



General Assembly

Distr.: General
18 January 2010

Original: Russian

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

Contents

	<i>Page</i>
II. Replies received from Member States	2
Ukraine	2



II. Replies received from Member States

Ukraine

[Original: Russian]

[11 December 2009]

1. During 2009, Ukraine has continued to implement the recommendations of the Third United Nations Conference on the Exploration and Peaceful Uses of Outer Space (UNISPACE III) both through national projects and through international cooperation. The space activities of Ukraine in 2009, as in previous years, have been aimed at implementing priority projects set out in the fourth National Space Programme, fulfilling the obligations undertaken by Ukraine within the framework of international programmes and projects, increasing the effectiveness of the work of the national space sector and fostering broad cooperation with other States and international organizations.

2. In addition, a key event among the space activities of Ukraine in 2009 was a retreat held by the Government of Ukraine on 10 April to address the development of the Ukrainian space sector in modern-day conditions, the first meeting of its kind. The retreat was hosted by one of the leading enterprises of the Ukrainian space sector, the State enterprise Yuzhnoye Design Office, in the city of Dnipropetrovs'k. During the meeting, the Cabinet of Ministers of Ukraine adopted 16 decisions relating to various areas of space sector activity and providing for the creation of special conditions for its development. This has made it possible to increase planned budgetary funding for the space rocket industry by 1.8 times in 2009 and also to increase funding for the National Space Research and Technology Programme of Ukraine for 2008-2012 by eight times. Information on the measures taken to implement priority projects as part of that programme is provided below.

1. Space technology development

Global navigation satellite systems

3. Measures have been developed in Ukraine to strengthen State regulation of the development, introduction and application of satellite navigation technologies. Decision No. 959 of 9 September 2009 of the Cabinet of Ministers of Ukraine, entitled "Certain issues regarding State regulation in the area of satellite navigation", grants the National Space Agency of Ukraine (NSAU) the status of specially authorized State agency responsible for the coordination of State regulatory measures in the area of satellite navigation and related international cooperation.

4. In addition, NSAU, together with other relevant State agencies, has been tasked with preparing a draft law on State regulation in the area of satellite navigation. Furthermore, NSAU, the Ministry of Transport and Communications, the Ministry of Education and Science and the State Committee of Ukraine for Technical Regulation and Consumer Policy are to certify the System for Time Coordination, Positioning and Navigational Support for Ukraine (SKNOU), which uses global navigation satellite systems.

5. The measures established in the aforementioned decision include the implementation by NSAU, in collaboration with the Vinnytsia, Dnipropetrovsk and Kharkiv regional administrations, of pilot projects for the introduction of satellite navigation technologies in industry, transport and communications and also in the areas of health care and the environment for the period up to 2012.

6. Development of SKNOU using the Global Positioning System (GPS) and the Global Navigation Satellite System (GLONASS) has continued in 2009. The main instrumentation network of SKNOU comprises the Navigation Field Control Centre and a network of control and correction stations. The main function of SKNOU is to create the conditions necessary for the guaranteed provision of precise, reliable and accessible time coordination, positioning and navigation services of quality to users of global navigation satellite system information throughout Ukraine.

7. The Navigation Field Control Centre constitutes the organizational and technical core of SKNOU and is intended to carry out the following functional tasks:

(a) Collection and preliminary processing of data received from control and correction stations;

(b) Continuous monitoring of navigation fields created by the satellite navigation systems Navstar (United States of America), GLONASS (Russian Federation) and, in the future, Galileo (European Union);

(c) Generation of local differential correction information and control of the quality of that information;

(d) Creation of a scale for SKNOU system time and control of its coordination with GPS time, GLONASS time and Coordinated Universal Time;

(e) Generation of wide-area differential correction information and control of the quality of that information;

(f) Distribution of differential correction information among users in Ukraine and in neighbouring territories;

(g) Support of information exchange between the Navigation Field Control Centre, control and correction stations and external users;

(h) Monitoring of the ground-based segments of SKNOU and management of the system's operation.

8. Nine control and correction stations have been constructed and are operating on a pilot basis in the cities of Kharkiv, Dunayivtsi, Chernigov, Feodosia, Yevpatoria, Yavoriv, Mukachevo, Lugansk and Kyiv. The Research Institute for Radio Engineering Measurements, an open joint-stock company in Kharkiv, plans to construct three continuously operating control and correction stations in the cities of Vinnytsia, Sevastopol and Kirovograd by the end of 2009. The new control and correction stations will become part of the SKNOU network. Thus, by the end of 2009, the SKNOU network will consist of 12 continuously operating stations.

National satellite communication system

9. In 2009, NSAU reached an agreement with investors concerning financing for the establishment of a national satellite communications system using a Ukrainian

communications and broadcasting satellite. The company Export Development Canada is ready to provide the Ukrainian State enterprise Ukrkosmos, which is under the management of NSAU, with the sum of US\$ 254.6 million in credit under State guarantees for a 10-year period.

10. The following work is planned within the framework of the establishment of the National Satellite Communications System:

(a) Construction of the satellite and implementation of a comprehensive series of tests both on the ground and in orbit;

(b) Launch of the satellite using a Zenit-3SLB carrier rocket, including launch insurance;

(c) Construction of ground-based facilities for control of the satellite and preparation of a central teleport and ground-based infrastructure enabling the users of satellite communication services to use the satellite resources;

(d) Completion of work to provide frequency and in-orbit support and international coordination of satellite networks.

