IISL-92-0066

LEGAL ASPECT OF MONITORING AND PROTECTING EARTH ENVIRONMENT BY SPACE TECHNOLOGY

HE Qizhi*

Beijing. China.

The United Nations General Assembly at its 44th session approved the designation of 1992 as International Space Year(1), which placed special emphasis on earth-looking activities. With the use of space technology greatly expanded, the earth has never been so closely observed as comtemplated in the past. The year 1992 could be a milestone in the search for understanding the earth. The efforts in this direction have been further progressed and environmental issues have proceeded from scientific and technical studies to the probes of legal and institutional measures, designed to cope with and prevent dangers involved.

Potentials of Monitoring Environment by Remote Sensing from Space

In the application of space technology, remote sensing has become increasingly important. That is because remote sensing by satellite has planetary dimensions. The synoptic view and the possibility of frequent repetitive coverage of large and inaccessible areas of the earth, makes global monitoring of changing environmental phenomena technically feasible and economically attractive. While Landsat of the United States and SPOT of France have been widely used, other countries, including a number of both developed and developing countries have used their own and other satellites for remote sensing purposes.

Land. The inherent capabilities of space observation is particularly suited to the study of land masses and nearly every facet of human activities on land, such as resources management, agricultural production, forestation, hydrology, the prevention of floods, droughts, desertification, soil erosion and other natural disasters, etc.

The various space programs, the International Geosphere-Biosphere Programme (IGBP) for instance, demonstrate clearly how these Programs on land are critically dependent on the data gathered by space technology. Data ob-

IISL: Member IAA.

tained by remote sensing satellites often unobtainable by any other means, complemented by other collateral data and "ground truth" have been used with great success and brought huge benefits to mankind. In this context, the United States proposed the so called "Global Habitability"[2], focussing on the study relating to habitability of the earth.

Sea. Marine remote sensing is an integral part of space technology. Data derived therefrom were extremely helpful for predicting and analyzing periodic and cyclical phenomena of the ocean, thus making climate forecasts more reliable and valuable.

Satellite surveillance is also the best way in discovering ocean pollution by detection of chemicals, oil, petroleum, hydro-carbons, sewage, solid wastes and radioactive substances, etc. in the sea. The Global Investigation of Pollution in the Marine Environment [GIPME], founded by UNESCO's Intergovernmental Oceanographic Commission [IOC], provides continuing assessment of the health of the sea through various projects and methodologies. The primary objective of this Commission is to establish the relationship between marine pollution and its effects on ocean organism and man, constituting an important contribution to the study of Global Habitability.

During the Gulf War, satellite surveys showed that millions of gallons of oil pouring from Kuwait terminals formed a slick of about 56 km long by 16 km wide, causing severe damage to the marine birds and life[3]. All these indicate that the application of remote sensing by satellite in the study of marine pollution and other items of oceanography seems to be boundless.

Atmosphere. The study of earth atmosphere involves numerous programmes, such as the World Climate Programme [WCP] and World Weather Watch [WWW], established by the World Meteorological Organization [WMO], and the Earth Watch or Global Environment Monitoring Systems [GEMS] organized in the early 1970's by the United Nations Environment Programme [UNEP]. These programmes were aimed at using international efforts to monitor the atmosphere over the land and sea. The WWW is a global observing system that gathers and disseminate data of the atmosphere by weather satellites of various space countries. These data serve as the foundation for weather forecasts, storm warnings and other environmental assessment worldwide. The emissions of carbon dioxide and other gases leading to green house effect, and the release of chlorine and hydrogen chloride into atmosphere which is believed to be the main cause of ozone layer depletion, including the ozone hole in the Antarctica, are grave issues confronting mankind. In dealing with these urgent problems, space technology has an important part to play.

All these development concerning the utilization of space technology for monitoring and protecting environment have to be responded in the legal field, so as to guarantee and promote continuous progress on this topic

of vital importance.

Legal Framework

The monitoring of earth environment by satellite, like any other space activity, is governed by the general principles of space law, as enunciated in the Outer Space Treaty. One major principle is that the outer space shall be free for exploration and use by all states without discrimination of any kind. This freedom is subject to certain other restrictions prescribed in the Treaty, such as space activities must be carried out for the benefit of all mankind and in accordance with international law, states must bear responsibility for national space activities, outer space should be used for peaceful purposes, etc.

In addition, specific principles governing remote sensing by satellite were elaborated by the Legal Subcommittee of COPUOS after long years of deliberation. These are a set of principles concerning remote sensing of the earth from space adopted by the United Nations General Assembly Resolution in 1986[4].

These principles allow states to carry on remote sensing activities from space without advance notice, and implicitly permit free dissemination of data and information without prior consent by the sensed states. Principle X stipulates that remote sensing shall promote the protection of the earth's natural environment, and to this end, states participating in remote sensing activities shall disclose all information in their possession identified as capable of averting any phenomenon harmful to the earth's natural environment. Principle XI further provides that remote sensing shall promote the protection of mankind from natural disasters, and to this end, states participating in remote sensing activities which have identified processed data and analyzed information that may be useful to states affected by natural disasters, or likely to be affected by impending natural disaster, shall transmit them to the latter as promptly as possible.

With regard to the acquisition of data and information obtained by remote sensing, Principle XII provides that the primary data, processed data and analyzed information acquired over the sensed state must be made available to that country on a non-discriminatory basis and on reasonable cost terms once they are produced.

