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Committee on the Peaceful Uses of Outer Space

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

Note by the Secretariat

Addendum

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II. Replies received from Member States

Chile

[Original: Spanish]

1. Established by Supreme Decree No. 338 of 17 July 2001, the Chilean Space Agency has the following basic functions:

(a) To advise the President of the Republic on all matters concerning the identification, formulation and implementation of policies, plans, programmes, measures and other activities relating to space and to serve as the coordinating authority for public bodies responsible for such matters;

(b) To draw up and propose a law establishing an institutional framework for the development of space activities on a permanent basis;

(c) To propose the national space policy and measures, plans and programmes for its adoption or execution.

2. Since 2001, a national space community has been developing and expanding in the academic and scientific spheres, in the State administration (ministries, departments, prefectures, municipalities and public services) and in the private sector. A register of specialized human resources trained in space science has been compiled. In 2007, an important strategic working alliance was established with the National Land Information Coordination System (<http://www.snit.cl>), which is a ministerial council engaged in national land data management, a major element from the perspective of users of remote sensing.

3. Through active participation in the activities of the United Nations and the conclusion of intergovernmental agreements and memorandums of understanding with the space agencies of Brazil, China, Ecuador, France, Israel, Spain, the Republic of Korea, the Russian Federation and Ukraine, as well as with the Office for Outer Space Affairs of the United Nations Secretariat and the International Space University, a network of international contacts has been established. Steps to sign space agreements with Argentina, Colombia, Germany, Guatemala, India, South Africa and the United Kingdom of Great Britain and Northern Ireland are at an advanced stage.

4. Since 2005, the Chilean Space Agency has been working on the implementation of the Earth observation satellite project. On 21 December 2007, nine international space companies were invited to submit tenders, and it is hoped that a contract will be awarded in March 2008.

5. With regard to the two basic tasks allocated to the Agency under its founding decree, the results obtained to date are outlined below:

(a) Concerning the national space policy, a proposal was transmitted to the President of the Republic, Dr. Michelle Bachelet Jeria, in the last quarter of 2007 and is expected to be promulgated by Government House as an official document in the first quarter of 2008;

(b) Concerning the drafting of a law permanently establishing the Chilean Space Agency as a public service, with its own assets and legal personality, a bill

has now been drawn up. On instructions from the Office of the President, however, steps are being taken to set up, as an interim measure, an agency that will take the form of an interministerial council based at the Ministry of Finance. The text of the draft supreme decree was sent to the Ministry of Finance in 2007, and it is hoped that the matter can be finalized by the end of the first quarter of 2008.

6. During 2007, progress was made on installing a latest-generation ground station for direct reception of satellite images from the aerial photographic mapping service of the Chilean Air Force. That public service will form a key part of the overall national architecture of the land segment allotted to outer space use. It is expected to be opened in the first quarter of 2008.

7. Plans were made in 2007 for the organization of the international space conference on space technology and climate change, to be held, under the chairmanship of Mr. Raimundo González Aninat, Ambassador on Special Mission, on 1 April 2008, during the 2008 International Air and Space Fair (FIDAE 2008), which will be officially opened by the Minister of National Defence, the Undersecretary of Aviation, the Commander-in-Chief of the Chilean Air Force and the Director for Special Policy of the Ministry of Foreign Affairs.

8. Plans were made in 2007 for the participation of Chile in FIDAE 2008, with the installation of a 32-square-metre stand displaying the activities of the Chilean Space Agency.

9. The following steps have been taken with a view to the execution of the project to acquire an optical Earth observation satellite:

(a) In 2007, a request for information was issued to 25 international space companies, from 15 of which information was received and analysed under an evaluation process;

(b) As a result of the evaluation, nine international space companies were requested to submit proposals for the acquisition of an Earth observation satellite. The request for proposals was issued on 21 December 2007, and it is expected that the proposals will be received by the end of February 2008 and that the contract will be awarded and signed in March 2008. The budget for this project is 70 million United States dollars (see the press release on the website of the Ministry of Defence: <http://www.defensa.cl/>).

10. An academic and scientific network with an interest in space issues has been set up and developed, comprising 12 of the country's most renowned universities, including the Pontifical Catholic University of Chile, the University of Chile, the Federico Santa María Technical University, the University of Santiago de Chile, the University of Concepción, the Universidad Católica del Norte, the Catholic University of Temuco and the Universidad Austral de Chile. This scientific community is involved, as an advisory panel, in the process of assessing the proposals for a satellite system and the implementation of the national satellite operating system.

