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Committee on the Peaceful Uses of Outer Space

Unedited transcript

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Vienna

Chairman: Mr. G. Brachet (France)

The meeting was called to order at 10.06 a.m.

The CHAIRMAN *(interpretation from French)*: Good morning distinguished delegates. I now declare open the 558th meeting of the Committee on the Peaceful Uses of Outer Space.

This morning we will continue our consideration of agenda item 7, Implementation of the Recommendations of UNISPACE III.

We will also continue and suspend our consideration of agenda item 8, Report of the Scientific and Technical Subcommittee on its Forty-Third Session, pending the report of the Ad Hoc Expert Group of the DMISCO, as well as the report of the Working Group on the Use of Nuclear Power Sources in Outer Space.

We will continue and conclude our consideration of agenda item 9, Report of the Legal Subcommittee on its Forty-Fifth Session, as well as agenda item 10, Spin-Off Benefits of Space Technology: Review of Current Status.

We will also begin our consideration of agenda item 11, Space and Society.

At the end of this morning's meeting, there will be three technical presentations. The first by Mr. Ralf Baumann of Germany on the topic of "Mars Express: Very Close to an Exciting World". The second technical presentation, Dr. Kai-Owe Schrage of the International Academy of Astronautics, who will present the Academy's Report on "The Study on Space Traffic Management. And finally, Mr. Dadhwal of the Centre for Space Science and Technology Education in Asia and the Pacific who will present a report on the status of operation of the Centre.

And finally I would like to inform representatives that the Working Group on the Use of Nuclear Power Sources in Outer Space of the Scientific and Technical Subcommittee is currently holding its intersessional meeting in Room C-0713 and all interested delegations are welcome to attend this meeting.

Implementation of the recommendations of UNISPACE III (agenda item 7)

Let us begin the consideration of agenda item 7, I think we will conclude this morning, Implementation of the Recommendations of UNISPACE III.

Distinguished delegates, I would like to draw your attention to Conference Room Paper 11, which was distributed by the Secretariat yesterday afternoon. The document, which is available in English only, is entitled "Strengthening the Link Between the Committee and Commission on Sustainable Development".

Any of you who wish to make statements or comments on this document have the floor.

And I especially draw your attention to paragraph 6 of this Conference Room Paper, which includes seven sub-paragraphs, and subject to your comments, the thrust here is to include the seven points in the Committee's report to the General Assembly.

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If you have any comments on this document, please you have the floor.

I see no comments, no requests for the floor.

I will grant you one or two extra minutes to peruse the document just in case you have any comments on paragraph 6.

I believe you have had sufficient time to glance at this document. What I draw from it is that we are providing work for the Scientific and Technical Subcommittee for 2007 to elaborate and develop a contribution for the CSD for the period 2008-2009.

I see no comments. I see no objections. These items will, therefore, be included in the Committee's Report to the General Assembly.

I now turn to the list of speakers under this agenda item. I have one speaker, France. I thus give the floor to France. Jean-Yves.

Mr. J. Y TRÉBAOL (France) *(interpretation from French)*: Thank you Mr. Chairman. I would like to briefly return to the issue of DMISCO. But before I do this, I would like to present the apologies of my delegation for we were to make a technical presentation this morning on the Humanitarian _____SAT Container. Unfortunately, the vagaries of air transport have not enabled my colleague to be present here this morning and I wish to apologize sincerely.

A few words, this Humanitarian Container, which is easily airborne, can be provided to all assistance teams in a disaster area. It provides telecommunication means which provide for emergency telecommunications links and the transmission of satellite imagery as well as navigation data. The presentation of this tool will take place next week on 21 June in Tampere in Finland at the International Conference in Tampere and the meeting of the Working Group on Emergency Telecommunications.

Mr. Chairman, I thank you for this and I now move on to the other topic, I am referring to DMISCO.

Mr. Chairman, my delegation would like to briefly return to the issue of DMISCO which we had referred to in our statement under general debate.

We probably expressed ourselves poorly by stating that we were not in favour of the creation of this entity which I believe will now be called SPIDER.

What we wish to express is that we support this initiative in which, you know this well, the French delegation has been very active up to these last few weeks, but we did have a number of questions. These questions which we expressed were related, as stated in previous statements, to the interaction between this entity with the various existence and active organizations in this field. As José Achache of the GEO Secretariat repeated it, we should avoid any overlap and focus on complementarity. Following the outcome of the work of the Expert Group in February, we would like to believe that the Office was preparing a summary document on this topic which would clarify this item which, of course, is the cornerstone of this project. Recent discussions these last few days have led me to understand that the report of the Group of Experts will meet our concerns. Will examine it carefully but we will require some time to examine it in an objective way.

Another topic for concern is the long-term future of this entity. We have seen a number of proposals for contributions and we thank in a most heartfelt way those States which have offered their services. Nonetheless, this entity will have to be a lasting one and its long-term financing should be subject to consideration. We all know here that the United Nations budget is experiencing a number of serious difficulties and any increase in the various contributions we will have to consider very seriously.

If this is not the case, if there is no increase, this budget should be redeployed and this could be to the detriment of other projects or programmes. We will have to be vigilant.

Finally, we reiterate our hope that this entity, if it is approved, should be close to staff members in the field. We all know, and in the case of natural disasters, which this entity could be confronted with, there are a great number of issues to deal with, for example, sovereignty of States, culture, religion and so forth. And a solution has to be found, one which would be appropriate to each situation, which would not be unique in nature, managed by a number of bureaucrats, bureaucrats which would be found in one place in the world.

Mr. Chairman, I thank you.

The CHAIRMAN *(interpretation from French)*: I thank the French delegation for its statement and this clarification regarding its stand on the French position on the DMISCO project, which perhaps is no longer called DMISCO but we will

familiarize ourselves with a new name when the time is right.

We have no further speakers on this agenda item.

Is there any other delegation that wish to take the floor on agenda item 7, Implementation of the Recommendations of UNISPACE III?

I see none. Oh, Italy, I apologize. Italy you have the floor.

Mr. A. GABRIELLI (Italy): Thank you Mr. Chairman. As far as the DMISCO is concerned, Italy supports the creation of this new entity and express great appreciation of the work carried out by the Ad Hoc Expert Group. But on the other hand, Italy needs to better understand what is the work background structure of DMISCO, the potential activities of it and its links with the other existing organizations. So at the national level, Italy would like to better analyze the political organization of this future entity.

Of course, Mr. Chairman, Italy recognize the vigorous and the challenge of the preliminary working plan but again we need more time to better understand the long-term financing, the logistics, the political and the economical aspects of this entity.

Thank you Mr. Chairman.

The CHAIRMAN *(interpretation from French)*: I thank the distinguished delegate of Italy for his statement on the same agenda item.

Do any other delegations wish to take the floor and make any comments? It does not seem to be case.

This concludes our consideration of agenda item 7, Implementation of the Recommendations of UNISPACE III.

Report of the Scientific and Technical Subcommittee on its forty-third session (agenda item 8)

We will now move on to the Report of the Scientific and Technical Subcommittee on its forty-third session which is our agenda item 8.

On this agenda item, we have two speakers. China. I thus give the floor to Madam Liu.

Ms. X.LIU (China) *(interpretation from Chinese)*: Thank you Mr. Chairman. The Chinese delegation notes with satisfaction the Report of the Scientific and Technical Subcommittee which has shown that the Office for Outer Space Affairs has carried out fruitful work with limited resources to implement the United Nations Programme on Space Applications. The Chinese delegation would like to express its appreciation to the Secretariat for its efforts in implementing the Programme and to all the other member States and international organizations for their support.

Mr. Chairman, in cooperation with COPUOS, the Chinese Government hosted a United Nations/China Workshop on Tele-Medicine Development in the Asia-Pacific Region in Guangzhou, China, in December 2005. The Chinese Government provided financial as well as human resources assistance to the Workshop.

Mr. Chairman, the China National Space Administration, in cooperation with the Secretariat of the Asia-Pacific Multi-Lateral Cooperation, will host a nine-month Master Programme on space technology and applications in Beijing in July 2006. This Programme, to be based on the four teaching modules developed by the United Nations, will be provided the Beijing University of Aeronautics and Astronautics and the Chinese Government and the Secretariat of the Asia-Pacific Multi-Lateral Cooperation will offer scholarships to some of the trainees attending this programme.

Mr. Chairman, the report of the Scientific and Technical Subcommittee provided an update on the status of implementation by the Subcommittee of the various recommendations of UNISPACE III. The Chinese delegation appreciates the work of all the Action Teams which have not only promoted the mutual understanding and cooperation between member States but also achieved the substantive progress in implementing the recommendations of UNISPACE III.

Mr. Chairman, the Chinese delegation is very satisfied with the progress achieved by the Working Group on Space Debris of this Subcommittee and appreciates the consensus reached by the Working Group on the draft Guidelines on Space Debris Mitigation.

Mr. Chairman, the Chinese delegation highly commends the work of the Ad Hoc Expert Group established by the relevant resolutions adopted at the fifty-ninth session of the General Assembly and we are

confident that DMISCO set up within the United Nations framework would contribute to the promotion of global disaster management.

Thank you Mr. Chairman.

The CHAIRMAN *(interpretation from French)*: I thank the delegation of China, Madam Liu, for her statement and for her assessment of progress achieved by the Scientific and Technical Subcommittee on the various issues it dealt with during the course of its forty-third session.

Also I have on this agenda item a statement by Indonesia. It is my pleasure, therefore, to give the floor to Indonesia.

Mr. S. DAMANIK (Indonesia): Thank you very much Mr. Chairman. At the outset, my delegation would like to express our appreciation to Mr. Suresh from India, Chairman of the forty-third session of the Scientific and Technical Subcommittee, for his excellent work in working towards the achievement of fruitful results. We would like also to thank Ms. Alice Lee, the Office for Outer Space Affairs Expert on Science and Technology, for the comprehensive report she delivered last Friday on the activities of the United Nations Office for Outer Space Affairs during 2005-2006.

In this opportunity, I would like to touch upon four issues, namely the space debris, the system-based disaster management support, the International Heliophysical Year 2007 and the Symposium on Equatorial Orbit for 2007.

Firstly, our delegation welcomes the progress made by the Working Group on Space Debris on the drafting of the Space Debris Mitigation Guidelines, especially the consensus reached within the Working Group on the text of draft guidelines. My delegation hopes that the draft guidelines will be adopted in the next Subcommittee.

Secondly, with regard to the space-system-based disaster management support, Indonesia welcomes the plan to establish a disaster management international space coordination entity. Indonesia, as a disaster-prone country, expects that this entity would enhance the capacity of the international community in providing support to affected countries in the face of disaster.

Our third issue, Mr. Chairman, is that in celebrating the International Heliophysical Year 2007, Indonesia is preparing various activities under the coordination of the National Institute of Aeronautics and Space, LAPAN. Among these activities is a research on solar physics and Sun-Earth relationship that is being undertaken by the Bandung Institute of Technology. This Institute, in cooperation with LAPAN and the Jakarta Planetarium, also organizes public outreach programmes. We establish cooperation with other countries, among others, with Japan on geo-magnetic observation, MAGDAS Project, and solar physics. At the moment, further collaboration with other countries is being considered in the field of solar radio burst, energetic particles and ionosphere observation.

Mr. Chairman, we are pleased to note that the Scientific and Technical Subcommittee has agreed that the theme for the 2007 COSPAR/IAF Symposium will be "The Use of the Equatorial Orbit for Space Application: Challenges and Opportunities". We consider this theme as of high importance as there are at least two significant characteristics of equatorial orbit. Firstly, access to the equatorial geostationary orbit, which is already known to be a limited asset, is important for the communication system in certain countries, especially for developing countries.

The second reason is with regard to the application of equatorial orbit for the purpose of remote sensing. Cloud cover is one of the serious obstacles in using optical remote sensing application in the equatorial region. The use of equatorial orbit will provide more revisit time and thus may overcome the cloud cover problem.

