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Space Treaties and Disaster Management

Fabio Tronchetti

**PhD Candidate, International Institute of Air and Space Law
Leiden University, the Netherlands**

Introduction

Space technologies have significantly increased the global capacity to face and respond to natural disasters. Thanks to the constant monitoring of the state of the Earth provided by remote sensing and meteorological satellites, it is possible not only to identify natural phenomena as soon as they take place but also to organise a better and proper response to a natural disaster once it has already occurred. The greatest advantage of using space devices for disaster management purposes, indeed, relies on the fact that they may play a fundamental role in all the phases of a disaster, both in the pre-and in the post-disaster period.

The importance of applying space technologies to disaster management it is also witnessed by the increasing number of international and regional initiatives aimed at improving the quality of emergency operations and reducing the effect of a disaster through a better coordination in the uses of these technologies. I may quote, for instance, some recent developments, such as the establishment of a Charter on Space and major disaster, the setting up of a United Nations Platform for Space-Based Information for Disaster Management and Emergency Response (UN-SPIDER), and the plans for the creation of the Global Monitoring for the Environment and Security (GMES) and for the definition of the Global Earth Observation System of Systems (GEOSS).

Although all these initiatives have more a political than a legal nature, it is interesting to examine their relation with the existing principles of space law¹. In this respect, it is important to make clear that due to the novelty of international cooperation in disaster management and, in particular, of the use of satellite data in such a context, only little dedicated and rather general legal regulation exists. As a consequence, the international legal environment for the application of satellite information for disaster management purposes does not offer a clear picture.

In order to contribute to clarify the current situation, this paper will examine the relation between the space treaties and disaster management.

In particular, the paper will analyse whether or not and to which extent the provisions of the five space treaties provide a legal basis allowing and encouraging the use of space technologies for disaster management purposes. After such analysis, some legal issues, such as the possible need for a liability regime in case of failure to warn in presence of threatening natural phenomena, will be addressed. In its last part, the paper will focus on the practical impact, both at

¹ For a general analysis on the legal aspects of disaster management see S. Ospina, "SOS-Is Anyone Getting This Message?", in Proceeding of the Forty Ninth Colloquium on the Law of Outer Space (2006), p. 80; C. Christol, "Hurricanes and Remote Sensing", in Proceeding of the Forty Ninth Colloquium on the Law of Outer Space, (2006), p. 90

international and regional level, of the space treaties on the field of international cooperation for disaster management.

The impact of the space treaties on international disaster management

Space law comprehends five space treaties, namely the Outer Space Treaty (1967)², the Rescue Agreement (1968)³, the Liability Convention (1972)⁴, the Registration Convention (1975)⁵, and the Moon Agreement (1979)⁶.

The starting point of our analysis is that none of these treaties contain any specific provision on environment or disaster management. The reasons of this absence are basically two. The first is a practical one and refers to the degree of development of space technologies at the time the space treaties were negotiated. The second has a more legal and political nature and it has its roots in the international political situation of the late 1960's and early 1970's.

As to the first, I may say that when the space treaties were under discussion, space technology was still in an infant stage. At

that time, it was not possible to foresee its possible developments and its practical application like, for instance, its use for disaster management purposes. This explains, on one side, why the drafters of the treaties did not insert any clause regarding the possible application of space tools for disaster management activities and why, on the other, they focused their attention on other legal issues concerning the exploration and use of the space environment. In simple terms, we may say that the drafters of the space treaties could not imagine in the late 1960's that one day in the future satellite data would have been used for pre-and post-disaster operation. This is basically the reason why no specific rules in this respect were inserted in the text of the treaties.

As to the second reason behind the absence of any reference to natural disaster issues in the space treaties, it is important to understand that when they were under negotiation, I particularly refer here to the Outer Space Treaty, the main purpose of the drafters was to prevent outer space to become the theatre of conflict between the two superpowers, namely the US and the USSR. They wanted to make sure that the exploration and use of outer space would have been carried out in a peaceful and cooperative way and that the upcoming space era would have represented an opportunity of development for all mankind. What mattered at that time was, therefore, to lay down a legal regime allowing the broadest participation in space activities and ensuring the exploration and use of outer space to be performed for the benefit of all. As a consequence, the setting up of rules concerning the utilisation of space technologies for specific purposes, such as for disaster management, did not represent a priority at that time. Moreover, we may also add that there was a tacit agreement among all the parties involved in the negotiations on the fact that the definition of such detailed rules would have taken

² Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, (usually referred as Outer Space Treaty), London/Moscow/Washington, signed on 27 January 1967, 610 UNTS; TIAS 6347; 18 UST 2410; UKTS 1968 No. 10; Cmnd. 3198; ATS 1967 No. 24; 6 ILM 386 (1967).

³ Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space, done 22 April 1968, 28 UST 695; TIAS 8480; 1023 UNTS 15.

⁴ Convention on International Liability for Damage Caused by Space Objects (hereafter Liability Convention), done on 29 March 1972, 961 UNTS 187; 24 UST 2389; UKTS 1974 No. 16; Cmnd. 5068; ATS 1975 No. 5; 10 ILM 965.

⁵ Convention on Registration of Objects Launched into Outer Space (hereafter Registration Convention), signed on 14 January 1975, 1023 UNTS 15; TIAS 8480; 28 UST 695; UKTS 1978 No. 70; Cmnd. 6256; ATS 1986 No. 5; 14 ILM 43.

⁶ Agreement Governing the Activities of States on the Moon and Other Celestial Bodies, signed on 18 December 1979, 18 ILM 1434; 1363 UNTS 3

place in a later stage of the definition of the space law regime.

Having said that one may wonder whether or not the space treaties have any impact on the issue of international disaster management. The answer is yes.

Although, as I mentioned, the treaties do not contain any specific reference to disaster management issues, certain provisions contained thereof may be used, directly or indirectly, to support and implement the use of space technologies for disaster management purposes. These provisions are mainly contained in the Outer Space Treaty and in the Liability Convention.

The Outer Space Treaty and disaster management

The Outer Space Treaty represents the Magna Charta of space law. It contains principles and rules applicable to all activities to be carried out in outer space. Considering the general acceptance that the Treaty has received, the analysis of its provisions represents the first necessary step when dealing with space law or space applications issues.

As a point of departure of our research we may say that although the expression “disaster management” does not appear in the text of the Treaty, its provisions have had and still have a fundamental role in (for) stimulating the use of space technologies for pre-and post-disaster management activities anyway.

Let’s take, for instance, article I, par. 1, which contains one of the more important principles of the entire space law system, namely that that “*the exploration and use of outer space, including the Moon and other celestial bodies, shall be carried out for the benefit and in the interests of all countries, irrespective of their degree of economic or scientific development, and shall be the province of all mankind*”. According to Article I, par. 1, thus, States are entitled to perform activities in the space environment. However, they have to

keep in mind that the exploration and use of outer space represents a common goal of all mankind and that all countries have to benefit from it. The main purpose of space activities is, indeed, to generate positive effects for all States. As a consequence, space powers have a kind of “moral obligation” to use their space activities as a mean to help and support less developed countries.

The basic question related to Article I, par. 1 is how to put into practice its terms, namely how it is possible to carry out space activities for the benefit of all. In this respect, the use of space technologies for disaster management purposes represents a way to answer to this question. The use of satellite information for pre-and post-disaster operations is a practical method to perform outer space activities for the benefit and in the interests of all. Satellite data and pictures, indeed, play a crucial role in saving humans lives and in better coordinating rescue and emergency operations in case of a natural disaster.

Therefore, if we consider this practical implication of Article I, par. 1, it is easy to understand that its impact on international disaster management issues has been particularly relevant. Thanks to its requirement to carry out activities in space for the betterment of conditions of all mankind, it has, at least indirectly, encouraged the use of space technologies for disaster management purposes.

The importance of Article I of the Outer Space Treaty, however, is not limited to its paragraph 1. Paragraph 2, indeed, lays down another principle which has a direct impact on international disaster management, namely that “*Outer space, including the Moon and other celestial bodies, shall be free for exploration and use by all States without discrimination of any kinds, on a basis of equality and in accordance with international law, and there shall be free access to all areas of celestial bodies*”. Article I, par. 2, makes clear that States have the right to explore

and use outer space and that the access to the space environment may not be limited in any way. This provision may be interpreted as providing the legal basis for putting into orbit remote sensing and telecommunication satellites that, as it has already been said, are of crucial importance for the success of disaster management activities.

