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## LEGAL ASPECT OF IMPLMENTING WORLD HERITAGE CONVENTION USING REMOTE SENSING DATA

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### ABSTRACT

This paper examines legal issues relating to the use of space technologies for monitoring World Heritage sites. Thanks to international cooperation based on the United Nations Educational, Scientific, and Cultural Organization (UNESCO) and the European Space Agency (ESA) 'Open Initiative on the Use of Space Technologies to Support the World Heritage Convention', State Parties particularly among developing countries are benefiting from the use of images to study World Heritage sites. This paper looks at the World Heritage Convention and how space technologies can support the implementation of the Convention from the viewpoint of 1) the legal framework of remote sensing from space and from 2) general international law: the protection of World Heritage sites and associated issues of State sovereignty.

### INTRODUCTION

Our world possesses places as unique as the great Pyramids of Egypt, the Great Wall of China, and the Great Barrier Reef in Australia. The extraordinary cultural and natural diversity of the world is an important source of life and inspiration for humanity. In 1972, the work suggested by several Member States of the United Nations Educational, Scientific, and Cultural Organization (UNESCO), got consolidated and entered into force through the adoption by UNESCO of the Convention concerning the Protection of World Cultural and Natural Heritage. This Convention aims to safeguard sites, which are considered to have outstanding universal values; these sites are then inscribed on the World Heritage List. The number of sites inscribed on the World Heritage List continues to grow each year. However, ensuring the protection of these sites has been a challenge due to various factors, including, lack of appropriate measures to monitor sites. The 'Open Initiative' started by the European Space Agency (ESA) and UNESCO in 2001, has provided an additional tool to assist developing countries in monitoring their

World Heritage sites. This paper will first look at the World Heritage Convention and the ESA-UNESCO 'Open Initiative' by examining legal aspects of monitoring heritage sites from space, then it will explore issues regarding sovereignty and protection of sites, and finally it will consider how the preservation of World Heritage can be further supported by using space technologies.

### BACKGROUND

In 1972, the World Heritage Convention<sup>1</sup> was adopted during the 16<sup>th</sup> session of the UNESCO General Conference in order to safeguard sites in the world that have unique universal values (the World Heritage sites). These World Heritage sites consist of cultural sites<sup>2</sup>, natural sites<sup>3</sup> and

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<sup>1</sup> Convention for the Protection of the World Cultural and Natural Heritage 1972 11 ILM 1358.

For more details see <http://www.unesco.org/whc>

<sup>2</sup> Monuments: architectural works, works of monumental sculpture and painting, elements or structures of an archaeological nature, inscriptions, cave dwellings and combinations of features, which are of outstanding universal

mixed sites. Today, there are 812 sites inscribed as World Heritage sites around the globe, including 628 cultural, 160 natural and 24 mixed properties. As of the 31<sup>st</sup> of March 2005, 180 States have signed the Convention. This is a very well represented and ratified Convention reflecting the State Parties understanding of the importance of preserving our heritage for present and future generations.

The Convention aims to achieve the conservation of sites with outstanding universal values through close international cooperation and assistance. Article 4 of the World Heritage Convention recognises the duty of State Parties to ensure the identification, protection, conservation, presentation and transmission of cultural and natural heritage sites to future generations. Article 5 stipulates "Each country shall endeavour to take the appropriate legal, scientific, technical, administrative and financial measures necessary for the identification, protection, conservation, presentation and rehabilitation of this heritage". Thus, the Convention calls State Parties to take comprehensive measures in preserving sites. Article 7 underlies the overall goal of the Convention that international protection of the world's cultural and natural heritage shall be

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value from the point of view of history, art or science;

Groups of buildings: groups of separate or connected buildings which, because of their architecture, their homogeneity or their place in the landscape, are of outstanding universal value from the point of view of history, art or science;

Sites: 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.

<sup>3</sup> Natural features consisting of physical and biological formations which are outstanding universal value from aesthetic or scientific point of view, geological and physiographical formations and precisely delineated areas which constitute the habitat of threatened species of animals and lands of outstanding universal value from the point of view of science and conservation

understood to mean the establishment of a system of international cooperation and assistance designed to support State Parties to the Convention in efforts to identify and conserve the sites.

