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COMMITTEE ON THE PEACEFUL USES OF
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Agenda item 5

Implementation of the
recommendations of UNISPACE III

Promoting greater participation of young people in space science and technology

At the forty-third session of the Scientific and Technical Subcommittee, the Working of the Whole agreed that member States of the Committee, entities of the United Nations system and other organizations having permanent observer status with the Committee should continue to report to the Working Group of the Whole on their efforts to promote education and opportunities for greater participation of youth in space science and technology. The annex to this document contains the reports received by the Secretariat.

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Annex

Promoting greater participation of young people in space science and technology

Ecuador

[Original text: Spanish]

Despite the fact that Earth observation from space began more than thirty years ago, the use of remote sensor products to study natural resources and the environment is still at an early stage in some countries. Accordingly, the United Nations has identified the need to promote awareness of space science and technology in more regions and countries. In the case of the American continent, the Regional Centre for Space Science and Technology Education and Latin America and the Caribbean (CRECTEAC) was established and, under a memorandum of understanding, this has enlisted the CLIRSEN Remote Sensing Training Centre as a regional sub-centre for training. Aware of the responsibility assigned to it, the Centre has started drawing up plans to ensure that its structure and operation meet the objectives set.

According to the approach put forward by the Office for Outer Space Affairs, the Centre will provide the support required by the sub-centres, which are located closer to areas with less technological development and can therefore carry out technology transfer more efficiently and at lower cost. This support should mainly take the form of allocating study grants to participants in short- and medium-term courses and providing instructors specialized in the practical applications of space sciences essential for successful results. Training of instructors at the regional level should also be encouraged. A project submitted to the Ministry of Education is to be launched, through the CLIRSEN Remote Sensing Training Centre, to include the use of remote sensor products in the study of natural resources and the environment in secondary school curricula. This project will require the support of the United Nations and its specialized organizations. With the necessary support CLIRSEN intends to take action as early as the primary-school level to ensure that new generations appreciate the importance of using natural resources properly and with due regard for the environment.

Finally, CLIRSEN has signed and will be signing agreements with research centres and universities for its remote sensing experts to assist in providing students with vocational training, including practice and experience in developing projects.

Germany

[Original text: English]

- DLR School LABS: Where research, school and practical experience meet

Sharing the enthusiasm and engineering science with students and helping teachers to design diversified and practical courses are the main goals of the DLR School Labs.

The concept is built around stimulating technical and scientific experiments for secondary school students, primarily on aviation, space and transportation topics, regularly updated to reflect the latest research results. Experiments have been developed by DLR scientists and engineers, and the educators on the School Lab staff can adopt the complexity and extent of the experiments to the level of competence and interest of the students.

DLR also invites teachers to take advanced training, provides them with information material and supports them in integrating the experiences gained in the DLR School Lab into the regular school courses. In modern, well-equipped labs with high-tech instruments, a team of experienced scientists and dedicated university students in natural and engineering sciences are ready to help teachers and school students with their research experiments.

The first School Lab was created in DLR's research centre Göttingen in the year 2000. This initiative rapidly expanded to other field centres. Today DLR counts 6 School Labs. Since 2000, some 27 000 students took part in one day and some 15 000 in half day courses in the labs. Nearly 1800 teachers participated in advanced training. The interest in School Labs continue to grow, meanwhile also resulting in written partnership agreements between DLR and individual schools.

Japan

[Original text: English]

Japan has led the Action Team on Capacity Building, which was established by the COPUOS to implement one of the action items adopted by UNISPACE III Conference in 1999 in its Vienna Declaration. Capacity-building is an essential element of the development of the society. Japan continues to work toward the objectives articulated in the process to review the recommendations of UNISPACE III, known as UNISPACE III+5 Review, in order to enhance capacity building in space-related activities. The Plan of Action endorsed by the General Assembly in its resolution 59/2, as contained in the report of the Committee in document A/59/174, provides that further action should be taken to achieve a systematic exchange of experiences and information and coordination of capacity building efforts.