11. The main contractor to perform the work is MacDonald, Dettwiler and Associates (Canada), a leading world manufacturer of payloads for communications satellites. The satellite, expected to weigh 3.2 tons, is to be launched with a Zenit-3SLB carrier rocket from the Baikonur launch site in 2011. This will make it possible, inter alia, for Ukraine to carry out a substantial proportion of its telecommunications activities relating to the 2012 UEFA European Football Championship independently.

12. The satellite will be controlled from the territory of Ukraine and the control stations will be manned by Ukrainian staff. In addition, more than 40 Ukrainian enterprises will be involved in the construction and launch of the satellite, including the Yuzhnoye Design Office, the State enterprise Yuzhny Machine-Building Plant (Dnipropetrovs'k), the open joint-stock company Khartron (Kharkiv) and the factory Arsenal (Kyiv). The planned operational lifetime of the satellite is at least 15 years.

13. The intended function of the first Ukrainian telecommunications satellite is to back up ground-based communications networks. The satellite will provide radio broadcasting and fixed-satellite services and ensure the broadcasting of satellite television, including high-definition television, access to information networks and multimedia services and the operation of corporate and State VSAT networks. The satellite will provide full television signal coverage of Ukraine. The services will be available over a wide area comprising, in addition to Ukraine, the Baltic States, Belarus, the Czech Republic, Hungary, Poland, Romania, the Republic of Moldova and Slovakia.

Earth remote sensing

14. In order to expand and modernize the Sich national space system for Earth observation, work has continued in 2009 on the development of the Sich-2 satellite, the launch of which is scheduled for 2010. The satellite, which weighs 158 kg, is intended for Earth research in the optical range and will be equipped with an optical scanner manufactured in Ukraine with a resolution capability of 6 to 7 metres. The

satellite will be launched into sun-synchronous orbit at an altitude of 668 km by a Dnepr carrier rocket. The launch of Sich-2 will enable Ukraine to perform tasks of major national economic importance, such as crop-yield forecasting and monitoring of emergency situations, using a national Earth research satellite with its own control system.

15. In 2009, work continued on the development of a geographic information system as part of the European Global Monitoring for Environment and Security (GMES) programme and the Global Earth Observation System of Systems (GEOSS).

16. Ukrainian organizations are carrying out Earth remote sensing work in the following areas:

(a) Establishment of ground-based facilities for receiving, registering and processing Earth remote sensing data;

(b) Design of technologies to provide data support to an environmental monitoring system for the benefit of the various regions of Ukraine;

(c) Development and construction of advanced special-purpose equipment and Earth remote sensing space complexes;

(d) Creation of space systems for the monitoring of emergency situations and regional and local changes in the environment.

17. The provision of Earth remote sensing data to Ukrainian users is the main activity of the Priroda State Research and Production Centre for Aerospace Information, Earth Remote Sensing and Environmental Monitoring, an enterprise under NSAU management. The Aerospace Imagery Fund of Ukraine, established as part of the Priroda State Research and Production Centre, is a source of information for which demand is constantly growing, as is evidenced by the number of orders received by the Centre each year for Earth remote sensing data.

18. The Priroda State Research and Production Centre collaborates constantly with enterprises and organizations engaged in such activities as the real-time monitoring of natural resources, the research and analysis of trends in the behaviour of natural processes and phenomena, the forecasting of possible consequences and the adoption of mechanisms for disaster prevention.

19. Users of Earth remote sensing information include various State agencies, including the Ministry of Agrarian Policy, the Ministry for Emergencies and Protection of the Population from the Consequences of the Chernobyl Disaster, the Ministry of Education and Science, the Ministry of Defence, the National Academy of Sciences, the Ukrainian Academy of Agrarian Sciences, the State Committee of Ukraine for Land Resources, the State Committee of Ukraine for Water Resource Management, the State Statistics Committee and the Ministry for Protection of the Environment.

20. An analysis of the ways in which the information has been used shows that clients carried out the following activities:

- Monitoring of the Chernobyl exclusion zone
- Mitigation of the consequences of river flooding and the waterlogging of land

- Estimation of forest cover in the Odessa region of Ukraine
- Monitoring of the course of the Ukrainian part of the Danube river
- Use of satellite information to carry out a comprehensive assessment of the regions
- Exploration for oil and gas and study of the geological composition of regions where oil and gas are found and of specific oil and gas fields
- Basic research on the use of satellite information in oil and gas exploration
- Development of methods and technologies for remote calculation of statistical indicators for agricultural crops
- Forecasting of crop yield and assessment of crop condition
- Establishment of a vegetation index
- Monitoring of land use
- Assessment of trends in land use
- Mapping of erosion, the variability of subsoil and land pollution
- Updating of topographic maps
- Creation of a cartographic database for Ukrainian ecosystems
- Assessment of the extent of pollution of groundwater
- Definition of the optical characteristics of the atmosphere and determination of the surface distribution of soil humidity
- Practical sessions in the teaching of methods of analysing multi-zone images taken from space.

2. Space research

21. On 30 January 2009, a Ukrainian satellite telescope for measuring electron and proton fluxes, STEP-F, designed and constructed by the V. N. Karazin Kharkiv National University and the first of its kind, was launched into Earth orbit to become part of the scientific equipment of the Russian Coronas-Photon satellite. On 20 February 2009, STEP-F entered into operation. A planned programme of scientific research to enhance understanding of solar activity and its influence on processes occurring on Earth is under implementation.