The major contribution of the Outer Space Treaty to the cause of disaster management, however, relies on the fact that it broadly encourages and supports international cooperation in the exploration and use of outer space. In order to understand why the promotion of international cooperation in space activities is so important for disaster management purposes, we have to spend some words on how disaster management operations take place and on which elements are required to ensure their proper and successful implementation.

When we use the term disaster management we refer to all aspects of planning and responding to a disaster, including both pre-and post-disaster activities. Such term, thus, is related to the management of both the risks and consequences of disasters.

Disaster management activities are not easy. They have to be carried out in an emergency situation where the normal working conditions are altered and many elements can suddenly go wrong. What emerges after an analysis of the most recent activities which have been carried out after the occurring of a disaster is the fact that a high degree of coordination among all the subjects involved is required in order to make sure the success of similar activities. Indeed, it is only when all the emergency systems are operated in a coordinated way that it is possible to guarantee the achievement of the purpose for which disaster management operations are planned for, namely the mitigation of the effects and consequences of a disaster and the reduction of human losses.

Having in mind, thus, the importance of cooperation for disaster management activities, it is rather intuitive to see how relevant it has been the impact of the Outer Space Treaty in this respect. The Outer Space Treaty has established the requirement to cooperate when exploring and using outer space. This has resulted in a strong incentive for States to coordinate and to encourage the broadest possible participation in the use of space technologies. As a consequence, with regard to disaster management issues, this obligation to cooperate has created a significant incentive to harmonize and combine the use of space technologies for pre- and post-disaster management operations.

The analysis of how this cooperation in the utilisation of space technologies has taken place in practice, both at international and regional level, will be provided in the last part of this paper. Let's see now how and to which extent the Outer Space Treaty promotes international cooperation in the exploration and use of outer space.

The incentive to cooperate when performing space activities is contained in several provisions of the Treaty, for instance in Article I (3), III, IX, and XI. This clearly shows, on one side, the fundamental place that international cooperation has within the context of space law and, on the other side, how the drafters of the Treaty considered to be essential to have a cooperative attitude when operating in the space environment.

Article I, par. 3 lays down that "*There shall be freedom of scientific investigation in outer space...and States shall facilitate and encourage international cooperation in such investigation*". Similar concepts are contained in Article III which declares: "*State Parties to the Treaty shall carry on activities in the exploration and use of outer space...in accordance with international law...and in the interests...of promoting international cooperation and understanding*". Additionally, the importance of international cooperation in

the uses of outer space is significantly stressed in Article IX which states: *“In the exploration and use of outer space ...State Parties to the Treaty shall be guided by the principle of cooperation and mutual assistance and shall conduct all their activities in outer space...with due regard to the corresponding interests of all other State Parties to the Treaty”*.

The fact that these articles use the term “shall” with regard to international cooperation in outer space is not meaningless. It means that States have a general obligation to cooperate when exploring and using outer space and that they have to promote and enhance ways to make their space activities coordinated and to encourage participation in such activities. The mention contained in Article III to international law is a clear reference to the UN Charter which, in its Article I (3), establishes the duty for States to cooperate in solving international problems of economic, social, cultural or humanitarian character. Moreover, the reference made in Article IX to the fact that States have to be guided by the principle of mutual assistance during their exploration and use of outer space, may be interpreted as providing an additional incentive to use space technologies for the benefit of all such as, for instance, for disaster management purposes.

The requirement to cooperate when carrying out space activities is also mentioned in Article XI which, however, adds some additional elements to the analysis of the positive impacts of the Outer Space Treaty on the use of space technologies for disaster management purposes. Article XI, indeed, states that: *“In order to promote international cooperation in the peaceful exploration and use of outer space, State parties conducting activities in outer space...agree to inform the Secretary-General of the United Nations as well as the public and the international scientific community, to the greatest extent feasible and practicable, of the nature, conduct,*

locations and results of such activities...”.The last part of the text of Article XI , thus, means that once States are parts to the Outer Space Treaty they have a kind of moral “obligation” to share, to the greatest extent feasible and practicable, the results of their space activities. This provision has a direct and positive influence over one of the most sensitive issues concerning the use of space technologies for disaster management purposes, namely the sharing of remote sensing data⁷. The general and in real time availability of such data, indeed, is of vital importance for the efficiency of pre- and post- disaster management activities. The distribution of these data, however, raises several legal issues, such as the rights of the “sensed” State and copyright titles over satellite information. I will not go into any details regarding these issues. The important point to be stressed here is that the terms of Article XI stimulate and encourage States Parties in sharing their earth observation data made by satellites with the rest of the world, especially with the States most affected by a disaster.

