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THIRD UNITED NATIONS CONFERENCE ON THE EXPLORATION AND PEACEFUL USES OF OUTER SPACE

Draft report of the Third United Nations Conference on the Exploration and Peaceful Uses of Outer Space

Note by the Secretariat

Corrigendum

1. The present corrigendum was prepared by the Secretariat on the basis of the comments made by the Preparatory Committee for the Third United Nations Conference on the Exploration and Peaceful Uses of Outer Space (UNISPACE III) at its 1999 session, during its final consideration of the text of the draft report of the Conference (see A/CONF.184/3 and Corr.1).

2. Text added to the draft report is shown in boldface; deleted text is scored through. An ellipsis [...] indicates that the remaining text of the paragraph is unchanged.

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Summary

I. Introduction (Parts I-III)

[*First paragraph*]

Outer space is the province of all humankind, and ~~therefore~~ should **therefore** be used for peaceful purposes [...]

II. Harnessing the potential of space at the start of the new millennium (Part IV)

B. Facilitating and utilizing communications

[*Second paragraph*]

Rapid advances in communications and information technologies have had many positive effects, but have also widened the gap between those who can use those technologies to access more information more quickly and those who cannot. New satellite communications systems can reduce that information gap. ~~In addition, countries with poor communications and information infrastructures should consider establishing legislative and regulatory frameworks, assessing how space technology can meet their information and communications needs and investing in telecommunications infrastructure accordingly.~~ **In addition, developing countries should consider taking appropriate steps in order to meet their information and communication needs.**

C. Improving and using position/location capabilities

There are currently two global satellite navigation systems (GSNS), the Global Positioning System (GPS) of the United States of America and the Global Navigation Satellite System (GLONASS) of the Russian Federation. The use of transmitted signals to determine position, velocity and time from these military systems has been offered free of charge to civilian users. The services are used largely in the field of transportation and surveying, but new applications, such as in meteorology and geology, satellite navigation, telecommunications timing and geographical information systems (GIS), have emerged. With a view to further developing the capabilities of such systems, the United States is embarking on a major enhancement of GPS as well as implementing the Wide Area Augmentation System (WAAS), Europe is implementing the European Geostationary Navigation Overlay System (EGNOS) and Japan is implementing the Multi-functional-Transport-Satellite-based Satellite Augmentation System (MSAS). ~~Europe is considering a follow-up system, the Global Navigation Satellite System-2 (GNSS-2).~~ **For Europe, the next stage will be the second- generation global navigation system, Galileo, which is in its initial definition phase**. International acceptance of such systems for navigation and other civil applications purposes depends on the guarantees of open access and continuity for civilian use and the enhancement of the system through overlay or augmentation [...]

F. Information needs and the global approach

[*Second paragraph*]

However, many developing countries have not yet established information infrastructures and thus lack access to information as a basic resource for development. ~~It is critical for those~~ **Therefore, as information is a basic resource for development, it should be a matter of**

priority for many developing countries to invest in building up their national information infrastructure. ~~Furthermore, the resolution of environmental and other issues at the global and regional levels will require a greater integration of national information networks into regional and global ones.~~ This can be facilitated by the use of appropriate space technologies and by the adoption of common standards, distributed networks and common user interfaces.

Furthermore, the resolution of environmental and other issues at the global and regional levels will require a greater integration of national information networks into regional and global ones.

H. Promotion of international cooperation

[*Third paragraph*]

To develop political support for international cooperation in space activities, there should be multilateral consensus to implement common space goals, identified, *inter alia*, by the General Assembly in its resolution 51/122, at the highest decision-making level. To enhance its role in promoting international cooperation in the peaceful uses of outer space, the United Nations should ensure that the agenda of the Committee on the Peaceful Uses of Outer Space and its subcommittees reflect the full scope of issues of relevance to contemporary space activities. Steps should also be taken to improve the coordination of space activities within the United Nations system. The full implementation of those ~~activities~~ **goals** by the United Nations and Member States will promote the peaceful and fruitful exploration and utilization of outer space for the betterment of this and future generations.

*
* *

I. Background

7. Significant progress in the development of space science and technology and their applications have enabled humans to exploit the last frontier, outer space. Efforts to utilize the space environment were further strengthened during the post-Apollo period. Space stations, such as **Salyut,** Mir and Skylab, and platforms have provided opportunities to conduct various research activities in orbit [...]