Meanwhile, international cooperation is provided in Principles V, VIII, and XIII, which call in a number of ways for cooperative actions to benefit as many countries as possible.

It shall be noted that the above mentioned Principles on remote sensing though in the form of the United Nations Resolution and being recommendatory in character, are nevertheless important in carrying out remote sensing activities. That is because most of the substantive content of these principles are already a part of existing treaties, and others are customary rules of international law. Still others may require some operational context to solve the

problems likely to arise in the course of implementation. Thus as a whole, these principles are useful and can serve as guidelines in carrying out remote sensing activities.

Need for Global International Coordination

The importance of monitoring and preserving the earth environment by space technology has become increasingly aware and is being recognized by the world community. As a result, some international research programmes, such as IPGP, WRPC, WWW, GIPME, UNEP [United Nations Environment Programme], etc., have been initiated. However, these programmes have been carried on separately. There is no overall coordination of the growing number of the existing and perspective earth observation satellite programs.

There have been a number of suggestions of setting up an overall international organization charged with the function of tackling the challenge of monitoring environment on a world wide scale. The notable one is the International Satellite Monitoring Agency [ISMA] proposed by France in 1978 (5), which though being put forward essentially for arms control verification purposes, could be turned into an international monitoring agency for environment. Again, a World Environment Authority was proposed recently (6), charged with the huge task of setting up both the space system, with satellites stationed on geostationary and polar orbits and the creation of ground infrastructure for gathering, processing and managing data derived from the earth observation system from outer space.

However, owing to the tremendous investment and other difficulties involved in these proposals, these propositions could hardly be realized in the near future. The practical way is to accomplish the goal phase by phase or step by step. The initial phase could comprise the setting up of an international coordination center or agency, while the final goal of establishing a complete space monitoring system be accomplished in the second or final phase.

With the ultimate goal in mind, what is needed at present is an international coordination center or agency, based on comprehensive, continuous and long term acquisition of data and information on earth environment from existing space systems. In view of the key role played by UNEP (United Nations Environment Programme), the proposed agency could be established under the aegis of the UNEP and could be charged by an international agreement/ arrangement with the following main tasks.

1. To gather and administer all data and information on environment provided by national ground stations. As provided in Principle X of the Remote Sensing Principles, states participating in remote sensing activities shall disclose all information in their possession identified as capable of averting any phenomenon harmful to the earth's natural environment, and should transmit to the international organ for collecting and managing environmental data.

In the field of meteorology, the distribution of data obtained by satellite is provided free of charge to member states of World Meteorological Organization (WMO) in accordance with the practice of offering international service for public use [8]. With regard to environment, the commercial distribution of remote sensing data and information seems to be inconsistent with the public purpose of using such data and information for environmental protection. This problem has to be faced and there might be two ways in its solution: either adopting the meteorological type of free charge, or taking some sort of hybrid system based on both commercial distribution and free supply as in the meteorological field. Anyhow, an international coordinating agency is necessary to serve as a data bank or center on environment. In this way, all these data and information can be better and widely used, and proposals on environmental issues could be made by UNEP for implementation by states concerned.

2. To coordinate the activities of various scientific programmes on environment, such as IGBP, GIPME, WCRP, etc. At present, relevant data and information acquired by satellite remote sensing though being used in various scientific programmes, yet lack coordination and concentration. The proposed agency could be regarded as a kind of effort to rationalize the various observation projects on global level. Through such coordination, access to and exchange of data and information between different international partners could be achieved, thus enhancing the complementarity and compatibility of the earth observation systems.

3. To increase assistance to developing countries by encouraging them to concentrate their attention and efforts to environmental issus and help them to acquire the technology of receiving, processing and using remote sensing data and information they need. The center or agency could also be charged with the expanding training for developing countries, whose part is indispensable for monitoring and protecting the earth environment.

The universal dimension of the work requires international cooperation. While the final goal will be achieved at a later stage, the imminent aim seems to be some sort of global coordinating center or agency for comprehensive gathering and administering data and information provided by existing satellite systems. Such an organization is actually a data bank on environment, and would be an important step towards the ultimate goal of setting up a World Environment Authority with global space monitoring system for the protection of the earth.

Notes:

* The views expressed in this paper are those of the author, and do not necessarily represent those of any organization with which he is connected.

[1] UNGA Res. 44/46, Dec. 8, 1989.

[2] This term was first proposed by NASA during UNISPACE-82, (see "Global Habitability", printed material presented at the Conference), and in the statement made by the Head of the United States Delegation in the general debate of the Conference. See Report of the Second United Nations Conference on the Exploration and Peaceful Uses of Outer Space, Vienna, 9-21, August, 1982, UN Doc. A/CONF/101/10, pp.126-127.

[3] China Daily, 29 January, 23 February, 1991.

[4] UNGA Res. 41/65, 3 December, 1986. According to Principle I concerning definition, satellite meteorological and military reconnaissance activities are excluded from the scope of these Principles.

[5] UN Doc. A/S-10/AC.1/7, 1 June, 1978.

[6] S. Courteix, Towards An International Satellite Monitoring System of the Environment, Proceedings of the 33rd Colloquium on the Law of Outer Space, 1990, pp. 148-151.

[7] For instance, the cost of building and launching a Landsat would be of the order of US $6/800 million, excluding the building of ground infrastructure and operational costs.

[8] Cf. John A. Leese, World Meteorological Organization--Demonstrated Accomplishments and Strong Plans for the Future in Applying Space Technology, Journal of Space Law, Vol. 14, No. 2 pp.140-147.