The provisions of the Outer Space Treaty may also be applied with regard to other aspects related to the use of space technologies for disaster management purposes such as, for instance, to responsibility and liability issues. As we

⁷ See in this respect, L.J.Smith, C. Doldirina, *“Remote Sensing Data: Some Critical Comments on the Current State of Regulation and Reflections on Reform”*, in Proceedings of the Forty-Ninth Colloquium on the Law of Outer Space, (2006), p. 253; M. Rao, S. Murthi, *“Legal Issues Relating to Convergence of Imagine, Positioning and Spatial Databases”*, in Proceeding of the Forty-Eighth Colloquium on the Law of Outer Space, (2005), p. 20; P. Achilleas, *“High-Resolution Remote Sensing Imagery and Human Rights”*, in Proceeding of the Forty-Fourth Colloquium on the Law of Outer Space, (2000), p. 113; M. Longo, *“Interrelation Between State and Private Enterprises in the Commercial Activities in the Outer Space”*, in Proceeding of the Forty-Fourth Colloquium on the Law of Outer Space, (2000), p. 124.

all know, according to Article VI of the Treaty States Parties are internationally responsible for national activities in outer space, whether carried on by governmental agencies or by non-governmental entities. Moreover, the activities of non-governmental entities in outer space have to be authorized and continuously supervised by the appropriate State Party. Article VII, additionally, sets out that *“Each State party that launches or procures the launching of an object into outer space...and each State party from whose territory or facility an object is launched, is internationally liable for damage to another State Party to the Treaty or to its juridical person by such object or its component parts on the Earth, in air space or in outer space”*⁸. These provisions are clearly applicable when a State Party is using its own space system for disaster management activities. For instance, a launching State is liable in case of damages caused on the Earth surface, in air or in outer space, by its own satellites or other systems which at the time of the accident were being used for disaster management purposes. As it is easy to see the liability provisions contained in the Outer Space Treaty are rather generic. Indeed, they do not spell out, for instance, what “damage” means and how a damaged State can get compensation for the damages it has suffered. Because of the vague character of the terms of Article VII a new Treaty, a Liability Convention, aimed at setting out a specific legal regime regarding liability issues arising as a result of space activities, was negotiated in the early 1970’s. Obviously, the provisions of the Convention acquire primary importance when we want to clarify which rules and principle are applicable in case of damages caused by a space object which is used for disaster management purposes.

⁸See C.H.Walker, *“State Liability for Private Satellites and Ways to Limit Exposure”*, in *Proceeding of the Forty- Third Colloquium on the Law of Outer Space*, (2006), p. 253

As a final consideration of this paragraph, I may say, summarizing, that thanks to their “humanitarian and supportive” nature, the provisions of the Outer Space Treaty play an important role for disaster management purposes. Indeed, because of their emphasis on the need to use outer space in a cooperative way and for the benefit of all, these provisions represent an incentive for States to utilise their space technologies for disaster management activities.

The relation between the Liability Convention and disaster management activities: is there a need for a liability regime in case of the failure to warn?

As mentioned the Liability Convention sets out international rules and procedures concerning liability for damages caused by a space object. The main purpose of the Convention is to ensure the prompt payment of a full and equitable measure of compensation to victims of such damages. In order to do so, first of all the Convention establishes that a launching State is absolutely liable to pay compensation for damage caused by its space object on the surface of the Earth or to aircraft in flight. In the event of damage being caused elsewhere than on the surface of the Earth to a space object of a launching State or to a person or property on board such a space object by a space object of another launching State, Article III lays down that the latter shall be liable only if the damage is due to its fault or the fault of persons for whom it is responsible. As soon as an accident occurs, the State which suffers the damage may present to a launching State a claim for compensation for such damage according to the procedures established from Article IX to Article XXI.