13. The United Nations has been involved in space activities since the very beginning of the space age. ~~Following the launch of the first man-made satellite, Sputnik-1, in October 1957, in~~ **In** the midst of the cold war, there was a growing concern in the international community that space might become yet another field for intense rivalries between the super-**P**owers or would be left for exploitation by a limited number of countries with the necessary resources [...]

II. Enabling environment for space exploration and utilization

28. Since the beginning of the space age, space exploration and exploitation have yielded tremendous scientific as well as economic and societal benefits for **hu**mankind [...]

32. Satellite communication systems [...] have introduced improved techniques and new technologies. The emerging new services would provide more efficient solutions, in both developed and developing countries, for dealing with issues of regional and global concern, such as improving opportunities for education, ensuring access to adequate medical services, increasing the effectiveness of disaster warning and relief operations and developing adaptation or mitigation strategies in relation to climate change **and for the conservation of biological diversity.**

41. There are many areas where collective efforts should be made to achieve common objectives of **hu**mankind. One of those objectives is to maintain optimal interactions with nature. Since the beginning of civilization, **hu**mankind has lived in a competitive relationship with nature. [...]

45. The challenge lies in increasing cooperation [...] Following the adoption of Agenda 21 at the United Nations Conference on Environment and Development**, held in Rio de Janeiro, Brazil,** in 1992, a number of initiatives have been taken, including the use of space science and technology for monitoring the environment. [...]

IV. Harnessing the potential of space at the start of the new millenium

61. The variable interaction of the Sun with the Earth's magnetosphere, ionosphere and upper atmosphere can create potentially damaging environments for space assets that provide weather forecasts, ~~telephone and other forms of communication~~ **radio communications**, television, navigation and other important services. [...]

70. Human activities and natural phenomena can now be observed [...] A growing number of space activities are increasingly at risk because of the production of **human**-made space debris. [...]

73 *bis*. The launch of reflectors for the illumination of parts of the Earth's surface also has a potential negative impact on biological diversity. Research should be undertaken prior to the launching of any such reflectors.

74. In the twenty-first century, the planet Earth could face the potential hazard of rapid environmental change~~s~~, including warming of the climate, rising sea level, deforestation, desertification and ~~land~~ **soil** degradation, depletion of the ozone layer, acid rain and a reduction in biodiversity. [...]

(c) Specific action programmes

85. Since many weather phenomena are directly related to the economy and well-being of society, weather forecasting has been a crucial requirement of societies around the world for centuries. Weather forecasts are currently ~~generated by~~ **initiated through** global models, which ~~are~~ in turn ~~used to create~~ **provide boundary conditions used in** high-resolution regional models ~~in order to forecast more~~ **to assist forecasters in providing** specific local details of weather systems, such as temperature, wind and precipitation.

89. Future satellite missions will make improved and better calibrated observations of the above-mentioned and other parameters. [...] The **intercalibrated** instruments will also collect data on the concentration and distribution of greenhouse gases, aerosols, ozone, atmosphere chemistry and solar radiation, which are needed to improve global climate change models.

90. Ongoing satellite missions make or help derive key global observations of atmospheric structure and dynamics, sea-surface temperature, surface parameters, precipitation, land-surface characteristics and selected atmospheric chemical species via geostationary and polar-orbiting platforms. Examples of those satellites systems are GMS, GOES, GOMS, INSAT and METEOSAT and the METEOR and NOAA-AVHRR series of

meteorological satellites, the Earth observation series of satellites, including Fengyun (China), IRS (India), LANDSAT (United States), SPOT (France), Resurs-01 (Russian Federation), Sich (Ukraine), Okean (**Russian Federation**/Ukraine) and the international Priroda programme, as well as the TOPEX/Poseidon (France/United States) ocean circulation mission **and the Tropical Rainfall Measuring Mission (TRMM) (Japan/United States)**. Recently, ERS-1 and -2 of ESA, SIR-L/X-SAR of Germany/Italy/**Japan**, JERS-**1** of Japan and RADARSAT-**1** of Canada have made it possible to map the Earth's surface through clouds or at night in the locality concerned, while providing new information on geological features, topography, atmospheric structure, sea ice, deforestation, bathymetry, coastal zones, oceanography and agricultural assessments, among other things. [...]