22. The STEP-F apparatus is intended for the continuous measurement of fluxes of electrons, protons and alpha particles that are trapped in the Earth's inner and outer radiation belts and that flow from those radiation belts into the atmosphere during solar flares and sudden ionospheric disturbances. It is also designed to provide information on the fluxes and spectra of energetic particles with a view to the study of energetic solar cosmic rays, the way in which those rays are transported in interplanetary space and changes in the Earth's radiation belts during the twenty-fourth cycle of solar activity.

23. Work is being carried out to establish a ground-based system for monitoring space weather. The system is intended to establish the link between space phenomena and changes in the neutrosphere, in particular the link between solar

flares and the speed of solar wind and that between solar flares and atmospheric infrasound. The construction of a device for the acoustic and electromagnetic sensing of the ionosphere and for obtaining experimental data for the construction of a physical model of the lithosphere and ionosphere is planned.

24. Cooperation with the Russian Federation in the preparation of the scientific missions Spektr-R (RadioAstron), Phobos-Grunt, Resonance and Spektr-UV is continuing, particularly in the preparation of the corresponding ground-based infrastructure at the NSAU National Space Technology Operating and Test Centre.

25. Work is continuing to prepare for scientific experiments in space as part of the long-term programme, adopted on 14 October 2006, of joint scientific research and experiments by the Russian Federation and Ukraine on the Russian segment of the International Space Station (ISS). Space experiments aboard the Russian segment of ISS will yield new knowledge in the areas of biology, materials science and physical and chemical processes in space conditions. Preparations for the space experiment Obstanovka-1, including the design of an on-board system for the collection of data relating to the electromagnetic environment around ISS, are in their final stages.

3. Space systems

26. Work is continuing to establish and operate an NSAU information and analysis system for the collection, processing, analysis and organization of data from functional systems in order to provide decision-making support to the authorities at various levels.

27. The system currently comprises the following:

- (a) An information centre (NSAU, Kyiv);
- (b) An analysis centre (National Space Technology Operating and Test Centre, Yevpatoria);
- (c) The main information room of the National Space Technology Operating and Test Centre (Yevpatoria);
- (d) Components of functional systems that provide Earth remote sensing information;
- (e) A centre for the reception and processing of special information (Dunayivtsi).

28. As regards specific applications of Earth remote sensing data and data from meteorological satellites, the NSAU information and analysis system is tasked, inter alia, with the following:

- (a) Environmental monitoring of the territory of Ukraine and neighbouring States;
- (b) Prevention, monitoring and assessment of damage caused by natural and man-made disasters.

29. Specific tasks currently being carried out include the following:

- (a) Determination of the extent of snow cover;
- (b) Detection of thermal anomalies;

- (c) Delineation of the area occupied by bodies of water and by water courses;
- (d) Estimation of the surface area of bodies of water;
- (e) Identification of waterlogged areas.

30. These tasks are carried out using data from open-access space objects, such as the Terra satellite (and its Moderate-resolution Imaging Spectroradiometer) and meteorological satellites belonging to the National Oceanic and Atmospheric Administration. Archive data generated using images with a spatial resolution of 8 to 40 metres are also used.

31. The NSAU information and analysis system is to be integrated with inter-agency systems as it continues to be developed. To date, cooperation has been established with departments of the Ministry for Emergencies and Protection of the Population from the Consequences of the Chernobyl Disaster and of the Ministry of Defence.

4. Cooperation with international organizations

Cooperation with the Committee on the Peaceful Uses of Outer Space

32. A delegation of Ukraine participated actively in the work of the forty-sixth session of the Scientific and Technical Subcommittee of the Committee on the Peaceful Uses of Outer Space, held from 9 to 20 February 2009. During the session, the Ukrainian candidate for the chairmanship of the Committee for 2010-2011, E. I. Kuznetsov, Deputy Director-General of NSAU, gave a presentation on his vision for the Committee's role and activities in 2010 and 2011 for delegations from countries of the Group of Eastern European States.

Cooperation with the Inter-Agency Space Debris Coordination Committee

33. NSAU is continuing its work on minimizing space debris. Ukraine conducts its space activities in line with the recommendations of the Inter-Agency Space Debris Coordination Committee, of which NSAU is a member, in the following main areas:

- (a) Prevention of the formation and reduction of the quantity of space debris produced by Ukrainian carrier rockets during space launches;
- (b) Prevention of the generation of space debris by the operation of Ukrainian space objects;
- (c) Space debris research using Ukrainian radar facilities;
- (d) Preparation and introduction of regulatory and technical documentation defining general requirements for limiting debris in near-Earth space generated by the operation of Ukrainian spacecraft.

Cooperation with the International Astronautical Federation

34. A delegation of Ukrainian space sector enterprises participated in the work of the 60th International Astronautical Congress, which is organized jointly by the International Astronautical Federation (IAF) and the International Academy of Astronautics (IAA) each year and in 2009 was held from 12 to 16 October in Daejeon, Republic of Korea. Shortly before the Congress, elections were held to

appoint new members and senior officials of IAA; Aleksandr Zinchenko, Director-General of NSAU, was elected Trustee of the Academy's Social Sciences Section, and Stanislav Konyukhov, Chief Designer and Managing Director of the State enterprise Yuzhnoye Design Office, was elected Vice-President of the Academy.