The provisions of the Convention are, thus, limited in scope to liability cases for damages caused by a space object only. With regards to disaster management issues, this means that these provisions are

only applicable if a satellite or another system used for disaster management purposes falls down on Earth and causes damages. As a consequence, all the others liability cases which may arise in connection with the use of space technologies for disaster management activities are not covered by the terms of the Convention. The question, then, is: what liability regime is applicable in such cases? For instance, what liability rules are in force in a situation in which damages and human losses are the direct consequences of the failure to warn of the arrival of a hazard? The answer is rather easy: there are no specific rules dealing with a similar scenario. This means that a legal vacuum concerning liability issues, which may arise as a result of disaster management activities, exists. This legal vacuum, in my opinion, needs to be addressed. Making clear who is liable in case of failure to warn, indeed, does not represent only an academic issues but also a practical one. Damages and losses caused by the negligent act of a certain operator who fails to warn about the imminence of a hazard are, unfortunately, very common. Therefore, I think that if a liability regime applicable in such a cases existed, all the subjects involved in disaster management activities would operate in an more responsible and efficient way.

Let's make now a practical example which will help us to understand the problems which arise from the absence of a liability regime in case of failure to warn and the need for having a uniform and clear legal framework of applicable rules in this respect.

Let's put, for example, a case in which the existence of a natural phenomenon has been discovered and recorded by remote sensing satellites. The analysis of the data provided by the satellites has shown that this natural hazard represents a huge risk for a certain nation and its population. In a similar situation the proper and in due time warning regarding the dangerous nature of

such hazard to the concerned nation may contribute to save many human lives and to reduce its catastrophic effect. However, due to the negligent act of the satellite operator this information is not provided. The result is that many people are killed and that a certain part of the territory of a country is utterly destroyed.

In a similar scenario who will be considered to be liable for the failure to warn of the arrival of a hazard? Maybe the operator of the satellite who has identified such hazard and has not provided this information to the States concerned? Or maybe the State of nationality of the operator? Moreover, under which law the subject recognized to be liable could be processed? Before which Court an action for damages could be taken?

The existing space law rules cannot provide an answer to these questions. As to the provisions the Outer Space Treaty, they are not relevant because they do not contain any reference to a hypothetical liability regime in case of failure to warn. With regard to the rules of the Liability Convention, they are not applicable because they refer only to liability cases which may arise as a consequence of damages caused by a space object to the surface of the Earth or to an aircraft in flight.

Therefore, I think that a specific set of rules dealing with liability for failure to warn in presence of a hazard is required.

Nevertheless, I am aware of the fact that some could argue that these new rules are not required and that a liability regime could be set out by using the existing space law principles and rules only. A foreseeable proposal in this respect could be to establish a liability regime for failure to warn based on the principle of State responsibility for private activities in outer space (Article VI of the Outer Space Treaty). According to a similar proposal, a State should be considered to be responsible for the negligent act of one of its nationals who has failed to warn about the arrival of a hazard. As a consequence,

such a State should also be deemed to be liable for the damages occurred as a consequence of this act. The feasibility of such theory depends on the extent to what the principle of State responsibility may be interpreted as creating, at least indirectly, an obligation to provide information and to warn in presence of a dangerous natural phenomena.

In my opinion, as the existing space law rules are concerned, it is very difficult to argue that a similar obligation exists. Anyway, some may argue that such a duty could be found in Principle XI of the UNGA Resolution n. 41/65 on Principles Relating to Remote Sensing of the Earth from Outer Space which states that “...*States participating in remote sensing activities that have identified processed data and analysed information in their possession that may be useful to States affected by natural disasters, or likely to be affected by impending natural disaster, shall transmit such data and information to States concerned as promptly as possible*”. However, a UN Resolution of the General Assembly is not a binding document and, therefore, it may not be considered as setting up an obligation to communicate data concerning a natural disaster.

For all these reason I consider a legal document specifically dealt with a liability cases arising as a result of the failure to warn in case of a natural disaster to be required. Such document should clearly establish who between a State and its private citizens (operators) is liable and under which conditions such liability is excluded. This document should also contain specific rules on how the delivery of natural disaster data should be performed. For instance, it should make clear that the duty to warn is not accomplished until the warning message is received and properly understood by the recipient. Thus, I think that the UNCOPUOS should start a discussion regarding the possibility to have an international instrument concerning

liability in case of failure to warn in presence of natural disasters.

The United Nations Declaration on Principles Relating to Remote Sensing of the Earth from Outer Space (UN Res. 41/65, 1986)

Although the UN Resolution 41/65 containing the Declaration on Principles Relating to Remote Sensing of the Earth from Outer Space does not belong to the corpus of the space treaties as such, its analysis is particular relevant for the purpose of this paper. Considering, indeed, the increased use of satellite data in the context of disasters, whether natural (earthquakes, floods, etc.) or man-made (landslides, oil spills), the examination of the Resolution’s provisions, which set out the main legal principles regarding the use of remote sensing satellites, is of great interest. Moreover, some of these principles contain specific references to the utilisation of remote sensing satellites for disaster management purposes.