However, the Convention does not provide concrete provisions as to how such a system should be established and/or what sort of measures should be taken by State Parties in efforts to identify and conserve sites. The reality is that it is left to the responsibility of each State Party to identify and conserve their sites. For instance, the application for a site to be inscribed on the World Heritage List must come from the country the site is located within. No site may be placed on the List without the consent of the nation concerned. This underlies that the sovereignty of each State is respected so much that identification and conservation hinges on the good will of the individual State Party. Rather than creating a concrete mechanism for the preservation of sites by the international community, the World Heritage Convention serves as a general framework and leaves the rest to each country for taking measures for conservation.

Since identification and preservation of sites is left to individual nations, some countries have better measures and/or efforts than others. Among all, developing countries often do not have adequate measures and/or financial resources to properly identify sites and to ensure the preservation of inscribed sites.

The UNESCO-ESA 'Open Initiative on the Use of Space Technologies to Support the World Heritage Convention' came into existence to assist developing countries by working jointly with developed countries.

### **Open Initiative on the Use of Space Technologies to Support the World Heritage Convention**

In 2001, UNESCO and ESA undertook an initiative to demonstrate the application of Earth observation and other space technologies (e.g. navigation and

positioning, communication) in support of implementing the World Heritage Convention, and to establish a framework of cooperation, open to space agencies, research institutions, non-governmental organizations (NGOs) and the private sector<sup>4</sup>. Since then, the initiative has been operating successfully and a number of space agencies have joined. Current partners include: Canadian Space Agency, Catholic University of Louvain of Belgium, Chinese Academy of Science, CNES - French Space Agency (under negotiation), CONAE - Argentinean Space Agency, DLR - German Space Agency (under negotiation), ESA, Eurisy, GEOSPACE, International Space University, Jet Propulsion Laboratory, National Aeronautics and Space Administration (NASA), National Remote Sensing Agency (NRSA) of India (under negotiation), Orbimage, Turkish Academy of Science, University Corporation for Atmospheric Research of the USA, and University of Ghent. Some governments have provided funding for projects and local conservation authorities, whose sites are selected for the projects under the 'Open Initiative', are also recognized as partners.

The aim of the initiative is to strengthen the capacity to monitor the state of conservation of World Heritage sites using satellite images in those countries requesting to participate. As well as create local capacity in developing countries that are less familiar with space technologies as far as applied to natural and cultural heritage sites.

In other words, the 'Open Initiative' provides in a certain sense what Article 7 stipulates "system of international cooperation and assistance to support State Parties to conserve and identify their heritage sites". This permits particularly developing countries to benefit from state of the art space-technologies and know-how from nations advanced in space technologies

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<sup>4</sup> Open Initiative on the use of space technologies to support the World Heritage Convention

for the conservation of sites. The 'Open Initiative' has served as a catalyst to intensify international cooperation and assistance through space-based monitoring of World Heritage sites. Satellite images are effective in monitoring the state of conservation of sites by detecting changes over periods of time, identifying emerging threats, and assisting State Parties to establish the basic data for the nomination of new sites.

The use of space technologies for monitoring natural sites is considered to be particularly effective because natural sites are often so large that it is difficult to monitor the whole site by the available means on ground. Often, the number of guards assigned to conserve a site is not sufficient to cover the whole area. For example, in Okapi National Park in Central Africa 1 guard is assigned to monitor 2700km square. This is equivalent to only 137 guards assigned to conserve the whole area of Japan, which is 377,835km square. Satellite images can cover large areas at a shot and are therefore suited to monitor the overall changes over periods of time. Furthermore, some World Heritage sites are in remote areas that are inaccessible and space technologies can play a significant role in capturing the precise state of these sites.

Earth observation applications to monitor the state of conservation of cultural heritage are less known since most cultural sites are much smaller in area than natural sites and thus it is more difficult to detect changes<sup>5</sup>. However, high resolution satellite images are useful in monitoring the surrounding environment of a cultural site, which is crucial in its preservation. For instance, a satellite image can detect that a city is expanding towards a cultural site such as Taj Mahal or Giza Pyramid.