In the past, Indonesia, in cooperation with The Netherlands, has conducted a study on the possibility to launch a remote sensing satellite to equatorial orbit, which is called the Tropical Earth Resources Satellite, TERS. We would be pleased to share the results and the main points of this study with you in the next COSPAR/IAF Symposium.

Thank you Mr. Chairman.

The CHAIRMAN *(interpretation from French)*: I thank the distinguished delegation of Indonesia, Mr. Damanik, for his statement and for the information you have shared with us on his country's activities within the framework of the International Heliophysical Year 2007, as well as the information he has provided us on the interest in the equatorial orbit. I would add here that in the field of meteorological, the equatorial orbit is of great interest to the dynamism of meteorological phenomenon in this geographical region.

I see no speakers on this agenda item, unless we have any last minute comments or questions following the two statements we have just heard.

It does not seem to be the case.

I thank once again the representatives of China and Indonesia.

Thus, we are suspending our consideration of agenda item 8, Report of the Scientific and Technical Subcommittee on its Forty-Third Session. In the meantime, of course, we will be waiting for the report of the Special Group of Experts on DMISCO and the report of the Chairman of the Working Group on the Use of Nuclear Power Sources in Outer Space on the intersessional meeting of this Group that is currently underway.

Report of the Legal Subcommittee on its forty-fifth session (agenda item 9)

Distinguished delegates, we are now resuming and we will hopefully conclude our consideration of agenda item 9, Report of the Legal Subcommittee on its Forty-Fifth Session.

We have three speakers on the list on this agenda item.

The first is the delegation of India. I call upon Mr. Radhakrishnan. Or maybe Dr. Suresh? We will call on the Indian delegation later, as it turns out. And now I call upon the distinguished representative of Nigeria, Mr. Olawale Maiyegun.

Mr. O. I. MAIYEGUN (Nigeria): Thank you Mr. Chairman and thank you for giving me the floor once again. It is an honour for me to address the Plenary a second time within a week.

Mr. Chairman, on behalf of the Nigerian delegation, I wish to extend our appreciation to the excellent work of the Legal Subcommittee under the leadership of Ambassador Raimundo González of Chile. He is the distinguished Ambassador that is well known to most of us here in Vienna. And I also wish to extend our appreciation to the immediate past Chairman of the Legal Subcommittee, Professor Sergio Marchisio of Italy, for his leadership and contributions in advancing the work of the Subcommittee during his tenure.

Mr. Chairman, the Nigerian delegation has noted with satisfaction the status of the ratification of the five United Nations treaties on outer space, as contained in the document circulated by the Secretariat during the forty-fifth session of the Legal Subcommittee in April 2006. Inasmuch as my delegation is in support of the idea of a universal, comprehensive convention on space law, we recognize that in order to strengthen the legal framework for global space activities, member States should commit themselves to the ratification and the scrupulous implementation of the existing legal instruments.

Nigeria is firmly committed to securing the universal adherence of States to the treaties and resolutions on international space law. In addition to the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, as well as the Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space, Nigeria recently became a Party to the Convention on International Liability for Damage Caused by Space Objects. We expect, or rather my delegation will be reporting at the next session of the Legal Subcommittee on the completion of steps being taken to accede to the Convention on Registration of Objects Launched into Outer Space. Although the United Nations treaties and resolutions on international space law provide a minimum framework for the conduct of space activities, my delegation is convinced that advances in technology necessitate the need to expand our understanding of the scope, content and application of space law rules.

Mr. Chairman, the Nigerian delegation notes the significance of defining and delimiting outer space, as well as the attendant issues arising from both space law and air law. Progress was made by the Working Group on Matters Relating to the Definition and Delimitation of Outer Space, which enabled the results under the related agenda item of the Legal Subcommittee. We anticipate that the proposal requesting the views and experiences of States with regard to an additional question will facilitate the Subcommittee's continued deliberations on this important subject.

Mr. Chairman, as part of Nigeria's commitment to the implementation of existing international legal instruments, my delegation attaches great importance to the subject of the draft Protocol to the Convention on International Interests in Mobile Equipment. We would like to thank the organizers of the recently concluded Government/Industry Forum, convened under the auspices of UNIDROIT on 24 April 2006 in London. We believe that the deliberations at the meeting and the recommendations thereto will serve to facilitate the next Meeting of

Governmental Experts, at which we shall provide our full support.

Mr. Chairman, my delegation wishes to use this opportunity to reiterate our sincere appreciation to the staff of the Office for Outer Space Affairs for their dedication and efficient organization of the Space Law Workshop convened in Abuja in November 2005. We also thank the experts who disseminated their wealth of knowledge and experience to the Workshop's participants. The Workshop has had a very positive impact, particularly on countries of the African region and we are currently giving serious consideration to including the study of space in the curriculum of eligible Nigerian institutions.

Mr. Chairman, our delegation looks forward to your continued guidance of our deliberations.

(Continued in French) And thank you very much.

The CHAIRMAN *(interpretation from French)*: Thank you distinguished delegate of Nigeria, Mr. Maiyegun, for your statement.

I am now going to call upon the distinguished representative of China, Mr. Hong Xu.

Mr. H. XU (China) *(interpretation from Chinese)*: Thank you Mr. Chairman. The Chinese delegation would like to offer its congratulations to the Legal Subcommittee of COPUOS on the success of its forty-fifth session and finds its report encouraging. The excellent work undertaken by its Chairman, Ambassador González, and Chairmen of the various Working Groups is still fresh in our memory.

Now I would like to make some comments on several of the elements in the report of the Legal Subcommittee.

With regard to the definition and delimitation of outer space, we agree to hold further discussions and consultations on this issue in the context of maintaining permanent security of outer space and promoting its peaceful uses. We are of the view that definition and delimitation of outer space should not hamper the efforts of countries to use outer space for peaceful purposes. Due to their complexities involved, it is hard to reach agreement on this issue in the near future so we agree to continued consultations among countries on the matter.

Regarding the draft Protocol on Matters Specific to Space Assets to the Convention on International Interests in Mobile Equipment, this delegation believes that the Protocol is a positive attempt to deal with the issue of commercialization of space activities but great precaution should be taken when introducing the guarantee security regime into international space law through the Protocol. Above all, the assumption of real international liability by a government for space commercial activities of non-governmental entities or private enterprises, including liability for compensation to damages and related issues, should be addressed. How to link the guarantee security regime based on private laws with international public space laws is a matter for further assessment.

As for the relationship between Space Assets Protocol and the outer space law system, we are of the view that, in principle, the basic principles of existing space law should take precedence.

Mr. Chairman, on the item of status and application of the five United Nations treaties on outer space, we appreciate the efforts made by the Working Group to promote their wider application, endorse the decisions of the Legal Subcommittee and support the extension of the mandate of the Working Group. WE will take an active part in the Working Group and will assist it in carrying through its Work Plan for the next stage.

Concerning practice of States and international organizations in registering space objects, the Work Plan of the Working Group, which is advisable and pragmatic in our view, will facilitate adherence to and application of the Registration Convention and harmonize registration practices of various States. The Chinese delegation supports the work of the Working Group. In accordance with the provisions of Article 2 of the Registration Convention, the Chinese Government set up a space objects launching State registry in 2001, which is hosted and maintained by the China National Space Administration. The Chinese Government has frequently submitted to the Secretary-General information on space objects launched by China, pursuant to Article 4 of the Convention and has updated space objects data.

Thank you Mr. Chairman.

The CHAIRMAN *(interpretation from French)*: I thank the distinguished representative of China, Mr. Xu, for his statement and for expressing the position taken by China in favour of the work of the Working Group on Registration.

We are now coming back to the Indian delegation. I am pleased to give the floor to Mr. Radhakrishnan.

Mr. K. RADHAKRISHNAN(?) (India): Thank you Mr. Chairman. The Indian delegation is very pleased with the progress and significant achievements made during the forty-fifth session of the Legal Subcommittee. We would like to congratulate Raimundo González, the new Chairman of the Legal Subcommittee, for the two-year term and place on record his excellent contributions during the forty-fifth session.

Mr. Chairman, the Indian delegation considers the contribution of the Legal Subcommittee over the years in developing an international legal regime of outer space as very important. In our view, the Legal Subcommittee occupies a leading and prestigious role in evolving and safeguarding the entire body of international space law, which was founded so far on ethical principles.

We reaffirm that the five United Nations space treaties, evolved through consensus and accepted by a large number of countries, constitute the cornerstone of international space law. The review of the status and application of the five United Nations treaties on outer space, therefore, is an important subject to encourage adherence to these by the States which are yet to become Parties to them.

The Indian delegation is of the view that GSO is an integral part of the outer space and is thus governed by the Outer Space Treaties. The continuing debate on this subject and on the subject of the definition and delimitation of outer space is crucial to arrive at a common understanding.

Mr. Chairman, we would like to inform to the COPUOS Committee that the Third Space Law Conference 2005 was held in Bangalore from 26 to 29 June. The Conference, titled “Bringing Space Benefits to the Asia-Pacific Region”, was jointly sponsored by the International Institute of Space Law, the Indian Space Research Organization, as well the Astronautical Society of India. Around 150 scholars from 10 different countries, including 30 from outside Indian, participated in the Conference. More than 25 papers were presented during the session.

Mr. Chairman, the Indian delegation is of the view that the sovereign right of every country to have access to space and opportunity to utilize space for developmental programmes, should be well respected. It is in this context, that the safety and security of space assets should be well preserved for better prosperity of mankind. We endorse the report of the forty-fifth session of the Legal Subcommittee.

Thank you Mr. Chairman.

The CHAIRMAN *(interpretation from French)*: Thank you Dr. Suresh(?) for your statement on behalf of the Indian delegation.

I now call upon the delegation of Italy, Professor Marchisio.

Mr. S. MARCHISIO (Italy): Thank you Mr. Chairman. During the general exchange of views, my delegation has had the opportunity to welcome your election as Chairman of this Committee. Let me add now a personal, warm congratulation.

Mr. Chairman, my delegation fully endorses the Report of the Legal Subcommittee on its forty-fifth session, as contained in document A/AC.105/871 and wishes to reiterate its deep appreciation for the able chairmanship of Raimundo González Aninat from Chile. We also express our appreciation for the excellent work, including the preparation of documentation, done by the Secretariat for the forty-fifth session of the Legal Subcommittee. Furthermore, we noted with satisfaction the initiatives taken by the Office for Outer Space Affairs, with the full support of the COPUOS member States, in promoting the understanding of space law and the adherence to the United Nations space treaties.

In this regard, my delegation would like to express its appreciation for the results of the Working Group on the Status and Application of the Five United Nations Treaties on Outer Space, reconvened this year under the chairmanship of Vassilios Cassapoglou from Greece. The Working Group continued its review of the United Nations treaties and of the obstacles to their universal acceptance, addressing the multiplicity of benefits to, and rights and obligations of, Parties to these treaties. My delegation believes that the United Nations treaties constitute the main tool for ensuring the peaceful exploration and uses of outer space for the benefit of all countries in a spirit of cooperation and partnership. However, it is our understanding that the lack of awareness of the benefits that can derive from their acceptance still requires efforts by the Legal Subcommittee in order to broaden the participation of United Nations member States. This is why my delegation supports the recommendation that the mandate of the Working Group should be extended for one additional year, postponing to 2007 a more general

review on the need to extend its mandate beyond that period.

We also took note with interest of the document entitled "Questionnaire on the Possible Options for Future Development of International Space Law", presented by Ukraine and sponsored by other delegations.