91. In the area of space studies of the Earth and its environment, there are studies on satellite applications of an interinstitutional and multilateral nature, among others, which are being carried out in Latin America and the Caribbean, such as: (a) monitoring of agro-climatic and hydrologic conditions for agriculture in South America; (b) development of a unified methodology for monitoring desertification, being conducted by countries of the region with UNEP; (c) research in land use and land cover change, being conducted by countries in Central America and NASA; (d) ocean biology, being conducted by Latin American countries and NASA; (e) monitoring the dynamics of glaciers and the Andean tropical snow-capped mountains, in collaboration with the United Nations and ESA, as well as the study of the dynamics of the pole in the southern hemisphere; ~~and~~ (f) monitoring of ozone, with the participation of countries of the region, NASA and the International Development and Research Center (Canada)**; (g) global forest mapping project being conducted by NASDA, NASA and the European Community, with the support of the National Institute for Space Research of Brazil.**

99. Navigation and positioning satellite systems are another promising tool [...] With ground positioning receivers and through repeated ~~observations~~ **measurements**, it is possible to determine relative motions of parts of Earth to within a few millimetres. That could make it possible to assess and map earthquake risk and predict volcanic eruptions and landslides. The use of optical **and/**or radar images for stereoscopic **and interferometric** viewing are also useful for that purpose.

101. Recognizing the need for a global effort to reduce the impact of natural disasters, the international community proclaimed the International Decade for Natural Disaster Reduction, beginning in 1990 (General Assembly resolution 44/236 of 22 December 1989). **The General Assembly has subsequently adopted annual resolutions on the issue of disasters, notably resolutions 52/200 of 18 December 1997 and 53/185 of 15 December 1998, aimed at mitigating the effects of natural disasters such as El Nino. Among other natural catastrophes covered by the Decade, locust infestations in particular in Africa, have a severe impact on disaster-prone countries and should be controlled through better use of space techniques through international cooperation.** As the Decade reaches its conclusion, there is evidence that enormous synergy has been established in the disaster management community throughout the world [...] The regional workshops and the International Conference on Early Warning Systems for the Reduction of Natural Disasters, held in Potsdam, Germany, in 1998, made recommendations on the need to incorporate the use of space technologies into disaster management planning and operational activities. **In order to meet the objectives of the Decade, the Advanced Land Observing Satellite (ALOS) project of Japan was endorsed by the Subcommittee of the Scientific and Technical Commission as an international and regional project of the Decade to contribute to strengthening risk assessment capabilities by producing natural hazard maps of East Asia. The ALOS project will be launched by 2002.**

110. The onset of drought in a given year can be predicted [...] The FAO early warning system for Africa, the African Real-Time Environmental Monitoring using Imaging Satellites (ARTEMIS), **as well as the appropriate actions taken by the National Institute for Space Research of Brazil related to climate studies in specific regions of the country, are** ~~is~~ based on that capability.

121. Another issue faced by users of Earth obseration data [...] Given the plethora of data available, without sufficient experience it is often difficult to select the right data to maximize the benefit to be derived from the data sets. **The Brazilian Amazon Surveillance System**, **SIVAM, is a good example of a large integrated system for collecting Earth observation data and distributing them to users**. Other related issues are the storage and archiving of data, linked to a disposal policy over time, the obsolescence of hardware and software and data-pricing policies, all of which create constraints to a broader use of the data.

126. To improve understanding of weather phenomena and their effects on the environment and human activities, it will be necessary to pursue the following objectives:

[...]

(c) Improvement of the coverage (in surface area and in terms of additional parameters and variables that are needed) for the calibration, **intercalibration** and validation of current and planned satellite and remote sensing observations;

[...]

129. As one of the steps towards an integrated global strategy [...] The possibility of converting such a network information database into a structured international framework for cooperation, combining satellite data with ground-based or other data, should be explored**, taking into account the confidentiality of any strategic information**.

135. ~~Through international cooperation, the least developed countries and other developing countries should be assisted in the development of the necessary knowledge and skills of their citizens in different aspects of space science and technology, particularly through their participation in the design, development and fabrication of small satellites, with a view to gaining an understanding of the technology and subsequent use of such small satellites for various socio-economic activities.~~ [*Move to follow para. 342*.]

