Principles of International Law Concerning Friendly Relations and Co-operation Among States*, GA Res 2625 (XXV), UN Doc A/2212 (1970).

⁵ See e.g. Mark W Janis & John E Noyes, *International Law: Cases and Commentary*, 3rd ed (St. Paul, MN: Thomson/West, 2006) at 465-66.

⁶ Christine M Chinkin, "The Challenge of Soft Law: Development and Change in International Law" (1989) 38(4) ICLQ 850 at 851. ("SOFT law instruments range from treaties, but which include only soft obligations ("legal soft law"), to non-binding or voluntary resolutions and codes of conduct formulated and accepted by international and regional organisations ("non-legal soft law"), to statements prepared by individuals in a non-governmental capacity, but which purport to lay down international principles").

⁷ See e.g. *ibid* at 857; Dinah Shelton, *Commitment and Compliance: The Role of Nonbinding Norms In the International Legal System* (Oxford: Oxford University Press, 2003) at 30-32. See also, UNECOSOC, *Report of the Secretary General, International Legal Instruments and Mechanisms*, UN Doc E/CN.17/1996/17 add.I.2, para 55.

⁸ Shelton, *supra* note 7 at 861.

instruments intended to facilitate the integration and development of a legal framework, such as that acknowledged by the UN Economic and Social Council (ECOSOC).⁹

With particular regard to space activities, the United Nations initiated a mechanism for international cooperation in 1961 with General Assembly Resolution 1721 on the International Co-operation in the Peaceful Uses of Outer Space.¹⁰ In 1963, the UN adopted a Declaration of Legal Principles¹¹ for outer space, which eventually culminated in five foundational outer space treaties and agreements.¹² Every year since then, the UN General Assembly continues to pass a resolution reaffirming its objectives concerning "international cooperation in the peaceful uses of outer space".¹³ Throughout these declarations, principles, and agreements, there is a significant and continuous thread linking the desire for international cooperation with the scientific and peaceful exploration and use of outer space.¹⁴

⁹ See generally UN Doc E/CN.17/1996/17 add.I.2, *supra* note 7.

¹⁰ *International Co-operation in the Peaceful Uses of Outer Space*, UNGA Res 1721(XVI), UN Doc A/RES/1721(XVI) (20 December 1961).

¹¹ *Declaration of Legal Principles Governing the Activities of State in the Exploration and Use of Outer Space*, UNGA Res 1962(XVIII), UN Doc A/RES/1962(XVIII) (1963).

¹² *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies*, 27 January 1967, 610 UNTS 205, 18 UST 2410, TIAS No 6347, 6 ILM 386 (entered into force on 10 October 1967) [*Outer Space Treaty*]; *Convention on Registration of Objects Launched into Outer Space*, 6 June 1975, 28 UST 695, 1023 UNTS 15 (entry into force 15 September 1976) [*Registration Convention*]; *Convention on International Liability for Damage Caused by Space Objects*, 29 March 1972, 961 UNTS 187, 24 UST 2389, 10 ILM 965 (1971) (entered into force 1 September 1972) [*Liability Convention*]; *Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched Into Outer Space*, 22 April 1968, 672 UNTS 119, 19 UST 7570, TIAS No 6599, 7 ILM 151 (entered into force 3 December 1968) [*Rescue Agreement*]; *Agreement governing the Activities of States on the Moon and Other Celestial Bodies*, 5 December 1979, 1363 UNTS 3 (entry into force 11 July 1984) [*Moon Agreement*].

¹³ See e.g. UNOOSA, Index of Online General Assembly Resolutions Relating to Outer Space, online: Office for Outer Space Affairs <<http://www.oosa.unvienna.org/oosa/en/SpaceLaw/gares/index.html>>.

¹⁴ The Outer Space Treaty, in particular, iterates the need for international cooperation. For instance, the rationales and principles laid out in the Preamble state a desire for scientific and legal cooperation for the use and exploration of space under the belief that "such cooperation will contribute to the development of mutual understanding and to the strengthening of friendly relations between States and peoples". Article I stipulates a State obligation to "facilitate and encourage international cooperation in [scientific] investigation" in space. Article III further invokes international law and the UN Charter "in the interest of maintaining international peace and security and promoting international cooperation and understanding." Article IX requires that States Parties "be guided by the principle of cooperation and mutual assistance" in conducting their activities in outer space. Other articles refer to applied international cooperation for more specific observation, consultation, registration and exploration activities.

Two additional instruments are relevant in this regard, namely the 1986 Principles Relating to Remote Sensing of the Earth from Outer Space (Remote Sensing Principles)¹⁵ and the 1996 Declaration on International Cooperation in the Exploration and Use of Outer Space for the Benefit and in the Interest of All States, Taking into Particular Account the Needs of Developing Countries (Space Benefits Declaration).¹⁶ Both of these instruments maintain objectives of international cooperation and aim to strengthen the rights of all sovereign nations, particularly developing countries. The latter Declaration further adds to the language of prior agreements by building on "experiences gained in international cooperative ventures".¹⁷

B. IMPLEMENTING THE PRINCIPLE OF INTERNATIONAL COOPERATION TO PROTECT WORLD HERITAGE SITES

Alternative interpretations for international cooperation also emerge from other disciplinary environments. From a policy perspective, it has succinctly been stated that "international cooperation in space is a reflection of foreign policy and functional policy preferences".¹⁸ Successful international cooperation initiatives are inherently connected to the political climate. Functional policy relates to the objectives and requirements of the parties involved, triggering aspects of economics, science and technology. Thus, from a functional, and perhaps more practical perspective, it makes sense that the Organization for Economic Co-operation and Development (OECD) defines "international cooperation" as "current transfers in cash or in kind between the governments of different countries or between governments and international organizations".¹⁹ This functional interpretation not only applies to a wide range of international organisational transactions, but also highlights the practicality of international cooperation as a tool for global exchange and development.

¹⁵ *Principles Relating to Remote Sensing of the Earth from Outer Space*, UNGA Res 41/65, UN Doc A/Res/41/65 (3 December 1986) [*Remote Sensing Principles*].

¹⁶ *Declaration on International Cooperation in the Exploration and Use of Outer Space for the Benefit and in the Interest of All States, Taking into Particular Account the Needs of Developing Countries*, UN GA Res. 51/122, UN Doc A/RES/51/122 (13 December 1996) [*Space Benefits Declaration*].

¹⁷ *Ibid*, Preamble.

¹⁸ Eligar Sadeh, "International Space Cooperation", in Eligar Sadeh, ed, *Space Politics and Policy: An Evolutionary Perspective* (Dordrecht: Kluwer Academic Publishers, 2010) at 283.

¹⁹ See OECD, "Glossary of Statistical Terms" (2008), online: OECD

<<http://stats.oecd.org/glossary/detail.asp?ID=2999>>.