Mr. Chairman, my delegation was particularly interested in the outcome of the Working Group on the Practices of States and International Organizations in Registering Space Objects reconvened under the chairmanship of Kai-Uwe Schrogl from Germany. We fully share the view expressed by other delegations that the Working Group achieved very positive results in identifying common practices which could form the basis for conclusions and recommendations to be adopted by the Legal Subcommittee. We would like to mention some issues that seem to be of the utmost interest, namely the harmonization of administrative measures, the additional information that could be considered appropriate at the time of registering a space object, the issue of non-registration of space objects, and finally, the transfer of ownership of space objects in orbit. Having joined the Registration Convention in 2005, my country is particularly interested in continuing to share its views with the members of the Legal Subcommittee.

Mr. Chairman, my delegation also believes that the Working Group on the Definition and Delimitation of Outer Space, chaired by José Monserrat Filho from Brazil, reached positive results. The agreement within the Legal Subcommittee on the opportunity of developing criteria for analyzing the replies to the Questionnaire on Outer Space Objects constitutes a useful instrument for giving a new focus to this issue, which is gaining new relevance due to the development of sub-orbital flights. Furthermore, my delegation welcomed the proposed interaction with the Scientific and Technical Subcommittee to clarify some technical elements.

Mr. Chairman, it is our view that this Committee should also consider positively the results of the examination of the developments concerning the draft Protocol on Matters Specific to Space Assets to the Convention on International Interests in Mobile Equipment. We considered with the utmost interest the information provided for by the observer from ICAO on the Aircraft Protocol, its entry into force, the registration system and the role of Supervisory Authority assumed by the Council of ICAO, as well as the publication of the regulations and procedures for the International Registry. This information clarified how the system of the protocols to the Cape Town Convention functions in practice. These developments, as well as the developments that will intervene later this year after the third meeting of the UNIDROIT Committee of Governmental Experts negotiating the Space Assets Protocol fully justifies the continuous interest of the Legal Subcommittee on this issue. For this reason, my delegation supports the proposal of keeping this item within the agenda of the Subcommittee for the next session.

Last but not least, Mr. Chairman, my delegation shares the concern expressed by the distinguished delegate of the Czech Republic, Vladimir Kopal, on the need of strengthening the agenda of the Legal Subcommittee. In this regard, we fully support your view, Mr. Chairman, that this issue should be considered when discussing the document on the future work and activities of COPUOS.

Thank you very much.

The CHAIRMAN *(interpretation from French)*: I thank Professor Marchisio for his statement on behalf of the Italian delegation. I thank him in particular for the clarity of his contribution, his excellent and very precise way of covering the sum total of subjects. Thank you again for your contribution.

Any further requests for the floor on this agenda item which we are going to conclude?

I see no requests for the floor.

Thus, we have concluded our consideration of agenda item 9, Report of the Legal Subcommittee on its Forty-Fifth Session.

Spin-off benefits of space technology: review of current status (agenda item 10)

Distinguished delegates, we are moving on to the consideration of agenda item 10 of the agenda which we will hopefully conclude as well, Spin-Off Benefits of Space Technology: Review of Current Status.

Under this agenda item, I have several speakers. We are going to start with the delegation of Japan, Madam Kaori Sasaki.

Ms. K. SASAKI (Japan): Thank you Mr. Chairman, distinguished delegates, on behalf of the Japanese delegation, I am honoured to present to you

some examples of Japan's spin-off efforts in the field of space technology at this session of COPUOS.

To begin, the Japan Aerospace Exploration Agency, JAXA, has established the Industrial Collaboration Department in order to strengthen the competitiveness of the Japanese space industry and the enhancement of space utilization. The Department, which is predominantly in charge of the spin-off, i.e., technology transfer of various space technologies, patents and intellectual properties accumulated by JAXA for industry use, is expected to boost the level of cooperation among the public, academic and private sectors.

During the last session of COPUOS, Japan introduced a couple of spin-off examples, such as the "Free Piston Stirling Engine", used in co-generation and dispersed power source as well s "Functionally Gradient Material", which is being used as a heating element.

Apart from that, we would like also to offer some illustrations of a couple of upcoming spin-offs. One of note is thermal insulation material which was used to the fairing of the H-IIA Launch Vehicle and is going to be applied as a spray-type heat insulation for buildings. Another notable spin-off is the technology of the blast-wave-simulation software during the lift-off of launch vehicles which is going to be applied to the design of front carriages for high-speed trains.

These are just mere examples of Japanese overall space spin-off efforts. Aiming to reap comparable spin-off benefits, JAXA has undertaken various supportive activities such as; increasing the promotion of licensing by business-academia collaboration coordinators who support the commercialization of technology based on JAXA's licensing promotion system; extending venture business support programmes; and providing JAXA's R&D facilities to private companies in order to support their commercialization plans. These activities are expected to lead to future generations of successful spin-off results.

Japan is of the belief that the spin-off of space technology will advance economies through the production of new innovative technologies, thereby contributing to the improvement of the quality of life.

Thank you for your attention.

The CHAIRMAN *(interpretation from French)*: I thank Madam Sasaki for her statement on behalf of the Japanese delegation which provided information on specific examples of spin-off benefits of space technology in her country. Thank you very much.

I will now call upon the delegation of Canada, Mr. Douglas Aldworth.

Mr. D. ALDWORTH (Canada): Thank you Mr. Chairman. Mr. Chairman, in terms of spin-off benefits of space technology, the Canadian delegation will speak this year about telecommunications by satellite, or Satcom. Canada's Satcom activities play an essential role in the maintenance of Canada's identity and sovereignty and also support the objectives of Canadian telecommunications policy.

Mr. Chairman, the benefits to be expected from Satcom activities are best understood by examining the four major uses of Satcom in Canada. The well-being of Canadians and military and security objectives are financed mainly the public sector, while entertainment and global connectivity uses have more significant private investment. The Canadian Space Agency's role is to act as a catalyst and advocate for the development of creative technologies and applications.

Mr. Chairman, Canada has been a pioneer in the provision of infrastructure for telephone, Internet, broadcasting and tele-services by satellite. The Government's goal is that every Canadian, no matter where he or she lives, should have access to modern communication services. This connectivity challenge encompasses many governmental services to citizens including tele-health, tele-education and tele-justice. Canadian organizations and federal and provincial government departments have initiated many pilot programmes aimed at providing tele-services to remote communities, For example, in 199, Canada was the first nation to establish Internet connectivity to all libraries and 16,000 schools. In September 2003, Dr. Mehran Anvari and Dr. Craig McKinley performed the world's first hospital-to-hospital tele-robotics-assisted surgery and tele-monitoring from St. Joseph's Healthcare in Hamilton to North Bay General Hospital 400 kilometres away.

Mr. Chairman, satellite communications reduce the "digital divide" between communities, reducing inequalities in accessing and promoting literacy and other skills needed in information societies both domestically and internationally. Satcom connects isolated areas and communities and provides critical communications supporting times of disaster or crisis.

In 1997, Canada announced its goal to become the most connected nation in the world. Considering that there are over 400 isolated communities in the far North, this challenge can only be met through satellite connections. Six years later, Anik F2 was providing opportunities to connect all Canadian regions and communities and providing support for public institutions and community-based applications.

Mr. Chairman, Satcom, in conjunction with other space and terrestrial assets, plays a major role in surveillance, sovereignty and security, including peace-keeping and public safety. Communications during and after a disaster are essential for management, mitigation and relief operations. Damaged infrastructure or excessive traffic often make the use of terrestrial or wireless communication systems inadequate. Additionally, heavier-than-normal communication volume is usually experienced for several years after a disaster. Satellite-based communication systems are ideally suited to address these issues. They are quickly deployable, reliable, flexible, offer local, regional and international connectivity and are often accessible with minimal hardware or ground infrastructure.

Mr. Chairman, pilot programmes such as Real-time Emergency Management via Satellite, REMSAT, have demonstrated the usefulness of space assets for public safety and disaster relief operations using available international space assets. However, as users' basic needs expand, larger volumes of information will be exchanged and larger bandwidth will be needed. Recent progress on innovative technologies has made ultra-small Ka-Band terminals potentially capable of fulfilling these needs at a relatively low cost.

Canada is a pioneer in satellite-aided search and research and has played a leadership role in creating a global system based on satellite beacons, together with Russian, France and the United States: the COPAS-SARSAT system. Since 1982, the COSPAS-SARSAT system has been used to help people in all sorts of worldwide distress situations, assisting in the rescue of 17,000 lives, more than 1,000 in Canada, in 4,500 search and rescue events.

Mr. Chairman, Pay-Per-View, HDTV and speciality channels are expected to generate significant revenue. New services include direct downloading of movies to movie theatres, replacing the current shipment of film in canisters, interactive TV, ITV, and video-on-demand.

GPS navigational services, particularly for recreational activities such as hiking and fishing may also increase the growth of the entertainment aspect of Satcom. Positioning applications that rely on satellite signals are now part of many electronic device and have become vital equipment for aircraft, ships and other vehicles. According to analysts, sales of GPS receivers, chips and devices have already exceeded US$5 billion with an expected yearly revenue growth of 12 per cent until 2010.

Mr. Chairman, Canadian industry and universities and federal government R&D organizations, provide a relative small but critical amount of capital for R&D investment in Satcom. The CSA and the Communication Research Centre, Canada staffs, do a limited amount of early R&D relating to Satcom.

Without modern satellite communications, many new services would not be possible and remote regions of Canada would become increasingly isolated while urban areas would benefit from broader ranges of services. The total revenue for Satcom in Canada in 2003, including navigation, was approximately CAN$1.6 billion which makes it by far the largest financial component of Canada's space activities.

Mr. Chairman, communications satellites are essential components of the Canadian communications system and contribute to the Canadian economy in several ways mentioned above and to Canada's visibility at the international level. Satellite communications contribute to reducing social inequity, bridging the digital divide and increasing Canadian's standard of living.

Satellite communications systems, as used in a number of applications, are an efficient and effective way for government and its agencies to deliver services to the public.

Thank you Mr. Chairman.

The CHAIRMAN *(interpretation from French)*: Thank you Mr. Aldworth for your statement which presented in a very exhaustive way all satellite telecommunications applications as used in Canada. It is true that Canada is something of a pioneer in this field for, if my memory serves me right, the first domestic telecommunications satellite was the Canadian one.

Are there any questions or perhaps requests for the floor?

It would not seem to be the case.

If there are none, we will conclude our consideration of agenda item10, Spin-Off Benefits of Space Technology: Review of Current Status.

Space and society (agenda item 11)

And we can now move on, and for the first time, consider agenda item 11, Space and Society.

On this item, I would like to remind the delegates that in paragraph 49 of its resolution 60/99, the General Assembly requested the Committee to continue to consider, at its current session, under its agenda item entitled "Space and Society", the theme "Space and Education", which was taken on as the special topic for discussion for the period 2004-2006, in accordance with the Work Plan adopted by the Committee at its forty-sixth session.

According to the Work Plan, the Committee, at its current session, will develop concrete action plans for incorporating outer space into education, enhancing education in space, expanding space tools for education and ensuring that space-based services contribute to the achievements of the Millennium Development Goals on access to education. And secondly, it will prepare a brief document on the role of space in education, as well as the link between space and education, for transmission to the General Conference of the United Nations Educational, Scientific and Cultural Organization, UNESCO.

I now peruse the list of speakers for this agenda item and the first speaker on my list is Malaysia. And I give the floor to Mr. Mustafa Din Subari.

Mr. M. DIN SUBARI (Malaysia): Thank you Mr. Chairman. Mr. Chairman, distinguished delegates, ladies and gentlemen. We are happy to announce here that in collaboration with the Russian Federation, Malaysia is planning to send out our first Angkasawan, or astronaut, to the International Space Station, ISS, next year 2007. The fact that such a programme is not an extraordinaire to some member States of this meeting, but for Malaysia, the Angkasawan programme is truly a programme of the people of Malaysia. When the application for candidacy was first open, we received more than 11,000 applicants from all mixture of races, religion and education background. Of course, at the end of the selection process, the final two Angkasawan are more than qualified professionally.