35. Each year, IAA recognizes international teams of scientists that have achieved the greatest successes and breakthroughs in the development of space rocket technology. In particular, IAA recognizes projects such as Space Shuttle and the Mir orbital space station. In 2009, IAA recognized the international space project Sea Launch as a scientific and technological breakthrough.

36. The Sea Launch project is a unique achievement in science and technology and also an example of effective international cooperation among the aerospace companies Boeing (United States of America), Yuzhnoye Design Office (Ukraine), Yuzhny Machine-Building Plant (Ukraine), Energia (S. P. Korolev Rocket and Space Corporation, Russian Federation) and the engineering, construction and technology company AkerSolutions (Norway).

37. In Ukraine, work on the construction of the three-stage carrier rocket Zenit-3SL as part of the Sea Launch programme was nominated for the 2009 State Award of Ukraine for science and technology.

38. During the work of the International Astronautical Congress, a delegation from the Yuzhnoye Design Office (including representatives of the embassies of the Republic of Korea and Ukraine), headed by S. N. Konyukhov, held a meeting with senior officials of the Korea Aerospace Research Institute. As a result of the meeting, it was agreed that a delegation of the Republic of Korea would visit Ukraine at an early date to explore in detail the possibilities offered by Ukrainian enterprises in the space rocket industry and to discuss possible cooperation on the KSLV-2 project.

39. Also during the Congress, Valery Korepanov, Deputy Director of the L'viv Centre of the National Academy of Sciences-NSAU Institute of Space Research, held a meeting with the director of the Selena-2 project of the Japanese Aerospace Exploration Agency and discussed the possibility of the participation of Ukraine in that mission and the subsequent development by the L'viv Centre of an ultra-lightweight space magnetometer. (In April 2009, Mr. Korepanov was awarded the Christiaan Huygens Medal for 2009 by the European Geosciences Union for significant achievements in the development of sensors and electrical and magnetic instruments for research on the Earth and the solar system.) As an outcome of the meeting, it was agreed that personal contacts would be established with a counterpart group in Japan.

40. In addition, in 2009 representatives of Ukraine participated in the activities of the Missile Technology Control Regime (MTCR), in particular:

- (a) A meeting of MTCR technical experts (15-17 April 2009, Stockholm);
- (b) An MTCR "reinforced point of contact" meeting (29-30 April 2009, Paris);

(c) The preparation of materials for the eighth Regular Meeting of the Subscribing States to the International Code of Conduct against Ballistic Missile Proliferation (28-29 May, Vienna);

(d) The preparation of materials for the meetings of the working bodies of MTCR and the MTCR plenary meeting (5-13 November 2009, Rio de Janeiro);

(e) The preparation of materials for and participation in a regular meeting of the Working Group on Non-Proliferation and Export Control (23-25 September 2009).

41. Two preliminary notifications of launches of Ukrainian carrier rockets and an annual policy statement relating to carrier rockets and ballistic missiles in 2009 were prepared and transmitted to the Executive Secretariat of the International Code of Conduct against Ballistic Missile Proliferation through the Ministry of Foreign Affairs of Ukraine.

42. In addition, senior NSAU officials participated in eight meetings of the Inter-Agency Commission on Policy Relating to Military and Technical Cooperation and Export Control.

5. Carrier rocket launches

43. In 2009, five space rockets produced in Ukraine — one Dnepr, one Cyclone-3, one Zenit-3SL and two Zenit-3SLB — were successfully launched.

44. The Zenit-3SLB and Dnepr rockets were launched from the Baikonur launch site, while the Cyclone-3 rocket was launched from the Plesetsk launch site in the Arkhangelsk region of the Russian Federation. The Zenit-3SL rockets were launched from the Odyssey launch platform near Christmas Island, in the Pacific Ocean.

45. On 30 January 2009, the 122nd and final launch of a Cyclone-3 lightweight space rocket took place at the Plesetsk launch site. There are no plans to launch more rockets of this type in future.

46. The three-stage Cyclone-3 is the latest of a series of lightweight space rockets and is modelled on the ballistic rockets of the Yuzhnoye Design Office. It is produced by the Yuzhny Machine-Building Plant in cooperation with Ukrainian and Russian companies. Cyclone-3 has a dual-thrust motor and can be kept launch-ready for long periods, and is intended for the launch of space objects into medium-altitude near-Earth orbit.

47. The Cyclone-3 was used to launch the Russian research satellite Coronas-Photon, which weighs 1,885 kg and is intended for research on the sun and the influence of solar activity on processes occurring on Earth. Coronas-Photon carries the satellite telescope STEP-F, which measures electron and proton fluxes and was constructed at the V. N. Karazin Kharkiv National University as part of the National Space Programme of Ukraine.

6. Bilateral cooperation

48. In 2009, the cooperation of Ukraine with other States in the area of exploration and use of outer space for peaceful purposes was based on international agreements on space exploration, the international obligations of Ukraine relating to space

activities and current Ukrainian legislation governing space activities. Also in 2009, Space-Inform, a specialized centre for information and analysis and an NSAU information partner, continued, with NSAU support, to maintain and update databases on international space activities under the following headings:

- (a) Spacefaring nations of the world;
- (b) International space law;
- (c) Business contacts: meetings and visits;
- (d) Space events: dates and special and anniversary events;
- (e) Participants in space activities;
- (f) Reports and presentations;
- (g) Information and analytical materials.