UNESCO in particular utilises various mechanisms of international cooperation in order to carry out its mission. UNESCO, with a current membership of 195 Member States and nine Associate Members,²⁰ is an international organisation mandated with fostering global peace and security through intercultural dialogues on education, science, and culture.²¹ Its key program areas are: education, natural and social sciences, culture, and communication and information.

As a standard-setting organisation, UNESCO participates in States' efforts to conclude universal agreements by serving as a forum for coordinating issues in accordance with its mission.²² In fact, the core activities of the Organisation are based on international agreements formed on the principle of international cooperation tailored to the field of action. For example, UNESCO's cultural mission is based on international cultural cooperation. Specifically, this mission provides governments, authorities, organisations, associations, and institutions responsible for cultural activities with constant guidance under the Declaration of Principles of International Cultural Cooperation of 4 November 1966.²³ Article III of the Cultural Cooperative Declaration establishes that "[i]nternational cultural co-operation shall cover all aspects of intellectual and creative activities relating to education, science and culture".²⁴

²⁰ Initiated during World War II, UNESCO was officially established in 1945 with 37 Member States. Associate Members are parties that "are not responsible for the conduct of their international relations." *Constitution of the United Nations Educational, Scientific and Cultural Organization (UNESCO)*, 16 November 1945, 4 UNTS 275, 41 AJIL Supp 1,), art II(3) (entered into force 4 November 1946) [*UNESCO Constitution*]; UNESCO Resolution 41.2, "Rights and Obligations of Associate Members" online: UNESCO <http://portal.unesco.org/en/ev.php-URL_ID=48880&URL_DO=DO_TOPIC&URL_SECTION=201.html>.

The Associate Members are: Aruba, British Virgin Islands, Cayman Islands, Faroes, Macau, China, the Netherlands Antilles (notwithstanding constitutional changes within the island governments), and Tokelau.

²¹ *UNESCO Constitution*, *supra* note 20, art 1. See also UNESCO, "Introducing UNESCO: Who we are", online: UNESCO <<http://www.unesco.org/new/en/unesco/about-us/who-we-are/introducing-unesco/>>.

²² See UNESCO, "Standard-Setting Instruments", online: UNESCO

<http://portal.unesco.org/en/ev.php-URL_ID=12024&URL_DO=DO_TOPIC&URL_SECTION=201.html>.

²³ UNESCO, *Declaration of the Principles on International Cultural Cooperation*, 4 November 1966, UNESCO's Standard-Setting Instruments, IV.C., online: UNESCO

<http://portal.unesco.org/en/ev.php-URL_ID=13147&URL_DO=DO_TOPIC&URL_SECTION=201.html> [*Cultural Cooperation Declaration*].

²⁴ *Ibid*, art III.

Moreover, Article IV of the Cultural Cooperative Declaration delineates the aims of international cultural cooperation "in its various forms", whether it is bilateral, multilateral, regional or universal.²⁵ In establishing systematic mechanisms for international cooperation, UNESCO, through its Member States, passed the 1972 Convention for the Protection of the World Cultural and Natural Heritage (World Heritage Convention).²⁶

The World Heritage Convention is comprised of thirty-eight articles divided into eight sections. Article 7 defines the purpose of the Convention to be "the establishment of a system of international co-operation and assistance designed to support States Parties to the Convention in their efforts to conserve and identify that heritage".²⁷ Overall, UNESCO's World Heritage List includes 1007 properties as of 2014. Among these, 779 are cultural, 197 natural, and 31 are mixed properties, located across 157 States.²⁸ The World Heritage Committee (Committee)²⁹ convenes annually to decide on the inscription of new properties to the World Heritage List, as well as to discuss the deletion and addition of properties from the List of World Heritage in Danger.

Moreover, Article 3 of the World Heritage Convention requires a State Party "to identify and delineate the different [cultural and natural heritage] properties situated on its territory".³⁰ In addition, under Article 4, States Parties have a duty to ensure "the identification, protection, conservation, presentation and transmission to future generations of the cultural and natural heritage" situated on its territory, which property "belongs primarily to the State" and obtains classification as a world heritage property.³¹ This State responsibility requires a State Party to "do all it can" to protect its own world heritage sites, through the use of its own resources or with international assistance and co-operation, where needed. Furthermore, Article 6 stipulates a duty of cooperation on the part of the international community to aid and assist requesting States

²⁵ *Ibid*, art IV.

²⁶ *World Heritage Convention*, *supra* note 1.

²⁷ *Ibid*, art 7.

²⁸ Note World Heritage Sites are classified as cultural, natural or mixed heritage. See UNESCO, *World Heritage List*, online: UNESCO <<http://whc.unesco.org/en/list>>.

²⁹ The Committee is responsible for the implementation of the World Heritage Convention. It defines the use of the World Heritage Fund and allocates financial assistance upon requests from States Parties, "World Heritage Committee", online: UNESCO <<http://whc.unesco.org/en/committee>>.

³⁰ *World Heritage Convention*, *supra* note 1, art 3.

³¹ *Ibid*, art 4.

with the protection of their world heritage sites.³²

State responsibility and commitment are further detailed in Article 5 with requirements for establishing and implementing "effective and active measures" for the "protection, conservation and presentation" of nationally located cultural and natural heritage.³³ State implementation measures may include initiating regional planning programs, establishing staff and support services on sites, undertaking scientific and technical conservation research, and adopting measures to give the heritage a function in daily community life.³⁴ In addition to State commitment requirements to the protection of cultural heritage, States Parties are also mandated "not to take any deliberate measures which might damage directly or indirectly the cultural and natural heritage [sites] situated on the territory of the State Parties to this Convention".³⁵

Article 11 of the World Heritage Convention further stipulates a State obligation to create a national inventory of properties constituting cultural and natural heritage and furnish this report along with the status of heritage conservation to the Committee.³⁶ These national reports provide the Committee with information necessary for them to assess site conditions, and decide if measures need to be taken and resolve any recurrent problems.³⁷ The Committee also maintains a cumulative World Heritage List and disseminates an updated version every two years.³⁸

Most importantly, the Convention delineates the conditions for requesting international assistance.³⁹ Article 19 provides that "[a]ny State Party may request international assistance" to protect its cultural or natural heritage site.⁴⁰ In so doing, States are to provide the Committee with supporting documentation.⁴¹ Under Articles 20 and 21, the Committee then makes a determination to add the property to the World Heritage List, as funding is limited to listed properties, and the

³² *Ibid*, art 6.

³³ *Ibid*, art 5.

³⁴ UNESCO, *World Heritage Information Kit*, online: UNESCO <<http://whc.unesco.org/en/activities/567/>> [*World Heritage Information Kit*].