139. An additional consideration would be that the [...] The Office for Outer Space Affairs would ensure that any disaster-related recommendations made by UNISPACE III were considered and taken into account in the recommendations adopted at the final event of the Decade and that some specific actions, such as the initiation of pilot projects, were included. **Finally, fully aware of the crucial role played by space technologies especially global communications and Earth observation satellites, in providing essential information for hazard mapping, risk assessment and early warning, as well as for disaster preparedness, relief and rehabilitation, and convinced that, as the International Decade for Natural Disaster Reduction is coming this year to its end, the Conference believes that there is a need to continue to take advantage of new progress in space techniques and operational activities together with the synergy established in the disaster management community. Moreover, natural disasters of increased magnitude being a fact of life and bearing in mind the experience gained over the past decade, the Conference invites therefore the General Assembly to renew the International Decade for Natural Disaster Reduction for a new decade so as to reduce and mitigate the effects of natural disasters throughout the world, in particular in developing countries.**

144. An appropriate mechanism should be ~~evolved~~ **developed** for synergistic cooperation and coordination between the Committee on the Peaceful Uses of Outer Space, with its secretariat, the Office for Outer Space Affairs, and other international bodies working in the space field, **including the Commission on Sustainable Development,** the United Nations Environment Programme (UNEP), the Global Environment Facility, FAO, the United Nations Educational, Scientific and Cultural Organization (UNESCO), WMO and WHO, in particular on critical issues such as global warming, climate change, human health problems and sustainable development, and with CEOS on the coordination of satellite missions.

145. The economic growth rate of the developing regions [...] Satellite communications could also be the key technology to bring developing countries to participate in the process of building up the global information infrastructure (GII) (**see para. 236**).

162. The work of allocation and coordination of **the ~~associated~~ frequency bands for the various space radio communications services and the associated** geostationary **and non-geostationary** satellite orbital positions by ITU needs to be fully supported and its effects on developing a more efficient and equitable distribution of spectrum-orbit resources need to be encouraged, taking into account possible technological innovations, in order to ensure access to and use of such resources by developing countries. [...]

166. The following specific actions should be taken:

[...]

(d) Study of the feasibility of international and regional cooperative systems for satellite-based broadcasting and communications for development, taking into account the needs of ~~the~~ developing countries;

(e) Promotion of the development of rural infrastructure for communications through international cooperation.

167. Global satellite navigation systems (GSNS) are space-based radio positioning systems [...] The COSPAS-SARSAT system makes it possible to determine the position of a~~n~~ **mobile** object fitted with a tracking beacon when the object is in a distress situation. **Intended mainly for the study and protection of the environment, the Argos system, developed by the Centre national d'etudes spatiales of France and placed on board the NOAA-series of meteorological polar-orbiting satellites of the United States, makes it possible to determine the position of a mobile object anywhere on the surface of the Earth** (**see para. 100**).

171. To improve the positioning information of the [...] With a total of three signals available for civilian use in the future, GPS services will provide more accuracy by allowing easier corrections for atmospheric distortion, greater robustness by protecting against the effects of narrow-band interference~~,~~ and easier use by allowing more rapid receiver acquisition of **signals from** the available satellites. Similar activities are now under way with respect to the GLONASS system.

174. To improve the positioning information of the current GPS and GLONASS civil signals, the European Commission, ESA and the European Organization for the Safety of Air Navigation (Eurocontrol) have together begun to implement an

initial global satellite positioning system, referred to as the European Geostationary Navigation Overlay System (EGNOS). EGNOS is based on a regional augmentation of GPS and GLONASS and will employ navigation payloads on geostationary satellites. ~~In addition, Europe has proposed to initiate work on an independent follow-on system, Global Navigation Satellite System-2 (GNSS-2).~~ **Europe has initiated the development of the Galileo project, which is a second-generation independent satellite navigation system.**

175. The European system**, which is a civilian system developed through the initiative of the European Union and ESA,** is intended for use in many disciplines, from agriculture to transportation, and will meet civil aviation navigation requirements for all phases of flight, from en route to precision approach and landing—the strictest of all satellite navigation user requirements. [...]