The other important aspect of our Angkasawan programme is the scientific modules to be taken to the ISS. For these modules, as well, applications are open to all levels of academic and research institutions. Suggested areas of interest include life science, physical science and medical science as well as traditional food and textiles.

Mr. Chairman, as part of our space awareness programme for the public, we have successfully organized a unique "artist-in-residence" programme at our National Planetarium recently. The object of this programme is to find means and ways to integrate space science to the walk of life of the general public. After having a 10-month tenureship with us, our first artist-in-residence will be presenting his research findings in the form of "sonic-cosmic" sound and music to the public audience in July this year.

Thank you Mr. Chairman.

The CHAIRMAN *(interpretation from French)*: I thank Mr. Subari for his statement and I congratulate him on the launch of the Angkasawan programme which will lead to the sending of a Malaysian astronaut to the ISS next year.

I will now call on the distinguished delegate of the United States, Mr. Higgins.

Mr. J. HIGGINS (United States of America): Thank you Mr. Chairman. My delegation is pleased to address the special theme of Space and Education at COPUOS. We acknowledge the important role of space education for inspiring students to pursue careers in science, technology, engineering and mathematics; to increase the number of professionals entering those fields; to strengthen national capabilities in the fields of science and industry; and to enhance educational opportunities using satellite-based tele-education and e-learning.

The United States Civil Space Programme continues to emphasize the importance of space to education, and education to space. One of our top priorities is to expand the science, technology, engineering and mathematics pipeline in the pre-college grades and to increase the science, technology, engineering and mathematics workforce in the post-secondary grades. As an example, let me highlight several NASA and NOAA education programmes. In an effort to meet its pipeline and workforce needs of the future, NASA is implementing two national education initiatives: the Educator Astronaut Programme and the Explorer Schools Programme. It is also working towards engaging the informal education

community through its NASA Explorer Institutes initiative.

Through the NASA Educator Astronaut Programme, some of the best teachers in America are being given an opportunity to become permanent members of our Astronaut Corps. With the leadership of these educator astronauts, we will be able to better utilize the International Space Station for science experiments created by students and build connections between science at work and science in the school. One feature of the Educator Astronaut Programme is the "Earth Crew", an online component accessible through the Programme's website at edspace.nasa.gov that is open internationally to encourage school classes, families and private organizations to be actively involved with NASA.

The NASA Explorer Schools Programme selects school teams from grades four to nine for a three-year partnership with NASA. This partnership aims to promote ongoing professional development for educators and administrators and to create family involvement through electronic and web-based opportunities. The NASA Explorer School Programme targets under-served populations in diverse geographic locations throughout the United States. On 5 May of this year, NASA announced 26 new NASA Explorer Schools. NASA Explorer Schools are now in all 50 States, Washington D.C., Puerto Rico and the United States Virgin Islands. In this regard, we are very pleased to note that in December 2004, NASA, the European Space Agency and The Netherlands Ministry of Education, Culture and Science entered into a written understanding to establish the Delta Research Schools Programme in The Netherlands. The Delta Research Schools Programme is patterned after the NASA Explorer Schools model and selects schools throughout The Netherlands for a three-year partnership. We understand that the first seven Delta Researcher Schools are now completing their first year in this collaborative effort.

Another primary initiative for NASA is the NASA Explorer Institutes, which is a national programme designed to engage the informal education community, provide instructional materials and resources for use at their home institutions, and to serve as professional development opportunities for informal education professionals across the nation. Ultimately, this initiative will engage the public in shaping and sharing the experience of exploration and discovery. The Institutes, located at NASA Centres and informal education venues across the United States, will represent partnerships among NASA, Space Grant institutions, associations, community-based organizations, museums, science centres and planetariums.

Similarly, NOAA is expanding its education presence on the Web. NOAA has developed partnerships with federal and private entities, such as the National Science Foundation, the Consortium for Oceanographic Research and Education, NASA, the American Meteorological Society, the National Science Teachers Association, and the National Marine Educators Association, to promote numerous products and services in remote sensing and ensuring that kindergarten through college curricular and educational products are aligned with the National and State Science Education Standards.

I would like to highlight three NOAA education programmes.

First, the Satellite and Education Conference, a joint effort between NOAA and the California State University in Los Angeles, aims to help educators understand satellite products, educate the current and future generations about the changing Earth and inspire young people to pursue scientific careers. Two hundred ad seventy-five teachers attended this Conference last year.

Secondly, NOAA Outreach Coordinators are consulting with educators and students to be creative and innovative and to develop tools that would educate the youth in a non-classroom environment. Together they are developing products to help students learn about space, satellites, orbits and what happens to satellites when they are no longer active.

And third, students are encouraged to participate in NOAA-related careers by applying for internship, scholarship and fellowship opportunities. These programmes are designed to increase undergraduate training in oceanic and atmospheric science, research, technology and education, and to foster multi-disciplinary training opportunities. They also are structured to increase public understanding and support for stewardship of the ocean and atmosphere and improve environmental literacy, to recruit and prepare students for public service careers with NOAA and other natural resource and science agencies at all levels of government, and to recruit and prepare students for careers as teachers and educators in the fields of ocean and atmospheric science.

For more information on NOAA education programmes, please visit the web at www.education.noaa.gov.

The United States continue to work with foreign partners in developing global capacity in the space and technology field, particularly in the remote sensing area. As you may recall from special presentations in years past, the GLOBE programme continues to be an excellent example of a worldwide student-teacher-scientist partnership that has continued to grow and prosper. GLOBE is a hands-on, school-based, international environmental science and education programme. Now in its eleventh year, GLOBE has rained over 32,000 teachers in more than 17,000 schools in 109 countries, to use GLOBE in their classrooms. Students have provided data from over 14 million measurements to the GLOBE database, which is accessible on the World Wide Web. In 2005, for the first time, the GLOBE Annual Conference was held outside of the United States. The Czech Republic hosted the Conference in Prague from 31 July to 5 August, celebrating the tenth anniversary of the Programme's international implementation by returning to the site of the first GLOBE International Training Workshop, which was held in Prague in April of 1995. The 2006 GLOBE Annual Conference will be held in Phuket, Thailand, from 31 July to 4 August. Without question, GLOBE continues to be an excellent example of the interplay between space and education, done on an international scale and tailored to the needs of the participating countries.

The International Space Station is playing a role in education and reaching out to international education communities. This is best demonstrated through three projects, EarthKAM, the Amateur Radio on the ISS, and the ISS Education Downlinks. To date, more than 66,000 students from over 850 schools worldwide, as well as members of the general public, have used EarthKAM to investigate every corner of the globe. Amateur Radio on the ISS has supported contacts with 22 countries and it has tremendous general public/outreach participation with over 29 million participants between October 2004 and September 2005, and approximately 85 million participants since the Programme inception. Through International Space Station live in-flight education downlinks, students and educators interact with the crew as they answer questions and perform educational demonstrations. During one ISS downlink with Hiroshima High School in Hiroshima, Japan, this part year, more than one million student and educators were able to participate in the link thanks to the collaboration of Hiroshima University, Subaru Telescope, Hawaii Observatory and the National Astronomical Observatory of Japan.

In an effort to enhance education and public outreach, the NASA Education Portal has been recently revised and it is hoped that this electronic resource and other such e-education activities will help inform the public around the world about the wide array of NASA's education programmes. Three major sections of the NASA Portal feature information specifically for educators, students and children. NASA's unique research and array of mission permit the production of educational materials that educators and parents can use to engage student interest in science, technology, engineering and maths, and the NASA Office of Education is continuing to explore ways in which it can most effectively and efficiently disseminate this information. We encourage all Committee members to visit the NASA Portal at www.NASA.gov and NASA's education Internet site at www.nasa.gov/education.

A likely challenge to using the unique environment of space to inspire students to study science and technology in all nations is the availability of resources. NASA and NOAA continue to welcome opportunities for international collaboration where resources can be leveraged and when collaboration supports their educational strategic goals and objectives.

Mr. Chairman, I have presented a number of examples of ways in which my country is working to inspire the next generation of explorers and to strengthen our nation's educational posture by using content, materials and applications unique to space activities. We look forward to sharing more ideas and experiences with the Committee and to learning more about the successes achieved by other member nations.

Thank you.

The CHAIRMAN *(interpretation from French)*: Thank you Mr. Higgins for your statement and thank you for the very exhaustive information you have provided us on the educational programmes related to NASA's activities on the one hand, and NOAA on the other, which are indeed very well structured in your country. I do thank you for this.

I will now give the floor to the Austrian delegation.

Mr. G. MAGERS(?) (Austria) *(not on speakers list)*: Thank you Mr. Chairman. Mr. Chairman, in this last year of the special theme "Space and Education", we would like to share briefly our activities in this important field. Let me begin by what we have to offer on the international level.

There is, firstly, the Summer School Alpbach, which may be well-known to some of you by now, as it can proudly look back to a 30-year tradition. On a yearly basis, since 1975, the Alpbach Summer School has provided two weeks in-depth teaching on different aspects of space science. The aim of the Summer School, which is co-organized by the Austrian Aeronautics and Space Agency of FFG, the European Space Agency and the national space agencies of all ESA member States is to offer advanced training and work experience to 60 European students. The Summer School offers both lectures on space-related topics as well as concentrated work on system studies in self-organized working groups. The participants are challenged to extend and to strengthen their knowledge and to put it into practice during workshops. The purpose of the Summer School is to foster the practical application of knowledge derived from lectures, to develop organizational and teamwork skills and to encourage creativity. Teams will compete to execute the best project, judged by an independent jury. The teams themselves are responsible for the selection of the subject of the project and for the team structure and working methods.

This year's topic is "Monitoring of Natural Hazards from Space". The Programme will address innovative satellite mission concepts for improving the understanding of geo-physical processes related to natural hazards and for improving hazard prediction and disaster management. The lectures will cover scientific and technical topics of Earth observation from space and address geo-physical aspects and observations of the following hazard types: earthquakes, volcanoes, landslides, floods and wildland fires.

In addition to this long-term activity, we have established close cooperation with a number of international actors, in order to have Austrian students benefit from a variety of educational activities offered by those institutions. In this context, I would like to mention our cooperation with ESA and EURISY on education competitions and campaigns, as well as our support for Austrian students interested in programmes of the ISU, the International Space Camp and others. Our liaison office for all these activities is the Aeronautics and Space Agency of FFG, which hosts a dedicated education page on the FFG website. In the framework of the European Union's ERA net initiative, Austria, together with the region of Bremen, Germany, has the lead in the work package "Education and Outreach".

With regard to the Austrian space education activities on the national level, I would like to mention the project BRITE Austria, which will be the first Austrian nano-satellite and it will be designed by students. It is an astronomy experiment, more precisely a star camera, flown on a nano-satellite run by the University of Graz and Vienna in cooperation with the University of Toronto and building on the expertise of Canadian satellites. This initiative will enable students to get hands-on experience in the design, manufacturing, testing and operations of a spacecraft. The long-term goal is to develop an Austrian "Nano-Satellite Bus". More details can be found on the website www.tugsat.at.

Finally, we support the Austrian Space Forum, a national network of young space enthusiasts, who organize a variety of outreach activities for schools and universities throughout the year. In April this year, they implemented the so-called "Austromars Project", an outreach project which included a simulation of a manned landing on Mars at the Mars Society's experimental research station in Utah, United States of America.

By supporting these activities, financially as well as institutionally, we strive not only for expansion and deepening of the knowledge and experience of those who already dedicate their energy and talent to space-related research, but also seek to create enthusiasm with those who have only a vague idea about space affairs, especially the younger generation. In doing so, we hope to contribute creative and intellectual potential for future explorative activities waiting to be undertaken.

Thank you Mr. Chairman.