³⁵ *World Heritage Convention*, *supra* note 1, art 6.

³⁶ *Ibid*, art 11(1); *World Heritage Information Kit*, *supra* note 34 at 9.

³⁷ *World Heritage Information Kit*, *supra* note 34 at 9.

³⁸ *World Heritage Convention*, *supra* note 1, art 11(2).

³⁹ *Ibid*, Part V.

⁴⁰ *Ibid*, art 19.

⁴¹ *Ibid*.

Committee defines the procedural and content requirements for requesting international assistance.⁴²

The 1972 Convention outlines that Members States benefit by:

belonging to an international community of appreciation and concern for universally significant properties that embody a world of outstanding examples of cultural diversity and natural wealth.⁴³

Utilising this international cooperative approach, individual States can learn to appreciate and protect the world's natural and cultural heritage. Moreover, the "international" aspect raises awareness throughout the international community on the importance of heritage preservation, as well as highlights unique national cultural features and natural heritage to be shared with the world.

In summary, the underlying responsibilities under the World Heritage Convention are the State commitment to preserving, monitoring, observing and protecting the sites within a State Party's territory, and the corollary commitment to assist others in doing the same, whether by contributing financial, technical and/or intellectual assistance. For developing nations in particular, membership in UNESCO provides access to financial assistance from the World Heritage Fund and to other emergency assistance, such as urgent responsive actions to natural disasters. Receiving recognition from UNESCO on a designated heritage site also provides States with opportunity and visibility to obtain assistance from other related sources for local conservation projects. Thus, tourism to designated cultural and natural heritage sites is yet another example of a consequential benefit to a State's industry and economy as their sites shift from "national" status to "world heritage".

C. THE OPEN INITIATIVE: A NEW INTERNATIONAL SPACE COOPERATIVE MECHANISM

International agreements and conventions are one source of international law that can be applied effectively to enhance peaceful cooperation among States. Individual States negotiate these agreements based on national policies and existing international frameworks with

⁴² *Ibid*, arts 20-21.

⁴³ *World Heritage Information Kit*, *supra* note 34 at 9.

the objective of securing political promises for conforming State conduct on certain issues. International organisations, such as UNESCO, also utilise and apply these political strategies in order to fulfil their missions. In serving its objectives to preserve and protect world heritage from ongoing threats,⁴⁴ UNESCO initiated an institutional partnership agreement in 2001 with the European Space Agency (ESA), under the authority of Article 6 of the 1972 World Heritage Convention, called the UNESCO-ESA Open Initiative on the Use of Space Technologies to Support the World Heritage Convention,⁴⁵ to support the World Heritage Convention (Open Initiative).⁴⁶

1. GOALS AND MISSION

The goal of the Open Initiative is to develop a framework of cooperation between "public, private and civil society groups" based on the international cooperation principle.⁴⁷ Consequently, the Initiative is open to all institutions with expertise in core space technologies. Its mission is to create a cooperative umbrella to share States' existing space expertise and technology with Member States who lack these technological advantages,⁴⁸ for purposes of assisting developing countries to monitor their world heritage sites. In so doing, UNESCO will be able to help improve States' natural and cultural conservation

⁴⁴ UNESCO's mission grows more challenging each year as the World Heritage list continues to expand and heritage sites face ongoing threats. According to UNESCO, natural disasters and man-made threats to World Heritage properties include: looting, insufficient management, unsustainable tourism, development pressures, war and conflict, see online: UNESCO <<http://whc.unesco.org/en/158/>>.

⁴⁵ Reference Framework Open Initiative UNESCO-ESA Space Technologies to Support the World Heritage Convention, *Introduction* (2001) (unpublished) [*Open Initiative*]; see also Mario Hernandez, Ulrich Huth & Gunter Schreier, "Earth Observation From Space For The Protection Of UNESCO World Heritage Sites: DLR Assisting UNESCO" in *The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences*, Vol XXXVII, Part B8. Beijing 2008, online: International Society for Photogrammetry and Remote Sensing <http://www.isprs.org/proceedings/XXXVII/congress/8_pdf/5_WG-VIII-5/01.pdf>.

⁴⁶ UNESCO, *The Open Initiative: UNESCO Space for Heritage Network*, online: UNESCO <<http://www.unesco.org/new/en/natural-sciences/science-technology/space-activities/space-for-heritage/unesco-space-network/>> [*Space for Heritage*].

⁴⁷ *Open Initiative*, *supra* note 45 at 2.

⁴⁸ The Open Initiative provides:

Not all State parties have the necessary capacity to use and interpret satellite images in monitoring the State of conservation of World Heritage sites.

Ibid at 2. Further, it is provided that "Contribution by different partners is considered vital": *Ibid* at 7. See also UNESCO, *Space for Heritage*, "Our Mission", online: UNESCO <http://www.unesco.org/science/remotesensing/?id_page=86&lang=en> [*Our Mission*].

activities.⁴⁹

The main purpose of the Open Initiative is to develop case studies of selected World Heritage sites and provide beneficiary States with *in-situ* research, sponsored by Open Initiative members and project participants. A Member State will be able to strengthen its national conservation policies pertaining to its World Heritage sites through scientific data and research obtained via the space technologies provided. In addition to technical assistance, a core principle of the Open Initiative is the provision of: capacity-building workshops, outreach and educational activities to the beneficiary countries. The rationale of this exchange is to solidify a commitment on the part of a beneficiary State and ensure continuity in its preservation efforts.⁵⁰ The Initiative also implies an exchange of knowledge among beneficiary States and sponsor members (universities, space agencies, governmental institutions or international organisations).

2. ACCESSION PROCEDURE

Participation in the Open Initiative is extended to States as well as to institutions such as universities, the private sector, and public space actors. Institutions maintain identical membership requirements as States under the Open Initiative. Since its entry into force, accession to the Open Initiative has been conducted through letters of agreement or MOUs, although these modalities are not particularly provided for under the Open Initiative accession procedures. For instance, in 2008, the Japanese Space Agency (JAXA) acceded via a Memorandum of Unity. In the Memorandum, JAXA formalised its cooperative practice with UNESCO in contributing cutting-edge space images of World Heritage Sites.⁵¹ In fact, JAXA has contributed high quality space images from its remote sensing satellite, *Daichi* (ALOS), since 2001.

⁴⁹ See UNESCO, "Open Initiative on the Use of Space Technologies to Support the World Heritage Convention", online: UNESCO <http://www.unesco.org/science/remotesensing/?id_page=135&lang=en>.

⁵⁰ *Open Initiative*, *supra* note 45 at 4. The use of satellite images implemented "upon request of a State Party, would strengthen the capacity of the staff in the country including the site staff". Hence:

The country should show its commitment by providing national expertise, ground truth information, in-kind contribution, etc.