49. Ukrainian policy with regard to international cooperation has been guided by the following core principles:

- (a) Compliance with international obligations relating to outer space;
- (b) Fulfilment of the priorities and objectives of Ukrainian foreign policy and security policy;
- (c) Strengthening of the position of Ukrainian businesses in the global market for space technologies and space services;
- (d) Focus on priority areas of space activity.

50. The efforts of Ukraine in the area of international cooperation have focused chiefly on fostering an international legal environment conducive to the participation of Ukrainian space sector enterprises in international space projects and on promoting the foreign trade activities of those enterprises and their stable and active presence in the space services market.

51. The long-standing collaboration between Ukraine and the Russian Federation is based on close cooperation among enterprises, joint participation in international space projects, the use of Russian complexes for the launch of Ukrainian carrier rockets and the existence of a long-term cooperation programme and of a coordinated plan of action among space agencies for the continuous development of space technology.

52. On 10 June 2009, the seventh meeting of the Ukrainian-Russian Subcommission on Cooperation in the Space Industry was held in Moscow. The delegations representing the national space agencies of the two countries at the meeting were headed by Aleksandr Zinchenko, Director-General of NSAU, and Anatoly Perminov, Director of the Russian Federal Space Agency. Issues relating to implementation of the programme for cooperation between the Russian Federation and Ukraine in the exploration and use of outer space for the period 2007-2011 and other matters concerning cooperation in the exploration and use of outer space were discussed at the meeting. Both delegations remarked that all necessary conditions were in place for the successful development of cooperation between the Russian Federation and Ukraine in space activities. As a result of the talks, the Director-General of NSAU and the head of the Russian Federal Space Agency

signed the minutes of the seventh meeting of the Ukrainian-Russian Subcommittee on Cooperation in the Space Industry, held within the framework of the Committee on Economic Cooperation of the Ukrainian-Russian Inter-State Commission. It was agreed to continue joint work on the implementation of a priority project to establish a system to provide the Russian Federation and Ukraine with time coordination and navigation support using GLONASS and other global navigation satellite systems, scientific space projects, joint experiments aboard the Russian segment of ISS and cooperation in developing Earth remote sensing systems.

53. On 11 June 2009, an agreement between the Cabinet of Ministers of Ukraine and the Government of the Russian Federation on technology protection measures within the framework of cooperation in the exploration and use of outer space for peaceful purposes and in the design and use of space and rocket technologies was signed at the Ministry of Foreign Affairs of the Russian Federation. The agreement establishes the legal basis for the implementation of measures for technology protection in the course of implementation by Russian and Ukrainian space sector enterprises of joint projects, including those in which third countries are involved. In particular, the agreement sets out the legal requirements that must be met by Russian enterprises wishing to obtain authorization to participate in the Brazilian-Ukrainian Cyclone-4 project and legal conditions for the transfer to Ukrainian enterprises of scientific and technical products generated as a result of such cooperation. Those Ukrainian enterprises will be required to protect Russian technologies and products on the basis of a plan drawn up jointly for that purpose.

54. On 1 September 2009, within the framework of cooperation with the Russian Federation, a regular joint meeting of representatives of the Russian Federal Space Agency, NSAU, the Russian Academy of Sciences and the National Academy of Sciences of Ukraine was held at the National Space Technology Operating and Test Centre (Yevpatoria, Autonomous Republic of Crimea). The participants discussed joint projects and expressed satisfaction at the progress of implementation of the programme for cooperation between the Russian Federation and Ukraine in the exploration and use of outer space for the period 2007-2011. In particular, they noted the successful cooperation between Ukrainian and Russian specialists in implementing the Coronas-Photon research project on solar activity and the significant work accomplished in preparing the technical resources of the National Space Technology Operating and Test Centre for participation in the Phobos-Grunt and Spektr-R (RadioAstron) projects. It was decided that it would be expedient to expand the functional capabilities of the RT-70 radio telescope so that it could be used in implementation of the Phobos-Grunt programme.

55. In order to strengthen scientific ties further, it was decided to create a Ukrainian component of the scientific programme that forms part of the Spektr-UV project and to step up the preparation of an agreement on cooperation in the scientific projects Spektr-UV and Millimetron. The participants agreed to continue talks regarding the participation of Ukrainian specialists in the planned Russian scientific projects Luna-Glob and Interheliozond/Polar-Ecliptic Patrol. They also agreed to introduce a new plan for cooperation in the preparation of scientific experiments aboard the Russian segment of ISS and to draw up, by April 2010, an updated version of the long-term programme of joint scientific research and experiments by the Russian Federation and Ukraine aboard the Russian segment of ISS.

56. Acknowledging the importance of the further development of cooperation between the Russian Federation and Ukraine, the participants considered that it would be advantageous to begin drawing up a draft programme for cooperation between the two countries in the exploration and use of outer space for the period 2012-2016.

57. During the meeting, decisions relating to satellite navigation — in particular the establishment of a ground-based augmentation system to enhance GLONASS — and to the strengthening of ties between Russian and Ukrainian space sector enterprises in the area of production were adopted.

58. Joint working groups were tasked with formulating, by the end of 2009, proposals for cooperation in the area of Earth remote sensing, particularly with regard to the development of an information system for the management and exchange of Earth remote sensing data and the establishment of a shared network of Russian and Ukrainian test sites for the calibration of Earth remote sensing equipment carried aboard spacecraft.

