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English only

**Committee on the Peaceful
Uses of Outer Space**
Scientific and Technical Subcommittee
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Vienna, 30 January-10 February 2017

International cooperation in the peaceful uses of outer space: activities of Member States

I. Introduction

1. In the report on its fifty-third session, the Scientific and Technical Subcommittee of the Committee on the Peaceful Uses of Outer Space recommended that the Secretariat continue to invite Member States to submit annual reports on their space activities ([A/AC.105/1109](#), para. 36).
2. In a note verbale dated 29 July 2015, the Secretary-General invited Member States to submit their reports by 17 October 2016. The present note was prepared by the Secretariat on the basis of reports received in response to that invitation.

II. Replies received from Member States

Pakistan

[Original: English]
[19 December 2016]

SUPARCO, the national space agency of Pakistan, is pleased to submit the annual report on space activities to the 54th session of the Scientific and Technical Subcommittee of Committee on the Peaceful Uses of Outer Space. In this report, summary of the activities which were carried out during the year 2016 are highlighted.

Pakistan is operating a network of three ionospheric stations and two geomagnetic observatories in the country for acquiring round-the-clock local data. These datasets are also shared with international forums for updating of global assimilative models and scientific studies.

SUPARCO initiated a project in collaboration with the Food and Agriculture Organization of the United Nations (FAO). The project comprises, the land cover mapping of Pakistan using Land Cover Classification System (LCCS) of FAO on the basis of Object Based Image Analysis (OBIA). Mapping of Punjab, Sindh, Khyber Pakhtunkhwa provinces and FATA has been completed and respective atlases have



been published. Moreover, the mapping of Balochistan province is in progress. The project will help to improve methods and linkages between national, regional and global studies on land cover and environment.

SUPARCO's COSPAS-SARSAT Ground Receiving Station was established to provide distress alert and location data to, help search and rescue agencies in assisting persons in distress. The station is operational round the clock. Two Rescue Coordination Centres have also been established each at Pakistan Civil Aviation Authority (CAA) and Maritime Security Agency (MSA) to assist the rescue operations. National Beacon Registration Database is being managed to provide facilitation regarding registration of Pakistani coded emergency beacons. Upgradation of existing capability is planned by switching to Medium-altitude Earth Orbit Search and Rescue System (MEOSAR), which will improve both the speed and location accuracy for detecting beacons.

Under the National Disaster Management Plan, SUPARCO, the National Space Agency has been assigned the role of focal agency to provide space-based information for emergency response during natural and man-made disasters. In this regard, its contributions inter alia include:

(a) Provision of rapid and detailed satellite-based damage assessment maps during all the phases of disaster cycle namely rescue/relief, early recovery, rehabilitation and reconstruction.

(b) Preparation of hazard maps based on satellite-derived information and Risk Modelling for contingency planning.

(c) Technical assistance to National Disaster Management Authority (NDMA) and Provincial Disaster Management Authority (PDMA) for the conduct of Multi Hazard Vulnerability and Risk Analysis (MHVRA) studies in the most vulnerable districts.

Heavy rains, during spring and monsoon seasons, trigger landslides in the northern part of the country. SUPARCO has streamlined its process to disseminate timely and accurate information to decision makers and various flood management agencies through its Disaster Watch Geo-portal as part of flood monitoring framework for rapid information dissemination. Furthermore, the project namely "Strategic Strengthening of Flood Forecasting and Management Capacity of Pakistan" was completed in 2014 and was operationally utilized in 2016 monsoon season in Pakistan. The project was carried out under the sponsorship of the United Nations Educational, Scientific and Cultural Organization (UNESCO). National partners Included Pakistan Meteorological Department (PMD), Federal Flood Commission (FFC) and the National Disaster Management Authority (NDMA) while Japan Aerospace Exploration Agency (JAXA) and the International Centre for Water Hazard and Risk Management (ICHARM), Japan provided technical assistance. In this regard, an international conference titled "Standardizing Flood Forecasting and Warning Approached in Trans-boundary Catchments" was held during April 2016 in Lahore and attended by national and international partners.

Pakistan is actively contributing as JPT-2 member of Sentinel Asia Initiative of Asia-Pacific Regional Space Agency Forum (APRSAF) and support activities at this forum. Furthermore, Pakistan considers that APRSAF provides an excellent platform to promote valuable cooperation and contributes in providing inter-regional solutions to the socioeconomic problems through use of space technology and its application.

Pakistan is the founding member of Asia-Pacific Space Cooperation Organization (APSCO) and we fully endorse and support all initiatives and projects that are undertaken at APSCO. In this regard, Pakistan is participating in the space

science projects being jointly executed. These include “Research on Atmospheric Effects on Ionospheric Modelling through Study of Radiowave Propagation and Solar Activity”, “Research on Determining Precursor Ionospheric Signatures of Earthquakes by Ground-based Ionospheric Sounding” and “Asia-Pacific ground-based Optional Space Objects Observation System” (APOSOS) network.