Ibid at 7.

⁵¹ JAXA, *JAXA and UNESCO Memorandum of Unity for Monitoring World Heritage Sites*, December 2008, online: JAXA <http://www.jaxa.jp/press/2008/12/20081202_unesco_e.html>.

3. SCOPE OF ACTIVITIES

Members of the Open Initiative agree to the following activities in accordance with their resources and capabilities, the core activities of which are:

- a) To assist developing countries in the monitoring of the World Heritage sites.
- b) To improve observation monitoring and management of World Heritage cultural and natural sites.
- c) To assist countries in acquiring the initial capacity to use space technologies for the conservation of their heritage.⁵²

In this regard, capacity building in a developing State is focused on providing local conservation authorities with the proper training required to continue the task of monitoring and preserving the site using the newly available space technology.

Furthermore, a State Party to the 1972 World Heritage Convention can obtain aid and support for its World Heritage site from the Open Initiative by requesting assistance from UNESCO or directly applying to the UNESCO Committee, regardless of whether the site is already under threat or not. Once UNESCO evaluates the situation and designs an appropriate programme, space partners are identified and contacted by UNESCO. A project can only be enacted, however, if funds and resources are available. In many cases, space agencies and private companies contribute to the mission by providing relevant satellite imagery without cost.

⁵² *Our Mission*, *supra* note 48.

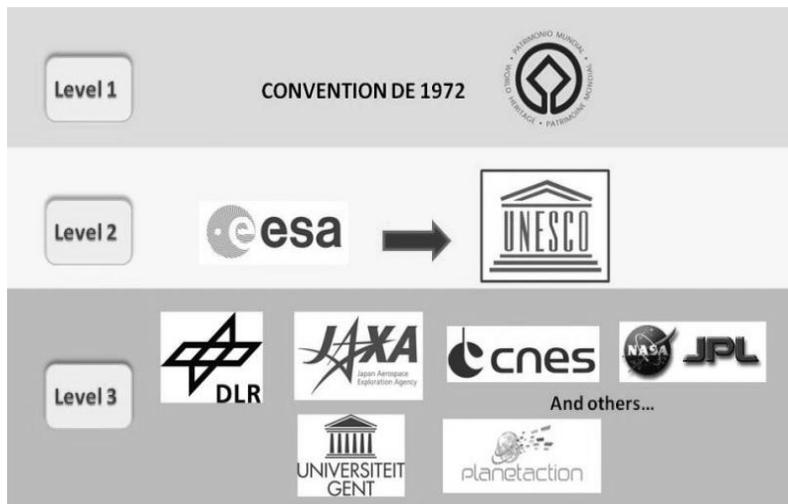


Figure 1. UNESCO-ESA Open Initiative Structure

Source: Sandra Cabrera Alvarado

Selected prior case studies include deforestation, climate change, urban growth, and archaeological conservation. Additional case studies will be explained in more detail in Section IV of this paper. Hence, the contribution of the Open Initiative to space law and policy is the innovative negotiation and agreement making process with the targeted purpose of creating a specialised space network to reach a specific objective.

D. A NEW LEGAL FRAMEWORK FOR SPACE AGREEMENTS

An intergovernmental call for cooperation marks the first step in organisational policymaking. The next step is to negotiate and formalise the terms of agreement and delineated roles and contributions of each participating agency or entity. The international elaboration process of collaboration and defining requirements is particularly pertinent to the space field as it presents a unique area of novel and evolving technological capabilities for Earth benefit, as well as a growing community of both State and highly-skilled non-State actors. As an intergovernmental organisation UNESCO is in a singular position to harness the potential of these existing space capabilities, networks and actors to effectuate its cultural and scientific mission objectives through relevant and appropriate customised space agreements. These agreements in turn, are based on and also further the legal precepts and

principles of the peaceful use of outer space as well as international cooperation and assistance established under public international law and the *corpus juris spatialis*.

While numerous forms and methods of establishing international agreements exist, UNESCO's Open Initiative advances a new trend for forming space law agreements, with particular regard to institutions receiving equal recognition and status, and playing identical roles to that of States. In point of fact, the Open Initiative grants space institutions the same capacity as States in concluding international agreements. This recognition originates from the foundational cooperation principle, desire and objective to engage as many institutions as are willing to contribute to the core activities of the Open Initiative.

Another trend in the elaboration of agreements here is the non-liability aspect. Traditionally, liability attaches via national contract and tort law where a beneficiary sustains harm and/or damages as a result of a contracting party's actions.⁵³ The International Law Commission outlined the content and scope of State responsibility towards other States and the international community in the Draft Articles on State Responsibility.⁵⁴ Under the Open Initiative, however, parties do not incur liability by signing or performing on a contract in order to encourage inter-party cooperation. Nonetheless, an ethical obligation to cooperate in accordance with UNESCO guidelines and supervision may still be implied based on the 'good faith' compliance principle of *pacta sunt servanda* and State membership to the World Heritage Convention.⁵⁵ The Open Initiative text and subsequent contracts that arise with the organisation of projects therefore do not constitute a typical legally binding instrument. Meaning, by intention there are no provisions for sanctions, settlement of disputes, or other legal mechanisms for enforcement. As a result, no legal obligations, responsibility or liability

⁵³ Note that liability for requested satellite imagery, data, knowledge exchange and training etc. is not likely actionable here under the Liability Convention as the Open Initiative agreements pertain to data, information and persons acquired or exchanged from within sovereign territories and therefore do not concern launching activities or space objects *per se*. Thus, the legal responsibility and liability for issues such as damages arising from inaccurate, dated or misinformed data (a national activity) would ordinarily be a matter for domestic courts under the relevant national legal system not international space law; or possibly the International Court of Justice where a States claim is brought on a particular breach of international law and/or State responsibility.

⁵⁴ ILC, *Draft Articles on Responsibility of States for Internationally Wrongful Acts*, November 2001, Supplement No 10 (A/56/10), chp.IV.E.1.

⁵⁵ *Vienna Convention on the Law of Treaties*, 23 May 1969, 1155 UNTS 331, art 26. *Pacta sunt servanda* provides that States have a duty to perform their treaty obligations in good faith.

attach to the agreement and associated contracts. This Initiative is founded on State interest and the initiative of assisting States, cementing compliance via the traditional and voluntary spirit of international cooperation.

As a result, this agreement is imbued with "soft law" characteristics.⁵⁶ As a standard setting organisation, UNESCO can formulate and foster voluntary codes of behaviour, through these soft (non-binding) instruments and agreements intended to facilitate the integration and development of existing UN legal frameworks, resolutions and goals with specific applications of international cooperation--specifically, with regard to utilising space-derived technologies for the benefit of all nations, fostering mutually acceptable collaboration terms and the sharing of remote sensing data, information and knowledge.