The CHAIRMAN *(interpretation from French)*: Thank you for your contribution on behalf of the Austrian delegation. I take this opportunity to thank Austria for the consistency, the continuity of its Programme which is very well-known in Europe but even beyond Europe.

I will now call upon the delegation of Nigeria, specifically Mr. O. O. Jegede.

Mr. O. O. JEGEDE (Nigeria): Thank you Mr. Chairman for the opportunity to contribute to the agenda item "Space and Society" under the special theme "Space and Education" on behalf of the delegation of the Federal Republic of Nigeria.

Mr. Chairman, serious and concerted efforts for promoting space education in Nigeria began with the hosting of one of the two United Nations-affiliated African Regional Centres for Space Science and

Technology education at Ile-Ife in 1998. The Centre's main mandate is capacity-building through post-graduate training of educators of the Anglophone African countries and research and development activities in the area of space science and technology application for a sustainable development. The initiative is to populate the level of indigenous participation for applications of space science and technology, thereby saving huge costs of training of the personnel in developed countries and redressing the "brain-drain" syndrome. The other task is to promote space education through organizing public awareness programmes and particularly curriculum development in junior and high schools.

Mr. Chairman, permit me to mention briefly modest achievements that the Centre has been making on space science education. Since 1999, the Centre has successfully carried out post-graduate training in the areas of remote sensing/Geographic Information System, satellite communications, satellite meteorology and climate change, and basic space and atmospheric science. In the current year, the scope has been widened considerably to admit participants from 10 other member States including Zambia, Uganda, Kenya, Ethiopia, Sudan, Cameroon, Gambia, Malawi, Liberia and South Africa. All foreign participants are supported by the Nigerian Space Agency as a demonstration of regional capacity-building. We particularly thank the Office for Outer Space Affairs for providing travel scholarships. We are interested in providing opportunities to female participants. This semester, we have two female participants from Kenya and Nigeria. In March 2006, the Centre co-organized a Workshop on Geo-Information System-Based Forest Monitoring in Nigeria.

The Centre is using both the print and electronic media to popularize space education, particularly on the issues bothering on the environment. It is also partnering with the Nigerian Space Agency, Federal Ministry of Education and UNESCO on space education curriculum development project at junior levels. In further pursuance of this initiative, the Centre is providing funding for the fabrication of mock-ups of space hardware such as satellites, launch vehicles, as well as a space museum. As a pilot phase, the Centre will be organizing in July 2006, a project-based workshop on space education for elementary and junior schools in Nigeria.

Mr. Chairman, at the African Leadership Conference on Space Science and Technology, held at Abuja, Nigeria, in November 2005, imperativeness of both regional and international collaboration was canvassed to ensure that space-based services contribute to the Millennium Development Goals. With Nigeria's venture into ownership of a commercial communications satellite, outreach activities are being initiated to promote benefits like tele-education and tele-medicine to the society.

Distinguished delegates, I thank you all very much for your attention.

Thank you Mr. Chairman.

The CHAIRMAN *(interpretation from French)*: Thank you Mr. Jegede for your statement on behalf of the delegation of Nigeria and thank you for the information you have provided to the delegates on the activities of the Centre for Space Science and Technology. We observe with great pleasure the progress made by the Centre and by Nigeria in terms of promoting knowledge about space applications within your country and in the entire region.

I will now call upon the distinguished representative of Canada.

Mr. T. OUATTARA (Canada) *(interpretation from French)*: Thank you Mr. Chairman.

(Continued in English) Mr. Chairman, the Canadian delegation would like to deliver a statement on the Canadian Government's Space Awareness and Learning Programme.

Mr. Chairman, the Space Awareness and Learning Programme is mandated to increase the scientific literacy of youth, students and educators across Canada and encourage the former to pursue higher education and eventually a career in the areas of science and technology.

The Programme covers six areas of activity including pedagogical resource development, distance and tele-learning, professional development for educators, special projects, Youth Stakeholder Speakers Bureau and a Space Awareness and Learning Grants and Contributions Programme.

All resources are developed to meet the curricular requirements of educators and students at the elementary and secondary levels so that they can be integrated seamlessly into the classroom. Each resource provides students with information and opportunities to engage in hands-on and minds-on problem solving. Educators are provided with background information on the science concepts to be covered in the resource as well as the specific space

context they can use to bring relevancy to the teaching of the science contents. Most of our resources are available via the CSA website at www.space.gc.ca/asc/eng/educators/default.asp.

The CSA uses interactive web applications, like Vclass as well as IP and ISDN Videoconferencing platforms to bring Canadian Space Programme scientists, engineers and astronauts directly into the classroom to explore science and space concepts and engage in live, interactive and hands-on problem-solving opportunities with students and their teachers.

Professional development is provided to educators across Canada to help them learn or refresh their knowledge of science concepts, become familiar with the space context and learn how to use the latter to teach science effectively while encouraging students' interest in the topic. The CSA also hosts an annual three-day Space Educator Conference at the headquarters of the Canadian Space Agency. CSA space scientists, engineers and astronauts host the workshops and keynote sessions.

Our special projects provide students with the opportunity to engage in hands-on space-focused science learning, which mirrors similar research taking place within the Canadian Space Programme. Through collaborations with other government departments, post-secondary academic institutions, not-for-profit organizations and private sector organizations, the CSA is able to offer unique learning experiences like the Tomatosphere Project. This year more than 210,000 students in elementary and secondary school will prepare to become Canada's first generation of potential space farmers, horticulturalists and researchers committed to understanding the role of plants in supporting life off-planet.

(Continued in French) Mr. Chairman, space agriculture is an integral part of long-term space research missions. The Tomatosphere Project, commissioned by the Canadian Space Agency, the Ministry of Agriculture and Food, Heinz Canada, the Centres for Excellence in the Province of Ontario, University of Guelph and Stokes Seeds, has been put in place to allow schoolchildren to make inspiring discoveries. This project is based on the educational curriculum for the third and fourth grades of secondary school, age nine and 10, familiarizes students with experience in the germination of seeds, with an accent on scientific approach. In 2005, students used three types of seeds, seeds that have spent the winter on the island of Devon in the North of Canada but had been exposed to simulated space conditions and a control group.

In the spring of 2006, students had an opportunity to cultivate tomato plants coming from two groups of seeds: a control group and a group of seeds that had actually spent time on the International Space Station at a 400 kilometre orbit above the Earth. These seeds were brought to the Station onboard the Russian Progress re-entry vehicle in January 2004 and returned to Earth by the STS-114 vehicle in August 2005. This is a blind experience. The students and their teachers did not know the origin of each group before the process of germination was completed and the results were summarized.

Mr. Chairman, observance of the development of these seeds will make it possible to answer questions that have to do with the supply of food, water and oxygen during space missions of long duration and the need to process carbon dioxide produced by the breathing of the crew members. The trip to the Earth and Mars, and the return trip, will last up to three years. It is essential, therefore, to know how to grow food during the mission towards Mars and the stay on that planet and then the return trip to Earth.

Tomato plants are very good examples of this kind of process. Tomatoes provide wholesome nutrition and also humidity. Students will have a chance to compare the rates of germination for the two groups of seeds and then assess the growth of the plants. They will learn to carry out a scientific experience and this project will perhaps inspire them to continue scientific and technological research. Student of today are the astronauts and space mass researchers of tomorrow.

(Continued in English) Mr. Chairman, each year, the CSA also offers financial support for Canadian non-for-profit organizations which are engaged in the development and delivery of Canadian space-focused learning programmes, materials and events for youth. The Agency also offers subsidies annually to support students and educators at all levels wanting to participate in Canadian space-focused learning events, ranging from workshops and conferences to competitions.

Mr. Chairman, let me state that "Growing Seeds on Mars is the Future in Farming". The progress of nation resides in its youth. Outreach to and support for Canadian youth in space affairs and activities is a sound investment in Canada's future space capabilities.

Thank you Mr. Chairman.

The CHAIRMAN *(interpretation from French)*: Thank you Mr. Ouattara for your presentation on Canada's activities in the educational sector of your country. While listening to your statement, I wanted to ask you to bring me some tomatoes when you come to the next Plenary meeting so that we, too, could take part in assessing the results of that experiment. I do not know if it is already envisaged in the Programme. In any case, congratulations on that initiative.

This was the last statement, I think, under agenda item 11.

Are there any questions or further requests for the floor from delegations on this agenda item?

Yes, the distinguished representative of Colombia. You have the floor.

Mr. C. ARÉVALO YEPES (Colombia) *(interpretation from Spanish)*: Yes, thank you very much Mr. Chairman. We, too, would like to make a brief presentation on the contribution made by Colombia within the framework of the Space Conference in the educational area.

We have conducted projects at various levels, national and regional. First of all, the Pro Tempore Secretariat of the Space Conference of the Americas in pursuance of the decisions made at Cartagena, Colombia, has promoted activities in the area of education through organizing projects that highlight various applications of space technologies designed to improve the quality of life in Latin America. The Secretariat launched a project designed to promote knowledge of space objects. The project was shared with the COPUOS. It has to do with the Colombian telecommunications satellite and a project to involve educational institutions in work with the results provided by the operation of that satellite.

We also carried out an international seminar on satellite navigation. That was in September 2005 for our region. We worked with major universities and a group of experts and students monitored progress within the framework of that project.

From 18 to 23 August of 2005, we held a week of activities in Colombia attended by international experts in geodesy, cartography, photometry, digital photometry and remote sensing, management of space data and geographic information systems. This was a major event for us and we attach great importance to projects of that nature.

Colombia is a country that needs to think about the very practical benefits that this kind of work can bring to our population and not just the population of the capital but throughout the country, including the heartland.

We have, therefore, organized six workshops attended by 120 participants and 348 observers. A number of expert presentations were made within the framework of the transfer of knowledge and experience. The Colombian Institute of Geography also organized two training courses on data space management and we developed a system for processing space-based information for the production and standardization purposes. A number of publications were prepared and I would like to particularly highlight some of the considerations that may have been voiced here before and I apologize if I repeat myself but this is very important for my country.

Particularly, I wanted to touch upon activities carried out in various cities and towns throughout Colombia in terms of raising awareness of space science and technology.

In November 2005, specifically 27 November, we carried out multiple activities on that day, with a particular emphasis on the provinces, on the various parts of Colombia, they are sometimes quite remote from the capital, and we used space technology to bring them together. This action was supported by UNESCO and we are grateful for that support. We also benefited from the participation of Brazil and Madam Takemi Chiku, on behalf of JAXA.

These may sound like small-scale events but for us it is the germ, the seed that we must carefully cultivate so that it can grow into nation-wide awareness. The various departments of the Government, the Secretariat for Education and the various municipal governments throughout the country actively supported that event and took an active part in organizing these activities. And the result as to the greater awareness of the public is very palpable. Not just students but professionals as well.

We observed a very real benefit in terms of the educational materials that have been developed and published as a result for the various regional groups and this work continues.

This has been a summary of just some of the examples, Mr. Chairman, that we have undertaken in Colombia in terms of trying to tap the enormous potential that exists and exists within the international community and COPUOS in particular.

Thank you very much.

The CHAIRMAN *(interpretation from French)*: Thank you Ambassador for your intervention on behalf of Colombia and for the information you have provided on the activities in the educational sphere undertaken in your country. Indeed, these activities are very important and they help us to train and prepare a future generation of space researchers at the service of the development of your country and other countries in the region.

I believe there are no further requests for the floor.

Yes, maybe Ambassador González of Chile.

Mr. R. GONZÁLEZ ANINAT (Chile) *(interpretation from Spanish)*: Thank you very much Mr. Chairman. I would like to thank my distinguished friend, the Ambassador of Colombia. I believe that his statement was very comprehensive, very complete and also very important.

In Chile, we have now (not?) undertaken a formal review of the various activities undertaken by universities throughout the country but there have been many project in the area of space science and technology education, the use of satellites for educational purposes.

