

SPACE SERVING HUMANITY:  
SATELLITES IN DISASTER PREVENTION AND MANAGEMENT

A Joint Seminar of ISPL and UCL Space Domain  
14 May 2019

**DISASTER EVENTS AND LEGAL FRAMEWORK**

*Professor Sa'id Mosteshar, Director, ISPL*

Two sets of rules apply to remote sensing for the management of disasters. They are the UN Remote Sensing Principles, and the Disaster Charter. The Remote Sensing Principles apply to all remote sensing activities from space. The Disaster Charter covers not only remote sensing but also other space-based services of use in disasters situations.

The Remote Sensing Principles were a culmination of many years of discussion and negotiation, finally coming to fruition in 1986. They aim to strike a balance between the interests of sensing States and those of sensed States. In its 2011 report, UN COPUOS recognises the value of remote sensing in disaster management.

The Disaster Charter was founded by ESA and the French space agency, CNES, and began operating in November 2000. The Charter supports relief efforts and allows registered users to request and access free satellite data over stricken regions. In its first ten years, the Disaster Charter provided satellite data of more than three hundred disaster events such as earthquakes, hurricanes, cyclones, floods and fires, spanning nearly one hundred countries.

There is a significant distinction between the Remote Sensing Principles and the Disaster Charter: States are parties to the Remote Sensing Principles, while members of the Disaster Charter are not States, but their space agencies and space system operators, including private entities.

The Remote Sensing Principles are contained in a UN General Assembly resolution passed and adopted by unanimous consent. They are effectively non-binding, but in practice are adhered to by all States. Indeed, in their remote sensing activities States can and often do exceed the requirements of the Principles. The Disaster Charter is one example of this.

The Disaster Charter is by contrast a cooperation agreement between its members. Disaster Charter members are free to withdraw. But requirements on States to cooperate also exist under the Outer Space Treaty (OST), particularly to address the interests of developing countries.

Although they are of different application and scope, both the Remote Sensing Principles and the Disaster Charter give access to remote sensing information to assist countries and communities in distress. Many countries have laws dealing with this type of obligation, commonly referred to as "good Samaritan" laws, although generally they exclude man-made disasters created by wars, persecution and forms of violence. The Remote Sensing Principles and the Disaster Charter create mechanisms to provide information and other assistance.

**UN PRINCIPLES RELATING TO REMOTE SENSING FROM OUTER SPACE**

1. INTRODUCTION

A combination of the discussions and reports led to the *UN General Assembly Resolution on Remote Sensing Principles*. The adoption of the Remote Sensing Principles by the General

Assembly was a compromise between two positions. It removed the restriction on the dissemination of data and information and it gave an advantage to developing countries.

However, the Principles recognize the sovereignty of States over their resources. Resources remain under the control of the sensed State; the act of sensing them does not remove that control. Many of the Remote Sensing Principles restate or elaborate existing international law articulated in the OST.

Those participating in remote sensing activities will in general observe best practices and international guidelines. The Disaster Charter, refers specifically to the Remote Sensing Principles and the provisions of Principle XI, which could be argued to support the recognition of the applicability of the Principles to natural disasters, at least by Charter Members.

## 2. DEFINITIONS

The Remote Sensing Principles apply where the “*remote sensing*” is for the purpose of improving *natural resources management*, *land use* and the *protection of the environment*. It is arguable that the detection of resources, including minerals or water, is not subject to the Remote Sensing Principles.

The definition of remote sensing in the Principles is confined to that which uses sensors from space to detect electromagnetic radiation only from the surface of the Earth. Thus, it does not cover other means of detecting Earth characteristics or resources. An example of a system not within this definition is NASA’s Gravity Recovery and Climate Experiment (GRACE) that detected aquifers and other features by means of density from 2002 to 27 October 2017. The system did use electromagnetic radiation to measure the distance between two satellites, but it did not carry out any sensing of the Earth’s surface.

The definitions enunciated in Principle I further limit the application of the Remote Sensing Principles to three specific purposes. These are management of natural resources, land use and the protection of the environment. Reflecting security considerations and related concerns of States, the definitions operate to exclude their application to security-related remote sensing. The application of the requirements of common benefit and interest and access to data to security-sensitive data and information would be a difficult, if not impossible, task. It is also noteworthy that in relation to disasters, the UN requested Charter participants not to use VHR data in order to preserve the security and other crucial interests of the sensed States.

## 3. PRINCIPLES X & XI

These Principles deal with disclosure of processed data and information useful to the protection both of the natural environment and to dealing with the consequences of changes in the environment. Data and information must be disclosed to States affected, or likely to be affected, by a natural disaster.