#### **LEGAL ASPECT OF MONITORING WORLD HERITAGE FROM SPACE**

Activities relating to the 'Open

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<sup>5</sup> *Ibid*

Initiative' are based on the legality of sensing activities from space established by Outer Space Treaty<sup>6</sup>, and the UN Remote Sensing Principles<sup>7</sup>. Principle IV of the UN Remote Sensing Principles, a General Assembly Resolution adopted by consensus in 1986 stipulates that remote sensing should be conducted in accordance with Article I of Outer Space Treaty which refers to the freedom of conducting space activities. This establishes rights of States to sense the entire surface of the Earth from space without acquiring prior consent from the sensed States. This contrasts clearly with aerial photography, in which the consent from the sovereign State is required prior to taking imagery from the airplane.

However, the approach of the 'Open Initiative' is that a project is not initiated unless the host country agrees to be involved. That is, a site will not be monitored unless prior consent of the country is granted. Requests to engage in activities related to the 'Open Initiative' often come from countries that wish their sites to be better preserved and are willing to cooperate extensively to improve the state of conservation. In short, it is monitoring undertaken with prior consent given from the sensed State that will and should bring benefits to the sensed State.

For instance, in the highly successful ESA – UNESCO project, 'Monitoring Habitats of Gorillas' Habitat' that aims to protect the endangered habitats of Mountain Gorillas in Central Africa, requests for assistance came from the government of Republic of Congo (DRC), Rwanda and Uganda. The selected regions for the project are national parks that host gorillas across the borders of Rwanda, Uganda and the Democratic Republic of Congo. The region includes the World Heritage sites of Virunga National Park and

Kahuzi Beiga National Park in DRC and Bwindi Impenetrable Forest National Park in Uganda. Due to influences from conflict within the region, influx of refugees and illegal clearing of forest, the habitats of gorillas have been put in danger<sup>8</sup>. The terrain is mountainous including some of Africa's highest peaks reaching over 5,000 m in altitude and consequently the area has been inaccessible and poorly mapped. As a result of completion of the first phase of the project, for the first time accurate maps of the region derived from satellite images has been provided to local end-users. During the project, satellite images taken over the sites between 1990 and 2003 were compared to get a view of the state of conservation of the region and assess the adverse impacts on the environment<sup>9</sup>. The products included digital elevation models, vegetation and land use change maps, as well as 1:200,000 and 1:50,000 cartography to help the conservation authorities and non-governmental organizations working in and around the parks<sup>10</sup>.

By combining the GIS layers provided by the project with Global Positioning System (GPS) data collected in the field, gaps in existing anti-poacher patrol coverage can be identified and readdressed and the mitigation of gorilla groups can be followed across national boundaries<sup>11</sup>. The mapping could not have been done without the use of Earth observation, which provided an efficient, cost-effective and frequent updated means of surveying the most inaccessible regions of interest<sup>12</sup>. Less than 700 Mountain Gorillas remain alive and the project has significantly contributed to

<sup>6</sup> Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies, Jan. 27, 1967, 610 *U.N.T.S.* 205

<sup>7</sup> Principles Relating to Remote Sensing of the Earth from Outer Space, Resolution 41/65 (1986)

<sup>8</sup> [http://www.esa.int/esaEO/SEMCKCEV797E\\_environment\\_0.html](http://www.esa.int/esaEO/SEMCKCEV797E_environment_0.html) (Last accessed on 20 September 2005)

<sup>9</sup> Brochure on "UNESCO-using Space Technologies for the conservation of Natural and Cultural Heritage" 2005

<sup>10</sup> *Ibid*

<sup>11</sup> <http://www.geoplance.com/uploads/FeatureArticle/0506nwl.asp> ( Last accessed on 17 September 2005)

<sup>12</sup> *European Space Agency Data User element DUE\_DUP Directory 2002-2004* p.32.

preserving their environment<sup>13</sup>.

### **Implementation of World Heritage Convention and UN Remote Sensing Principles**

The 'Monitoring of Gorillas' Habitat' project serves as an excellent example of not only the implementation of the World Heritage Convention but also the aforementioned UN Remote Sensing Principles. First, the project serves to implement Principle V of the UN Remote Sensing Principles which states to promote and intensify international cooperation, especially with regard to the needs of developing countries. The ESA-UNESCO 'Open Initiative' is facilitating this by establishing a network of 'space scientific experts' to assist developing countries.

