



# General Assembly

Distr.: General  
29 April 2009

Original: English/Russian

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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

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## **II. Replies received from Member States**

### **Philippines**

[Original: English]

#### **1. Background**

1. The Science and Technology Coordinating Council-Committee on Space Technology Applications (STCC-COSTA) is the national body of the Philippines responsible for providing coordination, cooperation and information dissemination on space activities. It is also responsible for technological and human resource developments and issues relating to all fields of space technology in support of environmentally sound and sustainable national development.

#### **2. Members**

2. The following Government and private entities are members of STCC-COSTA: Philippine Council for Advanced Science and Technology Research and Development; Philippine Atmospheric, Geophysical and Astronomical Services Administration; University of the Philippines Diliman; National Mapping and Resource Information Authority; Bureau of Soils and Water Management of the Department of Agriculture; Mines and Geosciences Bureau of the Department of Environment and Natural Resources; Office of Civil Defense of the Department of National Defense; Philippine Institute of Volcanology and Seismology; Philippine Institute of Environmental Planners; Advanced Science and Technology Institute of the Department of Science and Technology; Philippine Council for Aquatic and Marine Research and Development; Commission on Information and Communications Technology of the Department of Transportation and Communications; National Telecommunications Commission.

#### **3. Responsibilities**

3. In conducting its tasks, STCC-COSTA coordinates national and international activities on space technologies and their applications; draws up national strategies and action plans for space technology development and oversees their implementation by appropriate agencies; facilitates the exchange of information among space technology practitioners; monitors Philippine participation in local and international seminars, workshops, conferences and technical/regional working groups in the area of space technologies and their applications; facilitates the sharing of facilities and equipment, the exchange of expertise and collaboration on projects; serves as the national secretariat and focal point on space technology applications; and assists and advises national agencies on matters pertaining to space technology applications and related fields.

#### **4. Space technology applications activities and initiatives for 2007**

4. Details of the activities and initiatives carried out by the Government of the Philippines in the space technologies applications sector can be found on the website of the Office for Outer Space Affairs of the Secretariat (<http://www.unoosa.org>).

## 5. Other

5. In 2007, the secretariat of STCC-COSTA was involved in the following activities, among others:

(a) Workshop on Spatial Data Infrastructure, held in Bangkok from 22 to 24 February: the Workshop was a joint effort by the Subcommittee on Space Technology and Applications of the Association of Southeast Asian Nations (ASEAN), the Japan Aerospace Exploration Agency (JAXA) and the Asian Institute of Technology (AIT), which acted as host. The Workshop was aimed at facilitating the sharing of experiences gained by the ASEAN member States and Japan in the development of national and regional spatial data infrastructure, in other words in the development of the technology, policies, standards and human resources necessary to acquire, process, store, distribute and improve the use made of geospatial data. Representatives from national survey mapping and space technology agencies from the following countries attended the Workshop: Brunei Darussalam, Cambodia, Indonesia, Lao People's Democratic Republic, Malaysia, Philippines, Singapore, Thailand and Viet Nam. Participants from Australia and Japan, as well as from the Economic and Social Commission for Asia and the Pacific and AIT, shared information on the latest concepts, developments and means of utilization of spatial data infrastructure in Australia and Japan, and elsewhere. Participants exchanged views on follow-up activities and made the following recommendations: (i) all States that had not yet done so should conduct in-country consultations with relevant stakeholders for the establishment of national spatial data infrastructure; (ii) additional technical assistance should be provided to some countries, such as Cambodia, the Lao People's Democratic Republic, Myanmar and Viet Nam, on various aspects of spatial data infrastructure, tapping into resources available under the Sentinel Asia project to support the activities; and (iii) a second workshop on spatial data infrastructure should be conducted;

(b) ASEAN-Pakistan Workshop on Geo-informatics, held in Islamabad from 10 to 12 September 2007. The specific objectives of the Workshop were: (i) to share information and experience on geo-information between Pakistan and ASEAN member States; (ii) to establish linkages between institutions in ASEAN member States and the Space and Upper Atmosphere Research Commission (SUPARCO) of Pakistan for human resource development and research and development cooperation in geo-informatics; and (iii) to identify joint activities to be implemented in the future in the form of training opportunities and workshops, and research and development. Three main working groups for joint cooperative research between SUPARCO and the ASEAN Subcommittee on Space Technology and Applications were developed, namely the working group on land use/land cover change, the working group on food security and the working group on hazard mitigation. On the basis of the working groups, three projects were developed for submission and possible funding under the ASEAN-Pakistan Cooperation Fund;