11. With regard to space debris, a coordination network has been set up with a number of national research centres and the General Directorate of Civil Aeronautics in order to undertake appropriate coordination on the basis of notifications of re-entry of space objects to Earth, using notices to airmen (NOTAMs).

12. The Chilean Space Agency continues to conduct pre-feasibility studies on the use of geostationary orbit positions assigned to Chile by the International Telecommunication Union for a future satellite telecommunications project.
13. In 2007, support was given to university students in the preparation of degree dissertations on topics covering remote sensing applications, telecommunications and satellite engineering.
14. In the fourth quarter of 2007, the Ministry of National Property allocated a 1,000-square-metre, two story government property in the centre of Santiago for use as the new headquarters of the Chilean Space Agency. The building (Calle Dieciocho, No. 165) is part of the country's historic heritage. It is hoped that the resources necessary for repairs and refurbishment can be secured in 2008.
15. In the area of space law, the legal consultant of the Chilean Space Agency has participated in the following important events:
 - (a) The forty-sixth session of the Legal Subcommittee of the Committee on the Peaceful Uses of Outer Space, held in Vienna from 26 March to 5 April 2007;
 - (b) Fiftieth session of the Committee on the Peaceful Uses of Outer Space, held in Vienna from 6 to 15 June;
 - (c) The symposium "Global Earth Observation System of Systems (GEOSS) in the Americas", held in Brazil from 17 to 19 September 2007;
 - (d) The Group on Earth Observations Ministerial Summit, held in Cape Town, South Africa, from 28 to 30 November 2007.
16. At each of those meetings, particular stress was laid on seeking a balance between the obligations arising from the provisions of space law and the use of space applications for the benefit of developing countries.
17. The promotion of space law in Chile includes the organization of public information seminars and activities with a view to building up a critical mass of specialists.

Russian Federation

[Original: Russian]

1. Introduction

1. The national activities of the Russian Federation in 2007 in the use of outer space for peaceful purposes were carried out by the Russian Federal Space Agency (Roskosmos) through the Russian Federal Space Programme, the Global Navigation Satellite System (GLONASS) special federal programme and other special programmes in cooperation with the Russian Academy of Sciences, the Ministry of Defence of the Russian Federation and other clients and users of space information and services.
2. In 2007, the Russian Federation carried out 26 carrier rocket launches, one of them unsuccessful, with 48 space objects launched (18 Russian space vehicles and 30 space vehicles belonging to other countries). There were 20 carrier rocket launches from the Baikonur launch site, with 42 space vehicles launched. From the

Plesetsk launch site, there were five carrier rocket launches, with five space vehicles launched. One space vehicle was put into space from the launch base in the Orenburg region.

3. The following Russian space vehicles were launched:
 - (a) Two manned Soyuz TMA spacecraft (Soyuz TMA-10 and TMA-11);
 - (b) Four Progress M unmanned cargo vehicles (Progress M-59, M-60, M-61 and M-62);
 - (c) One experimental research space vehicle (Foton-M3);
 - (d) One Raduga-1 space vehicle;
 - (e) Ten Cosmos space vehicles (Cosmos-2427 – Cosmos-2436).
4. The following space vehicles belonging to other countries were launched: Anik-F3 (Canada), TerraSAR-X (Germany), SAR-Lupe (Germany), Egyptsat-1 (Egypt), Saudisat-3 (Saudi Arabia), Saudicomsat-3 (Saudi Arabia), Saudicomsat-4 (Saudi Arabia), Saudicomsat-5 (Saudi Arabia), Saudicomsat-6 (Saudi Arabia), Saudicomsat-7 (Saudi Arabia), Libertad-1 (Colombia), CP3 (United States of America), CP4 (United States), CAPE-1 (United States), Aerocube-2 (United States), CTSB (United States), MAST (United States), four Globalstar satellites (United States), Genesis-2 (United States), DirecTV-10 (United States), Globalstar-2 (four satellites, United States), Sirius-4 (Sweden) and Radarsat-2 (Canada).

