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*Legal Aspects of Disaster Management and the Contribution of the Law of
Outer Space*

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Legal Aspects of Disaster Management: European Efforts Including GMES
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1. I have divided my intervention in two parts: the first one deals with the European efforts in disaster management, namely the GMES joint Initiative ESA/EU; the second contains some general remarks concerning disaster management from the space law perspective. Europe has successfully developed and launched advanced Earth observations systems, providing a comprehensive set of operational space missions with permanent and continuous observing capabilities. Unfortunately, organisations that promote public welfare are often forced to rely on fragmented and poorly presented information. To improve the European capacity in this field, the Global Monitoring for Environment and Security (GMES) was foreseen since 1998 with the Baveno Manifest. Following official documents “It represents in simple terms a concerted effort to bring data and information providers together with users, so they can better understand each other and agree on how to make environmental and security-related information available to people who need it”. A challenge for GMES is to gather relevant data and provide services which will enable decision-makers to better anticipate or integrate crisis situations relating to the management of the environment, such as natural and human made disasters.

After Galileo, the GMES has become the second European Union’s “flagship” in space policy. GMES is an EU-led initiative, in which the European Commission will manage related actions for identifying and developing services and the European Space Agency (ESA) will manage the implementation of the space segment. In this sense, GMES falls within the European model of cooperation in the space field. This model is the result of more than thirty years of joint efforts among European States through the ESA and the European Community (EC). While the ESA, in conformity with the Paris Convention of 1975, has been, and still is responsible for developing a long-term European space policy and carrying out a European space programme, the EC, acting as the first pillar of the EU, has given ground to an “extended” European space policy, as reflected in the European Commission’s White Paper of 2003. The latter covers the transitional period (2004-2007) envisaged until the (potential) entry into force of the Treaty establishing a Constitution for Europe. This transitional period is ruled out by the EC/ESA Framework Agreement concluded on November 25, 2003 as a key for the successful implementation of the first phase.

Meanwhile, the draft Constitution for Europe was concluded. The main novelty is that space appears among the EU powers (or competencies) shared with member States, paving the way towards a European space policy (ESP) as a “common” policy governed by the EU legal order. However, this treaty has not yet entered into force.

For this reason, the current stage continues to be characterized by the legal framework for the transitional period. Space is envisaged by the EU as a “relevant technology” to support the implementation of the existing EC policies (transport, trans national networks, industry, research

and development) with a multiplicity of legal basis, which enable the EC to call upon to space as a technology to support their implementation.

Accordingly, the ESA-EU relations are currently regulated by the Framework Agreement, which covers all cooperation, relations and interaction of the ESA with the EU and is in course of implementation. The Framework Agreement, which covers a period of cooperation of four years and can be renewed for another period, is seen as a key to the implementation of the first phase referred to in the White Paper. Eight specific fields of cooperation are identified: sciences, technology, earth observation, navigation, communications by satellite, human space flight and microgravity, launchers and spectrum policy related to space.

The Framework Agreement prepared the legal basis for the cooperation between the ESA and the EU, namely in the form of “joint Initiatives”, provided for by Article 5. These initiatives have taken different forms, such as Galileo and the GMES.

2. This being the current legal framework of the ESA/EU space related activities, it is worth note to recall that the GMES was endorsed by the ESA and the EU Councils in 2001. In its Communication to the EU Gotheborg Summit, the European Commission called for establishing by 2008 a European capacity for Global Monitoring for Environment and Security (GMES) to gather, interpret and use data and information in support of sustainable development policies. An exploratory initial period, undertaken jointly by the EC and the ESA, took place between 2001 and 2003. It was established that the GMES had to support several EU objectives and policy domains, namely Europe’s environmental commitments, within the EU territory and globally, and the Common Foreign and Security Policy, including the European Security and Defence Policy.

Later on, in the Communication of the European Commission to the Council and the European Parliament of 2004, was included a summary of the main actions to be undertaken from 2004 to 2008. This communication – entitled “From concept to Reality”- planned to introduce the first three earth observation services: *emergency management*, land monitoring and marine environment.

The GMES initiative has now reached a stage of maturity where it can progress to its development and implementation phase. This phase coincides with the development of the Galileo satellite-based infrastructure for navigation and positioning, which will be available from 2008 onwards. Compatibility between the two systems will be ensured in order to offer complementary services to users.