The project has also implemented Principle VII which stipulates "States participating in remote sensing activities shall make available technical assistance to other interested States on mutually agreed terms." The 'Monitoring of Gorillas' Habitat' project assisted developing countries by providing satellite derived maps and other cartographic products, transferring the know-how to the local conservation authorities with respect to how to interpret the satellite images, and how to take the GPS points. This approach of the ESA-UNESCO 'Open Initiative' has facilitates the UN Remote Sensing Principles and at the same time makes the country become totally involved as a partner of the project, which therefore also facilitates the associated capacity building.

Furthermore, the project implemented Principle X that stipulates "remote sensing shall promote the protection of the Earth's natural environment". The ESA-UNESCO 'Open Initiative' implements this principle to protect the broader sense of Earth's environment which include world heritage sites. World Heritage

sites, especially natural sites are considered to constitute a part of the Earth's important global ecosystems including tropical rainforests and coral reefs. Indeed, satellite remote sensing has been useful to study atolls at some of the richest coral reefs in the Pacific, which are considered to be potential World Heritage sites. For example, UNESCO participated in a project to study the Ailinginae Atoll, which is situated north of the Republic of the Marshall Islands. The map of the coral reef was made based from high-resolution satellite images and this will now be used as a reliable source for the World Heritage Committee to determine whether it meets the criteria to be added on the World Heritage List<sup>14</sup>. This project as well as the 'Monitoring of Gorillas' Habitat' project, have contributed significantly to regional environmental protection.

It has to be noted here that the Virunga, and Kahuzi-Biega, national parks selected under the 'Monitoring of Gorillas' Habitats' project are on the World Heritage List in Danger<sup>15</sup>, which is a list of sites where priority assistance is given due to their aggravated state. The List of World Heritage in Danger is designed to call the attention of the international community to the conditions that threaten the sites and to encourage corrective action. Among the 812 sites that are inscribed, 33 sites are considered to be in danger. The list includes several parks and nature preserves<sup>16</sup>.

<sup>14</sup> SICILIANO, D. and K. Joyce "Mapping for Conservation: Using QUICKBIRD satellite imagery to assess marine and terrestrial resources of Ailinginae Atoll, Republic of the Marshall Islands, a proposed World Heritage Site". *30th International Symposium Remote Sensing of the Environment (ISRSE)*, Nov 10-14, 2003 Honolulu, Hawaii.

<sup>15</sup> Inscribing a site on the List of World Heritage in Danger allows the World heritage Committee to allocate immediate assistance from the World Heritage Fund to the endangered property.

<sup>16</sup> Natural sites on World Heritage in Danger list as of September 2005 include 1. Manovo-Gounda St. Floris National Park in the Central African Republic, 2 Comoé National Park in and 3. the Mount Nimba Nature Reserve in the Ivory Coast

<sup>13</sup><http://www.geoplace.com/uploads/FeatureArticle/0506nwl.asp> ( Last accessed on 21 September 2005).

However, even with respect to the World Heritage Sites in Danger, the sovereignty of host nations is still respected to a large extent as the site in danger cannot be included on the List of World Heritage in Danger without consent of the nation. It is up to their own discretion to place them on the List. This can raise an important question as to the legal status of the World Heritage sites and their associated relations with sovereignty.

The World Heritage Convention has a 'double language' that is difficult to interpret. The World Heritage Convention mentions that natural and cultural heritage constitute "world heritage for whose protection it is the duty of the international community as a whole to co-operate", yet World Heritage Convention respects the sovereignty of each State Party over its associated World Heritage site. Indeed the legal status of World Heritage sites in a strict sense is property of a sovereign State(s) as stipulated in Article 4 of the convention.

At first glance World Heritage resembles to the concept of "common heritage of mankind" which evolved in the context of exploitation of resources, especially in the mineral resources of international seabed areas regulated under Article XI of the 1982 Law of the Sea Convention<sup>17</sup>. This law states that the resources of the seabed, ocean floor and subsoil are considered to be common heritage of mankind, in other words, natural resources from a common area belong to all humanity. However, if one examines this

& Gunia, 4. the Virunga, 5. Garamba, 6. Kahuzi-Biega, and 7. Salonga National Parks and 8 Okapi Wildlife Reserve all in Democratic Republic of Congo, 9 Simien National Park in Ethiopia, 10 Rio Plátano Biosphere Reserve in Honduras, 11 Manas Wildlife Sanctuary in India, 12 Bam and its Cultural Landscape in Iran, 13 Air and Ténéré Natural Reserves in Niger, 14 Djoudj National Bird Sanctuary in Senegal, 15 Ichkeul National Park in Tunisia, 16 Everglades National Park in USA.