2. Manned flight programme

5. In 2007, in accordance with its international obligations regarding the development and operation of the International Space Station (ISS), the Russian Federation launched one manned transport spacecraft and three cargo spacecraft, controlled and tracked the flight of the Russian segment of ISS and implemented the planned programme of research and experiments.

6. In 2007, space experiments in a wide range of research areas were performed in the Russian segment of ISS. Work was done on 43 experiments, 34 of them Russian.

3. Space technology applications programme

(a) Space communications, television transmission and navigation

7. In 2007, space systems continued to be used in maintaining a single information space in the Russian Federation and providing modern telecommunications services for various users.

8. The orbital network for space communications, television transmission and navigation includes the following space vehicles: Ekspress-A, Ekspress-AM, Yamal-100, Yamal-200 (communications, television), Ekran-M, Bonum-1, Gonets-D1, Gonets-M (communications), Glonass, Glonass-M and Nadezhda (navigation, search and rescue).

9. GLONASS continued to operate and comprises, at present, 21 operating satellites (13 of them Glonass-M satellites). It is planned to expand the GLONASS system orbital network to 24 satellites by the end of 2009 (global coverage).

10. In order to replenish the Russian segment of the International Satellite System for Search and Rescue (COSPAS-SARSAT), work is under way to construct and launch in 2008 two small Sterkh satellites, which are more than five times lighter and will remain in service two-and-a-half times longer than their predecessors.

11. To date, over 20,500 persons have been rescued with the help of COSPAS-SARSAT, including over 1,000 citizens of the Russian Federation and other countries of the Commonwealth of Independent States.

(b) Remote sensing of the Earth, meteorological observations, environmental monitoring and natural disaster management

12. The natural resource satellites Resurs-DK and Monitor-E are currently in orbit. The Resurs-DK high-precision observation satellite provides images of the Earth's surface with a resolution of up to 1 metre. Work is near completion on the development of two new-generation hydrometeorological satellites, the medium-orbit Meteor-M and the geostationary Elektro-L, which are expected to go into service in 2008.

13. In order to achieve the most comprehensive monitoring of the environment possible, work is under way on the gradual creation and improvement of space facilities within the framework of an advanced Earth remote sensing satellite system that will include the following elements:

(a) Geostationary meteorological satellites for the observation of large-scale processes affecting the global weather that take place in the atmosphere and at the Earth's surface in the tropics and, partly, at higher latitudes (Elektro-L);

(b) Polar-orbiting meteorological satellites at relatively low altitudes (800-1,000 kilometres) for the global integrated observation of the atmosphere and the Earth's surface (Meteor-M 1 and Meteor-M 2);

(c) Real-time optico-electronic observation satellites providing information relevant to sectors of the economy connected with the use of natural resources (Monitor-E, Resurs-DK, Resurs-P);

(d) Satellites for radiophysics-based observation, equipped with radiolocators, microwave radiometers and multispectral surveying instruments for operating in the visible and infrared regions of the spectrum for studies of the ice along the Northern Sea Route in the Arctic and for many other oceanographic and oceanological studies (Meteor-M3);

(e) Observation satellites using high-precision radiolocation, for all-weather surveying of the Earth, which is particularly important in high-latitude regions of the Russian Federation, where many oil and gas companies are operating (Arkon-2);

(f) Satellites for the monitoring of disasters and the investigation of potential earthquake precursors (Kanopus-B).

14. In 2007, work continued on developing the main Earth remote sensing information centre. New stations for receiving, processing and storing data are being set up, and a data collection system for Eurasia was launched.

(c) **Natural disaster management using space technology**

15. One of the priority areas of the Russian Federation's space activities is the development of space technologies and information support for natural disaster management, including the following:

(a) The forecasting, detection and monitoring of hazardous phenomena in the atmosphere and at sea (hurricanes, gales, typhoons, ice formations etc.) using data from satellites of the Meteor and Elektro types obtained in various regions of the optical and radio (ultra-high-frequency) ranges of the electromagnetic wave spectrum;

(b) The detection and monitoring of floods using data from satellites of the Meteor-M, Monitor-E and Resurs-DK types. New space technologies for the provision of information to facilitate natural disaster management are to be developed and applied;

(c) The detection and monitoring of forest fires that cover an area of more than 40 hectares, using the smoke plume and data from satellites of the Meteor-M, Resurs-DK and Monitor-E types obtained in the visible and infrared ranges of the electromagnetic wave spectrum. Consideration is being given to equipping satellites with state-of-the-art infrared instruments for the early detection and monitoring of the boundaries of forest fires covering an area of more than 0.1 hectares.