Before dealing with the principles contained in the Resolution, it is necessary to spend some words about its legal nature. A Resolution of the United Nations is not a binding legal document *per se* and, as a consequence, its legal effect is not comparable to that of an international treaty, whose provisions are binding to its parties. However, UN Resolutions may evolve into reflection of customary law and, moreover, they usually carry on a considerable weight in the political and moral sphere. Although not legally and directly obliged to respect and apply the principles contained in a similar Resolution, States are usually rather prudent in rejecting and refusing to put into practice such principles. Anyway, whatever it is the status of a UN Resolution, its principles represent a valid starting point for the further development of rules in a specific topic.

With regard to UN Resolution 41/65, there is an open debate among legal scholars

about its status. A large group of authors consider its principles to be evolved into customary law⁹. They base their argument on the fact that the majority of States has accepted such principles and that the Resolution itself was adopted by consensus by the UN General Assembly. Another group of experts reject this interpretation by arguing that some of major space powers actually do not put into practice some of the Resolution's principles. Whatever it is the legal value of the Resolution 41/65 it is, anyway, widely accepted that it has a direct impact on the use of space technologies for disaster management activities.

First of all, Principle I of the Resolution contains a definition of primary and processed data. The former are defined as "raw data that are acquired by remote sensors borne by a space object and that are transmitted or delivered to the ground floor from space by telemetry in the form of electromagnetic signals, by photographic film, magnetic tape or any other means (Principle I, b). The latter are "the products resulting from the processing of the primary data, needed to make such data usable" (Principle I, c). It is rather intuitive that having a clear definition of what "satellite data" means, it is the basic and necessary starting point for using and applying such data.

Principle VI is also relevant in the sense that it encourages States to set out agreements to provide for the establishment and operation of data collecting and storage stations and processing and interpretations facilities.

However, the most significant provisions for disaster management purposes are those contained in Principles X and XI. Such provisions, indeed, deal with the issue of sharing satellite data concerning hazard and with the moral incentive for the

States in posses of such data to inform the States concerned.

Principle X states the need for States to communicate relevant information regarding threats to the Earth natural environment to other States concerned, while Principle XI calls upon States in possession of relevant data regarding natural disasters to inform as promptly as possible those States which are likely to be affected by impending natural disasters or which have been already affected by them. Although Principle X and XI affirm that: "States shall disclose such information..." and "States participating in remote sensing activities...shall transmit such data and information...", it is very difficult to argue that States are legally obliged to do so. On the contrary, these provisions represent soft law and, therefore, it is left up to the States to decide whether or not make such data available. Nevertheless, the terms of Principle X and XI create a significant moral and political incentive for States to share their satellite data regarding a disaster with the States concerned.

International and regional cooperation in disaster management activities

As it has been already mentioned¹⁰, the major impact of the space treaty, in particular of the Outer Space Treaty, on disaster management activities consists in the fact that the treaties support and encourage cooperation in the use of space technologies for disaster management purposes. This kind of cooperation has significantly developed in the last decade both at international and regional level, as a result of a series of dramatic natural events which have affected different areas of the Earth¹¹.

¹⁰ See *supra* pag. 5 and 6

¹¹ For a general overview on this issue see S. Singamsetty, D. Banerjee, "Global Spatial Data Infrastructure: Issues for Space Law and International Cooperation", in *Proceeding of the Forty Ninth Colloquium on the Law of Outer Space*, (2006), p. 214.

⁹ See in this respect, for instance, M. Williams, "The UN Principles on Remote Sensing Today", in *Proceedings of the Colloquium on the Law of Outer Space* (2005), p. 2.

In this part of the paper I will briefly touch upon some examples of international and regional cooperation in the utilisation of space technologies for disaster management purposes. As to the former, I will analyse the International Charter on Space and Major Disaster and the so called "UN Spider"; as to the latter, I will deal with GMES and APSRAF.