179. A number of ~~political and economic problems~~ **questions** also need to be ~~resolved~~ **addressed** before a~~ny~~ new type of satellite navigation system can be deployed on a global or regional basis. ~~To overcome those problems, the current GNSS-2 initiative will have to focus more on a clear definition of its mission, operational structure and cost-benefit ratio than on the technologies to be applied.~~ **It is most desirable that all interested countries cooperate in order to benefit from the development and implementation of such a system.**

180. The radio frequency ~~spectrum~~ **bandwidth** in which all GSNS operate ~~must~~ **should** be kept free of interference from other radio emissions that could degrade performance of GSNS user equipment. There are issues before ITU that will be acted upon at the World Radiocommunications Conference in May 2000 that could have significant impact on the utility of GSNS to all countries in the future. It is essential that the radio frequency ~~spectrum~~ **bandwidth** used by GSNS be kept free of interference for all earth, air and space users.

183. Countries operating the GSNS should commit themselves to not switching off the navigational signals in use or intentionally reducing the quality of those signals ~~before the new fee-collecting global satellite navigation system is installed~~.

183 *bis*. A global positioning civil signal should be continuously supplied to all users (especially developing countries) free of charge.

230 *bis*. During the last 10 years, the European Centre for Space Law, in collaboration with several universities in ESA member States, has been organizing summer courses on legal problems related to space activities. Every year, about 40 law students attend the courses. Thus, the courses contribute to the development of legal training in the field of space activities.

231. The participation of young people in the educational and training activities of the United Nations Programme on Space Applications is still limited. While the United Nations should continue to provide educational and training opportunities for policy makers, scientists and engineers who would have direct and immediate impacts on the socio-economic development in developing countries, the United Nations, in collaboration with other relevant organizations within the United Nations system, could provide educational and training opportunities for students and young scientists and engineers who will become future space leaders around the world. **The education and training should include space science and technology and its applications.** This would contribute to developing the human resources necessary to ensure the continued utilization of space applications for economic and social development.

233. In the light of the above, the Preparatory Committee at its 1998 session agreed that the ~~Youth~~ **Space Generation** Forum should be organized as one of the components of the Technical Forum of UNISPACE III. ~~Events for undergraduates are~~ **A round table aimed at increasing the awareness at the political level of the usefulness of integrating space techniques and applications into European curricula would be** planned by the European Association for the International Space Year (EURISY). For graduate students and young professionals, the International Space University's alumni associations ~~will~~ **would** organize **meetings to be held** parallel ~~sessions~~ with UNISPACE III, with the aim of presenting to the decision makers in the current space programmes the visions and perspectives of young space professionals around the world concerning future space endeavours.

237. [...] Many countries have national infrastructures for information where the access to information is recognized as a basic right. ~~while~~**. However,** many developing countries have yet to establish information infrastructures and lack the recognition of access to information as a basic resource for development. ~~The essential existence of databases as prime tools for decision-making and development needs to be demonstrated with concrete examples of their cost-effectiveness in organizing information and assisting with analyses.~~

246. The issue of **calibrated, intercalibrated and statistically representative** metadata for data access, search and exchange is a key issue if information access is to be universal. [...]

247. As policy makers turn their attention to designing a sustainable development approach to management of the problems of Earth and its resources, data and information are urgently needed in a readily accessible and easily understandable form. ~~Recognition of t~~**T**he usefulness of spatial information (information in map form) for decision-making and its inputs for spatial area-based planning and development

should be generally recognized ~~is, with a few exceptions, lacking in developing countries. Such a situation needs to be corrected in order to improve the decision-making process~~.

250. In order to establish an all-encompassing information infrastructure consisting of the components indicated below, countries should take necessary actions at the national level, bearing in mind the need to coordinate those actions at the international level:

(a) *Databases*. The key elements of the infrastructure are the databases and developing databases for different purposes and users (private, public, scientific and government) is the major task to be accomplished in a systematic development of infrastructure. **Databases should contain information on the progress of space science and technology and its applications, on space-related education and training facilities and on experts and organizations working in those fields.** In most countries, the emphasis will be on converting the massive amounts of analog data to computerized databases;

254. The commercialization of space activities has been a highly positive development. Through numerous joint ventures, ~~including those with companies from developing countries,~~ commercial systems and services are creating, for example, expanding constellations of communications satellites. These constellations of satellites have relied successfully on the international private sector to provide financial investment and to manufacture, operate and market satellites and services. [...]