(c) Several project proposals submitted through the ASEAN Committee on Science and Technology (and the ASEAN Subcommittee on Space Technology and Applications) were referred and evaluated;

(d) The following international collaborations aimed at utilizing space technology applications for monitoring emerging infectious diseases: (i) participation in two workshops of the Asia-Pacific Economic Cooperation

Technology Foresight Center Initiative on converging technologies to combat emerging infectious diseases, one held in Tokyo in May 2007 and the other in Taipei, Taiwan Province of China, in October 2007; and (ii) participation in the Regional Expert Meeting on Using Space Technology for Avian Influenza Monitoring and Early Warning in Asia, held in Bangkok in September 2007;

(e) Collaborative activities with the Space Environment Research Center of Kyushu University in Japan on studies on seismo-electromagnetics;

(f) Initial informal talks on possible sandwich research programmes with the Center for Environmental Remote Sensing of Chiba University in Japan (under development);

(g) In-house pre-feasibility and technical feasibility studies on small satellite technology transfer and development (under development);

(h) Activities related to Sentinel Asia of the Japan Aerospace Exploration Agency (JAXA). The Fourth Sentinel Asia Joint Project Team Meeting, held in Makati City, the Philippines, from 5 to 7 September 2007, was in support of such activities;

(i) Initiatives in support of the Wideband InterNetworking Demonstration and Test Satellite programme (in coordination with the Advanced Science and Technology Institute of the Department of Science and Technology of the Philippines).

## **Ukraine**

[Original: Russian]

1. In 2008, Ukraine continued to implement the recommendations of the Third United Nations Conference on the Exploration and Peaceful Uses of Outer Space (UNISPACE-III) within the framework of national projects and international cooperation efforts. Also in 2008, the national scientific and technical space programme of Ukraine for the period 2008-2012, the fourth such programme since Ukraine gained independence, was approved.

2. The objectives contained in the space programme for the period 2008-2012 are to further develop Ukraine's space activities and make effective use of those activities to solve urgent problems of national security and to promote the introduction of advanced technologies and raise the level of science education in Ukraine. The basic tasks foreseen in the framework of the space programme for the period 2008-2012 include increasing the effectiveness with which space resources are used; developing advanced technologies; improving the quality of international cooperation; and creating and making effective use of space resources that meet the needs of those State bodies that have responsibility for maintaining the defensive capabilities and ensuring the national security of Ukraine.

3. The tasks and measures contained in the space programme for the period 2008-2012 correspond to the strategic priorities established by the Presidential Decree of 12 February 2007 on Ukraine's national security policy. Those priorities are the following:

(a) To create conditions that will ensure the health and safety of the population (through a balanced system based on the use of natural resources, the prevention of man-made disasters and the mitigation of consequences arising from such disasters and the achievement of high levels of safety for the environment and from nuclear and radiation sources);

(b) To ensure favourable external conditions for the development and security of the State, by: (i) creating a secure international environment around Ukraine and strengthening the systems of collective security at the European and transatlantic levels; (ii) developing harmonious, mutually beneficial and good neighbourly relations with other States in the region; (iii) promoting, as an essential condition for national and regional security, mutually beneficial cooperation between Ukraine and the Russian Federation based on pragmatism and openness; (iv) intensifying interaction between Ukraine and Canada and the United States of America, between Ukraine and the States members of the European Union and other European countries and between Ukraine and leading States in the region; (v) creating the basis for Ukraine to become a full member of the European Union; and (vi) ensuring that information remains secure even as the structure of the global information community becomes more integrated.