What I would like to highlight at this point is something that we need to constantly bear in mind and it has to do with education, with training, with dissemination of knowledge. Among those students who do not in the normal way of things have access to such information would have no opportunity in their daily life in becoming integrated with the rest of society, as far as science and technology is concerned. We are talking about the silent majority, if you will, the invisible component of this huge potential that we keep talking about, the younger generation.

It is true that in our part of the world, we benefit from major breakthroughs such as the Space Conference of the Americas which constitutes an enormous stride forward towards raising awareness. In 1990, in Costa Rica, then in 1992 in Santiago de Chile and then in 2002 in Cartagena, we have had these Space Conferences for the entire region, historic events. But overall, in the historical perspective, this is a very short period of time. We have put in place a number of major programmes and received the support of various countries that have included these activities in their national policies and also in the regional and sub-regional policies that they pursue. The international community has taken major commitments in supporting these events. The relevant resolution of the General Assembly of the United Nations was adopted and in regional terms, we have seen a very practical mechanism of cooperation arise since those early Space Conferences of the Americas. Obviously, a lot of effort is still required. Benefits such as, for example, education which is at the very centre of the next Space Conference in Quito from 25 to 28 June.

What is surprising in our view, is that all States which will participate in this Conference have not all referred to this. I think this would pay tribute to the efforts which have been undertaken here, all our governments, from the current political conditions in Latin America. There is the social question and the social question, the social issue is strengthened and this is why it is surprising. However, we would like to underscore yet again that in the field of education, the link between society and space, and I am referring here to Latin American society, is extremely important and we must achieve a quantum leap forward. We cannot deny the existence of the mandate which was so painstakingly negotiated in Cartagena. It involved night sessions, as a result of which, consensus was achieved. I certainly hope that no one will forget this. We have a regional mechanism to fight against poverty, to overcome all these obstacles on the path to achieving MDGs. We have to recall here at this Fifth Conference for within the framework of contributions made by Latin American States in achieving these MDGs and thus the last Report on Human Development dated 2005 and we hope that that of 2006 will refer to science and technology.

If we look closely at what happened in 2005, we will notice that we do not refer to space technology. I certainly think that this is an act of omission, quite a serious one, and we come to realize that fundamental issues for our countries are far from being resolved, the MDGs are far from being attained. I certainly get the feeling that even in 2050, when these objectives might finally be achieved, none of us will be here. From the point of view of our societies, our world will not be a lasting one, nor be it a sustainable one.

The issue of biodiversity is also one fraught with a great many problems. The issue of patents, we have to ensure that there are monitoring mechanisms, that individuals are trained to be able to identify what resources we have at our disposal. I would also like to stress the existence of an inter-dependent link which is a result of globalization but of the evolutional society as a whole as well. Society can be a good one or it can be a bad one but we should be able to benefit from

space technologies to enable us to have an overall view or perception of things, an overview, which would enable us to move forward and to improve our quality of life and our standards of living as a whole.

At a regional level, within the framework of the Space Conferences of the Americas, they are problems at the practical level. We are not able to achieve MDGs. And also there is a lack of compliance with our legal mandate which we have taken upon ourselves. I would like to remind you here what Argentina said last time, referring to the creation of an entity which could take these problems into account, these problems which we are facing in Latin America. The inequality of income is an enormous problem for one, one which we are not proud of.

The CHAIRMAN *(interpretation from French)*: I thank you Mr. González.

Do we have any other delegations wishing to take the floor?

I do no see any.

So we will continue our consideration of agenda item 11, Space and Society, this afternoon.

Technical Presentations

And we will move on to the technical presentations which we planned to hold at the end of this morning's session. There are three of these and I will remind the speakers that they have to limit their presentations to 20 minutes.

We will thus begin by giving the floor to Mr. Ralf Jaumann from Germany for his presentation on "Mars Express: Very Close to an Exciting World".

Mr. R. JAUMANN (Germany): Thank you Mr. Chairman, ladies and gentlemen. I am pleased to give you an impression why Mars is so interesting and exciting to scientists and the first most interesting impression from Mars is was it some times in the past a habitable world? And that is a precursor question to the real good question, was there life on Mars? And of course in our fantasy, we knew that there was life on Mars and H. G. Wells has written the War of the Worlds, beginning last century, and we also know that we have some impressions on Mars. On the surface, which some people think are sculptures from aliens but if you look at the image beside this, that is not the real reason. The real reason is that nature and that is erosion of mountains on Mars.

But coming to the real scientific question, what is really needed for life? We, of course, need for life biochemical reservoirs but that is not a big issue, that is spread over all the Universe. But the real issue is we need a reactive solvent and that normally is water. We on Earth do not know anything else which can take this role. And we need a flux, mixing them up all these biochemical reservoirs and all the stuff of above. And the only way to mix this up, we also need water. There is nothing else known which can do the job.

And finally, in order to give life a chance we need a lot of time and, of course, we need energy but energy is no real big issue in the solar system.

So coming to water. Water has three phases. So we knew it as ice, we knew it as steam and, of course, it can be liquid. But what is not really liquid all over the solar system, it is just in a very tight area in the solar system. Liquid, as you know, this area is the part where Venus(?) is. But a billion years ago, Mars was also in such a kind of area so there was a big probability that water was liquid on Mars, a billion years ago. And this means there is a chance on Mars that life originated and life evolved on Mars. And that was the reason to investigate Mars.

Mars Express is the first European Mission. It is an ESA mission to another planet. It was launched in June 2003. It arrived at Mars in December 2003 and since two and a half years, we are very successful in investigating Mars. One of the major instruments on Mars Express is the camera. The camera really has been dedicated to do three things: to make high-resolution images of the Mars surface, to do this in colour and finally give us a 3-D view of the surface of Mars. And this in a geological sense, is needed in order to investigate whether Mars has been a habitable environment or not and that means the search for water.

Today, Mars is some kind of a desert planet and what we see on Mars is mostly dust, very oxidized dust and some kind of sand and some kind of dunes. And if we go to the Poles of Mars, like on Earth, we see something else, we see condensates and the most important condensate, the most prominent condensate is CO_2. But beneath the CO_2 in summertime, both Poles, North Pole and South Pole, we see water ice. There is water on Mars. We have known this for a long time but just on the Poles. But there should be much more water on Mars and the theory is that this water is hidden in the ground, as we know from Earth, some kind of frozen rich ice layers beneath the surface which we call something like pammer(?) frost on Earth

because it is cold today on Mars. How can find this pammer(?) frost? We need some expression on the surface of this pammer(?) frost. And if we look at the surface areas we get a lot of expressions of sub-surface water and if you look at this image, there are two parts, there are some highlands on the right side, there are some lowlands on the left side and there is an impact crate, originally from collisions of asteroids and comets with planetary bodies like Mars. And if you look at a closer view of this impact crater, we see that the thrown out material of this impact crater has a certain structure. It looks like a mud flow and that is a hint that during the impact the pammer(?) frost had been molten and the material rocks and mud and water has been mixed up and thrown out.

If we look at the same area, you will see on the right side some kind of valleys and if you look very close to these valleys, we see at one point that there is a river coming out of these valleys. It is not going very far because lava has obscured but at least there is a lot of information that there was also water coming out from the underground going on the surface of Mars.

So there are other areas on Mars which have a lot of large depressants and what we see here is the size of the images from the left to the right about 50 kilometres and you see there are really large depressions. And to explain this, we have to assume that there has been something excavated from the underground and this probably has been water. We know this process on Earth. If we have a volcano under a glacier, then they bring heat to ice, ice is melting and we get some kind of cooking seas in this area and at a certain time the sea is overwhelming its borders and large floods are going across the surface. We know this today from Iceland and we are pretty sure that this happened on Mars, very often and on a really large scale, not like on Iceland with a few tons of kilometres but on Mars with a few thousand of kilometres of this flooding. And if you look at the surface of Mars, we see a lot of features which are flow-like features and you see there was a crafter in the middle of the image and it was an obstacle which has been eroded by water. And here we also have more than 50 kilometres from the left to the right, you see there was a real big flooding going on on Mars at a certain time. So all the geology of Mars says that there was a lot of water on Mars in the past times of Mars.

That is another example. We see some kind of real river on Mars. That is a river valley and if you look at the left side of the image, you see there is within the valley a river. All these images need high-resolution and because of all these features, the river has about 50 to 100 metres width and it is about 40 metres depth. Though if you do not have high-resolution, you will never see it. And the background for this is if you want to really know how much water was on the surface, you really need to know this high-resolution and that is the major goal of all future Mars missions.

At the end of this river, we probably had lakes. One indication for lakes is that you have what we call in geology “deltas”. The river has transported, has been sedimented in this depression area, which is an impact crater. But the real question is, you see sediments but you are not pretty sure whether there was a lake or not and geologists want to know this and the easiest way is to get three-dimensional information and you see that a double impact crater, you see at the lower parts you see parts of the delta and if you really look at the elevation of this delta, you find that at the elevation of the delta, the whole system is closed. So that means the delta is the upper point of sea or water level and that may be the real situation that there was a standing body of water on Mars and that is what we really need in order to investigate life, standing bodies of water.

And there a standing body of water. We should see deposits which, coming out from standing bodies of water, and that is another area, we see specific deposits. And if we have a close look to this, and that again says we need high-resolution of the Martian surface, we see that this deposit which is in the middle of some kind of depression, we see that it is layered material. And if we take spectral information from this layered material, we clearly see its salts. So that is not volcanic, that is deposited in a standing body of water and the material itself is gypsum, what we know on Earth is deposited in water.

The next part for looking for life is to looking for glacial features because ice has a lower density than water so it means that ice is floating on water. That had the advantage that bodies of water are freezing from top to bottom and that means, even under really cold conditions, we can have liquid water at the basis of glaciers. Do we see glacier features on Mars? We see a lot of glacier features on Mars and that is one of the big issues for Mars Express. It is a real discovery. A lot of them are relatively young.

And what we see here is, that is a mountain. The mountain is about 3,000 metres high and we see there has been a glacier coming from the mountain going to the first of these circular features, which is an impact crater, overflowing the rim of this first crater and going to the second one. We do not really see the ice any more but we see the rocks which have been

transported by the ice and showing the flow features of the ice. The ice, in the meantime, has been _____(?), has been done away.

But we also see water ice in craters, at least in northern latitudes. That is some kind of, probably a remnant of a lake or some kind of condensates in an impact crater and it is a real big issue because today we have at some places supports really stable conditions for ice on the surface and probably also for water on the surface.

Then the real big question which is not answered yet is, how long was water acting on the surface of Mars? The first time we had the probability to investigate this kind of valley here and what you see here is the valley floor is about 3.3 billion years old and the rest of the surrounding materials where the valley is cut in, is about 3.7 billion years old. So that means 350 billion years are between the age of the valley floor and the surroundings and that is pretty much time for evolving or for originating life in a water liquid environment. But if we go and calculate the erosion and the water transport from the river which we see in the valley, we only need a million years in order to dig the valley. So that only can means there was not water on Mars for a long time but it was only for a very short episodical time so that means Mars probably was wet but only for short episodes.

So we can conclude on this that, in a geological sense, Mars is a habitable environment because we have water, we have all the ingredients we need to start life but the time question is really an open question. We are not sure how long liquid water was on the surface of Mars and was this sufficient to enable biological processes or, with other words, we really have to investigate in the future the history of water on Mars and the question, how long was Mars wet, in order to solve the question for life outside of Earth.

Thank you for your attention.

The CHAIRMAN *(interpretation from French)*: Thank you for your presentation. It was an interesting one on the issues on Mars and progress we have achieved following the Mars Express mission. It is extremely fascinating and this planetary exploration is that the more we progress in our knowledge of the planet, the more we come to realize that our models were simplistic ones, that they are put into question, thrown into question again by the new information which we gather as a result of missions such as Mars Express. And this, of course, the great value of the scientific exploration programmes. Thank you again and thank you for having shared this presentation with all the members of the Committee.