Pakistan has been participating in Expert and Working Group meetings such as Space Weather, Space Debris, Nuclear power Sources and Action Team on Near-Earth Objects. Pakistan has also joined Space Mission Planning Advisory Group (SMPAG) to prepare for international response to a Near Earth Object (NEO) impact threat through documentation and implementation of preventive measures.

Being member, Pakistan participates actively at World Meteorological Organization (WMO) Inter-Coordination Team on Space Weather (ICTSW), Asia-Oceania Space Weather Alliance (AOSWA) and International Real-time Magnetic Observatory NETWORK (INTERMAGNET).

Pakistan in collaboration with ISNET has organized the 2nd International Conference on Space (ICS) from September 20-22, 2016 at Islamabad. A number of participants from various countries attended the Conference.

World Space Week (WSW) 2016 celebrations are being conducted in more than 10 cities of Pakistan for raising awareness among the masses through extensive media coverage, family fairs and also serve to involve students and spark interest in space-related fields through different competitions, such as water rocket events, space education-related booklets etc. In fact WSW celebrations mark a much anticipated and exciting series of events for a number of schools in the country and even students of remote areas of the country enthusiastically participate in these activities.

Slovakia

[Original: English]
[7 December 2016]

Scientific and Technical Subcommittee represents key fora for cooperation in the area of outer space affairs on the international level. The benefits of space contribute tremendously to human development. Space technology can catalyse progress in virtually every sector, and contribute to the overall progress of actors conducting activities in outer space. More actors, both States and private companies, use space more than at any previous point in time and space assets and space services have become an integral part of society.

In this context the first Slovak satellite named SkCube, made in Slovakia, is about to be launched into the outer space probably this year. It belongs to a category of CubeSat type satellites, weighs about one kilogram and is using radio-amateur frequencies. Its operational orbit will be 450-720 km above the surface of the Earth. It will orbit the Earth approximately every 90 minutes at a speed of 28,000 km per hour. The SkCube is made up of an on-board computer, an electricity supply system and a communications system. It also features a sensory system, an orientation control system and a small camera. The main experiment will concern the reception of very long radio waves coming from deep space and from the upper layers of the atmosphere. We look forward to this extraordinary event of the launch of historically the first self-standing satellite of the Slovak Republic in outer space, as it clearly demonstrates the potential of our country to successfully carry out space projects.

Slovakia is well aware of the obligations imposed by the international law connected with the conducting of space activities and in the near future stands ready to

commence with preparations of the national legislation in order to implement the United Nations treaties on outer space into national legal order. The United Nations treaties on outer space, including the 1967 Outer Space Treaty, have played a positive and important role in regulating national space activities, maintaining order in outer space and promoting international cooperation.

Slovakia notes the importance of the United Nations Register on Objects Launched into Outer Space as one of the most important tools for enhancing transparency and confidence-building in conducting activities in outer space. In March 2016, in compliance with Article II of the Registration Convention, a national registry of space objects has been established and is maintained by the Ministry of Education, Science, Research and Sport of the Slovak Republic. The big challenge before the international community and the legal subcommittee in particular is how to create a legal regime regulating outer space activities of the 21st century. International efforts are required to reach a consensus and establish rules on phenomenon such as the growing commercialization of space activities and space mining, the increasing amount of space debris and the risk of conflicts in the outer space.

Slovakia is interested in the engagement of its scientific community and industry representatives in the space industry as well as in its commercialization. Ministry of Education, Science, Research and Sport of the Slovak Republic is co-responsible for the development of space activities in Slovakia, including the cooperation with the European Space Agency (ESA). For this purpose, an inter-ministerial Commission for space activities in Slovakia was established. We currently prepare the Strategic Document about the Development of Cosmic Activities in Slovakia, which would allow deeper linkage of our activities with international partners.

Key national institution which undertakes scientific research in Slovakia is the Slovak Academy of Sciences. As a member of the Committee on Space Research (COSPAR) (<http://nccospar.saske.sk>), the Slovak Academy of Sciences is involved in various scientific projects and provides space research reports on regular basis. The present research activities cover material research in space, space meteorology and space physics, geophysics and astronomy, experiments for measurements in space, such as participation in the Experiment MEP-2 on board of RADIOASTRON space observatory, Experiment PICAM for mission ESA-BepiColombo and Experiment DOK-M for project RESONANCE, currently in development. Scientific studies in interplanetary matter, space solar physics and explorations of the comets, solar wind and its interactions with the Earth's magnetosphere have been done in various institutes in Slovakia.