Principles X and XI are two sides of the same coin in the sense that Principle X protects the natural environment of the Earth through disclosure of information about possible harm to the environment, while Principle XI is aimed at protecting mankind from environmental events. In one view mankind, as well as natural events, can cause adverse changes to the environment, which remote sensing can help to protect against. Conversely, mankind is vulnerable to environmental changes that remote sensing can help avert or at least forecast, thereby ameliorating their impact.

While Principle X applies only to *information*, Principle XI extends to *processed data and analyzed information*. As a consequence the protection of mankind is given greater priority, requiring more and earlier information to be given to avert the effects of events potentially harmful to people. The Charter provides the institutional and structural framework to give effect to Principle XI.

On a literal interpretation of the purposes to be served by remote sensing, natural disasters do not fall within the definition of *remote sensing* in Principle I(a). But the focus of Principle XI is to protect people from the consequences of natural disasters. Its inclusion points to the need to interpret these Remote Sensing Principles more broadly than merely focusing on the literal definition of remote sensing in Principle I(a), but so as to give effect to the general intent of the Principles.

## **INTERNATIONAL DISASTERS CHARTER**

### **1. INTRODUCTION**

Growing appreciation of the usefulness and availability of Earth observation information in early warnings and managing the impact of disasters brought about the establishment of the International Disaster Charter (“Disaster Charter”).

### **2. PURPOSE AND OPERATION OF THE CHARTER**

The Disaster Charter provides the framework for cooperation among space agencies and space system operators for the use of space capabilities, to assist States and communities to avoid or minimize and to manage the consequences of disasters. However, that the Charter cannot be activated for slow-onset disasters like droughts.

There is a well-defined process by which countries affected by disaster can request the assistance of the Charter’s members.

The Disaster Charter has two main objectives:

- Supply during periods of crisis, to States and communities whose population, activities or property are exposed to an imminent risk, or are already victims, of natural or technological disasters, data providing a basis for critical information for the anticipation and management of potential crises; and
- Participation, by means of this data and of the information and services resulting from the exploitation of space facilities, in the organization of emergency assistance or reconstruction and subsequent operations.

It was formed in April 2000 by the European Space Agency (ESA) and the French space agency, Centre National d'Etudes Spatiales (CNES), and became operational on 1 November 2000. It now has 17 members and 34 contributing satellites. This followed UNISPACE III, at which Earth observation was a major topic of discussion. Its Report of Resolutions of the meeting includes:

1. *Declare* the following as the nucleus of a strategy to address global challenges in the future:
  - (a) ....

- (b) Using space applications for human security, development and welfare: action should be taken:
  - (i) ....
  - (ii) To implement an integrated, global system, especially through international cooperation, to manage natural disaster mitigation, relief and prevention efforts, especially of an international nature, through Earth observation, communications and other space-based services, making maximum use of existing capabilities and filling gaps in worldwide satellite coverage.

The Disaster Charter is a tangible and practical implementation of the aspirations and strategy embodied in this declaration. It promotes the co-operative use of facilities by space agencies and system operators to provide data and other services during emergency operations.

### 3. TERMS OF THE CHARTER

Members of the Charter are not States - they are space agencies, or national or international space system operators with access to space facilities [Art VI], whereas States are the subjects of the UN Principles. The space facilities to be accessed are not confined to remote sensing, but include other space systems providing meteorology, positioning, telecommunications and TV broadcasting, receiving equipment including VSATs and archives [Art I].

Charter members are of course bound by any other international agreements to which they are party, including those relating to intellectual property and liability. However, the Disaster Charter provides for waiver of the liability of satellite operators who provide data under the Disaster Charter.

The disasters covered by the Charter are any natural or unintended man-made event that causes loss of life or widespread property damage. The period during which the relevant services are to be provided spans from immediately before the event occurs to immediately after the event, although *immediately* is undefined in the Charter.

The space data provided is the data detected by a space system, and to which a Charter party has access. This includes the processed information that has been prepared for the management of crises. At the time of writing, the Disaster Charter had been activated to respond to over six hundred crises.

### CRISIS COMMUNICATION CHARTER

Recognising the importance of communication between relief agencies, providers of information and rescue operations, in October 2015 the European, Middle-East and African Satellite Operators Association (ESOA) and the United Nations signed a Charter on Crisis Communications to ensure better coordination of satellite communications to deliver a predictable response for the humanitarian community to respond to disasters. While almost all satellite operators are active at times of disaster, the Charter provides a mechanism that delivers an improved, more efficient and more effective response from the satellite community. Some ESOA Members are also active sponsors of Télécoms Sans Frontières, an NGO involved in deploying communications for disasters around the world.