<sup>17</sup> Article 136 of part XI of the law of the sea convention declares "the sea floor and its resources are the common heritage of mankind"

term in depth, one can realize that there is a fundamental difference. It is important to recall that the World Heritage Convention was established in 1972 and discussions started long before that date. At the time, the concept of world heritage was not associated directly with what is now known as the term "common heritage of mankind" since the concept was not clearly established until 1980s.

The term "common heritage of mankind" can be better understood by referring to a Latin term. The "common heritage of mankind" is a concept to challenge older concepts of *res nullius* and *res communis* as a legal approach to common resources<sup>18</sup>. *Res nullius*, which in most systems included wild animals and plants, belongs to no one and can be freely used and appropriated when taken or captured<sup>19</sup>. A "*res communis*" is a thing which belongs to a group of persons and it may be used by every member of the group, but cannot be appropriated by anyone: the idea of "common heritage" goes much further than "*res communis*" and gives "Humanity" the right and duty to organize and rule the thing or territory<sup>20</sup>. In fact, common heritage of mankind is managed by international body that acts on behalf of humanity. For example, the natural resources of deep sea beds are managed by the International Sea-Bed authority which is the title holder and therefore a trustee of mankind<sup>21</sup>.

The fundamental difference between World Heritage sites and "common heritage of mankind" is that common heritage of mankind belongs to all humanity, whereas

<sup>18</sup> KISS, A. and D.SHELTON *International Environmental Law*, Transnational Publishers, Inc., New York, 2000 p.249.

<sup>19</sup> *ibid*

<sup>20</sup> KERREST, A. "Outer Space *res communis*, common heritage of mankind" Available on the Internet at <http://fraise.univ-brest.fr/~kerrest/IDEI/Nice-appropriation.pdf>.

<sup>21</sup> FRANCONI, F. "Thirty Years on : Is the World Heritage Convention Ready for the 21 st Century ?" *Italian Yearbook of International Law* Vol. XII, 2002, p.22.

World Heritage sites although they should be protected by all mankind, still remain under the jurisdiction of the State. Although heritage conceptually belongs to all mankind, sovereignty can be exercised upon the sites by the host nations. The World Heritage Committee<sup>22</sup> cannot play the same role as the Sea-Bed authority and to be the title holder of World Heritage sites and manage them on behalf of the international community.

The significant implication is that although State Parties to the World Heritage Convention have the treaty obligation to preserve the sites, the notion of responsibility of mankind as a whole to preserve them is weaker than that of "common heritage of mankind" on the ground that there is the concept of permanent sovereignty over natural resources reflected in General Assembly Resolution<sup>23</sup> and non-interference with sovereign affairs. This brings some difficulties as far as the enforcement of the World Heritage Convention.

Indeed, for certain sites, the enforcement of the World Heritage Convention has not been adequate. Armed conflict and war, earthquakes and other natural disasters, pollution, poaching, uncontrolled urbanization and unchecked tourist development pose major problems to World Heritage sites. The World Heritage Committee has recognized this fact by

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<sup>22</sup> The Committee is responsible for the implementation of the World Heritage Convention, defines the use of the World Heritage Fund and allocates financial assistance upon requests from States Parties. It has the final say on whether a property is inscribed on the World Heritage List. The Committee can also defer its decision and request further information on properties from the States Parties. It examines reports on the state of conservation of inscribed properties and asks States Parties to take action when properties are not being properly managed. It also decides on the inscription or deletion of properties on the List of World Heritage in Danger.

<sup>23</sup> GA. Resolution. 1803 (XVII), 17 U.N. GAOR Supp. (No.17) at 15, U.N. Doc. A/5217 (1962).

inscribing 33 World Heritage sites on the List of World Heritage in Danger. This implies that 33 World Heritage sites are losing the main values for which they were inscribed.

#### Property of sovereign State(s) invoking common concern of humanity

The fact that host nations have sovereignty over their sites does not mean that it is in their hands to take whatever action with the heritage. Although no one contests the sovereignty of let us say, the Italian state over Venice or of Kenya over its wild fauna, the worlds conscience would react unanimously if the Italian government decided to destroy that historic city and replace it with an industrial plant or if the Kenyan authorities enacted a law commanding the destruction of all the elephants on their territory<sup>24</sup>.