59. Brazil has continued to be a key partner of Ukraine in recent years. Work on the construction of the Cyclone-4 space and rocket complex at the Alcântara Launch Centre is continuing as part of an international project. The Cyclone-4 is a high-performance carrier rocket constructed on the basis of proven technologies. Its characteristics ensure that it will become a leader in the market for services for the launch of satellites into low Earth orbit and geostationary transfer orbit.

60. In March 2009, Aleksandr Turchinov, First Vice-Prime Minister of Ukraine, held a meeting with Carlos Ganem, President of the Brazilian Space Agency, and members of a Brazilian delegation to discuss issues relating to the implementation of the Brazilian-Ukrainian Cyclone-4 project.

61. At the meeting, the participants discussed the status of implementation of the Cyclone-4 project and prospects for the development of cooperation between Brazil and Ukraine with regard to space activities. Mr. Ganem noted that the implementation of the project would be the first step in a series of joint projects. Mr. Turchinov emphasized the importance of the implementation of the project for Brazil and Ukraine, even in crisis conditions, and underscored that the Government of Ukraine was constantly monitoring its progress. The participants expressed confidence that a test launch of the Cyclone-4 carrier rocket would be possible before the end of 2010.

62. On 23 March 2009, senior officials of NSAU met with leaders of the Brazilian delegation and directors of the joint Brazilian-Ukrainian company Alcântara Cyclone Space in Kyiv. The representatives of the Brazilian and Ukrainian space agencies agreed to strengthen their technical cooperation. During the meeting, the participants discussed the possibility of constructing a joint Brazilian-Ukrainian launch complex for the Cyclone-4 carrier rocket at the Alcântara Launch Centre. The Brazilian representatives gave assurances that all major difficulties had been overcome and that it remained only to resolve minor legal formalities relating to the proposed site. The Director-General of NSAU expressed the hope that a large majority of members of the Brazilian parliament would support the planned use of the land for the site.

63. With regard to other potential areas of cooperation between Brazil and Ukraine that offered genuine possibilities for successfully uniting the efforts of Brazilian and Ukrainian specialists in conducting space activities, the following four key areas were identified:

(a) The joint development and construction of space objects and space complexes for Earth research and their systems, subsystems and components;

(b) Cooperation in the area of civilian technologies, beginning with the development and construction of efficient wind power plants with a capacity of 2,000 to 2,500 kilowatts. Pilot activities in this area are already under implementation;

(c) Construction of solid-fuel and liquid-fuel rocket engines;

(d) Development of joint educational programmes on space.

64. China remains an important partner of Ukraine with regard to space activities. A delegation of NSAU headed by the Director-General visited Beijing from 14 to 17 April 2009 as part of an agreement with the China National Space Administration (CNSA). The purpose of the visit was to expand cooperation as part of the plan for cooperation between China and Ukraine for the period 2006-2010, in particular through the implementation of two system projects (exchange of space-related data within the framework of the Chinese Huanjing-1B project and the Ukrainian Sich-2 project) and joint implementation of an ionospheric satellite project.

65. During the talks with CNSA, the key possibility of including some 15 new areas of cooperation in the plan and the steps to be taken in preparation for their implementation in 2009-2010 were discussed.

66. The visit was lent special significance by a meeting of the Director-General of NSAU with Dai Bingguo, member of the State Council of China. During that meeting, a broad range of issues relating to cooperation between China and Ukraine with regard to space activities and ways in which to attract Chinese investment for diverse projects relating to wind and solar power and other advanced technologies were discussed.

67. During the visit, several meetings were held with leading Chinese companies: the China Precision Machinery Import-Export Corporation (CPMIEC), the China Great Wall Industry Corporation (CGWIC) and one of the largest Chinese companies, Sinovel, which manufactures wind turbines. NSAU and CGWIC signed agreements on cooperation in the area of wind and solar power that provide for the construction in Ukraine of wind turbines and wind and solar power plants. These projects will be implemented on the basis of various plans and in accordance with a number of conditions (investment, loans, commodity credit, supply of equipment and the establishment of joint enterprises).

68. At a meeting with the CITIC International Cooperation Company, which attracts funding for projects with other countries through the China Export and Credit Insurance Corporation, it was agreed in a memorandum of understanding to implement a project to build a factory for the manufacture of tractors at the Yuzhny Machine-Building Plant.

69. From 26 to 31 July 2009, a delegation representing CPMIEC visited Ukraine to discuss ways to expand cooperation. During the visit, the Chinese delegation held

talks with senior officials of NSAU and visited the Yuzhnoye Design Office and Arsenal, a State-owned special engineering enterprise. The Research Institute for Radio Engineering Measurements and the Institute for Superhard Materials of the National Academy of Sciences of Ukraine also participated in the talks.

70. The following areas of cooperation were discussed:
- (a) Construction of satellites and use of satellite information;
 - (b) Design of equipment for satellite radio communication;
 - (c) Use of solar energy.

At the end of the visit, the minutes of the meetings were signed.

71. On 26 October 2009, during an official visit to Ukraine by a delegation of the Government of China headed by one of the Vice-Premiers of the State Council, an agreement to expand cooperation in the area of electro-optical infrared systems was signed between China and Ukraine. The Ukrainian signatories were Aleksandr Zinchenko, Director-General of NSAU; Nikolai Likholit, Director and Chief Designer of the company Arsenal; and Dmitry Peregudov, Director of the State enterprise Ukrimash; the Chinese signatories were Xu Dazhe, General Manager of the China Aerospace Science and Industry Corporation; Ji Yanshu, President of CPMIEC; and Zhao Xiao Long, Vice-President of CPMIEC.