I will now hand over for the second technical presentation which is somewhat different in nature, as you will all see. I will hand over to Mr. Kai-Uwe Schrogl who will intervene as a representative of the International Academy of Astronautics and will present the Study on Space Traffic Management. You have the floor Sir.

Mr. K.-U. SCHROGL (International Academy of Astronautics): Thank you Mr. Chairman, distinguished delegates. It is my pleasure to present to you on behalf of the International Academy of Astronautics the results of the recent Cosmic Study on the topic of Space Traffic Management.

The International Academy of Astronautics had been founded in 1916 (1960?). Its purposes are to foster the development of astronautics for peaceful purposes, to recognize individuals who have distinguished themselves in the branch of science or technology related to astronautics, to provide a programme for which the membership can contribute to international endeavours and cooperation in the advancement of aerospace science in cooperation with national science or engineering academies.

I should point out that there are some distinguished members of the Academy here in this room. Foremost to mention, of course, our Chairman but also Professor Kopal from the Czech Republic or Professor Almàr from Hungary.

Now the present study on Space Traffic Management is a academic study. I should point out this explicitly since it is not a policy paper and the views which are expressed are expressed in a personal capacity by the authors and coordinators. We have distributed this document in the pigeon holes so that every delegation should have one copy in hand.

I should also mention that all the studies of the International Academy of Astronautics are inter-disciplinary which makes them particularly interesting to all the areas which are relevant for astronautics.

This study has been coordinated by Petr Lála from the Czech Republic, present here also in the room, and myself. The Rapporteur for this venture has been Corinne Contant from France.

I will briefly introduce to you the main thrusts of this study and assess it. You will have the

opportunity to have looked into this one hundred page document on your own.

I should mention that this study has been undergone in a five-year time frame with the contribution of more than 20 persons from eight countries and I should also point out that the number of these people are present here in the room, including one representative each from the Secretariat, as well as the United States delegation.

Some of you might also remember that in 2002, we had a IISL/ECSL Symposium on this topic in the Legal Subcommittee meeting where a number of contributors and coordinators of our group have been part of the panel.

Space traffic, distinguished delegates, already takes place and I have put here simply a number of ideas and activities which are currently new and interesting and relevant. We have a growing number of non-governmental entities. We have satellite constellations, space debris is increasing. We are still at the advent of re-usable launch vehicles but there is a growing number of launch vehicles and launch centres.

For that purpose, we have drafted a definition on what space traffic and space traffic management actually means and we say it is the set of technical and regulatory provisions for promoting safe access into outer space, operations in outer space and the return from outer space to Earth, free from physical or radio-frequency interference.

This is the working definitions from which on we conducted our study. And the study has three parts. We look into the current status. Then we think about the elements for a space traffic management regime and then we provide a set of recommendations. And in this context, we, of course, identified two dimensions of space traffic. First of all, the scientific-technical area and then the regulatory field and you will easily distinguished these areas when we deal with them in the study. But, of course, and this is the specific thing of the study, we bring together these two dimensions into one coherent set of recommendations.

We then distinguished three phases of space traffic, as I already had pointed out in the definition. The first is the launch phase. The second one is the in-orbit operation phase and the third one is the re-entry phase which will help us to structure the subject and to then have a better look onto the various parts of how to look into and how to regulate these areas.

I will not go through all the points here. I will just pick out in the following charts a number of issues.

The following two charts are on the current status and the prospects for the next 15-year timeframe. And I only want to mention here that still there is a large majority of active spacecraft or satellites that have no manoeuvring capability but there are some, and there is a growing number, of manoeuvrable spacecraft. This will be very relevant for the regulation of traffic in outer space.

I should also mention that, following the successful flight of Spaceship One, there might be, in the case, of course, only if safety is guaranteed, a growing number of sub-orbital manned flights which also have to be taken into account. And when we look into the far distant future, this is the last bullet, there will certainly be technologies which are not yet into use now but which might be operational in the future, in the next 15 or 20 years, like tethers, stratospheric platforms or even space elevators, a very visionary concept, which might then be introduced and will have to be taken into account when it comes to a comprehensive space traffic management regime.

I also pointed already out that space debris is a problem of continuous concern. Therefore, the number of catalogued objects is also steadily rising and when we look into the question of monitoring space debris or what is going on in outer space, we have to say that there is no sufficient and accurate enough monitoring capability and capacity in order to provide for orbital avoidance services for all space assets nowadays.

I should also point out that, and this is something which is very relevant but not very often considered, and this is the last bullet, that constant information on space weather is very important for the conduct of space activities and satellite operations and such a constant monitoring capability might and will be very important in the future as well.

Now, the current legal and regulatory framework is characterized, of course, by the outer space treaties developed inside the framework of the United Nations. There are some rules which might provide the basis for a space traffic management regime but space law still lacks, or does lack, numerous provisions which would be essential for such a comprehensive traffic management regime. In this context, for example, the IADC Space Debris Mitigation Guidelines could be seen as one single element for a space traffic management regime.

The second chart on this topic, current legal and regulatory framework, I will only pick out the second bullet here. We do have a pre-launch notification system which has, however, been developed outside the framework of the United Nations COPUOS. This is the Hague Code of Conduct and this only shows, and should show to delegations here in the United Nations COPUOS that the United Nations COPUOS is not the only forum which is dealing with the development of space law or, when it comes to space traffic management, the regulation of space activities.

Now briefly turning to the three phases of space traffic, I have indicated these are the launch phase, the in-orbit operation phase and then the re-entry phase.

A quick look on the launch phase tells us that there are a number of legal questions we still have to deal with but also questions of safety, in particular safety certifications which should be introduce on a broader scale.

The in-orbit operation phase then is what you would initially think of when you hear of traffic and traffic management and there we have to see that manoeuvring and in-orbit collision avoidance is growing in importance. There is manoeuvring going on in the geostationary satellite orbit. There are also, in the GEO, something we call the one-way traffic going on. But there is, on the other hand, for example, no systematic zoning of outer space in other areas and in other orbital spheres. We should also point out, and this might be of interest to the Committee as well, that there is already coordination amongst private and commercial actors in the field.

The last area, the re-entry phase, and here I should only mention two or three points also. We do have more and more intentional or unintentional de-orbiting of a space object. And in the not too distant future, when there are more and more or when there will be a growing number possibly of re-usable spacecraft, we have to consider the question of the passage of space objects through airspace. And in this context, we might consider to discuss the ideas of recognized descent corridors.

Now, as I said, this is an academic study and the academic study does not look too detailed into the political or policy situation in the discussions which are going on in the intergovernmental sphere but tries to set up from basics the ideas of how to regulate in a comprehensive and most efficient way the activities which are going in outer space.

And so we identified a number of areas where we think that some action should be taken. And this is, first and foremost, securing the information needs, including that we have to define which data are necessary, what provisions there should be for the data, what kind of databases there should be, how they should be established and how the data should be distributed. Also, as I mentioned before as well, establishing an information service on space weather.

The second point is a notification system. As I said, we do not have in the framework of the United Nations treaties a notification but we do have a registration system and it will be useful for space traffic management to have such a pre-launch notification system and we could build on the accord(?) of conduct in this respect.

Now, space traffic management in outer space and in the two phases leading to outer space and returning from outer space has, of course, to deal with a number of legal issues as well, but also, and this is pointed out here in the eight or nine bullets you can see here, that such traffic rules could encompass things like zoning, right of way rules, prioritization with regard to manoeuvre, special provisions for specific orbits, specific rules also for constellations, including also debris mitigation missions as well as safety provisions for re-entries and finally also environment provisions which could also and would also include questions of pollution of the atmosphere or the troposphere, etc.

Also to be dealt with are questions related to legal definitions like space object, where there still is lacunae and also enforcement mechanisms and dispute settlements.

The last bullet I would like to specifically point out since in particular ICAO, the International Civil Aviation Organization, is dealing or starts dealing with space traffic management. Not that this should be of concern to this Committee but this Committee should have a close eye on the topics like space traffic management, if it is dealt with another organization which has a mandate, so far restricted to aviation, but which obviously intends to enlarge its scope.

Now the last point to mention, how could an organization look like, and I am speaking of an organization in a 20-years timeframe. We have put in here a number of words like outer space convention or the handling of agreements. It should only say that in 20 years' time, if there is a growing space traffic, if there rises the need for comprehensive regulation, then we also have to think about how to organize that and

possibly even space activities will develop into the same legal status as air traffic, but this is very much in the future.

Now, Mr. Chairman, this brief introduction to our study, as I said, one hundred page study, produced by members of the International Academy of Astronautics in their personal capacities, should be possibly of some inspiration for COPUOS, in particular in identifying questions and problems and which might then be possibly taken up in the course of the work of the Committee in the future and the International Academy of Astronautics will certainly be ready to support you in all the considerations you will be going on in the future.

Thank you very much Mr. Chairman.

The CHAIRMAN *(interpretation from French)*: Thank you Mr. Schrogl for your presentation, for its report rather, which was extremely interesting. Some delegations have received copies of the report and you have given us a summary, as you pointed out.

Before we go on to the next presentation, any questions on this presentation that we have just heard?

Yes, the delegation of Hungary please.

Mr. E. BOTH (Hungary): Thank you very much Mr. Chairman. First of all, I would like to congratulate for not only this technical presentation but the work which was introduced in this presence so this really excellent study showing some problems of the near and maybe not so near future. I would like to highly recommend to consider the last conclusions of the speaker that some of these items should be considered in detail in the future work of this Committee, maybe not in this year but next year or somewhat later, but this study sees the future until 2020 so 15 years' from now. So we have enough time to discuss the most interesting and the most crucial things, either in this Committee or maybe in the Legal Subcommittee or the Scientific and Technical Subcommittee.

Thank you.

The CHAIRMAN *(interpretation from French)*: Thank you for your comment. Indeed, I think we will be referring to this study again when we tackle agenda item 14. Among other subjects, we will discuss the future activities of the Committee under that agenda item.

Any further comments on this matter? Questions? Yes, the delegation of Canada.

Mr. D. ALDWORTH (Canada): Thank you Mr. Chairman. I would like to, on the part of the Canadian delegation, signify our support for the comments made by the distinguished representative from Hungary. This is a, in our view, a far-ranging and examination of the future of space and it is a study that, I think, points to perhaps some directions that COPUOS might want to take under consideration in our upcoming discussion on the future roles and activities of COPUOS.

Thank you very much Mr. Chairman.

The CHAIRMAN *(interpretation from French)*: Thank you for your comment. Again, I think we will probably be referring to this study later under agenda item 14.

I do not see any further comments on this specific presentation.

Thus, we are moving on the third presentation for this morning, and the last one, by Mr. Dadhwal. He is going to speak on the work of the Space Science and Technology Education Centre for Asia and the Pacific.

Mr. V. K. DADHWAL (Centre for Space Science and Technology Education in Asia and the Pacific): Thank you Mr. Chairman, distinguished delegates, ladies and gentlemen. It is my privilege to present to you a brief report on the status of the Centre for Space Science and Technology Education in Asia Pacific. I would like to begin by acknowledging the support of the United Nations Office for Outer Space Affairs in the working of the Centre as well as in organizing this presentation in today's session.

The Centre was established when 10 countries signed the Agreement on 1 November 1995 in New Delhi. The Cooperation Agreement with the United Nations was signed on 7 March 1996 and the Host Country Agreement was signed on 10 March 1998. I have listed on the right panel the countries which have signed the Agreement. To the initial 10, five more countries have joined in that period and last year, 2005, Thailand also joined the Centre.

The organizational structure of the Centre is shown before you. The CSSTEAP, as the Centre is also called, has a Governing Body which has a technical arm called Advisory Committee. The Advisory Committee is chaired by the United Nations Office for Outer Space Affairs.