International cooperation for disaster management

The International Charter on Space and Major Disasters¹² is the direct result of the general awareness of the importance of using remote sensing technology for reducing and mitigating the harmful effects of natural disasters. Its main purpose, indeed, is to provide a unified system of space data acquisition and delivery to those affected by a natural disaster.

The Charter was established by ESA (European Space Agency) and CNES (Centre Nationale d'Etude Spatial) in 1999 as a follow-up to the Third United Nations Conference on the Exploration and Peaceful Use of Outer Space (UNISPACE III), where the potential positive impact of Earth observation systems for solving regional and world problems was largely discussed. The Charter was signed on 20 October 2000 and has been operational since November 2000. The Charter now comprises seven member space agencies: ESA, CNES, the Canadian Space Agency (CSA), the National Oceanic and Atmospheric Administration (NOAA), the

¹² For the text of the Charter see at: http://www.disastercharter.org/charter_e.html. For an analysis of the Charter and its mechanism see A. Ito, "Issues in the Implementation of the International Charter on Space and Major Disasters", in *Space Policy*, Volume 21, Issues 2, 2005, p. 141-49; see also F. von der Dunk, "Big Brother or eye in the Sky? Legal Aspects of Space-Based Geo-Information for Disaster Management", p. 37, in *Geo-Information for Disaster Management*, ed. by P. van Oostean, S. Zlatanova, E.M. Fendel, Springer 2005

Indian Space Research Organisation (ISRO), Argentinian Comision Nacional de Actividades Espaciales (CONAE), and the Japanese Aerospace Exploration Agency (JAXA).

From a legal point of view, the Charter cannot be considered a treaty; it does not fit, indeed, into the definition of treaty contained in Article II of the Vienna Convention on the Law of the Treaties which defines a treaty "an international agreement concluded between States in written form and governed by international law, whether embodied in a single instrument or in two or more related instruments and whatever its particular designation"¹³. The Charter is a non-binding document based on the goodwill and best endeavours of the participants who express their intention to cooperate in the use of space technologies for disaster management purposes. Moreover, the Charter is not concluded between States but among space agencies and national or international space systems operators.

In order to implement the provisions of the Charter each space agency has committed its own resources¹⁴. This means that the affected State can benefit from at least eight types of satellites orbiting in different locations. This fact significantly increases the ways in which satellite data concerning a disaster may be communicated in due time to those affected by it.

The Charter establishes a peculiar mechanism to activate its provisions. Following a disaster, the afflicted State contacts the so-called "authorised users", who are civil protection organisations, rescue, defence and security bodies from

¹³ See Article 2 (a) of the Vienna Convention on the Law of the Treaties 1155 UNTS 331, January 27, 1980.

¹⁴ According to Article 6.1 of the Charter, indeed, the request to adhere to the Charter may be presented by a space agency or any space system operator which agree to contribute to the commitments made by the parties under Article IV. ESA, for instance, provides data from ERS and Envisat, while CNES from the spot satellite.

the country of a Charter member. The body contacted requests the activation of the Charter from the space agency concerned which, only then, acquires the data of the area affected by the disaster from their satellites, processes such data so as to get useful images, and distribute the resulting information free of charge to those States afflicted by the disaster. The distribution of the data is made by an appointed project manager, who will be then responsible for taking, acquiring and delivering the satellite images.

The Charter has been able to aid those affected by a disaster by providing the relevant images in a rather short time, although there is a constant effort aimed at making their distribution quicker. Recently, the Charter has been activated, for instance, by Bangladesh after the arrival of the tropical cyclone SIDR which has hit dozen of costal districts in the Bay of Bengal causing death and destruction.

The other example of international cooperation for disaster management purposes is represented by the "United Nations Platform for Space-based information for Disaster Management and Emergency Response – UN – SPIDER"¹⁵. The UN SPIDER is a United Nations programme established by the UN General Assembly by means of Resolution 61/110 of 14 December 2006 with the following mission statement: "*Ensure that all countries have access to and develop the capacity to use all types of space-based information to support the full disaster management cycle*".

Having in mind the devastating impact of disasters and convinced that the use of existing space technologies and their applications can play a vital role in supporting disaster management, the member of the UN General Assembly agreed to establish a new UN programme aimed at enhancing coordinated efforts at

the global level to reduce the impact of disasters¹⁶.

Unlike other initiatives, such as the analysed International Charter on Space and Major Disasters, which make space technologies available for humanitarian and emergency response, UN-SPIDER is the first instrument which focuses on the need to ensure access and use of those technologies during all phases of a disaster, including the risk reduction phase.