4. Research programmes

16. In 2007, the Russian Federation participated in international projects in the field of fundamental space research. The main space research results in 2007 were obtained during observation programmes conducted on board the International Gamma-Ray Astrophysics Laboratory (INTEGRAL) of the European Space Agency (ESA). Russian scientists took an active part in competitive observation programmes, in the course of which significant results were obtained in relation to the dynamics of superheavy bodies in the centres of galaxies and the evolutionary processes of neutron stars.

17. In addition, research continued in 2007 on cosmic rays and corpuscular flows within the framework of the Russian-Italian Mission (RIM)-Pamela project. The number of antiprotons and positrons registered in series exceeds all global statistics in this area to date. Work on the project is planned to continue until the end of 2009.

18. In the field of planetology, studies continued of Mars and Venus using Russian instruments carried on board Mars Express and Venus Express: the Planetary Fourier Spectrometer (PFS), Spectroscopy for Investigation of Characteristics of the Atmosphere of Mars (SPICAM), the Visible and Infrared Mineralogical Mapping Spectrometer (OMEGA), the Energetic Neutral Atoms Analyser (ASPERA), the High Resolution Stereo Camera (HRSC), the Mars Advanced Radar for Subsurface and Ionosphere Sounding (MARSIS). Further investigations of the planets' surface and atmosphere were made, and the data obtained are being processed and analysed.

19. Work continued on board the United States Mars Odyssey spacecraft on detecting and localizing subsurface aqueous ice on Mars, using the High-Energy Neutron Detector (HEND) instrument complex, which the Russian Federation helped to develop. This makes it possible to register fast neutron flows from the

surface of Mars caused by the action of solar winds. It is planned that research will continue in the period 2008-2009.

20. The investigations of gamma ray bursts and transient phenomena using the Konus-A instrument within the framework of the Russian-United States Konus/WIND project also continued in 2007.

21. On board the Russian research satellite Kompas-2, which went into operation in October 2006, scientific data are being received on volcanic activity, and various kinds of geophysical research are also being conducted.

22. The Russian and European scientists and engineers continued with preparations for the flight in 2007 of the Russian robotic biosatellite Foton-M3, which was launched on 4 September 2007 and returned to Earth 12 days later after successfully completing its research programme. In the course of its flight, the Foton-M3 carried out 26 separate scientific experiments.

5. Commercial use of space technologies in the Russian Federation

23. On the basis of the results of space activities, world-class high-tech items are being produced.

24. The main trends in the creation of innovative goods and services benefiting the Russian economy in 2007 are the following:

(a) Development of navigational methods, Earth remote sensing satellites, space communications and information science;

(b) Development and production of instruments for the fuel and energy complex;

(c) Development of new kinds of medical and rehabilitation technology;

(d) Development of new materials and advanced processes for manufacturing them;

(e) Development of instruments for the processing branches of the food and building industries.

6. International cooperation

25. In the Russian Federation, together with various ministries and other departments, as well as with enterprises developing rocket and other space technologies, Roskosmos contributed to international cooperation in space activities in 2007 in the following main areas:

(a) Use of Russian facilities to launch foreign payloads;

(b) Implementation, in cooperation with ESA, France and European industry, of a project for constructing facilities for the launching and adaptation of Soyuz-ST carrier rockets at the Guiana Space Centre in French Guiana, with work on promising means of launching heavy payloads (Ural project);

(c) Partnership in the establishment and operations of ISS and in on-board investigations;

(d) Further development of the international search and rescue system COSPAS-SARSAT (with Sterkh satellites);

(e) In the field of fundamental space research, implementation of the Spektr-RG Space Observatory project, with the extensive cooperation of foreign partners;

(f) Implementation of space technology projects (with Foton-M);

(g) Joint development with Brazil of a carrier rocket.