The future space components of the GMES need sufficient prior definition, including the incorporation of specific service requirements such as the capability of collecting and distributing large volumes of data at very high speed.

To adequately deploy the GMES services by 2008, substantial improvements will be required in in-situ observing systems both at the EU and global levels. In fact, GMES services add value by combining and linking data from different sources, over extended periods of time, and packaging this information in an accessible and relevant manner.

The diversity of data that the GMES services require and produce will benefit from the development of a data policy. This may vary according to the domains of services provided, but will need to find a balance between “non-discriminatory access”, economic viability and the necessary incentives for private services providers to invest in the development of such capacity. From the legal point of view, since the Aarhus Convention of June 1998 on access to environmental information and access to justice requests an open access to the environmental information for the benefit of citizens, a significant part of the GMES information should be freely available.

Finally, considering that some GMES services may include information relating to secure/multiple use purposes, it should be considered that certain added value activities would generate sensitive information requiring controlled access.

The GMES can assist through improved prediction, monitoring and assessment capabilities, in the preparation of strategies to cope with natural hazards and human made disasters, thus contributing to the reduction of the resulting human and economic losses. It is foreseen that the GMES services and observing systems will be instrumental in the development of a European growing role in global environmental monitoring.

The GMES services with their global dimension are a means for international cooperation. The space and in-situ observing systems through the data captured, constitute significant contribution to other international initiatives. It is foreseen that the European Commission will encourage the creation of a GMES partnership that would promote a common approach to the development and deployment of the GMES capacity. Partners will be invited to join the partnership through a GMES Memorandum of understanding.

The operational management of the GMES is still to be fully implemented using the mechanisms provided for by the Framework Agreement between the ESA and the EU. In short terms, the Commission, in partnership with the ESA, has set up a GMES interim structure in the form of a GMES Programme Office, populated in part by seconded experts from member States and relevant international organisations, such as EUMETSAT.

The main functions of this GMES Programme Office are to ensure the coordinated management of on-going GMES related EC and ESA founded projects and to specify more precisely the GMES capacity services and components to be made available by 2008.

Finally, in March 2006, the European Commission has established a new focal point for its GMES-related activities, to be known as the GMES Bureau, the new body responsible for creating an implementation strategy for GMES.

3. All in all, the GMES joint Initiative is to be considered as a positive step. In fact, mainly for disaster management and mitigation, the availability of data is a key point. It means not only to have access to the data needed in a timely manner, but also to obtain data and relevant products and services in an appropriate format for use. There is today a widely availability of remotely sensed images with various spatial, spectral and temporal resolutions and the potential application to disaster prevention and management. Space-based technologies have a real contribution to make in all areas of disaster management and prevention. Measures need to be taken to ensure the deployment of the technologies currently available.

The first tool put in place to cope with disasters prevention and mitigation was the Charter on Cooperation to Achieve the Coordinated Use of Space Facilities in the Event of Natural or Technological Disasters, also known as the "International Charter on Space and Major Disasters". It enable countries in which a natural or technological disaster has occurred to support disaster mitigation activities. Having being concluded among national and international space agencies and institutions of public nature, such as the European Space Agency (ESA), the French CNES, the Canadian Space Agency, the Indian Space Research Organization and the US's NOAA, it is evident that the legal basis of the Charter relies on an international administrative agreement and not, as has been said by some commentators, on a contract of private nature. But what is more important than the legal nature of the Charter, is the fact that, in response to the Indian Ocean tsunami of 26 December 2004, the Charter was activated and, for the first time, raw satellite imagery with a multi-user license was provided for by the space agencies cooperating within this legal framework. The data were hosted by the UNOSAT service and accessible to all entities (UN, governments, NGOs, universities) involved in work related to the international response to the countries affected by the tsunami.