Under the Open Initiative, the obligations and compromises are stipulated throughout the Initiative's introduction, scope of proposed activities, and the principle terms for participation. The instrument also raises potential areas for cooperation and methods of assistance.⁵⁷ A successful balancing of these activities, requirements and compromises necessarily requires prior discussion on a case-by-case basis. The resulting agreement terms will depend on the capabilities of the assisting parties and the needs of the requesting State, as evidenced by the domestic State of affairs with regard to conservation efforts and available national expertise.⁵⁸

Moreover, since assisting space actors contribute a valuable effort in providing high resolution satellite images for project objectives, no liability is implicated with regard to the accuracy of the images provided in the Open Initiative. The satellite images are processed and interpreted for use according to each requesting State's needs and with its full collaboration. In addition, the requesting/beneficiary State always retains national sovereignty and jurisdiction over the site and related activities, as per international law precepts and established space principles on respect for sovereign States.

⁵⁶ See e.g. Chinkin, *supra* note 6.

⁵⁷ *Open Initiative*, *supra* note 45 at 1, 3.

⁵⁸ *Ibid* at 7.

Last but not least, no mechanism for arbitration is provided for in the Open Initiative because these agreements are fundamentally based on voluntary participation. The assisting institutional and technical partners to the agreement agree on the terms and methods of assistance and provide the requested human capital and technological assets accordingly. Thus, the parties can contractually act without concern for liability for damages. Conversely, the assisted party likewise must accept a waiver of liability on the part of the participating partners, and in particular, the lack of recourse for any subsequent causes of action arising from the use of the technology and data offered.

While public international legal concepts on State responsibility may still apply to States actors, the liability waiver here may be seen as an extension of the 'Good Samaritan' principle as applied to other satellite data distribution scenarios involving natural disaster management.⁵⁹ States voluntarily rendering necessary space applications to assist with cultural heritage conservation efforts, as approved by UNESCO, can fall into an analogous category. Non-liability clauses are often used in bilateral and multilateral assistance agreements, such as the 1998 Tampere Convention, which provides protection for authorised personnel and nongovernmental organisations rendering assistance in disaster regions.⁶⁰ It is therefore reasonable to provide similar liability waivers to incentivise otherwise voluntary participation in natural and cultural site preservation and conservation efforts.

By contrast, private law issues pertaining to satellite data access and copyright are considered on a case-by-case basis. Some space partners, such as space agencies, provide both raw data and processed satellite images to UNESCO on a cost-free basis, conceding the copyright. UNESCO can then give the processed satellite images or raw images to the State in question. Alternatively, private satellite operators may impose copyright restrictions on their satellite images. For instance, operators may grant satellite data covering a particular site to UNESCO provided it agrees not to disseminate the raw data, only the specifically tailored product, to the assisted State or other involved actors.

The data and copyright agreement is thus negotiated between UNESCO and its space partner during project development, to include

⁵⁹ Atsuyo Ito, *Legal Aspects of Satellite Remote Sensing* (Boston, Mass: Martinus Nijhoff, 2011) at 162.

⁶⁰ *Tampere Convention on the Provision of Telecommunication Resources for Disaster Mitigation and Relief Operations*, 18 June 1998, 2296 UNTS 5, art 5 (entered into force 8 January 2005).

data use and distribution rights. Acquiring this data is essential to UNESCO in designing and providing an accurate cartography of the site for optimal management purposes. Moreover, while general remote sensing of another States' territory may potentially raise international conflicts with regard to sensed data dissemination,⁶¹ no conflicts have arisen in this regard under these agreements given the explicit request for satellite data assistance by the assisted State and the voluntary response of partner States. Further discussion on this issue is elaborated in section III.B.

III. THE SPACE LAW FRAMEWORK GOVERNING THE PROTECTION OF WORLD HERITAGE SITES

The foundation for utilising space applications for Earth observation to aid the preservation of world heritage sites is 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).⁶² The rights and obligations under this treaty represent the hard law elements for practical application. In addition, other international principles or soft law obligations provide a further policy framework for conducting space related activities.

A. SOURCES OF INTERNATIONAL LAW

The 1967 Outer Space Treaty is the foundational instrument delineating the rights and duties of States conducting activities in outer space. Significantly, Article I provides the corner stone for all space activities in establishing the free exploration and use of outer space for peaceful purposes.⁶³ Article III also extends international law to outer space, specifically invoking the UN Charter,⁶⁴ while Article VI stipulates that a State must shoulder responsibility for *all* national space activities, which include the activities of all governmental and nongovernmental (private) space operators.⁶⁵ The Preamble to the Treaty, while not legally binding, also illustrates the contextual motivations behind the treaty and specifically elicits international cooperation to develop "mutual

⁶¹ See e.g. Carl Christol, "Remote Sensing and International Space Law" (1988) 16 J Space L 21.

⁶² *Outer Space Treaty*, *supra* note 12.

⁶³ *Ibid*, art I.

⁶⁴ *Ibid*, art III.

⁶⁵ *Ibid*, art VI.

understanding and to [strengthen] friendly relations between States and peoples",⁶⁶ mirroring UNESCO's mandate.

For purposes of the present discussion, it is important to note that from the outset of international negotiations pertaining to outer space, which commenced in the late 1950s, the international community recognised the importance of establishing space as a realm built on international cooperation and mutual respect for all States, and these concepts were carried over into the subsequent UN Remote Sensing Principles of 1986 and the Space Benefits Declaration of 1996.⁶⁷

B. REMOTE SENSING PRINCIPLES OF 1986

The Remote Sensing Principles followed in the pioneering and exploratory spirit of the space treaties, thus the scope pertains only to remote sensing for Earth observation, preservation and protection.⁶⁸ These activities fall within the purview of UNESCO's Open Initiative thus triggering the application of the Principles. In this regard, two significant features concerning Earth observation are manifested in the Principles.

First, States may conduct remote sensing activities from space without obtaining prior approval by the sensed State, which reiterates Article I of the Outer Space Treaty in the free use of space for peaceful purposes.⁶⁹ However, States must likewise conduct their activities in accordance with international law.⁷⁰ Second, the Remote Sensing Principles establish a vested right in the sensed State to obtain access to the raw and processed data taken of its territory by another State.⁷¹

During the drafting negotiations, developing countries in particular were keen to have their sovereign rights and interests acknowledged and protected.⁷² They feared that their natural resources

⁶⁶ *Ibid*, Preamble, para 5.

⁶⁷ *Remote Sensing Principles*, *supra* note 15; *Space Benefits Declaration*, *supra* note 16.