259. GIS will become an essential tool for analysing data as well as presenting information for market and geopolitical analysis and for diverse applications such as environmental studies and disaster management planning. It is projected that the GIS market could reach **approximately** $5 billion in sales by the year 2000.

269. The simultaneous acquisition, adaptation and assimilation of high-technology knowledge, while perhaps desirable, are not always feasible. Many countries **have** ~~try~~ to overcome **constraints in their efforts** ~~that difficulty~~ by adopting strategies that differ according to their political and socio-economic environment and stage of economic development. [...]

273. While space provides a whole new realm of opportunity and a vast potential market for industry and business, it is still perceived by many as a final frontier rather than an economic market ripe for expansion. [...] Governments would also have to play a role in promotion, giving incentives and aiding the development of a private sector presence in space~~, making it just another place to do business~~.

277. ~~A f~~**F**avourable **international and national** environment**s** ~~in the recipient countries~~ need~~s~~ to be created to allow the transfer of technology to become permanent. [...]

279. Although several cooperative, mainly bilateral, programmes exist between developing countries for the transfer of space technology, current mechanisms for fostering South-South cooperation in technology development and transfer are insufficient. Mechanisms through which donor organizations may finance technology transfer projects at the regional level, such as regional information networks, are not sufficient because of policy constraints that heavily favour bilateral agreements. ~~Insufficient experience in preparing and submitting project proposals in the formats and with the information content required by various funding institutions is an additional constraint faced by developing countries.~~

280. Problems experienced by developing countries in the area of space technology exchange and spin-offs may be summarized as follows: (a) limited access to information; (b) low number of specialized training centres; (c) less efficient national technology transfer infrastructures; (d) lack of qualified suppliers; (e) insufficient ~~appropriate~~ funding and investment opportunities~~.~~**; (f) incompatibility of national legislation on transfer of technology between recipients and donors; and (g) insufficient effective international cooperation and collaboration. These problems could be solved in part or minimized through effective international cooperation mechanisms.**

285. In order to attract the investments that are vital for the success of technology transfer projects, the political will and commitment of national leaders as regards the introduction of new technology and the development of appropriate infrastructure should be apparent. ~~Political, social and economic stability would also greatly enhance the possibilities of foreign investment in emerging markets.~~ Incentives to encourage both foreign and local investors should be given in order to stimulate the adaptation of technologies acquired from abroad to meet local needs.

313. The international legal principles in the five treaties[10] have established the exploration and use of outer space as the province of all humankind, **outer space, including the Moon and other celestial bodies** not subject to national appropriation, and have ensured freedom of exploration. They have banned the placement of nuclear weapons in outer space and provided for **international responsibility of States for national activities in outer space,** liability for damage caused by space objects, the safety and rescue of spacecraft and astronauts, the prevention of harmful interference in space activities, the avoidance of harmful contamination of celestial bodies and adverse changes in the Earth environment, the notification and registration of objects launched into outer space, scientific investigation and the ~~exploitation~~ **exploration** of natural resources in outer space, as well as the settlement of disputes. Each of the treaties lays great stress on the notion that ~~the province of~~ outer space, the activities carried out there and

whatever benefits might accrue from them should be devoted to enhancing the well-being of all countries and humankind, and each includes elements based on the principle of promoting international cooperation in outer space activities.

316. Other intergovernmental organizations, in particular those of the United Nations system, are also contributing to the legal regime governing international cooperative space activities. [...] In addition, multilateral and bilateral treaties and agreements have secured the establishment and operation of international and regional space organizations and bodies, such as [...], and the development of cooperative programmes, such as the Council on International Cooperation in the Study and Utilization of Outer Space, the COSPAS-SARSAT search and rescue satellite system and the International Space Station. ~~Many~~ **Some** individual States **and groups of States** have also added to the corpus of space law through the adoption of **their** national laws **and agreements within the groups** governing their activities in outer space and their goals for international cooperative ventures.

317. The United Nations has succeeded in progressively developing and elaborating, in the form of treaties and declarations, a body of principles relating to space activities sufficient to be considered a ~~separate~~ **well-established** branch of international law **governing space activities**. In recent years, the increase in space activities has given rise to new, highly technical issues such as**,** ***inter alia*****,** space debris, the use of nuclear power sources in space and the reinforcing of intellectual property rights. Those subjects pose many challenging legal questions that call for creative ~~and flexible~~ solutions through international cooperation if international space law is to keep pace with the rapid advances in space technology and activities.