World Heritage invokes a similar responsibility expected of "common heritage of mankind" despite the difference in respective legal status. Legally speaking, World Heritage does not have the same status as the "common heritage of mankind" as applied to natural resources of deep sea bed but protection thereof constitutes "common concern of humanities"<sup>25</sup> as used in the preamble of 1992 Framework Convention on Climate Change stating that "change in earth environment and its adverse effects are a common concern of mankind". It seems that the term implies less to association with sovereignty and more to collective interest from international community.

Indeed, to the extent that the World Heritage Convention establishes an international system for the identification, registration and protection of the natural and

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<sup>24</sup> KISS, A.C. *Common Heritage Principle* See BASLAR, K. *The Concept of Common Heritage of Mankind in International Law* Kluwer, The Hague, 1998.

<sup>25</sup> The notion of common concern of mankind found its formal expression in the UN GA 43/53 of December 1988. See *ibid* 24

cultural heritage sites with outstanding universal value, it provides for a consent-based process of determination of a collective interest, or a "common concern" for their preservation and transmission to future generations<sup>26</sup>.

One good illustration of property of sovereignty State but invokes common concern of humanity is the Amazon. The Amazon is evidently one of the most crucial ecosystems of the Earth. The Amazon produces fifty percent of the world's oxygen and a typical 4 square mile part of it contains 750 species of trees, 125 kinds of mammals, 400 types of birds, 100 of reptiles and 60 species of amphibians<sup>27</sup>. There was discussion among the international community that the Brazilian government should not have absolute sovereignty over the Amazon region because the Amazon, itself, is one of the most fragile parts of the global ecosystem<sup>28</sup>. The Amazon is located within the territory of Brazil and its sovereignty can be exercised upon it. However, it is also the responsibility of the international community to preserve the Amazon forest as deforestation would seriously harm the Earth's environment and all mankind. Indeed, eco-intervention by many political and financial attempts to end the Amazonian ecological crisis has taken place<sup>29</sup>.

Common concern can be invoked naturally with transboundary sites<sup>30</sup>.

<sup>26</sup> FRANCIONI, F. "Thirty Years on : Is the World Heritage Convention Ready for the 21st Century ?" *Italian Yearbook of International Law* Vol. XII, 2002. p.24

<sup>27</sup> BASLAR, K. *The Concept of Common Heritage of Mankind in International Law* Kluwer, The Hague, 1998 p.152

<sup>28</sup> Brazil contains approximately three-fifths of the Amazon. The traditional Amazon comprises of some forty-two percent of Brazil's national territory or 3.5 million square kilometres. See BASLAR, K. *The Concept of Common Heritage of Mankind in International Law* Kluwer, The Hague, 1998 p.140

<sup>29</sup> *Ibid* 27

<sup>30</sup> Transboundary sites inscribed are : 1 Jesuit Missions of the Guaranis: San Ignacio Mini,

Although not many, World Heritage sites contain some transboundary sites belonging to more than one country: from two up to ten countries. In case of such transboundary sites, decisions to preserve them cannot be made by a single State Party but involves all of the countries that own the sites. In order to ensure protection, a certain degree of sovereignty of each State Party has to be compromised among the countries to which the site belongs to.

### Ensuring protection of sites: realizing Respect of Sovereignty < Protection of Sites

Although the legal status of World Heritage remains vague, practical solutions could be that sovereignty remains with the State Party but the international community assists the concerning State Party to find and implement alternatives for protection without putting in danger, as in the example