26. The following activities may be undertaken in 2008 for the further development of international cooperation:

(a) Carrying of payloads of foreign design and manufacture on board modifications of satellites of the Meteor-M and Resurs-DK types and future satellites of the Elektro-L type;

(b) Carrying of Russian scientific instruments on board foreign satellites within the framework of the Lunar Reconnaissance Orbiter (National Aeronautics and Space Administration (NASA) of the United States) and other projects;

(c) Russian participation in the Global Monitoring for Environment and Security and the Group on Earth Observations programmes;

(d) Russian participation in the European programme for monitoring forest fires and emergency situations and forecasting earthquakes, using equipment on board Meteor-M and Resurs-DK.

27. Proposals have been drawn up for Roskosmos to join the Charter on Cooperation to Achieve the Coordinated Use of Space Facilities in the Event of Natural or Technological Disasters (also known as the International Charter "Space and Major Disasters"), which provides for cooperation on the authorized use of space resources in situations of natural or man-made disasters.

28. Contractual services were provided in 2007 for the launch of foreign satellites using Russian carrier rockets of various classes (11 successful launches, in which 30 satellites were launched).

29. The Russian Federation possesses a range of facilities that permits the launching into Earth orbit at different inclinations of payloads weighing from a few hundred kilograms to 20 tons. Its Soyuz and Proton carrier rockets have been modernized (Soyuz-2 and Proton-M). With a view to, inter alia, providing guaranteed access to space, work is under way on the development of advanced launching facilities, including the Angara family of carrier rockets and the Air Start rocket-space complex.

30. For the launching of small lightweight satellites, programmes are under way for the introduction of launching methods based on converted rockets within the framework of the Start, Rokot and Dnepr projects.

31. In 2007, there were three successful launches of foreign satellites by means of Proton-M carrier rockets.

32. To date, the Russian Federation has concluded inter-State and intergovernmental agreements with over 20 countries on cooperation in the investigation and use of outer space. Also, Roskosmos has signed agreements with

the space agencies of 26 countries and ESA on joint space projects, as well as a large number of special agreements.

7. Space debris

33. Space activities worldwide are leading to an increase in the man-made pollution of circumterrestrial space, consequently impairing the safety of space flights. The Russian Federation is paying close attention to resolving the problems of space debris.

34. The Federal Space Programme for the period 2006-2015 provides, in the appropriate sections, for activities directed towards resolving the problems of space debris.

35. A definitive text was established in 2007 for the Russian All-Union State Standard (GOST) R, "Space technology products. General requirements for products to restrict man-made pollution of circumterrestrial space". The standard was brought into line with the requirements of the Space Debris Mitigation Guidelines adopted by the Committee on the Peaceful Uses of Outer Space at its fiftieth session.

36. The principal measures applied to Russian satellites, carrier rocket stages and boosters in 2007 include the following:

(a) Reduction of the pressure in propellant tanks and venting of the residual propellant in Proton-M and Soyuz-2 carrier rocket stages;

(b) When the booster is separated from the Breeze-M upper stage, there is no pollution of circumterrestrial space by small operational elements, while residual propellant and gases are drained in circumterrestrial space when the supplementary propellant tank is separated from the Breeze-M upper stage;

(c) The construction of the upper stages of the carrier rocket Dnepr avoids the pollution of circumterrestrial space by small operational elements by ensuring that pyrotechnic fasteners and elements of the separation system and similar equipment remain within the stage;

(d) In the upper stage of the Cosmos-3M carrier rocket, the construction of extractors for the satellite separation system has been refined to prevent discarding operational elements into circumterrestrial space;

(e) Considerable thought is being given to the feasibility of removing satellites from operating orbits by means of the electric propulsion systems that are normally used for altitude correction.

37. In 2007, development work continued on the functional components of an automated long-term forecasting and warning system for dangerous situations likely to affect functioning orbital networks and related objects or to affect the Earth caused by man-made and natural factors and on ways of reducing the risks associated with such dangerous situations.

38. An important factor in reducing the danger of man-made pollution is to establish an inventory of the objects polluting circumterrestrial space, especially within the geostationary orbit. To that end, the Keldysh Institute of Applied Mathematics and the Pulkovo Observatory in the Leningrad region have organized

an international network of 18 observatories covering the entire geostationary orbit. The observations conducted in the period 2004-2007 led to the identification of about 300 new objects in the geostationary orbit.

39. Work in the Russian Federation on resolving the problems arising from man-made pollution of circumterrestrial space is conducted within the framework of existing legislation governing space activities, with due regard for the introduction of appropriate practical preventive measures by the space agencies and organizations of other States.