319. Since UNISPACE 82 (see paras. 21-27 above), the world has witnessed dramatic growth in the commercialization and privatization of space-related activities. That trend has led to significant increases in the number of non-state actors involved in the ~~use,~~ exploration and ~~exploitation~~ **use** of outer space, as well as the number of different activities in which they are engaged. [...]

320. A further pressing concern is the fact that many States have yet to ratify or sign the various legal instruments governing space-related activities that have been elaborated within the framework of the United Nations. [...] The exercise has also drawn attention to the fact that actual adherence in practice by States to the provisions of the treaties to which they are parties is less than optimal, itself a matter requiring immediate consideration. **In this regard, States are urged to ensure that their national laws conform with the treaties.**

325 *bis*. Recognizing the principal importance of providing prompt, reliable and affordable access to outer space on a non-discriminatory basis for the successful development of space activities, the promotion of the development of international cooperation in launch services is currently of special importance.

325 *ter*. Examples of such cooperation include joint ventures such as Sea Launch with the participation of Norway, the Russian Federation, Ukraine and the United States; Starsem with the participation of France and the Russian Federation; and ILS with the participation of the Russian Federation and the United States, as well as the German-Russian Eurokot company.

326. In order to enhance international cooperation, there should be further strengthening of successful mechanisms for cooperation that already exist, such as intergovernmental mechanisms, quasi-governmental/private organizations,[15] ad hoc inter-agency mechanisms,[16] transnational industrial activities[17] and international non-governmental organizations. Intergovernmental mechanisms include bilateral cooperation, currently taking place between developing countries,[18] and multilateral cooperation, involving intergovernmental mechanisms. The latter may take various forms, including the establishment of a permanent **cooperative** institutional mechanism, such as the Committee on the Peaceful Uses of Outer Space, the **Regional Space Applications Programme for Sustainable Development (RESAP) under the auspices of ESCAP, the Asia-Pacific Regional Space Agency Forum in coordination with the National Space Development Agency of Japan and the Institute of Space and Astronautical Sciences of Japan,** the Asia-Pacific Multilateral Cooperation in Space Technology and Applications (APMCSTA) and ESA, the establishment of an ad hoc mechanism, such as the series of space conferences of the Americas held in Latin America and the Caribbean, and project-by-project cooperative mechanisms, such as the International Space Station.

330. The growing role of private industry in space activities and the parallel decline in government funding for space programmes are aspects of another issue reflecting overall economic trends. In that connection, it is important to recognize the private sector as a potential partner in future activities by identifying projects that could possibly benefit from its participation and to encourage its involvement **while encouraging fair competition in this field**.

333. ~~Another issue to be overcome for there to be increased participation in international cooperation activities by developing countries is their occasional reluctance to participate in such activities as a result of lack of confidence in their ability to act as equal partners in terms of know-how and technical capabilities. International cooperative schemes in this field should therefore put more focus~~ **In order to facilitate**

international cooperation, there is a need to focus more on promoting capacity-building in human resources on the part of developing countries.

339. Appropriate existing international mechanisms should be used to explore the further development of space technology applications that have a high potential for success and that contribute to meeting global needs. Where such a mechanism does not exist, one should be established and consideration given to new forms of cooperation **of mutual interest and benefit**. Such applications include but are not limited to the following:

[...]

V. The space millennium: Vienna declaration on space and human development

The States participating in the Third United Nations Conference on the Exploration and Peaceful Uses of Outer Space (UNISPACE III), held in Vienna from 19 to 30 July 1999,

[*First preambular paragraph*]

Reaffirming ~~*Taking into account*~~ the aims and principles of the Charter of the United Nations, the principles of international law and the relevant resolutions of the General Assembly,

[*Fifth preambular paragraph*]

Recognizing that outer space should be the province of all ~~mankind~~ **humankind to be utilized for peaceful purposes and in the interests of maintaining international peace and security**, as proclaimed in the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies,[1] and elaborated in the Declaration on International Cooperation in the Exploration and Use of Outer Space for the Benefit and in the Interest of All States, Taking into Particular Account the Needs of Developing Countries,[2]

[*Sixth preambular paragraph*]

Recognizing also that the orderly conduct of space activities is beneficial to all countries, whether or not they have already become active in space research or have started to utilize space applications, and that active support for space activities is expressed in the ~~adherence~~ **observance** ~~of~~ **by** States and ~~of~~ **by** international organizations **of the provisions of** ~~to~~ the outer space treaties,

[*Eighth preambular paragraph*]

Noting **the benefits and applications of space technologies in addressing** the unprecedented challenges to sustainable development **and also noting the effectiveness of space instruments for dealing with the challenges** ~~for humanity~~ posed by the pollution of the environment, depletion of natural resources, loss of biodiversity and the effects of natural and anthropogenic disasters,

[...]