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Santa Ana, Nuestra Señora de Loreto and Santa Maria Mayor (Argentina), Ruins of Sao Miguel das Missoes (Brazil), 2 Belfries of Belgium and France, 3 Mount Nimba Strict Nature Reserve (Cote d'Ivoire), 4 Fertő/Neusiedlersee Cultural Landscape (Austria, Hungary) 5 Historic Centre of Rome, the Properties of the Holy See in that City Enjoying Extraterritorial Rights and San Paolo Fuori le Mura (Holy See, Italy) 6 Curonian Spit (Lithuania, Russian Federation) 7 Struve Geodetic Arc (Belarus, Estonia, Finland, Latvia, Lithuania, Norway, Republic of Moldova, Russian Federation, Sweden, Ukraine), 8 Uvs Nuur Basin (Mongolia, Russian Federation) 9 Talamanca Range-La Amistad Reserves / La Amistad National Park (Costa Rica, Panama), 10 Belovezhskaya Pushcha / Białowieża Forest (Belarus, Poland) 11 Muskauer Park / Park Muzakowski (Germany, Poland) 12 Caves of Aggtelek Karst and Slovak Karst (Hungary, Slovakia) 13 Pyrénées - Mont Perdu (France, Spain), 14 Frontiers of the Roman Empire (Germany, United Kingdom of Great Britain and Northern Ireland) 15 Kluge/Wrangell-St Elias/Glacier Bay/Tatshenshini-Alsek (Canada, US) 16 Waterton Glacier International Peace Park (Canada, US) (1995), 17 Mosi-oa-Tunya / Victoria Falls (Zambia, Zimbabwe)



of the Amazon.

While, the sovereignty of individual State Parties should continue to be respected, the protection of sites needs to be ensured. Space technologies are a perfect tool for enforcement because it allows monitoring the state of conservation of sites without the physical intrusion into the territory. In the past, proposals from certain governments that suggested UNESCO should be given powers to enter into sovereign States to monitor their compliance with the World Heritage Convention were not supported and eventually withdrawn<sup>31</sup>. Satellite remote sensing has the advantage of being able to monitor without infringing upon state sovereignty. It is clearly suited for monitoring the state of conservation of transboundary sites as it can capture large areas across boundaries. Furthermore, satellite images can hasten the process of nomination of new sites.

Ensuring protection of sites needs a two-fold approach: implementation and enforcement. As it has been illustrated, activities and projects associated with the 'Open Initiative' assist both nations with and without possession of space technologies in preserving the sites effectively. Although it has not been used for this purpose enforcement of the World Heritage Convention would benefit extensively from space technology. It may be used for verifying the accuracy of reports submitted by countries, used as a basis to inform the State Parties of the precise state of their sites and to provide a better conservation tool or to advise them to put some sites on the List of World Heritage in Danger. Intervention by the World Heritage Committee on State Parties' conservation should be allowed at least for World Heritage sites in Danger particularly the natural sites. It is justifiable for them to intervene for the sake of protecting the sites, since the host nations have already decided to call the attention of the international community and/or the

Committee by placing them on the List, therefore it is considered they have generated common concern and will be common responsibility associated.

## CONCLUSION

Using space technologies is an effective means for a country to implement the World Heritage Convention. The 'Open Initiative' is assisting the implementation of the World Heritage Convention by providing a concrete mechanism to monitor the state of conservation and to share the capacity for conservation among divergent States and entities. It has also implemented some of the significant UN Remote Sensing Principles particularly, the strengthening of international cooperation to consider the needs of developing countries as it was clear from the successful outcome of the 'Monitoring Gorillas' Habitats' project. It undoubtedly continues to assist countries who are willing to preserve their sites or identify potential sites for nomination.

However, close examination of the World Heritage Convention also reveals its limitations. The identification or preservation of sites has been to a less or greater extent hampered by the issue of the sovereignty of host States. However, World Heritage sites invoke collective interest which can be referred to as "common concern of humanity" and it is the duty of the international community to preserve them.

The number of inscribed sites is rising each year and ensuring preservation of each site will increasingly be a challenging task at a local level. Space technologies can capture an overview of the state of conservation. By taking advantage of the freedom of remote sensing, monitoring of heritage should be encouraged extensively whether to study potential sites for nomination or monitor sites in danger. Images could be kept in an inventory and managed by the UNESCO World Heritage Committee so that the continuity for preservation of sites is ensured.

The 'Open Initiative' using space

<sup>31</sup> KUNICH, J.C. "World Heritage in danger in the hotspots" *Indiana Law Journal* 2003, p. 651

technologies is an effective tool for monitoring, has created innovative system of international cooperation to safeguard heritage through sharing capacity and knowledge. The successful outcome of the initiative has also invoked the potential use of space technologies to enforce the World Heritage Convention in order to ensure the preservation of sites with outstanding values around the globe and to transmit them to next generations.

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