The recommendations of the Action Team on Capacity Building provide the basis for such action. Japan has contributed to the implementation of some of those recommendations, such as i) to promote the sharing of educational materials and information; ii) to coordinate international activities on capacity-building; and iii) to enhance opportunities for the ongoing exchange of ideas on capacity building. Efforts have been made particularly through the Asia-Pacific Regional Space Agency Forum (APRSAF). Space Education and Awareness Working Group of APRSAF has been serving as the forum for space-related entities in Asia and the Pacific to exchange information, experiences and opinions regarding education, training and capacity building in space activities. It also supports activities to increase public awareness of the importance of space science and technology and their applications for the benefit of the society. As recommended by the Working Group, APRSAF held the first regional water rocket competition in conjunction with its twelfth session, held in Kitakyushu, Japan, in October 2005. The Working Group will continue this event on the 13th session of APRSAF which will be held in Indonesia next December. The water rocket event not only served to create opportunities for secondary school children in the region to learn basics of rocket science and to become more interested in space science and engineering. It also allowed them to experience the joy of working together beyond the differences of languages and cultures.

APRSAF endorsed the recommendations of the Working Group to organize a regional poster contest mainly for primary school children and to convene a space education forum, to increase public awareness of the importance of space activities for the society. Under the theme of "Importance of Space", participating countries of ARPSAF are currently selecting works done by school children to be submitted to the regional contest. Together with UNESCO, APRSAF successfully organized a Space Education Forum in Hanoi, Vietnam, in March 2006. Attended by decision makers in charge of education and a large number of school teachers and students, the

Forum helped increase their interest in space science and technology as well as highlighted the links between space activities and our daily lives.

One of such entities is Japan Aerospace Exploration Agency (JAXA). Through its Space Education Center, established in May 2005, JAXA has carried out various hands-on activities for primary and secondary schoolchildren to learn about space activities and their relevance to our history and future as well as our society. The Space Education Center continues to provide customized support to school teachers in response to an increasing number of requests from various schools around the country. Materials and programmes developed for those hands-on activities and for support to teachers are being compiled and made available widely through the web site of the Center for use by any interested educators.

In order to better respond to rapidly increasing demands and needs of school students and teachers as well as leaders of voluntary groups of young people interested in space activities, the Space Education Center is currently putting in place a new structure which may be called “Space School”. Through “Space School”, the Center is planning to provide correspondence courses at various levels in the fields of space science and technology while strengthening the linkage between its on-site activities and its support to teachers in their classroom teaching as well as enhancing training opportunities for teachers and leaders of voluntary groups to carry out space education activities. As it carries out various activities, JAXA Space Education Center continues to place importance on the link between space and life, and the importance of the society.

At the regional level, JAXA, through its Space Education Office, supports the activities of APRSAF Space Education and Awareness Working Group by serving as its secretariat. Through its cooperation with UNESCO in organizing APRSAF activities in space education, JAXA ensures that the regional efforts made through APRSAF are in line with global strategies pursued by such international organizations as UNESCO. This is particularly important as UNESCO leads the global efforts to promote the Decade of Education for Sustainable Development from 2005 to 2014. JAXA also joined Canadian Space Agency, ESA and NASA in establishing the International Space Education Board (ISEB). Various initiatives currently being discussed within ISEB would strengthen cooperation among those four space agencies in promoting space education. It is hoped that ISEB, whose membership is open to any public organisation carrying out space activities and pursuing an education programme, would provide an effective, global framework to coordinate and further strengthen efforts to enhance space education. While the primary focus of JAXA Space Education Center is currently on providing education opportunities for primary and secondary school children and supporting school teachers, some universities in Japan are making noteworthy efforts to provide hands-on training opportunities for university and graduate students in space science and engineering.

In the area of remote sensing and GIS, JAXA continues to provide advanced engineering education opportunities in Asia and the Pacific through Asian Institute of Technology, AIT. JAXA continues to send its staff to support this course on remote sensing and GIS, which has benefited by hundreds of promising engineers in the region.