United Kingdom of Great Britain and Northern Ireland

[Original: English]

1. The 2007 United Kingdom Space Activities brochure is the annual publication of the British National Space Centre (BNSC) that covers the events and activities of the previous 12 months and looks ahead to the coming year. Copies of the brochure will be made available to delegations at the meetings of the Committee on the Peaceful Uses of Outer Space in 2008.

2. This year has demonstrated the importance of European and international collaboration for space exploration, Earth observation and satellite services. The United Kingdom has had major involvement in a number of launches, including METOP, the new low-Earth orbit weather satellite, and the Solar Terrestrial Relations Observatory (STEREO), which investigates solar flares. Work has also started on Europe's first mission to Mercury.

3. The United Kingdom supported the development of the European Space Policy, comprising ESA, the European Union and Member States, which was agreed in May 2007 and highlighted the opportunities in the space element of the European Union Seventh Framework Programme.

4. BNSC and NASA are working together to identify areas for technological and scientific collaboration for future lunar exploration, and an agreement with the Algerian Space Agency has been implemented. The United Kingdom has been working with 13 other nations in the Global Exploration Strategy team and is considering a report from the independent Space Exploration Working Group on how best to engage in the Strategy. The United Kingdom also took a leading role in the activities of the International Polar Year and the International Heliophysical Year.

5. The space objectives of the United Kingdom and their organization have also been considered afresh. The House of Commons Science and Technology Committee issued a major report on national space activities, and a new space strategy for the period 2008-2012 is under preparation.

6. BNSC coordinates civil space activities of the United Kingdom and is at the heart of its efforts to explore and exploit space. It is made up of 10 government departments, research councils and the Met Office. BNSC is now hosted by the new Department for Innovation, Universities and Skills. A new research council, the Science and Technology Facilities Council, is responsible for coordinating the space science efforts of the United Kingdom.

7. The United Kingdom celebrated the fiftieth anniversary of spaceflight with an event at Jodrell Bank, the only telescope in the West that was able to track Sputnik-1.
8. Further information on United Kingdom space activities can be found on the BNSC website (www.bnsc.gov.uk).

Viet Nam

[Original: English]

1. Introduction

1. In 2007, Viet Nam was affected by a series of major disasters, such as typhoons, heavy rains, flash floods and land slides, that resulted in loss of lives and the destruction of thousands of items of property and infrastructure. Many big cities were inundated by more than 1 metre of water for days. The Government had to come to the rescue by delivering by helicopter food, clothes and medicine to inhabitants, who were living on their rooftops.
2. Aware of the importance of space technology for early warning of natural hazards and in disaster management, Viet Nam has promoted efforts to develop and apply space technology.
3. On 14 June 2006, the Government of Viet Nam approved the Strategy for Space Technology Research and Applications until 2020, under which the Space Technology Institute was established on 20 November 2006 within the Vietnamese Academy of Science and Technology. The Vietnamese Commission for Space Research and Applications will be established in 2008 to manage and supervise the national programmes, as well as international cooperation in space technology development and its applications.
4. Under the Strategy, in the period 2006-2010 Viet Nam must accomplish the following important tasks:
 - (a) Formation and completion of a legal framework for space technology research and applications, including the following actions:
 - (i) Studying the international laws and regulations on space use and investigation on behalf of the Government;
 - (ii) Constructing and improving the general regulations for government agencies and branches relating to space technology research and applications;
 - (iii) Forming and completing the documents regulating the storage, management, development and use of satellite images and derivative information such as maps and databases;
 - (iv) Constructing and promulgating security regulations related to the National Independent Programme for Space Technology Research and Applications;

(v) Constructing and promulgating the formatting standards and criteria for space technology research and applications to ensure compatibility at the national and international levels;

(b) Building the national space technology infrastructure, including the following actions:

(i) Building the ground receiving station and the centre for the satellite image database and processing, obtaining the technology of Earth observation small satellites and launching such a small satellite, and building a satellite global positioning system;

(ii) Deploying the communication satellite VINASAT project;

(iii) Establishing a key national laboratory for space technology;

(c) Promotion of research in space science and technology; the Vietnamese Academy of Science and Technology will preside over the deployment of the National Independent Programme for Space Technology Research and Applications, to start in 2008, with the aim of implementing the following main tasks:

(i) Researching and building the ground receiving stations;

(ii) Learning from and obtaining small satellite technology;

(iii) Employing high-tech applications such as optical observing technology, satellite radar technology and technology for the transfer of satellite information at a high transfer rate;

(iv) Conducting basic research to develop space technology;

(v) Studying and making ground devices and software;

(vi) Aiming at achieving the average regional level of space technology by 2010;

(d) Promotion of space technology applications; from 2006 to 2010, space technology applications need to be strengthened in the four main fields of communication, hydrometeorology, remote sensing and satellite positioning; until 2010, those fields must use space technology applications in their professional processes as follows:

(i) *Post and Telecommunications, Broadcast and Television.* Viet Nam aims to expand communication services in order to take full advantage of the VINASAT satellite and to develop remote learning, medical examinations and meetings and direct-to-home television;

(ii) *Hydrometeorology, Resources and the Environment.* It is necessary to improve the accuracy of forecasts of typhoons, flash floods, landslides and natural disasters, evaluate the impact of global climatic change on Viet Nam, access information on the fluctuation in land areas in periodic use and build the database for digital maps to be shared with both the central Government and local government;

(iii) *Agriculture, Aquaculture and Resources Investigation.* In order to enhance forecasts on national rice production, floods, forest fires and droughts, Viet Nam also plans, among other things, to further develop remote

sensing applications, expand aquaculture planning, offshore fishing, and research on detection of oil and underground water;

(iv) *Transportation, National Defence and Security*. Viet Nam not only takes advantage of the VINASAT satellite capabilities and uses the positioning technology for road, air and sea navigation, but also encourages economic organizations to invest in applications and services using positioning and navigating technology.

2. Activities and achievements

5. In November 2007, the Vietnamese ground receiving station was completed and put into operation. It will provide satellite images from the Satellite pour l'observation de la Terre (SPOT) and the Environmental Satellite (Envisat) for natural resource and environmental management. This is the cooperative project between the European Aeronautic Defence and Space Company (EADS) and the Ministry of Natural Resources and the Environment of Viet Nam.

6. The launching of the first Vietnamese Communication Satellite VINASAT is tentatively scheduled for March 2008. This is a cooperative project involving Lockheed Martin Corporation of the United States and the Vietnamese Ministry of Post and Telecommunications. The satellite will provide services for mobile communications, television and telemetry in Viet Nam. The Ministry of Post and Telecommunications plans to launch a second satellite in 2011.

7. Viet Nam plans to cooperate with EADS to design and develop a small Earth observation satellite weighing about 150 kilograms, VNRED-Sat, for environmental research and disaster management. The project will start shortly, as soon as the budget funds are made available. The satellite is scheduled for launch in 2011.

8. Viet Nam aims to fully carry out its National Independent Programme for Space Technology Research and Applications for the period 2008-2012.

9. The United Nations/Viet Nam/European Space Agency Workshop on Forest Management and Environmental Protection was held in Hanoi from 5 to 9 November 2007, co-hosted by the Office for Outer Space Affairs, the Ministry of Science and Technology of Viet Nam and ESA, and co-organized by the Vietnamese Academy of Science and Technology, the Ministry of Foreign Affairs, the Ministry of Natural Resources and the Environment and the Ministry of Agriculture and Rural Development.

10. The main goal of the Workshop was to increase awareness of the related ministries and their branches about using space technology for environmental research and management, including forest management, environmental security and disaster prevention and reduction. One of the main tasks of the Strategy for Space Technology Research and Applications until 2020 is to utilize space technology for environment management and protection in Viet Nam.

11. Viet Nam has an area of 331,690 square kilometres, of which forests occupy 126,639 square kilometres, or 38.2 per cent of the national territory. The forested area of Viet Nam is varied in nature and is spread throughout the country. In recent years, uncontrolled logging and a series of forest fires have caused critical environmental and socio-economic damage and deforestation in Viet Nam and, in particular, have led to landslides during the rainy season, causing the loss of lives

and property. To improve the quality and efficiency of forest management and environment protection and to minimize the damage, Viet Nam needs to strengthen its ties with other countries and exchange information, know-how and technology in order to develop a system for environmental management and disaster prediction.