4. By implementing the measures contained in the space programme for the period 2008-2012, it will be possible to do the following:

(a) To introduce in Ukraine advanced technologies for dealing with major issues related to sustainable development (such as the rational use of natural resources, the control of emergencies and the monitoring of crops) by establishing a permanently operating array of Sich satellites for Earth observation and a national system for use of the data obtained that is harmonized with international systems;

(b) To develop promising space technologies, modernize Ukraine's ground-based infrastructure for space activities and create conditions for the commercial utilization of Ukrainian carrier rockets;

(c) To create a satellite telecommunications network using a Ukrainian communications satellite;

(d) To expand international cooperation.

5. Thus, Ukraine's space activities in 2008 were directed at implementing high-priority projects of the space programme for the period 2008-2012, fulfilling its obligations within the framework of international programmes and projects and strengthening the effectiveness of the space sector through restructuring and commercialization, the broader introduction of advanced space technologies, the creation of conditions favourable to greater competition and private initiative and the establishment of extensive cooperation with other States and international organizations. Information about the implementation of those high-priority projects is given below.

## **1. Space technology development**

### *Global navigation satellite systems*

6. In 2008, work continued on deploying the Ukrainian coordinate time and navigation system (SKNOU) using global navigation satellite systems (GNSS) such

as the global positioning system (GPS) and the Global Navigation Satellite System (GLONASS). The coordinate time and navigation system is based on technology accepted for the European Position Determination System (EUPOS) project and involves the creation of three precise and user-friendly subsystems.

7. Five control/correction stations have been deployed and are operating on a trial basis in Kharkov, Dunayivtsi, Chernigov, Feodosiya and Evpatoriya. Within the resulting pentagon (covering 45 per cent of the territory of Ukraine), the principles of a system covering all of Ukraine have been tested. With the deployment of additional stations during the next three years, 90 per cent of the territory of Ukraine will be covered.

8. Work on establishing three more control/correction stations (in Yavorov in Lviv oblast and Lugansk and Mukachevo in Zakarpattia oblast) and integrating them into SKNOU is due to be completed by the end of November 2009. The results of round-the-clock testing of the stations indicate that the software and hardware are functioning well.

9. A main and a back-up navigation field control centre have been established in Dunayivtsi and Kharkov, where raw data from the stations are collected for joint processing. On the basis of operational trials with the SKNOU segment already deployed, the programme packages for ensuring the proper functioning of the SKNOU geodesic subsystem after data transmission sessions have been refined.

10. With the processed data, posted on the website of the navigation field control centres, users possessing dual-frequency receivers can perform geodesic tasks after data transmission sessions throughout and beyond Ukraine with 1-2 cm accuracy using standard software packages. The data can be used in determining the coordinates of spacecraft and aircraft, in matching space and aerial photos for purposes of Earth remote sensing, in testing new kinds of technology etc.

11. The development of software for a wide-area differential correction subsystem operating at present with GPS signals is nearing completion, the present focus being on the use of GLONASS data.

12. During tests, local differential correction data and wide-area differential correction data derived from the raw data have been delivered in real time to users within a 100-km action radius of the individual network stations. According to preliminary estimates, the wide-area differential correction data derived with the existing SKNOU segment will enable a large-scale user with a single-frequency navigation receiver to determine its position to within 1 m (horizontally) and 2 m (vertically) throughout Ukraine.

13. The system that has been created is based exclusively on domestic GLONASS and GPS monitoring resources. With the coverage of Ukraine that has been achieved and the means of data delivery to users that have been tested, it is possible to start introducing the system for various users within Ukraine and in nearby parts of neighbouring countries.

14. In 2007 and 2008, at the meetings of the Ukrainian-Russian subcommittee on space industry cooperation, the question of creating a joint differential correction and monitoring system was frequently discussed, and the question is now being considered at the governmental level in Ukraine and the Russian Federation. The committee on economic cooperation of the Ukrainian-Russian Interstate

Commission held its third session in Kyiv on 28 April 2008. That session led to the signing of a protocol in accordance with which the National Space Agency of Ukraine (NSAU) and the Federal Space Agency of the Russian Federation, among others, were requested to launch a joint project for the creation of a single navigational time zone for Ukraine and the Russian Federation on the basis of GLONASS and other GNSS. That project is comparable in scale with the European Geostationary Navigation Overlay Service (EGNOS) project of the European Union. Agreement has been reached on a plan for creating a single navigational time zone based on GLONASS. Ukraine's share of the work for creating the joint differential correction and monitoring system will be carried out within the framework of the programme for the period 2008-2012.