UN-SPIDER is expected to fulfil its mission by operating as a gateway to space information for disaster management support, by serving as a bridge to connect the disaster management and space communities, and by supporting capacity-building and institutional strengthening, particularly in the developing countries.

The subject charged with the implementation of the UN-SPIDER is the United Nations Office for Outer Space Affairs (UNOOSA).

Regional cooperation for disaster management: GMES and APRSAF

The first example of regional cooperation for disaster management is represented by the Global Monitoring for the Environment and Security (GMES)¹⁷.

GMES may be defined as a European initiative aimed at providing Europe with a global environment monitoring by combining all available ground and space data sources.

The Global Monitoring for the Environment and Security is the result of the cooperation between the European Commission and the European Space Agency that, since the middle of the 1990's, have started working together for defining European policies in space. As a consequence of some environmental

¹⁵ See at <http://www.unoosa.org/oosa/unspider/index.html>

¹⁶ See UNGA Res. 61/110 of 14 December 2006, Preamble points 2, 4, and 6.

¹⁷ See at http://www.esa.int/esaEO/SEM017YEM4E_index_0.html and <http://www.gmes.info/>

disasters, such as oil spill, and of the discussions concerning the Kyoto Protocol, the Commission and ESA began to realise the need for a system able to provide satellite observation data for a wide range of purposes, not only environmental but also “civil” and “military”. This led to the setting up of the GMES project whose main purpose is to give Europe an independent global monitoring capability, in support of environmental and security goals. GMES is envisaged as a decision-support system for both public and decision-makers, making easier the acquisition, distribution, and interpretation of data and information regarding the environment, risk management and security issues. It also represents a significant part of the European contribution to international initiatives concerning global environment and the safety of Earth. GMES, for instance, is the Europe’s contribution to the Global Earth Observation System of Systems (GEOSS).

Although GMES is expected to generate positive effects in many different areas, it is clear that its more relevant benefits will be in the area of disaster management.

The second example of regional cooperation for disaster management purposes is the Asia-Pacific Regional Space Agency Forum (APRSAF)¹⁸.

APRSAF represents a joint initiative of the countries of the Asia-Pacific region aimed at enhancing the development of each country’s space program and at establishing forms of cooperation in space activities in that region. APRSAF, which was set up in 1993, held annual meeting in which current space related issue and possible uses and applications of space technologies are discussed. APRSAF intends to ensure the wider participation of space agencies, government officials, regional and international organisation in projects whose main purpose is to contribute to socio-economic development

in the Asia-Pacific region and to preserve the global environment, through space technologies and its applications. In this respect, the APRSAF participants have launched the “Sentinel Asia” project.

Sentinel Asia basically is a politic initiative which aims at improving the sharing of disaster information in the Asia-Pacific region and at making the best use of earth observation satellite data for disaster management in that region. Sentinel Asia was originally proposed in November 2004 when it was realised the importance and advantages of using internet technologies to quickly communicate disaster management data. Sentinel Asia was not envisaged as a replacement of the already active efforts made by regional space agencies in delivering emergency information. On the contrary, it was considered an opportunity for expanding such efforts and for making those information available to more countries and more people in the region, especially in countries that do not have their own satellite reception facilities.

The final decision to launch the Sentinel Asia project was made soon after the Indian Ocean tsunami, when the need to complement existing space, and ground infrastructures in the region with a fast system of distribution of disaster-related data to agencies and the general public. During the 12th meeting of APRSAF held in Kitakyushu, Japan, in October 2005, the “Disaster Management Support System in the Asia-Pacific Region (DMSS)”, designed to improve the accuracy for disaster preparedness and early warning, was set up. One of the principal objectives of such system is the implementation of the Sentinel Asia project, through a three steps approach.

Conclusion

Although the Space Treaties do not contain any specific reference to the environment or to disaster management issues, they have played a significant role

¹⁸ See at <http://www.aprsaf.org/text/about.html>

in stimulating the use of space technologies for disaster management purposes. The major contribution of the Treaties in this respect has been to encourage States in cooperating when using such technologies during pre- and post-disaster activities. This cooperation has significantly developed in the last decade, both at international and national level, by improving the general capability to manage a natural disaster and by helping, thus, to reduce and to mitigate its catastrophic effects.