UNISPACE Ⅲ. Issues and Challenges

N. Jasentuliyana*

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Introduction

It is with much pleasure that I accepted the invitation to deliver this keynote address here today. At the outset, let me extend felicitations to the sponsors of this Conference for bringing together at this delightful location international experts in the aerospace field, at which we seek to establish ways for solving better the global problems through international cooperation in aerospace technology application.

As the world prepares to usher in the twenty-first century, it is readily

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- 본고는 1999년 10월 서울에서 "새 천년의 항공우주법 및 정책의 주요 과제와 방향"이라는 주제로 개최된 제9회 항공우주법 국제학술세미나대회에서 발표된 논문임

* President, International Institute of Space Law (IISL)
Formerly Deputy to the Director-General, United Nations Office at Vienna, and Director, Office for Outer Space Affairs

apparent that humanity has made significant progress and undergone profound changes on several fronts since the beginning of the twentieth century. Most noticeably, the old political paradigms and social structures that once held communities together have been challenged, threatened and forced to adapt. These ruptures in stability and normalcy create great discomfort for those lacking or without the means to keep pace with the change.

Several encouraging trends toward democratization, the empowerment of the individual and social groups, the continued protection of human rights, the participation of non-government actors in development, good governance and sound socio-economic policies are already evident throughout the world today.

Even so, several countries and regions are still groping with fundamental tasks of redefining, reforming and reorienting socio-economic and political systems. Furthermore, numerous new challenges are arising in many societies, ranging from economic growth and stability to job creation and employment; from poverty to income distribution and from social integration, solidarity and cohesion to ethnic division and strife.

Countries also face mounting pressures regarding Earth's environment and climate. Misuse or abuse of natural resources is a serious problem everywhere. The oceans are in constant peril from man-made hazards. The El Ni† o phenomenon plays havoc with traditional weather patterns and devastating floods and hurricanes kill thousands of people each year.

Yet there is a bright side. We should be relishing the challenge the next millennium is presenting us, for we do have the means to reverse our march toward a certain inevitability. We do have the ability to help

improve the lives of everyone here on Earth. For those of us gathered here today, space science and technology represents a valuable and effective, but perhaps little-acknowledged, means to achieve greater prosperity and a better quality of life for people everywhere.

In the forty years that we call the space age, the development and application of space technologies, have been pursued by a relatively small number of industrialized nations. As a direct consequence, these nations have been among the first to benefit, both economically and socially, from such technologies. Indeed, the potential for increased economic and social growth that could arise from greater utilisation of space technology has not yet been fully realized, especially in the developing countries, even though revolutionary technologies such as satellite telecommunications have gained widespread use throughout the world. The lagging behind of the developing world is more acute when you consider that for services other than basic access to a telephone, 84 percent of all mobile cellular subscribers, 91 percent of all fax machines and 97 percent of all Internet host computers are located in developed countries. By the year 2000, the telecommunications industry is expected to be worth more than $1 trillion annually. This despite half the world's population having never made a phone call. These statistics depict an alarming state of affairs and remedies need to be found urgently. It is now desirable that - in the years ahead - we should not only promote generally the greater use of space for peaceful purposes, but also promote specifically, the active participation in space benefits by the entire global community of nations.

It is precisely these twin challenges that lay at the core of international cooperation in space. While in recent years tremendous progress has been made in the development and application of space technology, striking changes have been taking place in the global geo-political landscape. Most significantly, an era characterized by ideological

confrontation has been brought to a close, giving rise to the prospect, by and large, of mutually beneficial greater collaboration among nations on all realms, including space matters. It is important that we acknowledge this most welcome development when we formulate here our proposals for enhancing international cooperation.

The closing phases of this century is marked by several important 'space' trends and, today, let me highlight for you some of those issues which are of particular relevance to the topics covered at this Conference.

The Commercialization of Space

Since several years, there has been an increasing tendency away from space activities fully financed by national governments to those which either the government and private industry finance jointly or those which are fully financed by the private sector. Whereas this increased commercialization has characterized the space communications industry for quite some time, it is also now becoming more common for certain areas of the satellite remote sensing market.

In remote sensing, we are also witnessing a similar trend. The support of the national defence and space authorities of some countries entering into substantial long-term purchase agreements with commercial entities for the delivery of required imagery or financially supporting the construction of specialized remote sensing sensors, rather than build their own remote sensing satellite systems. This trend has reduced the investment risk and therefore increased the financial viability of remote-sensing ventures by the private sector.

This increasing role played by the commercial sector in providing

communication and remote sensing services is also driving a demand for more commercial-based satellite launch services. We see this reflected in the use of novel approaches for providing those services, such as the use of converted missile launchers, launches from aircraft as well as launches from mobile sea platforms near equatorial locations.

Global satellite navigation systems is another important area of space commercialization. At the same time, there are yet untapped areas for space commercialization. For example, the micro-gravity of space offers potential use for the commercial manufacture of various new materials, including pharmaceuticals and alloys with properties much different from those manufactured on Earth.