15. A plan has been prepared for testing technology for data exchange between the Ukrainian centre for navigation field control and the Russian centre for differential correction and monitoring (in Moscow). Again, Ukraine's share of the work involved will be carried out within the framework of the space programme for the period 2008-2012.

16. For commercializing the use of GLONASS, the Russian Institute of Space Device Engineering and the Ukrainian Research Institute of Radio Measurements (in Kharkov) are engaged in a pilot project involving the establishment of a regional navigation system in Vinnitsa oblast in Ukraine. In August 2008, a presentation on the project was made in the offices of the Vinnitsa oblast authorities.

17. In order to establish a legal basis for the cooperation in question, a draft agreement has been prepared by the Government of Ukraine and the Government of the Russian Federation on implementation of the project for the creation of a single navigational time zone for Ukraine and the Russian Federation on the basis of GLONASS and other GNSS; the draft has been approved by NSAU and is currently being examined by the relevant Russian ministries and departments. Preparations for the signing of the agreement are due to be completed by the end of the first half of 2009.

18. Ukraine's cooperation with the European Union under the EGNOS-Galileo programme, provided for in the cooperation agreement dated 1 December 2005 between Ukraine and the European Union and its member States on a civil global navigation satellite system, is to take place with the involvement of the Kharkov, Dunayivtsi and Evpatoriya control/correction stations as part of the ground-based infrastructure of the EGNOS system.

19. Within the framework of Ukraine's cooperation with the Russian Federation and States members of the European Union, effective economic structures can be created for the provision of coordinate time and navigation services to users in Ukraine and neighbouring countries on a commercial basis. Such joint activities may prove to be a serious basis for the development of transboundary cooperation between Ukraine and neighbouring States that are members of the European Union in, for example, preparing for the European football championship to be held in 2012 and in the run-up to the winter Olympic Games to be held in Sochi, Russian Federation, in 2014. Relevant work is foreseen to be carried out in the framework of the programme for the period 2008-2012.

*National satellite communication system*

20. NSAU is continuing to work on the establishment of a national satellite communication system. On 3 May 2007, the Cabinet of Ukraine decided on the establishment of the national satellite communication system, including the construction of Ukraine's first telecommunications and broadcasting satellite. The document containing such a decision provides for the legal, organizational and technical measures necessary to enable the satellite to be launched in 2011. NSAU has been designated the State customer for the satellite, which will be used in the development of a national satellite-based network for television and radio broadcasting, data transmission and Internet service provision.

21. It is foreseen that the satellite will be placed in orbit during the third quarter of 2011 after being launched on a Ukrainian Zenit carrier rocket from the Baikonur space centre. Proposals for participation in the construction of the satellite have already been received from a number of companies and NSAU is in the process of selecting the company with which it will cooperate in the project, the cost of which, including the launching cost, will be 1.3 billion hryvnias. One third of the necessary financial resources will be provided from the State budget, as the satellite will support State programmes and be used in meeting the needs of the Ministry of Defence, the Ministry of Transport and Communications and the Ministry for Emergency Situations, among other ministries. The remainder is to be obtained from investors. Ukraine is interested in securing the participation of Belarus and the Republic of Moldova, as well as of the Transcaucasian republics that will be able to receive signals from the satellite.

*Earth remote sensing*

22. With a view to expanding and modernizing the Earth observation system Sich, work continued in 2008 on the Sich-2 spacecraft, with an optical radiometer having a resolution of about 8 m. The launching of Sich-2 is planned for 2009.

23. Work continued in 2008 on the development of elements of a geographical information system intended to be part of the European Global Monitoring for Environment and Security (GMES) system and the Global Earth Observation System of Systems.

24. In that context, the First All-Ukrainian Conference on Aerospace Observations for Sustainable Development and Security was held in Kyiv from 3 to 5 June 2008. Over 150 leading space scientists and space agency and company experts attended from Belarus, France, Germany, Israel, Italy, Kazakhstan, Poland, the Russian Federation, Ukraine and the United States.