⁶⁸ *Remote Sensing Principles*, *supra* note 15, principle I. See also Joanne Gabrynowicz, ed, *The United Nations Principles Relating to Remote Sensing of the Earth from Space: A Legislative History: Interviews of Members of the United States Delegation*, (Oxford, Miss: The National Center for Remote Sensing, Air and Space Law, University of Mississippi School of Law, 2002).

⁶⁹ *Outer Space Treaty*, *supra* note 12, art I.

⁷⁰ *Remote Sensing Principles*, *supra* note 15, principles III, IV.

⁷¹ *Ibid*, principle XII.

⁷² See e.g. UN Doc A/AC.105/133 (1974) at 4 (Commentary from Brazil); UN Doc A/AC.105/PV.197 (1979) at 14 (Commentary from Ecuador);

may be observed and exploited by space-capable nations and the data sold to third party States without their knowledge and to their disadvantage.⁷³ The adopted Principles thus rendered a right to the sensed State to obtain satellite data of its territory, disseminated by the sensing State, on a non-discriminatory basis and at reasonable cost.⁷⁴

As the Open Initiative seeks to assist States who lack the necessary expertise and technology to preserve heritage sites on their territory, particularly developing States, the earlier positions of these developing States are noteworthy. In fact, by facilitating the international exchange of satellite data and expertise, UNESCO is fulfilling its mandate as well as the objective of the Remote Sensing Principles while attuning to the targeted interests of (developing) beneficiary States. Specifically, the Open Initiative answers the call of the Remote Sensing Principles for international cooperation, technical assistance based on mutual agreement, and the applicability of international law and the Outer Space Treaty.⁷⁵

In this light, besides providing an ethical, legal and procedural approach to Earth remote sensing, the Remote Sensing Principles may be uniquely seen as an application of social justice to space technologies even if they do not rise to the level of hard law. Social justice pertains to fairness and equity among peoples.⁷⁶ In serving a multi-fold purpose, the Principles on Remote Sensing have been successfully and widely adopted by States and incorporated into national law.⁷⁷ There is even a legal debate as to whether it has achieved the status of customary international law today.⁷⁸ At the very least, the Principles remain a

UN Doc A/AC.105/C.2/SR.343 (1981) at 3 (Commentary from India);
 UN Doc A/AC.105/C.2/SR.345 (1981) (Commentary from Columbia);
 UN Doc A/AC.105/C.2/SR.345 (1981) at 2 (Commentary from Venezuela).

⁷³ *Ibid.*

⁷⁴ *Remote Sensing Principles*, *supra* note 15, principle XII.

⁷⁵ See specifically Principle III (implication of international law), Principle IV (respect for sovereign rights of States over their territory), Principle V (promote international cooperation), Principle VII (mutually agreed provision of technical assistance), Principle VIII (UN role in promoting and coordinating international cooperation and technical assistance), Principle XII (data dissemination policy) and Principle XIII (sensed State's right to consultation).

⁷⁶ UN, "World Day of Social Justice", online: UN

<<http://www.un.org/en/events/socialjusticeday/>>.

⁷⁷ See e.g. United States' *Land Remote Sensing Policy Act of 1992*, Pub L 102-555, 106 Stat 4163, 51 USC §§ 60121-60125.

⁷⁸ Francis Lyall & Paul Larsen, *Space Law: A Treatise* (Burlington, Vt: Ashgate, 2007) at 423; see e.g. Carl Christol, "Remote Sensing and International Space Law" (1998) 16 J Space L 21 at 40.

collaborative instrument of authority in conducting remote sensing activities and a foundation for requesting and exchanging Earth observation data across governmental and nongovernmental entities.

C. THE SPACE BENEFITS DECLARATION OF 1996

Discussions for UN Resolution 51/122, Declaration on International Cooperation in the Exploration and Use of Outer Space for the Benefit and in Interest of all States, Taking into Particular Account the Needs of Developing Countries, or the "Space Benefits Declaration of 1996," reached its zenith in the late 1980s.⁷⁹ Following the adoption of the Remote Sensing Principles, developing States acted to further protect their rights and interests in space on the international level. In eight consolidated articles, this UN Declaration reiterates two main and distinct aspects: first, the continued need for international cooperation in space. This includes "effective and appropriate" *modes* of cooperation as well as different *participants* as required, "including, inter alia, governmental and non-governmental; commercial and non-commercial; global; multilateral, regional or bilateral; and international cooperation among countries in all levels of development".⁸⁰

Secondly, both the Preamble and articles consistently call for strengthening international cooperation and providing (technical and financial) assistance to "developing nations" and those with "incipient space programmes".⁸¹ Thus this instrument both supports the established precepts of the open and free use of space, while also underscoring developing countries' interest in ensuring that the overarching use of space benefits all countries "irrespective of their degree of economic or scientific development", as stipulated in the Outer Space Treaty and its progeny.⁸²

The Space Benefits Declaration therefore bolsters the principles previously established in the space treaties, Remote Sensing Principles and other space related instruments by: reminding States of their commitments to international cooperation; building upon bilateral and

⁷⁹ Marietta Benkö & Kai-Uwe Schrogl, "Article I of the Outer Space Treaty Reconsidered After 30 Years 'Free Use of Outer Space' vs 'Space Benefits' " in Gabriel Lafferranderie & Daphné Crowther, eds, *Outlook on Space Law Over the Next Thirty Years* (The Hague: Kluwer Law International, 1997) at 70-71.

⁸⁰ *Space Benefits Declaration*, *supra* note 16, para 4.

⁸¹ *Ibid*, Preamble, paras 1, 3, 5, 6.

⁸² *Ibid*, para 1; *Outer Space Treaty*, *supra* note 12, art 1. See also Benkö & Schrogl, *supra* note 79 at 76.

multilateral space and international agreements and significantly broadening the field of space cooperation and opening potential participants to non-State parties and intergovernmental organisations. A pronounced political and legal flexibility is also afforded in this Declaration concerning contractual terms and aspects to be determined on "equitable and mutually accepted basis" as well as specific acknowledgement of the "rights and interests of the parties concerned, as for example, with intellectual property rights."⁸³ Thus, this unanimously adopted UN Declaration paved the way for contemporary cooperative space agreements like the Open Initiative, which implements, necessarily, mutually acceptable contract terms for cooperation and a tailored respect for source copyright.