The activities of the Centre are done at three host institutes: the Indian Institute of Remote Sensing, which is another remote sensing agency at Dehradun, which conducts a course on remote sensing and GIS; the Space Applications Centre in Ahmedabad, which conducts two programmes on satellite communication and satellite meteorological; and Physical Research Laboratory also at Ahmedabad, which specializes in space and atmospheric science.

Each of these training programmes also has a Board of Studies, eminent members who advise on the subject matters to be taught and also the depth and coverage.

On the left hand side, we have put two panels indicating the coordination with the host country, basically the _____(?) Department of Space and there is a Coordination Committee which looks after all the coordination within the CSSTEAP and the host country.

The Governing Body meets yearly so we met on 19 May 2006 at Bangalore. And in this meeting, we addressed basically the Strategy Document which was requested by the Governing Board Meeting of 14 May 2005 which had two specific action items on the Centre that, one, a 10-Year Commemoration Function be organized to mark the completion of 10 years of the functioning of the Centre. Second, for the second decade of the Centre, a Strategy Document be prepared.

The Board when it met on 19 May 2006, it reviewed this Strategy Document, gave guidelines for its refinement and also has suggested new training areas which would be addressed by CSSTEAP.

The Advisory Committee is the technical arm of the Governing Board. It is an independent body of experts which guides the technical programme of CSSTEAP, it evaluates the courses and advises CSSTEAP in setting technical facilities and all issues of coordination with other institutions. The Committee met on 17 May 2006 in Bangalore, Dr. Victor Kotelnikov was in Chair. The areas which were covered were educational programmes for disaster management, tele-medicine, GIS applications including epidemiology, and strengthening of the linkages with various institutes.

The follow-up action of the previous Advisory Committee meeting, which was held on 12 May 2005 in Dehradun, where Dr. Alice Lee was in the Chair and where the areas of the data availability, linkages, how to create application-oriented courses and strengthen the Master of Mtech courses and the research areas they were addressed. Again, the new specialization in RS & GIS covering disasters was addressed.

As I already pointed out, there are four areas of training and education in the Centre. These areas are remote sensing and GIS, satellite meteorology and global climate, satellite communications and Global Positioning Systems, space and atmospheric sciences.

The headquarters of CSSTEAP is in the campus of the Indian Institute of Remote Sensing at Dehradun. The building is shown here. On the lower panel we have the three places where the students are trained. On the left is the Indian Institute of Remote Sensing, which was set up in 1966 and as of now trained about 6,000 students.

This is the new facility which was built as a campus of the Space Applications Centre from where the course on satellite meteorology and satellite communications is being done and from this year, I understand, the Physical Research Laboratory will also shift its students to this course.

This is the Physical Research Laboratory, which was established in 1944 by Dr. Vikram _____(?) and is one of the very leading institutes on space science and physical research in India.

The educational programme is a PG Diploma of nine months. In each of the disciplines at the host institute, the top panel, and after successful completion of this programme, the students are awarded a PG Diploma by the Centre.

What you see on the left panel is the students are under obligation to go back and do a one-year follow-up project in the home country. From the very beginning to the end, to encourage the students to carry out this research project, we had to tie-up with the Andhra University which if a thesis is submitted and is bound by experts to qualify for the level of a Masters in Technology, a Degree would be awarded by Andhra University.

As of now, about 25 per cent of the students are able to do this successfully and obtain a Masters in Technology. In order to encourage most students to take up this Mtech and also help those students who are meritorious but do not have the facilities to do this, from 2004 the Centre has started awarding fellowships, three to four per year, for one year's work to be done in India by the selected students.

As far as the curriculum is concerned, a common curriculum is followed in the courses which is to be followed by all Regional Centres and this was finalized in the September 2001 meeting at Frascatti, Italy. Since now five years have passed, the time has come to take a real look at the curricula and see whether further revisions are necessary.

As far as our Centre is concerned, within the guidelines given by this curricula, the Board of Studies looks into the nitty-gritty of the courses and advises their area of consolidation and more depth is required.

The Institute has excellent linkages both within India as well as internationally. The DOS/ISRO Host Institutes and other institutes in the country, they provide faculty and guest lectures. Andhra University recognizes the Post-Graduate Diploma as a study equalled to their Master of Technology coursework. The Government of India organizations which sometimes support the international student travel, especially under those plans by the Ministry of Environment and as well as the Department of Space.

We have also a very significant academic linkage with a large number of universities and institutes where the Guest Faculty visits the Host Centres. In addition, the students visit these famous technical institutes in the country to get a glimpse of what are the areas of research in this area.

Internationally, the United Nations Office for Outer Space Affairs, UNESCO, UNDP and WMO have been providing fellowships and travel support to some of the students, or sponsor short courses.

We have linkages with the International Centres, ICIMOD in Kathmandu, Third World Academy of Sciences and GDTA, when it was functioning. There the student sponsorship and student exchange. Some of the students of CSSTEAP could visit these areas and carry out short-term research.

In addition, distinguished faculty from many universities and institutes from United States, United Kingdom, Europe, have either visited the Centre as a Guest Faculty or functioned as the Indian Advisory Committee of the Centre.

This is a snapshot of the Post-Graduate Diploma Programme carried out in the past 10 years. The columns indicate the course. As you can see, every year we conduct a course on remote sensing and GIS which starts on 1 October. Alternate years, the Ahmedabad Space Applications Centre, either a satellite communication or satellite meteorology programme is run. And the year the satellite meteorology programme is run, the Physical Research Laboratory also conducts the space science course. And we have on the right panel tried to indicate the number of 30 countries from where the students have come as of now.

Just to give more details on the various programmes. In satellite meteorology, four programmes have been completed with 72 trainees from 18 countries. Two short-term training programmes were done. One is a two-week workshop on emerging trends in satellite meteorology and one workshop on the emerging trends in satellite meteorological applications with special emphasis on microwave remote sensing. The areas of the pilot project of the students which is also sometimes the one-year research for the Mtech, these include: aerosol studies, land applications, snow and DVI; rainfall studies, evaluation and use of merged products; cloud motion vectors, global insulation using METEOSAT; mesoscale model studies, prognostic as well as diagnostic studies; tropical cyclone studies, Genesis and the tracking of the cyclone; MODIS data validation, specially the thermal products; and satellite climatology.

In space science, four programmes have been done where 39 participants from 10 countries have benefited. The pilot projects are in aeronomy, astronomy, high energy physics, atmospheric science and instrumentation. The number of pieces is indicated on the right.

During last year, three programmes were successfully completed. The ninth RS & GIS course. The short course on remote sensing and GIS in sustainable agriculture. And the fifth course of satellite communication.

The Phase II which is basically following the PG Diploma, the further research, four students stayed at IARS of the eight RS & GIS programme and successfully completed all the work related to Mtech.

In the ninth course, two students joined for the Master of Technology to work for 12 months.

Last year 18 students were awarded Mtech by the Andhra University, 11 in the remote sensing and GIS, one in satellite communications, two in satellite meteorology and four in space science.

In addition, the 10-Year Commemoration Function was also organized.

The short-term training in RS & GIS, up to now seven theme specific short-term courses and one workshop has been organized. The areas are indicated here: digital image processing for environmental management in 1999; remote sensing and GIS for natural resources and management in 2000-2001; geo-informatics for disaster management in 2002 and 2004; geo-informatics in biodiversity assessment 2003; geo-informatics for sustainable agriculture in 2005. In addition WMO conducted a sponsored workshop on remote sensing and GIS in agricultural meteorology. This was a two-week workshop.

As of last year, the short-term theme-specific course on geo-informatics for sustainable agriculture was organized. This is a four-week course. We had 17 trainees from nine Asia-Pacific countries participated. The countries and trainees are listed. In fact, for the first time, six trainees came from Afghanistan. The course structure included two weeks of basic remote sensing and GIS and two weeks of application of remote sensing and geo-informatics in agriculture.

As of now, 669 students have benefited from the programmes of CSSTEAP: 391 in the PG Diploma and 278 in the short courses and 17 Masters of Technology have been awarded by Andhra University.

Pursuant to the guidelines given by the Board when it met in 2005, on 8 November 2005 at the National Agriculture Science Complex, a 10-Year Commemoration Function was held. The participants included Shri Prithviraj Chavan, Minister of State and Prime Ministers Office, Dr. Sergio Camacho, Director, United Nations Office for Outer Space Affairs, representatives from the Governing Board countries, past Directors and Deputy Directors of CSSTEAP, and one student from each of the themes was specially invited to attend the function what he achieved after passing out from the Centre, and a large number of other associated institutes and guests, in fact, 250 people participated and a compendium which listed the 10 years of work of student research was also brought out.

These are some of the images from the function including the members on the dais. The students, current students and the past students and the Commemoration Function souvenir.

As of now, ongoing and planned activities are the tenth remote sensing & GIS course which will end on 30 June 2006 at Dehradun. And this year, in fact, from the past August, the fifth satellite meteorology course will start at SAC, the fifth PG Diploma on space science will start at Dehradun (Ahmedabad?), a short course on remote sensing and GIS in urban studies will be organized from 14 August to 15 September at Dehradun and the eleventh RS & GIS PG Diploma course, it will start on 1 October at Dehradun.

As far as the ongoing course are concerned which commenced on 1 October 2005 and will be ending on 30 June 2006, we had 62 applications from 13 countries and 19 candidates from 13 countries were admitted. The countries are listed here. And also the students when they visited the Mount _____(?) Solar Observatory.

The research pilot projects which the students are currently doing are in the area of: agriculture, soil spectral variability and cropping system; in geoscience, hydrology, terrain analysis and geo-hazard modelling; in forestry on plantations, mangroves, forest dynamics and conservation planning; coastal and marine science, including coastal zone management and water quality; urban site suitability; flood and hydrological modelling; and advances in remote sensing and GIS on spatial modelling, DEM generation, WebGIS, hyperspectral data analysis and SAR interferometry.

While we have done this 10-year programme, we were requested to have a continuous appraisal so a questionnaire was circulated up to all the students who passed out up to 2002 and 53 responses were obtained which suggested that training and course material was very useful and additional topics had been suggested. All the respondents, about half they could carry out further research using training as a base. Trainees have also requested they would like additional support especially for data and software in order to make effective use of the training. In fact, more practical training, longer pilot project duration and refresher programmes have been suggested by the majority of the respondents.

Thank you. More details can be seen at the website of the Centre.

The CHAIRMAN *(interpretation from French)*: Thank you for your very comprehensive presentation, Mr. Dadhwal, on the accomplishments of the Centre for Space Science and Technology Education in Asia Pacific.

We will continue listening to the presentation of other such Centres in the afternoon.

In view of the late time, I am going to shortly adjourn this meeting of the Committee. Before doing

so, I would like to inform you briefly of our schedule of work for the afternoon.

We will reconvene promptly at 3.00 p.m. At that time, we will continue our consideration of agenda item 8, Report of the Scientific and Technical Subcommittee on its Forty-Third Session. We will also continue our consideration of agenda item 11, Space and Society, and we will begin consideration of agenda item 12, Space and Water. Time permitting, we will also begin the consideration of agenda item 14, Other Matters.

At the end of the afternoon meeting, there will be four technical presentations, one by the representative of Japan, and the others by representatives of the three United Nations-affiliated Regional Centres for Space Science and Technology Education: the Centres in Nigeria, Morocco and Brazil/Mexico.

Finally, I would like to inform the delegates that the Working Group on the Use of Nuclear Power Sources in Outer Space of the Scientific and Technical Subcommittee will continue its intersessional meeting in the afternoon in Room C-0713. All interested delegations are welcome to attend.

Any questions or comments on this proposed schedule for the afternoon?

I see none.

This meeting is adjourned until 3.00 p.m.

The meeting adjourned at 1.00 p.m.