**2. Space research**

25. Ukraine's space research activities focus mainly on: Earth and near-Earth space; extra-atmospheric astronomy and astrophysics; and space biology, microgravity physics and technological development.

26. In 2008, satellite and ground-based data were processed and carefully analysed as part of an investigation into large-scale wave processes in the ionosphere and the atmosphere.



27. In preparation for the international RadioAstron project, equipment is being developed to support the antenna capabilities of the NSAU National Centre for the Management and Testing of Space Resources.

28. The next stage, which consisted of preparations for high-priority biology and materials science experiments within the framework of the long-term Ukrainian-Russian programme of scientific and technical studies in the Russian segment of the International Space Station, was completed.

29. Preparations continued for the following international scientific projects: the World Space Observatory/Ultraviolet (WSO/UV) project, which uses the Spektr-UV satellite, the Phobos-Grunt and Rezonans missions and the Groza experiment on board a Chibis microsatellite. Ukrainian specialists are continuing to develop scientific equipment as part of those preparations.

30. Basic development work continued on promising space technologies under an agreement between NSAU, the Centre national d'études spatiales (CNES) of France and the International Association for the Promotion of Cooperation with Scientists from the Newly Independent States of the former Soviet Union (INTAS) on joint bidding for NSAU/CNES/INTAS projects relating to such technologies. Within the framework of such projects, basic scientific and technical work is being done on the development of atomic clocks for space systems, of heat pipes and fuel cells for spacecraft and of technology for the processing of data gained by observing Earth from space.

### **3. Space systems**

31. Following the establishment of a main reference room at the National Centre for the Management and Testing of Space Resources, work is continuing on the creation and operation of an NSAU information analysis system.

32. Following test runs, Ukraine's system for the monitoring and analysis of conditions in outer space, which can be used in international programmes for minimizing space debris and preventing emergencies caused by space objects, has started operating. The tasks of the system include: detecting possible threats to the national security of Ukraine; finding and tracking pieces of space debris that constitute a serious hazard for spacecraft; forecasting the times and areas of impact of potentially dangerous space objects; and analysing the Earth observation possibilities of spacecraft and their overflights of given territories. The system is a source of strategic information about the space activities of all States engaging in such activities and a guarantor of Ukraine's national security.

33. In a striking example of what the system can do, on 17 January 2008 the launching of a Jericho II ballistic rocket from near Tel Aviv, Israel, was detected. The ballistic target was tracked for almost 90 seconds by the observation and monitoring facilities of the National Centre for the Management and Testing of Space Resources (in Evpatoriya), and the coordinates of the launch site and the point of impact were calculated. In February 2008, when the USA-193 satellite (also known as NROL-21) was destroyed in orbit by United States missile defence resources, Ukraine's electronic observation facilities tracked and monitored the satellite in orbit and detected its destruction and the presence of fragments.

#### **4. Cooperation with international organizations**

##### *Cooperation with the Committee on the Peaceful Uses of Outer Space*

34. During 2008, Ukraine participated in the following: the forty-fifth session of the Scientific and Technical Subcommittee of the Committee on the Peaceful Uses of Outer Space, held from 11 to 22 February 2008; the forty-seventh session of the Legal Subcommittee of the Committee, held from 31 March to 11 April 2008; and the fifty-first session of the Committee, held from 11 to 20 June 2008. At those sessions, Ukraine's representatives took an active part in the discussions on all key agenda items.

##### *Cooperation with the Inter-Agency Space Debris Coordination Committee*

35. NSAU continues to work on minimizing the pollution of space. In its space activities, Ukraine takes account of the recommendations of the Inter-Agency Space Debris Coordination Committee, of which NSAU is a member, and is focusing on the following activities:

- (a) Preventing the formation of space debris and reducing the amount of space debris resulting from the launch of Ukrainian carrier rockets;
- (b) Preventing space pollution caused by the operation of Ukrainian spacecraft;
- (c) Studying space debris with the help of Ukrainian electronic facilities;
- (d) Developing and introducing technical documentation on the general requirements with respect to limiting the pollution of near-Earth space through the use of Ukrainian space technology.

#### **5. Launch vehicles**

36. In 2008, eight Ukrainian-built carrier rockets were launched successfully: two were of the Dnepr type, one was of the Zenit-3SLB type and five were of the Zenit-3SL type.