In fact, international bodies, and particularly those concerned with space applications, have increasingly chosen the flexibility of international cooperative agreements and charters over legally binding agreements and treaties. Marco Ferrazzani, legal counsel and department lead at ESA, has also advocated the practical utility of such "soft law" mechanisms, in particular cooperative agreements, for advancing collaborative space initiatives and programs.⁸⁴ Specifically, he acknowledges that international organisations can exercise great influence through voluntary charters and coordination mechanisms that enable international space cooperation "in a manner that is flexible in form but still powerful in terms of achievable results".⁸⁵

The Preamble to the Space Benefits Declaration of 1996 also highlights the "growing scope and significance of international cooperation among States and between States and international organizations in the exploration and use of outer space for peaceful purposes." This encompasses the aims of UNESCO and ESA in establishing the Open Initiative in 2001. The space network created in the Open Initiative supports developing countries in direct line with the Declaration by "[f]acilitating the exchange of expertise and technology"⁸⁶ for protecting World Heritage Sites on mutually agreed terms and fostering "development of relevant and appropriate space capabilities in interested States".⁸⁷ For example, UNESCO partnered with the Canadian Space Agency for the use of Radarsat-1 to support research and analyses

⁸³ *Outer Space Treaty*, *supra* note 12, art 2.

⁸⁴ Marco Ferrazzani, *Alternative Approaches to International Space Cooperation*, ESA BULLETIN 110 (May 2002) at 76.

⁸⁵ *Ibid* at 80.

⁸⁶ *Space Benefits Declaration*, *supra* note 16, para 6.

⁸⁷ *Ibid*, para 5.

on World Heritage sites in Central Africa.⁸⁸ All of UNESCO's partnerships are based on the international cooperation principle (as reiterated by numerous UN treaties, resolutions and declarations both space related and non-space related).

It is also noteworthy to mention that the spirit of cooperation and respect for the rights and interests of nations promulgated in the Outer Space Treaty and Remote Sensing Principles followed in the same light of cooperation applied to other *res communes* or global commons, such as the High Seas and Antarctica. Thus, the evocation of international cooperation in establishing uniform standards of behaviour, whether deemed legally binding or not, is a time-honoured practice in international law. UNESCO's Open Initiative program further elaborates on these sources of international law and practices of cooperation. In coordinating and promoting cooperation, technical assistance, and space-based applications for preserving cultural heritage sites the organisation is fulfilling both its mandate and mission. It is also significant to note that the preservation list of cultural heritage sites includes both natural environments as well as human-made structures. Thus, international cooperation genuinely enhances and serves the interests of all nations on this planet – an objective repeatedly affirmed in the UN space Treaties, Principles and Declarations.

IV. CASE STUDIES

Two practical examples of this new international cooperation between UNESCO and space agencies are already evident in Africa and Mexico. Virunga National Park, a transboundary World Heritage site in Central Africa and Calakmal, an archaeological site in Mexico, have already benefited from the Open Initiative. These two case studies serve as exemplary applications for further Open Initiative projects.

⁸⁸ See UNESCO, *Using Space Technologies for the Conservation of Natural and Cultural Heritage Brochure (2001)*, online: UNESCO <http://www.unesco.org/science/remotesensing/upload/files/brochure_entiere_revue.pdf>.

A. THE OPEN INITIATIVE IN PRACTICE: THE PROTECTION OF VIRUNGA NATIONAL PARK

In 2001, ESA shared its Earth observation satellite data with UNESCO for the protection and monitoring of Virunga National Park⁸⁹ as a World Heritage site. This property contains a richly bio-diverse environment and ecology, lying in a transboundary region⁹⁰ between the Democratic Republic of Congo (DRC), Rwanda and Uganda. This project sealed the beginning of a new form of international space cooperation with a new approach to developing space policy by specifically targeting international non-governmental organisations as partners, such as the World Wide Fund for Nature, as well as States.⁹¹

Since, the Open Initiative particularly aims at enhancing the effectiveness of the conservation programmes of developing countries, UNESCO proposed a two-year project to assist the national conservation authorities of DRC, Uganda and Rwanda to preserve the last habitats and ecologies of mountain gorillas as well as other endangered animals located within Virunga National Park. In 2003, the project, called BEGo (Build Environment for Gorilla), began providing processed satellite imagery of the areas⁹² to the national conservation authorities. ESA's imagery helped to produce accurate cartography of the park, facilitating the monitoring of the habitat of an endangered species of mountain gorillas. This cartography was also compatible with Global Positioning

⁸⁹ The Park lies in the north-east of the Democratic Republic of the Congo, on the border with Uganda and Rwanda. Its management authority is the Congolese Institute for Nature Conservation (ICCN) the body which has lost numerous agents killed on active service. The Park encounters management problems. See UNESCO, *List of World Heritage in Danger*, Virunga National Park, online: UNESCO <<http://whc.unesco.org/en/danger/>>.

⁹⁰ DRC is located in the central part of the Albertine Rift, which is the western branch of the Great Rift of Africa and a major hotspot in terms of biological and landscapes diversity in the world.

⁹¹ UNESCO, *Using Space Technologies for the Conservation of Natural and Cultural Heritage*, (2001), online: UNESCO <http://www.unesco.org/science/remotesensing/upload/files/brochure_entiere_revue.pdf>.

⁹² Virunga National Park (covering an area of 790,000 ha) comprises an outstanding wealth of biological, ecological and geographical diversity, including the natural habitats of globally endangered species, such as mountain gorillas. The park has also been on the List of World Heritage in Danger since 1994 as a result of regional conflicts. Consequently, threats to the property include makeshift camps set up by displaced groups of people that have taken shelter in the park, ongoing humanitarian crises, a degradation of national security within the DRC and poaching. The park is home to over half of the world's 700 surviving mountain gorillas (*Gorilla beringei beringei*). For further information, see: UNESCO, *Virunga National Park*, online: UNESCO <<http://whc.unesco.org/en/list/63>>.

Systems (GPS) and was used to track gorilla movements, monitor changes and the degradation to their habitat.⁹³ This was the first time that an accurate map had been created for the region.

This initial project involved international cooperation at the State level, as well as discussions between the DRC, UNESCO and ESA, and the contribution of a federal agency, the Belgian Science Policy Office (BELSPO).⁹⁴ Despite a regional crisis and the complex geo-political situation on the ground, the resulting data and maps from the collaboration were delivered to the DRC and were helpful in effectuating anti-poaching efforts and monitoring gorilla movements.