72. The parties, noting the effectiveness of cooperation and recognizing their common interest in further pursuing mutually beneficial cooperation, expressed confidence that the cooperation between China and Ukraine would continue to develop with positive results in line with the interests of both countries in the area of outer space.

73. Within the framework of cooperation with Japan, in Tokyo on 9 March 2009 the Director-General of NSAU signed a memorandum of understanding between NSAU and the Sumitomo Corporation, one of the oldest commercial and industrial corporations of Japan. The memorandum of understanding provides for joint efforts to foster the development of alternative energy sources in Ukraine and to reduce emissions of greenhouse gases into the atmosphere, in accordance with the Kyoto Protocol to the United Nations Framework Convention on Climate Change. In conformity with that memorandum and also with a memorandum of understanding between NSAU and Mitsubishi Heavy Industries signed on 10 March 2009, representatives of the two Japanese companies visited Ukraine to discuss issues relating to cooperation in the implementation of wind power projects in Ukraine. As a result of the meetings and talks held in Kyiv and Dnipropetrovs'k, an agreement providing for further exploration of the possibilities for effective and fruitful cooperation in constructing wind turbines for wind power plants was signed by NSAU, Yuzhny Machine-Building Plant, Sumitomo Corporation and Mitsubishi Heavy Industries.

74. With regard to activities to strengthen cooperation with States members of the European Union and of the European Space Agency (ESA) in the area of outer space, it should be noted that the agreement signed on 25 January 2008 between the Government of Ukraine and ESA on cooperation in the peaceful use of outer space entered into force on 25 January 2009. The conclusion of the agreement was Ukraine's first step towards ESA membership. In order to give practical effect to the

agreement, its implementation began with the development of an NSAU-ESA plan of action for 2009, which provides for cooperation in areas such as space science, Earth research programmes, microgravity research, carrier rockets and support for educational activities in the area of space science and technology.

75. In the area of space science, in April 2009 the second seminar on cooperation within the framework of the European GMES initiative was held in Kyiv. During the seminar, German experts proposed the establishment of a joint European-Ukrainian consortium on space weather to be supported by the German Aerospace Centre (DLR), in accordance with the requirements of the third call for proposals under the European Union's Seventh Framework Programme for Research and Technological Development (July-December 2009). The issue will be included in the agenda for the next working meeting with German experts.

76. In the area of Earth research programmes, in February 2009 a seminar was held at NSAU in Kyiv to address legal aspects of the use of aerospace data generated using Earth remote sensing. In particular, DLR specialists offered to provide assistance with regard to any aspect of legal support for the establishment of a legislative basis for the use of such data in Ukraine. In addition, a presentation was given on the law adopted by Germany on 23 November 2007 relating to the security of data obtained from satellites.

77. In the area of microgravity research, six Ukrainian proposals were prepared for an international tender announced by the International Space Life Sciences Working Group for biological and medical experiments aboard ISS.

78. In the area of carrier rockets, the work of Yuzhnoye Design Office specialists in collaboration with representatives of the Italian company Avio to verify the performance of the Vega launch vehicle continued over the course of 2009. As a result of the many talks held, comprehensive responses were provided to the questions raised and note was taken of the comments made by the Avio representatives. The integrated project team, which comprises representatives of Avio and ESA, is expected to adopt a final decision in the near future concerning the delivery of a test model of the Vega launcher for the qualification flight. Meanwhile, talks concerning the serial production of the launch vehicle are being held.

79. With regard to support for educational activities in the area of space science and technology, the possibility of holding consultations regarding ways in which students could participate in ESA and NSAU youth programmes on outer space was raised during discussions with representatives of the ESA International Relations Department. The ESA Education Office responded with the proposal that Ukrainian universities participate in the European Student Moon Orbiter (ESMO) programme. To that end, it is proposed that Ukraine consider the possibility of arranging a cluster launch of the ESMO spacecraft using a Ukrainian carrier rocket. The possibility of the involvement of Ukrainian universities in work on the project was agreed upon informally with the National Aerospace Education Centre for Ukrainian Youth, while the issue of launch services was raised during discussions with representatives of Alcântara Cyclone Space. During the Paris Air Show Le Bourget 2009, representatives of Alcântara Cyclone Space met with leaders of the ESMO project; however, no specific agreement was reached. The possibility of signing a

preliminary bilateral or trilateral memorandum of understanding is being considered.

80. In February 2009, consultations were held with representatives of the European Commission at which a version of the outer space section of the draft association agreement between Ukraine and the European Commission was agreed upon.

81. During the Paris Air Show Le Bourget 2009, the Director-General of NSAU held meetings with Jean-Jacques Dordain, Director General of ESA; Johann-Dietrich Wörner, Chairman of the Executive Board of DLR; and Yannick d'Escatha, President of the French space agency Centre national d'études spatiales. The participants in the meetings discussed current issues relating to cooperation in outer space activities. In addition, emphasis was placed on the efforts undertaken by Ukraine towards obtaining ESA membership. Those efforts were welcomed by the Director General of ESA.