I. Protecting the **Earth's** environment and managing **its** resources

Action should be taken:

(a) To develop a comprehensive, worldwide, environmental monitoring strategy **for long-term global observations** by building on existing space and ground capabilities, through the coordination of various entities and organizations involved in such efforts;

(b) To improve the management of the Earth's natural resources by increasing and facilitating the **research and operational** use of remote sensing data, enhancing the coordination of remote sensing systems, and increasing access to, and affordability of, imagery;

(c) To ~~create and~~ implement an integrated, global, space-based, natural disaster management system by making maximum use of existing capabilities and filling gaps in worldwide satellite coverage;

(d) To develop and implement the Integrated Global Observing Strategy that would facilitate access to and the use of **space-based and other** Earth observation data;

(e) To ensure, to the extent possible, that space activities are carried out in a manner that does not threaten the Earth's environment;

[...]

III. Advancing scientific knowledge of space and protecting the space environment

Action should be taken:

[...]

[1] General Assembly resolution 2222 (XXI), annex.

[2] General Assembly resolution 51/122.

(c) To improve the international coordination of activities related to near-Earth objects, harmonizing the worldwide efforts directed at identification, follow-up observation and orbit prediction while at the same time giving consideration to developing a common strategy that would include future activities related to near-Earth objects;

(d) To protect the near and outer space environments through further research on designs, safety measures and procedures associated with the use of nuclear power sources in outer space;

(e) To ensure that all users of space consider the possible consequences of their activities, whether ongoing or planned, before further irreversible actions take place affecting future utilization of near-Earth space or outer space, especially in areas such as astronomy, Earth observation and remote sensing, as well as global positioning and navigation systems, which have already become areas of concern because of the pollution of the electromagnetic spectrum;

[...]

V. Strengthening and repositioning of space activities in the United Nations system

Action should be taken:

[...]

(d) To promote the efforts of the Committee on the Peaceful Uses of Outer Space in the development of space law by inviting the States and organizations concerned to ratify or accept the five outer space **treaties**[3] developed by the Committee and by considering the further development of space law according to the needs of the global community;

[...]

VI. Promoting international cooperation

Action should be taken to follow up the decision by the States participating in UNISPACE III:

(a) To ~~welcome~~ **take note of** the recommendations of the regional preparatory conferences for Africa and the Middle East, for Asia and the Pacific, for eastern Europe and for Latin America and the Caribbean that are relevant to efforts made at the global and regional levels, as set forth in sections A and B, respectively, of the annex to the present Declaration, and to call upon the international community, to the extent feasible, to ~~implement~~ **consider those recommendations in appropriate forums**;

[...]

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[3] The five treaties and agreements are the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies (the "Outer Space Treaty"), adopted on 19 December 1966, opened for signature on 27 January 1967, entered into force on 10 October 1967, 94 ratifications and 27 signatures; the Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space (the "Rescue Agreement"), adopted on 19 December 1967, opened for signature on 22 April 1968, entered into force on 3 December 1968, 83 ratifications and 25 signatures; the Convention on International liability for Damage Caused by Space Objects (the "Liability Convention"), adopted on 29 November 1971, opened for signature on 29 March 1972, entered into force on 1 September 1972, 76 ratifications and 25 signatures; the Convention on Registration of Objects Launched into Outer Space (the "Registration Convention"), adopted on 12 November 1974, opened for signature on 14 January 1975, entered into force on 15 September 1976, 39 ratifications and 4 signatures; and the Agreement Governing the Activities of States on the Moon and Other Celestial Bodies (the "Moon Agreement"), adopted on 5 December 1979, opened for signature on 18 December 1979, entered into force on 11 July 1984, 9 ratifications and 5 signatures.

[*Original footnote 10 to be deleted.*]