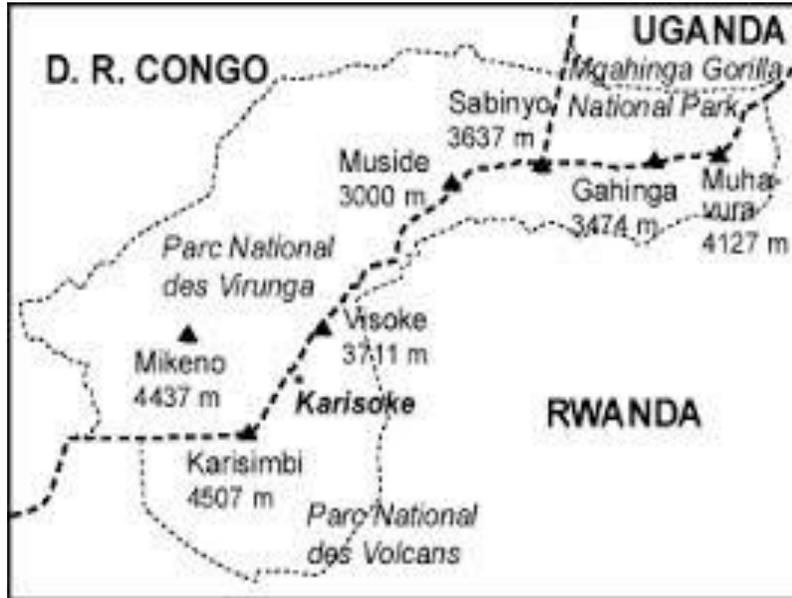
Figure 2. This *Landsat* image a satellite image taken in 1987 of the protected area of the gorilla habitat showing the Volcanic National Park area in Rwanda and the Mikeno sector of Virunga National Park. Image courtesy of NASA.



⁹³ For further information, see UNESCO, *Nurturing the Democratic Debate*, online: UNESCO <http://portal.unesco.org/en/ev.php-URL_ID=26763&URL_DO=DO_TOPIC&URL_SECTION=201.html>.

⁹⁴ BELSPO is a Belgian federal agency mandated with task of preparing, executing and evaluating national science policies. The agency supports the formation of Belgian universities and research centers in the scientific and technical fields. BELSPO joined the Open Initiative to develop activities and projects proposed by UNESCO, contributing with its space expertise and knowledge through its research centers and universities. For more information, see online: BELSPO <<https://www.belspo.be/>>.

Figure 3. This area map provides an area map of the park region. Image courtesy of NASA.



B. CALAKMUL CASE STUDY

Under the UNESCO-ESA Open Initiative, Mexico has also received space technology assistance to lend support to the Mexican conservation authorities managing the Calakmul archaeological site and biosphere reserve. The Ancient Maya City of Calakmul, located in the state of Campeche "deep in the tropical forest of the *Tierras Bajas* of southern Mexico",⁹⁵ was inscribed on the World Heritage List in 2002. The site "shelters rare species of flora and fauna" making it the largest tropical forest reserve in the country.⁹⁶ Because of its extent, the Mexican conservation authorities cannot control the threats facing the site, such as among others, pressure from human settlements, farming, extraction of commercial timber and tourism.

⁹⁵ UNESCO, *Ancient Maya City of Calakmul, Campeche*, online: UNESCO
<<http://whc.unesco.org/en/list/1061>>.

⁹⁶ UNESCO, *A 4D GIS to support the conservation of the Calakmul archaeological site and biosphere reserve*, online: UNESCO
<http://www.unesco.org/science/remotesensing/?id_page=136%E2%8C%A9=en>.

In 2010, UNESCO contacted one of its space partners, BELSPO, to coordinate a space technology-based project to support national conservation tasks at the Calakmul archaeological site by developing a four-dimensional (4D) heritage information system. This software uses satellite image data and remote-sensing technologies to "analyze the evolution of land use/cover in the area, [document] Maya ruins and detect evidence of the presence of archaeological remains in a tropical forest environment".⁹⁷ The 4D Geographic Information System (GIS) was designed specifically for use by the National Institute of Anthropology and History (INAH) and the National Commission of Protected Natural Areas (CONANP) under a collaborative agreement between UNESCO and BESLPO. All data acquired by the Belgian partner are given exclusively to the Mexican conservation authorities with restricted distribution rights to third parties. This new GIS system allows the managers of the protected area to store, share, visualise and interactively exchange data. This enhances coordination and organisation of various conservation, management, planning, monitoring and research efforts in the area.⁹⁸

V. CONCLUSION

International agreements and conventions are a traditional source of international law that can be applied effectively to enhance peaceful cooperation among States. Individual States negotiate these agreements based on national policies and existing international frameworks with the objective of securing political promises for conforming State conduct on certain issues. International organisations, such as UNESCO, also utilise and apply these political strategies in order to fulfil their missions. A new trend is emerging, however, toward creating soft law agreements and volunteer partnerships – this is becoming more evident especially in the space sector. Significantly, these new frameworks for space agreements on space technology and data exchange are pushing international cooperation even further, to include both State and non-State partners.

The Open Initiative is one prototype space framework that successfully works to expand the scope and network of space actors while equalising the value and status of partners and contributions. Here UNESCO has undertaken the unique role of a nexus, optimising resources by bringing together existing global networks for expertise,

⁹⁷ *Space for Heritage*, *supra* note 46.

⁹⁸ *Ibid.*

technology and cooperation following the principles of the Space Benefits Declaration. In so doing, UNESCO is increasing awareness of both World Heritage sites and the application of existing space technologies for preservation efforts. At the same time, it is following the Remote Sensing Principles and triggering one of the most important provisions, Principle XII, concerning the right of the sensed State to obtain access to the raw and processed data taken of its territory by another State. UNESCO's role therefore is to serve as the intermediary in procuring mission-specific raw and processed data of the developing sensed State from technologically capable governmental and nongovernmental entities. The data and images are then used for site training, monitoring, conservation and preservation-focused decision-making.

Furthermore, the Open Initiative draws heavily on the previously established Outer Space Treaty principle that space is to be "used for the benefit and in the interest of all countries, irrespective of their degree of economic or scientific development".⁹⁹ The fact that the Open Initiative seeks to aid countries that lack the necessary space-based technologies and expertise for conservation efforts speaks to the principles of international cooperation and mutual respect. In addition, the Remote Sensing Principles and the Space Benefits Declaration together provide a continued basis for UNESCO to secure international cooperation for the exchange of Earth observation data for the benefit of developing States. The Remote Sensing Principles, as incorporated by States, provide a legal basis for requesting data and information held by States to protect Earth environments. The Space Benefits Declaration further serves to cement intergovernmental cooperation on a localised level and expands the Organisation's objectives to include nongovernmental entities that provide necessary support and data services.

As evident by the very nature of these instruments adopted by the UN General Assembly, States choose to adhere to space law principles (hard and soft) and to voluntarily implement these principles domestically and internationally in practical programs like the Open Initiative. Participating nongovernmental entities to the Open Initiative likewise participate on a voluntary basis, and thus contractual provisions are based on mutually agreed terms brokered by UNESCO. In sum, the Open Initiative serves to foster practical assistance on par with the 'best efforts' practice employed in the space community to facilitate cultural conservation without triggering liability or other cumbersome legal

⁹⁹ *Outer Space Treaty*, *supra* note 12, art 1.

issues. By focusing on, targeting and facilitating mutually agreeable solutions for these world heritage site concerns and space resources, UNESCO is applying a new kind of soft law agreement and thereby contributing to the development of international soft law to be utilised for space and other areas.