82. Measures are being taken to implement the European Union-Ukrainian twinning project "Boosting Ukrainian Space Cooperation with the European Union", in full conformity with the schedule of work for that project. As at 1 October 2009, the following activities had been organized and carried out:

(a) 15 visits by experts, including four visits to space sector enterprises (in Kharkiv, Dnipropetrovs'k and Yevpatoria);

(b) 13 seminars and training events;

(c) 7 meetings of the project's Steering Committee;

(d) 12 working meetings of European experts, NSAU staff and specialists from the space sector and from the National Academy of Sciences of Ukraine.

83. In 2009, cooperation between Ukraine and Canada was stepped up. From 2 to 5 June 2009, NSAU officials undertook a working visit to Canada, where they met with senior officials of the Canadian Space Agency (CSA), MDA Corporation, Export Development Canada (EDC) and Bombardier.

84. During talks with the President of CSA, a presentation on the potential of the Ukrainian space sector was given and the possibilities of cooperation between Canada and Ukraine in the exploration and use of outer space were discussed. Agreement was reached on investment, the implementation of the project to establish a national satellite communications system for Ukraine and several other joint activities, in particular — in the area of Earth remote sensing — the use of a Ukrainian carrier rocket to launch payloads on behalf of Canada.

85. From 21 to 27 July 2009, the NSAU delegation visited Canada for a second time, as the result of which agreements were finalized with MacDonald, Dettwiler and Associates concerning the involvement of that company in the establishment of the satellite communications system for Ukraine and with EDC concerning a loan to finance that work.

86. On 23 September 2009 in Kyiv, the Director-General of NSAU met with Stockwell Day, Minister for Foreign Affairs and International Trade of Canada, to discuss future areas of space activity in which cooperation between Canada and Ukraine could be developed.

87. A Canada-Ukraine aerospace and aviation business summit organized by NSAU, the Embassy of Canada in Ukraine and the Science and Technology Centre in Ukraine was held on 29 and 30 September in Kyiv. The objective of the event was to establish mutually beneficial ties between Canadian and Ukrainian enterprises and research institutes working in the areas of space and aviation. Representatives of leading Canadian and Ukrainian space and aviation sector enterprises participated in the work of the summit.

88. The main users of the rocket and space technology and services of Ukrainian enterprises (in addition to China, the Russian Federation and the United States of America, as mentioned above), continue to be India, Israel, the Republic of Korea, Saudi Arabia, Turkey and the United Arab Emirates.

89. Cooperation with Azerbaijan and Belarus has also intensified. In 2009, the Cabinet of Ministers of Ukraine signed and approved two framework agreements on cooperation in the exploration and use of outer space for peaceful purposes, one with the Government of Azerbaijan on 9 April and the second with the Government of Belarus on 12 June.

90. On 4 September 2009 in Minsk, the Director-General of NSAU and Mikhail Myasnikovich, Chairman of the Presidium of the National Academy of Sciences of Belarus, signed a document entitled "Areas for future cooperation between enterprises and organizations of Ukraine and the Republic of Belarus in implementing the Framework Agreement between the Cabinet of Ministers of Ukraine and the Government of the Republic of Belarus on cooperation in the exploration and use of outer space for peaceful purposes".

91. Planned areas of cooperation between the two countries include the joint implementation of space research and space applications, in particular the joint design and construction of mini-satellites and microsatellites for Earth remote sensing, payloads for Earth remote sensing satellites (electro-optical and spectral equipment) and systems for the management, reception and processing of information from Earth remote sensing satellites, and the development of state-of-the-art technologies for processing Earth remote sensing data for various applications. It was agreed that information received from Belarusian and Ukrainian Earth remote sensing satellites would be shared. During the visit to Belarus, the NSAU delegation visited the United Institute of Informatics Problems of the National Academy of Sciences of Belarus, the State unitary scientific engineering enterprise Geoinformation Systems and the open joint-stock company Peleng, where delegation members learned about the scientific and production capacity of those organizations.

92. One of the most recent major events among the international space activities of Ukraine was the participation of NSAU in the first international specialized symposium "Space and global security of humanity", which was held in Cyprus and focused on possibilities for the establishment of a global aerospace system for monitoring natural and anthropogenic phenomena. In an address to the symposium, the Director-General of NSAU announced that a framework for the implementation of Ukrainian State policy on space activities for the period up to 2030, defining the priorities and strategic areas of Ukraine's space activities, would be prepared and approved by the end of 2009. The programme will focus particularly on the development of global security systems. In particular, the framework document will

provide for the expansion of strategic cooperation with the Russian Federation and the implementation of joint science and technology programmes with regional economic groups of countries of the Commonwealth of Independent States (CIS) and the European Union and with Brazil, China, India and the United States of America.

93. The establishment of a national geographic information system as part of the European GMES initiative and GEOSS and the strengthening of cooperation with the Global Ocean Observing System were presented as key results of the implementation of Ukrainian State policy. In addition, NSAU, together with institutions of the National Academy of Sciences of Ukraine, forms part of the Infrastructure for Spatial Information in the European Community and cooperates with ESA and the space agencies of Germany, France, the Russian Federation, other CIS member States and other countries (more than 20 countries in total).

94. In that regard, the Director-General of NSAU affirmed that Ukraine supports the proposal to establish an international aerospace system for monitoring natural and anthropogenic phenomena as an effective additional international mechanism, recognized by the United Nations, that will make it possible to exploit the aerospace potential of every spacefaring nation, including Ukraine, with the aim of ensuring the global forecasting and prevention of natural and man-made disasters.