In this sense, the Charter seems to be the first international instrument which gives full implementation to Principle XI of the 1986 UN Principles on remote sensing, as well as to Principle 18 of the UN Declaration on environment and development adopted at Rio de Janeiro in 1992. As a matter of fact, its preamble makes an express reference to the "UN Resolution 41/45 of

1986 on remote sensing of the Earth from space". It seems meaningful to recall these principles: Principle XI establishes that "Remote sensing shall promote the protection of mankind from natural disasters. To this end, 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 disasters, shall transmit such data and information to States concerned as promptly as possible". Principle 18 of the Rio Declaration provides that: "States shall immediately notify other States of any natural disasters or other emergencies that are likely to produce sudden harmful effects on the environment of other States. Every effort shall be made by the international community to help States so afflicted".

The recent developments and practices – including the Disaster Monitoring Constellation (DMC), an international consortium which comprises a partnership between organizations in Algeria, China, Nigeria, Turkey and the United Kingdom proposed in 1996 to construct a network of five affordable LEO micro satellites which objective is to provide a daily global imaging capability for rapid-response disaster monitoring and mitigation – are of the foremost relevance from the legal perspective. In fact, they indicate that the main UN Principles on remote sensing and sustainable development are beginning to work together in a concrete way in the field of disaster mitigation and prevention.

In this context, it is my understanding that the legal problems related to the use of remote sensing technologies for disaster prevention and management should be assessed in the light of two set of legal principles: on one side, the specific rules governing remote sensing activities in international space law, embodied in UNGA Resolution 41/65 of 3 December 1986 as Principles relating to remote sensing of the Earth from Outer Space; on the other side, the principles of international law on sustainable development codified in the acts adopted at Rio de Janeiro in June 1992, mainly the Rio Declaration on Environment and Development and its subsequent developments, such as the results of the Johannesburg Summit Rio+5 of 2002. Both set of principles, in fact, are already reflected in several treaties, acts of international organisations, declarations of the UN General Assembly, State practice and international commitments of other kind.

A key element of the UN remote sensing legal regime is the emphasis on co-operation, to which Principles V, VIII and XIII are devoted. The first Principle states the obligation of sensing States to promote international co-operation and to make available to other States opportunities for participation on equitable and mutually acceptable terms; the second, affirms the obligation of the United Nations and the relevant agencies of the UN system to promote co-operation, including technical assistance and co-ordination in the area of remote sensing; the third, calls upon sensing States to promote and intensify international co-operation, especially with regard to the needs of developing countries, by the means of consultations, upon request, with the sensed States.

The duty of States to co-operate is indeed a sort of procedural super-principle that would ensure the effective translation of each of the other principles into reality. In this context, the principle of global partnership, following the common but differentiated responsibilities criterion, can be seen as a more recent rephrasing of the obligation to co-operate.

International co-operation and technical assistance are indeed essential to space applications for environmental protection and disaster mitigation and prevention. In the last years, States and international organisations practice in this field has given strong support to the effectiveness of the co-operation principle. Co-operation has become essential not only in expanding the availability of space technology and applications so that all countries may benefit from them, but also, and mainly, in promoting international security in all its forms, including human security against natural and technological disasters.

The full consistency of the remote sensing activities for sustainable development with the applicable international legal regime finds the last, and more conclusive, element of evidence in the principles concerning environmental information and access to data contained in Resolution 41/65. Following Principle X, remote sensing shall promote the protection of the Earth's natural environment, while Principle XI attributes to remote sensing the task of protecting humankind from natural disasters.

The discipline of environmental information set forth in Principles X and XI of the UNGA Resolution, is preceded by a general clause contained in Principle IX, which makes reference to Article IV of the Registration Convention and Article XI of the Outer Space Treaty. Here, the obligation of information concerns not the collected data, but the remote sensing program as a whole that the sensing State is carrying on, and its components. The sensing State must in fact inform not only the UN Secretary general, but also any other State, and particularly the developing ones, which can be affected by the program.

Coming now to the two provisions concerning the disclosure of remote sensing environmental data, it is well known that Principle X deals with ordinary environmental harm, while Principle XI is concerned with *natural disasters*. In the first case, States participating in remote sensing activities that have identified information in their possession capable of adverting any phenomenon harmful to the Earth's natural environment, shall disclose such information to the States concerned. According to Principle XI, the States 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 disasters, shall transmit such data and information to States concerned as promptly as possible.