Many universities and technical colleges in Japan are engaged in hands-on space engineering activities such as developing satellites and rockets by the students. Four CubeSats by Tokyo University and Tokyo Institute of Technology as well as a small satellite by Chiba Institute of Technology to investigate the ecology of whales, five satellites in total developed by students, have been launched into outer space. Numerous universities pursue research and development of satellites. Students find great joy in having their own products fly into outer space. This type of activity should serve as a model of hands-on training that could be far more effective than

listening to lecturers in classrooms in space engineering. Those students who have been fortunate to experience such joy are pursuing careers in the Japanese space agency or aerospace companies, to become the driving force to promote space activities of Japan. In order to support those hands-on activities that I have just mentioned, the University Space Engineering Consortium (UNISEC) has been formed. Its membership now consists of more than 20 universities and 30 voluntary groups, and it carries out such activities to promote CubeSat activities and to provide opportunities to participate in the launch of CanSat and hybrid rockets.

At the global level, Japan also supports efforts to enhance capacity building in Earth observations with the use of space technologies such as those made by the Working Group on Education, Training and Capacity Building of the Committee on Earth Observation Satellites (CEOS) and by the Capacity Building Committee of the Group on Earth Observations, to carry out the 10-Year Implementation Plan of the Global Earth Observation System of Systems (GEOSS).

Poland

[Original text: English]

In Poland, space education activities are performed for students in many academic centers. The distinguishing examples are Warsaw University of Technology and Wrocław University of Technology. Space Research Centre of PAS (SRC PAS) supports widely space education activities by organizing contests and exhibits on space exploration and space science for youth. SRC PAS supports space education initiatives performed by students from universities and by volunteers from NGO's.

Other activities in space education for youth are performed by Non-Governmental Organizations. The examples of these are Polish Astronautical Society and Mars Society Polska. Polish Astronautical Society in 2002-2006 conducted space education programme ZNEK for high schools in Gdynia, Gdansk, Toruń and Warsaw. In the frame of ZNEK programme, there were lessons on astronautics in interdisciplinary approach, contest of robotics ZNEKBot, building of amateur rockets and the ARISS ham radio session with ISS astronauts. Mars Society Polska and Polish Astronautical Society in cooperation with Warsaw School of Economics organized two editions of Columbia Memorial Negotiations Game simulating the multilateral talks on Moon and Mars Exploration in 2005 and 2006. The project was conducted under the patronage of US Embassy in Poland and Space Research Centre of PAS in Warsaw. Mars Society Polska is conducting the project of analog Mars Pressurized Vehicle in Wrocław in cooperation with Wrocław University of Technology.

Apart from professional or high-level academic activities, being taken to support space engineering development progress, there are also such activities, carried out by groups of students and young engineers. Many of these initiatives are initiated at the universities, inside student scientific groups. It is possible for them to attain academic authorities' supervision, as well as financial support. This gives students an opportunity to take part in international projects or initiate some on their own. There are several international ventures, which students of Warsaw University of Technology (WUT) participate in, but there are also local ones.

- Student Astronautical Group (Studenckie Koło Astronautyczne SKA)

SKA is one of the most active student organizations at WUT. The group was established in 1996 at Faculty of Power and Aeronautical Engineering. Prof. Peter Wolański has been SKA supervisor since the very beginning. Our present coordinator is Marian Zastawny. We unite people from various faculties of the University, who are interested in wide range of space related

topics. Our main goal is to popularize astronautics and astronomy in the student environment as well as developing knowledge and skills useful in future engineer careers. We attempt to achieve this objective by being involved in different international and local projects, participating in seminars and conferences along with arranging space related lectures with professionals.

SKA members have participated in 5 Student Parabolic Flight Campaigns (SPFC), organized annually by European Space Agency (ESA). SPFC gives students from all over Europe unique opportunity to conduct interesting experiments in microgravity state achieved by special parabolic maneuvers of A-300 ZERO-G airplane. One of our participating teams was especially awarded, by being given opportunity to conduct their experiment on professional Parabolic Flight Campaign. They tested behavior of self-ignition process in microgravity. We are also members of Student Space Exploration and Technology Initiative (SSETI) organization. We took part in Express project, where SKA members created Operations team, responsible for controlling the satellite on the orbit. We also play important role in current SSETI main initiative – ESEO satellite. Again group of our students forms Operations team, which is creating mission profile and will operate ESEO in space. Moreover, we developed Configurations team, arranging satellite components properly. One of SKA students, Rafał Burek, was also SSETI vice-president.