Depending on the method of estimation, the commercialization of space already generate worldwide revenues estimated to be in the order of US$ 90 billion, and are continuing to climb with annual growth rates of more than 20 per cent. This trend goes hand-in-hand with an increased number of space users, mostly in the developing countries, that have become significant purchasers of space-related products and services.

On the other hand, it is equally important to bear in mind that there are specific political, social and economic issues associated with these trends which could have a negative effect on our efforts to improve international cooperation.

The international community has long recognised the clear need to facilitate technology transfer in space matters so that more countries can share in the benefits. However, for technology transfer to succeed, there must exist a favourable regulatory environment in the recipient country. A crucial element of such an environment is the existence of opportunities for the involvement of the local private

sector. In other words, recipient countries need to promote the local commercialization of space-related activities. Transfer of knowledge, know-how and technology to local industry is a key tool for developing long-term competency in these countries.

The extent to which the private sector could participate is determined by each government's policies. The government has a crucial role to play in introducing the private sector to the pursuit of meeting the country's requirements. It can and should play a pro-active role in numerous ways, such as: encourage commercial initiative where relevant; be a top user; ensure that public needs are met; foster competition and a level playing field; impel new applications and markets and phased transition; raise awareness of the users on potential of satellite systems and opportunity available; prove information and training in partnership with the industry; and provide necessary funding for R&D for new initiatives and promote international cooperation and industrial tie-ups.

Another important issue in space technology transfers, especially from the point of view of donor countries, is the existence of appropriate and applicable legal frameworks and international agreements governing such issues as intellectual property rights, trade marks, copyright and foreign licensing.

Satellite Navigation Systems

Global satellite navigation systems are the newest space systems we have developed. Today, the low cost of receivers for these systems and their enormous impact in increasing productivity in a wide range of activities has spawned a very high demand for related products. It is estimated that the market for satellite location equipment alone would

reach 6 to 8 billion US dollars by the year 2000. The commercial sector is meeting this demand in many innovative ways[1].

Owing to their military roots, the two currently operational satellite navigation systems, GPS and GLONASS, only offer some of their signals for civilian use and the more accurate signals are generally reserved for military purposes. There recently have been some initiatives in the United States and Europe which aim at improving the accuracy of the navigation signals that are available to civilian users[2].

These trends are accompanied by some major issues, including those related to national security. While some States may advocate full access to satellite navigation signals for all, others may, however, express concern about the potentially enhanced military capability that ready access to 'precision' signals could, in times of conflict, confer on their enemies. Given the immense civil importance of the satellite navigation sector, States need to work together to develop a common definition for "basic civil and public GNSS service" and continue technical discussions to build trust, resolve security issues, and reach an agreement of sufficient liability regime, because the full benefit of independent satellite navigation systems can only be realized if they are fully inter-operable and transparent to the user and are part of a common architecture.

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1) Areas such as engineering, geodesy, geographic information systems, automobile and aircraft navigation systems and precision farming, truck and automobile fleets, among others. Industry is increasingly integrating positional with other types of information in products, such as mobile telephones.

2) The GPS enhancement program of the United States will, for instance, eventually allow access by civilians to more signals from the GPS constellation. In addition, there are plans to use geostationary satellites to independently monitor and assess the integrity GPS signals. In Europe, there are also plans by the European Commission to improve the position information within Europe that is currently available from the GPS and GLONASS satellites through the use of geostationary satellites. Europe also has plans to build an independent global navigation system, GNSS-2.

Developing Countries and Space

Space is also coming to play an important role in support of the desire of many developing countries to further develop their economies, introduce essential services to their population and raise living standards, while by passing the need to implement complex and highly expensive ground-based infrustracture.

The extraordinary opportunities that space technology provides developing countries is apparent from the fact that two-thirds of the world's population live in developing countries, yet approximately 90% of all natural disasters and 95% of related deaths are in developing countries. Clearly, greater emphasis needs to be placed on promoting disaster management activities in developing countries.

Adequate access to information is crucial to all phases of disaster management. However, several countries do not have the required telecommunications infrastructure to support the reception and processing of disaster-related information, nationally and internationally. There is also presently no mechanism which allows the disaster management community to have efficient and simple access to space assets, such as Earth observation, satellite navigation and communication satellites during emergencies. Countries, including those which have not recently experienced a disaster, need to give high national priority to disaster management activities, and to better coordinate the relevant services and activities. These are issues which must clearly be addressed by the international community.

Another issue of importance is that knowledge of opportunities provided by space to enhance economies, services and quality of life was lacking in many countries, particularly in the developing world. If these

countries are to realize and exploit the full potential of space, a dedicated effort must be undertaken to disseminate information and knowledge to their leaders, provide education to key officials and train local personnel who would operate the ground-based portion of the infrastructure. Such an effort must be carried out in a coordinated fashion by Governments and the industrial space sector on a regional and global basis.