While the two dispositions show various differences concerning the kind of information and/or data to be "disclosed" or "transmitted", they appear interlinked, complementary and unified by the fact that no mention is made of conditions, like the non discriminatory basis or the reasonable cost. These conditions are envisaged, on the contrary, in Principle XII for access to remote sensing data by the sensed State. Moreover, Principles X and XI clearly indicate that the States to be informed are not only the sensed States, but, more generally, the States concerned. Information promoting sustainable development is, thereby, given a different status *vis-à-vis* the access to data regime set forth in Principle XII. It is probably more correct to identify the environmental regime on disclosure of data as the general regime, and to regard the Principle XII regime as a special one. It is true indeed that the promotion of the protection of the Earth's natural environment (Principle X) and of the protection of humankind from natural disasters (Principle XI) are typical and general objectives of remote sensing of the Earth's surface from space to improve natural resources management, the protection of the environment and, more in general, the life and security of all human beings.

The two principles just mentioned find corresponding provisions in numerous environmental protection conventions, which provide duties of States to inform each other, particularly in situations of imminent danger.

According to the aforementioned evolution both at level of general principles and conventions in force, it is commonly understood that States should provide prior notification and relevant information to neighbouring and potentially affected States regarding activities that may have a significant adverse environmental effect; they should also provide immediate notification to other States of any natural or technological disaster or similar emergencies that are likely to produce sudden harmful effects on their environment and on their population. Emergency notification allows affected parties the greatest possible opportunities to prepare for, and mitigate, potential damage.

However, it is also evident that some differences must be stressed between the transmission of remote sensing data and information according to Principles X and XI of UN remote sensing principles, and notification of emergencies and natural disasters following Principles 18 and 19 of the Rio Declaration.

The scope of Principles 18 and 19 of the Rio Declaration is to impose an obligation to the State within whose jurisdiction or control the natural disaster or emergency or harmful activities occur, while the Principles on remote sensing require the mere possession by States of information and data on harmful phenomena or natural disasters in order to envisage an obligation of disclosure and transmission, irrespective to the *lieu* of origin of the harm or of the disaster.

Both set of principles, indeed, do not prescribe the obligation of the sensing States to transmit the relevant information to the competent international organisations or to the UN Secretary General. On the contrary, such an obligation should be included as an important provision applicable to

environmental information concerning damages and disasters, in order to enhance international cooperation to prevent natural and technological disasters and to minimize their effects. Finally, nor the Rio principles, neither the UN remote sensing principles make explicit reference to information and data concerning imminent threats, natural disasters or serious harms to areas beyond national jurisdictions. Notification and transmission of data in this context is an obligation rooted in customary international law, connected with each State's due diligence obligation to prevent harm not only to another State's environment, but also to areas beyond national jurisdiction.

Another important aspect regards the right of access of sensed States to any primary or processed data "on non-discriminatory basis and on reasonable cost terms", to follow the formulation of Principle XII of the UN set of principles. This provision must not be interpreted in the ambiguous sense that there is a right of access only if this is available on a non discriminatory basis, but rather that the sensing State has an obligation to allow access, and that this access must be non discriminatory and at reasonable cost. State practice confirms that the *opinio iuris* is in favour of this - although not unlimited - right of access.

The tendency towards the privatisation of data retrieval, raw data processing, data analysis and data sales should not impair the principles laid down in the UN code and in sustainable development principles. In order to be consistent with Principle XII of the UN code, commercialization must guarantee the disclosure of data according to Principles XI and XII of the 1986 UN Code. More generally, I believe that the remote sensing environmental information must be free in principle for all users, though at reasonable cost, because of the public aspect of this kind of data. It is also evident that data concerning natural disasters should be allowed for free, due to the extreme constraints and the harmful consequences on the life and security of human beings, as the tsunami case demonstrates.

Even if remote sensing principles maintain their independent *raison-d'être* in the context of the evolution of space law, it is indeed true that international law, in which these principles fall by their legal nature and content, is undergoing a general transformation due to the awareness reached by the international community of the imperative need for global partnership to achieve natural disasters prevention and management.

In conclusion, the tsunami of December 2004 has prompted reflection on remote sensing data pricing policy, shifting toward no charge in case of major disasters. This seems to be really the most important element to be taken into account, from the legal point of view, in assessing the more recent initiatives.