Most important local project of SKA is PW-Sat – a cubesat satellite, which is intended to be first Polish spacecraft sent into space. The main idea of this mission is to test ability to bring satellite back from the orbit using inflatable balloon. The balloon will cause important aerodynamic drag increase as well as influence of solar wind. Apart from technical projects we also try to develop our knowledge through educational trips to interesting places and by initiating periodical meetings with astronautics professionals.

- Student Space Engineering Scientific Group (Studenckie Koło Inżynierii Kosmicznej – SKIK)

Student Space Engineering Scientific Group was founded at WUT, Faculty of Electronics and Information Technology, in 2004. Its work has been endorsed by Dr Krzysztof Kurek for Institute of Radioelectronics ever since. Marcin Olak is currently coordinator of this group. The statute goal of SKIK is to deepen the interest of its members (18 active members) in the use of information technology, telecommunications and electronics, in applications concerning high reliability, whereas special focus has been always put on astronautics and space technology. Since the very first days of SKIK's activity, its members have taken part in building of European Student Space Orbiter – a project coordinated by Student Space Engineering Technology Initiative (SSETI) and supported by Education Office of European Space Agency (ESA). The project is being carried on with the help of numerous student teams from all over the Europe, each taking care of some particular subsystem e.g. SKIK is meant to deliver on-board computer. Most of the communication happens via Internet. Therefore, biannual workshops in Noordwijk (The Netherlands) are important.

In September 2005, SKIK started a cubesat project called O3Sat. After conducting several studies, it turned out that the team is lacking in competency to propose an useful and inspiring payload. Eventually SKIK joined another cubesat project on WUT, called PW-Sat. Both ESEO and PW-Sat projects are now being prototyped.

- Radiolocation and Digital Signal Processing Students' Research Group (RDSP)

RDSP also originates from Faculty of Electronics and Information Technology. It is endorsed by dr Krzysztof Kulpa. The main field of research of RDSP is application of digital signal processing

algorithms in radar technology. The team is also concerned with programming, computer graphics, microwave technology and electronics in general. The space activity of the RDSP is coordinated by Bartek Dawidowicz and is connected to the SSETI-ESMO project. The team has carried out a detailed feasibility study of the SAR radar for this students' satellite. The results of its work were rewarded by three ESA Awards at STEC 2005 conference. The team has also obtained a distinction for the scientific stand (Innovation Village) on the SPIE International Congress on Optics and Electronics 2005. RDSP's future work is focused on writing simulation software for the SSETI-ESMO project.

In addition, there are a few projects that each of student groups, mentioned above, contribute to. One of these is a mission plan for first Polish minisatellite, following an idea of Dr Stephan Pascall from the European Commission. It assumes constructing a satellite and its further maintenance. It is expected to have a modular payload, which can be easily exchanged. As has been agreed, its first version will be equipped with panchromatic scanner and a camera of high resolution. Its main target is to provide a terrain mapping facility, taking pictures of high resolution as well as detecting floods and forest fires (with a revisit time of 3 to 4 days and up to 15 years of system's lifetime). It is planned to be positioned on Low Earth Orbit of high inclination. Students' actions in this matter are being supported by Institute of Radioelectronics and Photonics and Web Engineering Research Group (Institute of Electronic Systems). Current stage of development is phase B – general concept agreement and preliminary design.

Another important, international project, which students of WUT take part in is YES2 (2nd Young Engineers' Satellite) initiated by ESA Education Office. This satellite is a technology demonstrator for a concept commonly known as tether-assisted reentry. YES2's goal is to safely recover a payload sent from the orbit down to Earth (e.g. sending cargo from International Space Station). Special reentry capsule (Fotino) – a sphere of 40cm diameter, which can carry certain amount of load, will be used. This technology could reduce costs of experiments on board ISS, for example. Polish students construct mobile ground station, UHF communication system, structure mechanics, software and tether winding driver. YES2 is expected to be launched on 23 September 2007. When mission ends, they will also be involved in Fotino recapture in Kazakhstan.