Besides the Slovak Academy of Sciences, various Slovak universities have their departments, offices and institutions dedicated to space-related research or engineering, namely the Comenius University in Bratislava, Slovak University of Technology in Bratislava, University of Žilina, Technical university of Košice and the Pavol Jozef Šafárik University in Košice. The department of Nuclear Physics and Biophysics at the Faculty of Mathematics, Physics and Informatics of Comenius University in Bratislava focuses on the study of the interaction of cosmic rays with material objects and chemical analysis of meteorites. The department recently studied the fragments of meteorites Rumanová, Košice and Chelyabinsk, which fell in the Urals after a massive explosion. The Department of Astronomy, Physics of the Earth and Meteorology at the Faculty of Mathematics, Physics and Informatics at Comenius University examine the electromagnetic field in the atmosphere of the Earth, so called Schumann resonances. Another significant project of the Comenius University is the AMOS system, which is designed to observe almost entire sky and provide meteor trajectory and orbital data; parts of the system have been installed also in Hawaii and Chile.

The Faculty of Aeronautics at the Technical University in Košice offers general education in space systems in the area of astronautics, space technology, space dynamics and processes, satellite technology, space probes, planetary probes and planetary exploration systems, GNSS and planetary science. Apart from training of pilots and later astronauts, like first Slovak astronaut Ivan Bella, one of the current projects is the theoretical concept of small satellite navigation system for planet Mars (GNSS FATIMA). Faculty of Natural Sciences at Pavol Jozef Šafárik University in Košice and Comenius University Bratislava conducts measuring of cardiovascular rhythms in rodents in hyper-gravity terms and the Department of Geodesy STU BA focuses on radar interferometry and InSAR projects band measuring of the gravitational field of the Earth.

Apart from the academic and private sector, various institutions take part in space activities, such as Slovak Central Observatory Hurbanovo, which is studying the solar atmosphere and Slovak Environmental Agency in Banská Bystrica, focused on activities in the framework of the European Project Copernicus, conducting detailed satellite Earth observation. Satellite sensing is used within the work of various institutes, such as The Soil Science and Conservation Research Institute (SSCRI) in Bratislava covering agricultural activities using data from satellite sensing, the National Forest centre Zvolen, engaged in the impact of global warming on forest ecosystems using data derived from satellite observations and the Slovak Hydrometeorological Institute, which conducts studies of weather using the satellite meteorological data within EUMETSAT.

Since its establishment in 2009, the Slovak organization for space activities (SOSA) is committed to the popularization and development of space research and space technology development in Slovakia. Its activities are based on three main pillars. First, lecturing and publication at various conferences, scientific or medical journals, with a focus to bring the space research closer to the public via the Slovak mass media, second, promoting cooperation between Slovakia and the European Space Agency (ESA) and providing of consulting services to both government bodies as well as for research and development organizations interested in cooperation with ESA, and last but not least, the development of its own technological devices designed for flights to extreme environment, such as exploratory flights of stratospheric balloons to a height of more than 35 km above the surface of the Earth, and in recent years especially the construction of the first Slovak satellite SkCube. Slovak researchers have also been participating in analogue space missions, such as Dr. Michaela Musilova who was an analogue astronaut multiple times at the Mars Desert Research Station, United States of America.

Another association, which was created in 2015 with the aim to take active part in promoting and tackling issues of space policy, law and security related to space sector, is the Slovak Space Policy Association (SSPA). As a non-governmental organization providing expert advice to space community in Slovakia, it serves as a professional platform with the aim of creating a vision and conceptual framework for the further progress of Slovak space activities. Its members are professionals experienced with working for organizations such as the National Aeronautics and Space Administration (NASA), ESA, European Space Policy Institute (ESPI) as well as the Office for Outer Space Affairs of the Secretariat. In 2015, SSPA was the national coordinator for the World Space Week and its members are the national points of contacts for the Space Generation Advisory Council.

Slovakia signed its first Framework Cooperation Agreement with ESA back in 2010, which enabled us to exchange experts and students in various programmes and gain first on-hand experience with ESA technologies and procedures. Based on this, the European Cooperating State Agreement between Slovakia and ESA was signed last

year in Bratislava. This opens the door for Slovakia to take part in ESA's activities more closely, with first seven projects to be financed from Slovak national budget this year. We hope that Slovak R&D institutions will fulfil ESA's high expectations on the quality of research and development, and Slovakia becomes a full member in ESA after 2020.

The current main effort of Slovakia in the field of space is cooperation with ESA in Plan for European Cooperating States — PECS. We believe that the cooperation with ESA will offer rich opportunities for the development of Slovakia and our country will be also able to fully participate in the space activities of Horizon 2020 programme as well as strategic projects of Galileo global satellite navigation and Copernicus — Earth observation programme.

We hope that ongoing Slovak Presidency of the Council of the European Union (EU) will contribute to find new quality of the relations between EU and ESA and will closely work with member States and European Commission to find good opportunities for the European subjects within European Space Strategy while searching for best synergies with ESA and other relevant partners.

In concluding, the long-term sustainability of outer space activities and preservation of a safe and secure space environment is an issue that is currently under the spotlight and the international community should commit itself to using development as a means to solve sustainability issues such as space debris. This makes it necessary for us to promote the sustainable use of outer space for peaceful purposes for the benefit of human welfare, to realize mutual benefit by sharing the deliverables in a fair and reasonable manner, and to truly achieve the inclusive development of humankind's outer space endeavour.