37. The Zenit-3SLB carrier rocket was launched from the Baikonur space centre. One of the Dnepr carrier rockets was launched from the Yasny launch base (Orenburg oblast, Russian Federation) and the other from the Baikonur space centre. The Zenit-3SL carrier rockets were launched from the Morskoy Start (Sea Launch) floating launch pad in the Pacific Ocean.

38. On 28 April 2008, the first commercial launch of a modernized Zenit carrier rocket, under the Nazemny Start (Land Launch) programme, took place at the Baikonur space centre. The launch was carried out by International Space Services Inc. (of which the Yuzhnoye Design Office is a member), the Yuzhmash manufacturing company and a number of Russian organizations. The Zenit-3SLB (designed by the Yuzhnoye Design Office) was made up of a Zenit-2SB (Yuzhnoye and Yuzhmash), a DM-SLB upper stage (Energiya Rocket and Space Corporation) and a fairing (S.A. Lavochkin Scientific Production Association). It placed in geostationary orbit, on behalf of Israel, the AMOS-3 multipurpose satellite (weighing 1,300 kg) for high-resolution digital television broadcasting via cable and general national networks, which will replace AMOS-1. With its broader functional

possibilities, AMOS-3 will be able to cover the Middle East, Europe, Africa and parts of South and Central America.

### **Bilateral cooperation**

39. In 2008, Ukraine's cooperation with other States in space exploration and the peaceful uses of outer space was based on international treaties relating to the exploration of outer space, on the international obligations of Ukraine regarding space activities and on current Ukrainian legislation governing space activities.

40. Ukraine's policy with regard to such international cooperation was guided by the following core principles:

- (a) Compliance with international obligations relating to space activities;
- (b) Accommodation of the aims and priorities of Ukraine's foreign and national security policy;
- (c) Strengthening of the position of Ukrainian businesses in the global market for space technology and services;
- (d) Concentration of efforts on high-priority space activity areas.

41. The main international cooperation efforts focused on creating an international legal environment favourable to the participation of Ukrainian businesses involved in the space sector in international space projects and in foreign trade, and ensuring the sustained, active presence of such businesses in the space services market.

42. Ukraine's many years of collaboration with the Russian Federation are based on close cooperation among enterprises, joint participation in international space projects, the use of Russian launch complexes for the launching of Ukrainian carrier rockets and the existence of a long-term cooperation programme and a coordinated inter-agency plan of action premised on a long-range vision regarding the development of space technology.

43. In 2008, Ukraine's collaboration with the Russian Federation continued to focus on the international commercial space projects Sea Launch, Dnepr, Land Launch and Cyclone-4 and on preparations for experiments on board the Russian segment of the International Space Station.

44. On 12 February 2008, the presidents of the two States signed a joint plan of action that provided, among other things, for the intensification of work under the Russian-Ukrainian programme for the period 2007-2011 for collaboration in space research for peaceful purposes. The two sides agreed on technology protection measures and on the development and use of rockets and spacecraft. They also signed a protocol regarding amendments and additions on intellectual property and confidential information to the agreement between the Government of Ukraine and the Government of the Russian Federation on collaboration in the investigation and uses of outer space for peaceful purposes dated 27 August 1996.

45. In 2008, the subcommittee on space industry cooperation of the committee on economic cooperation of the Ukrainian-Russian Inter-State Commission held its fifth and sixth sessions, at which present and future collaboration in exploring and using outer space and in developing and using rockets and spacecraft was considered. The subcommittee paid particular attention to the implementation of,

inter alia, the following joint projects: Land Launch, Dnepr, the Russian segment of the International Space Station, CORONAS-PHOTON and Ionosat.