12. The Workshop also created opportunities for national managerial staff and scientists to learn from and exchange experiences with international colleagues with respect to space technology applications for forest management and environment protection.

13. At the Workshop, international and Vietnamese experts in remote sensing, satellite-image processing, the environment, natural resources, forestry, geology and other areas shared experiences and discussed the following key issues:

(a) International, regional and national initiatives and experiences in the use of space technology for forest management and environmental monitoring;

(b) Case studies of the successful application of space technology in forestry and environmental protection in the region;

(c) Space-related technologies and informational resources for addressing forest management, environmental sustainability and disaster management;

(d) Use of space technology for reducing the impact and risk of deforestation, forest fires and land degradation;

(e) International cooperation, capacity-building, education and training in the area of application of space technology for effective forest management and environmental protection in the region.

14. Viet Nam plans to continue with and strengthen cooperation in the area of space technology and its applications with countries and organizations in the region as well as at the global level, including with Australia, Belgium, the Centre National d'Etudes spatiales of France, EADS, ESA and the Japan Aerospace Exploration Agency (JAXA) and the Committee on the Peaceful Uses of Outer Space. The Vietnamese Academy of Science and Technology has already signed with JAXA an agreement for cooperation on space technology and development, including satellite technology, remote sensing applications (the Sentinel Asia project) and capacity-building.

15. At the fourteenth session of the Asia-Pacific Regional Space Agency Forum held in Bangalore, India, from 21 to 23 November 2007, Viet Nam registered to take part in the Forum's Earth Observation Small Satellite project, which will start in 2008 and continue until 2013. At that meeting, Viet Nam was chosen as the host country of the fifteenth session of the Asia Pacific Regional Space Agency Forum, to be held in 2008. That important event will provide an opportunity for Viet Nam to further cooperation and exchange information in space technology and its applications with the international community.

16. As is done every year, World Space Week was celebrated in Viet Nam, from 4 to 10 October, 2007. In 2007, particular focus was placed on the theme of the fiftieth space year.

17. In celebrating World Space Week, the Space Technology Institute of the Vietnamese Academy of Science and Technology cooperated with the United

Nations Educational, Scientific and Cultural Organization in organizing space education and awareness-raising activities. The activities were well received and supported by the Government, media, and schools throughout the country, with a large number of students participating in them.

18. The Space Technology Institute held a short-term training course to instruct schoolchildren how to make water rockets with a parachute, explaining the principles of a water-boosted rocket launch. A water-boosted rocket competition was held for secondary school students, with various categories of competition, such as for trajectory, parachute and most beautiful rocket.

19. The Space Technology Institute also launched a poster contest to further develop children's creativity on the theme of the fiftieth space year. The best paintings from schools throughout the country were chosen for a poster contest held in Bangalore, India, from 21 to 25 November 2007. All those activities were broadcast on the education programme of Vietnamese national television for children to learn how to make and launch the water rockets and to generate public support.

3. Summary, evaluation and perspective

20. Although space technology is only beginning its development in Viet Nam, with the support of the Government and responsible agencies as well as through international cooperation, Viet Nam is determined to build a solid foundation for the development of space technology in the country.

21. Already, initial steps in the development of space technology in Viet Nam have been taken, including the following:

(a) In the field of hydrometeorology, geostationary meteorological satellite (GMS)/National Oceanic and Atmospheric Administration (NOAA) of the United States satellite data are used to forecast weather, typhoons and other disasters with greater accuracy;

(b) In the field of information and communications, many ground stations have been constructed to serve television broadcasting and telecommunications, the most outstanding event being the deployment of the VINASAT project;

(c) In the field of remote sensing, Landsat and SPOT satellite images of the entire territory of Viet Nam have been obtained, and satellite navigation is being developed.

22. Future challenges for Viet Nam are completing the national policy and legal framework for space technology research and applications; increasing awareness of the importance of the human resource training in this field; constructing and improving space technology infrastructure; furthering international cooperation; mobilizing budgetary funds, official development assistance funds; as well as encouraging investments from various resources, including private companies in this field.

23. Viet Nam also devotes great attention to creating more opportunities and encouraging youth to study space science and technology.

24. It is hoped that in the future Vietnamese space technology will make progress in its development, achieve the overall regional level of development and

effectively serve the socio-economic development of the country, thus improving living standards, environmental and resource management and national defence and security.