46. A protocol based on the results of the sixth session provides, inter alia, for the following:

(a) To continue work on the Russian segment of the International Space Station and CORONAS-PHOTON projects, fundamental applied research and the development of Earth remote sensing resources and the use of such sensing data;

(b) To establish a joint Ukrainian-Russian enterprise for the production of end-user navigation instruments and the equipping of navigational information systems;

(c) To prepare for the signature of an agreement between the Government of Ukraine and the Government of the Russian Federation on the implementation of a project for the creation of a single navigational time zone covering Ukraine and the Russian Federation based on GLONASS and other GNSS;

(d) To hold a meeting to consider the implementation of the long-term programme of Russian-Ukrainian scientific investigations and experiments on board the Russian segment of the International Space Station with the participation of Ukrainian and Russian businesses and other entities;

(e) To design improved variants of the Zenit launch vehicle for the Baikonur space centre with a view to increasing the competitiveness of the Land Launch programme;

(f) To cooperate by Roskosmos in launches of Sich-2 and of experimental navigation equipment within the framework of the programme for the period 2008-2012, using Dnepr launch vehicles;

(g) For NSAU and Roskosmos to create a working group tasked with considering legal questions regarding the use of the results of intellectual activities involved in space projects.

47. Brazil remained a very important partner of Ukraine. At a meeting between NSAU representatives and senior managers of the Brazilian Space Agency, held in Brasilia on 28 February 2008, the Brazilian participants were informed about the status of work on developing the Cyclone-4 launch vehicle and space rocket complex. The meeting led to an agreement on bringing forward planned Cyclone-4 project implementation measures.

48. China continues to be a significant partner of Ukraine in the space sector and joint projects are being carried out successfully within the framework of a plan for the period 2006-2010 for Ukrainian-Chinese cooperation in the exploration and peaceful use of outer space that was signed at the fifth meeting of the Ukrainian-Chinese subcommittee on such cooperation, held in Beijing from 5 to 9 June 2006. The plan provides for the joint implementation by Ukrainian and Chinese enterprises of projects for the development of rocket and space technology. It covers 29 joint projects in the following areas: launch vehicles, satellites, space hardware (rocket and spacecraft components), and space science and electronics.

49. The two parties have noted that the aims of Ukraine's Ionosat project and of the Chinese project for the development of a seismo-electromagnetic satellite are

similar and complementary, and that there is scope for mutually beneficial cooperation in their implementation. Various levels of cooperation have been identified, ranging from scientific information exchange to the combining of the two projects into a joint Chinese-Ukrainian project. The two parties have agreed to initiate mutually beneficial cooperation in the field of space data exchange within the framework of the Chinese Environment-1-B project and the Ukrainian Sich-2 project. To that end, China and Ukraine have agreed to exchange information about the technical parameters of those projects.

50. In 2008, there was an intensification of cooperation between Ukraine and the United States. A framework agreement between the Government of Ukraine and the Government of the United States on cooperation in the exploration and use of outer space for peaceful purposes was signed in Kyiv on 31 March 2008. The purpose of the agreement is to create a framework for space cooperation between NSAU and the National Aeronautics and Space Administration of the United States on a basis of equality and reciprocal advantage, taking into account new trends in and approaches to space activities under current conditions. The agreement establishes the legal basis for space cooperation between Ukrainian and United States companies and other enterprises. It will help to promote the all-round development of long-term cooperation and partnership between Ukraine and the United States and make possible the high-quality implementation of joint initiatives of interest to the scientific sector and the industrial investment sector of both countries.

51. Measures to intensify space cooperation with States members of the European Union and with the European Space Agency (ESA) focused on the creation of conditions favourable to the gradual acquisition by Ukraine of the status of ESA member. An important step in that direction was the signing, on 25 January 2008, of an agreement between the Government of Ukraine and ESA on cooperation in the peaceful use of outer space, thus creating the organizational and legal basis for the promotion of space cooperation between Ukrainian and European companies and other enterprises. Among the potential areas of cooperation enumerated in the agreement are: space sciences; Earth research programmes and their applications; telecommunications; microgravity studies; the development and use of ground-based space facilities; and launch vehicles.

52. On 17 June 2008, representatives of NSAU and of various other Ukrainian organizations and institutions engaged in space exploration and space science activities met with representatives of ESA at NSAU headquarters. At that meeting, the following issues were considered with a view to identifying promising areas of space cooperation: the Galileo project; the GMES project; the Ionosat project; life sciences; prospects for using the RT-70 radio telescope in European programmes; areas of cooperation in the field of education between NSAU and ESA; issues regarding the establishment of a working group and of a 2008 workplan for such a group; and the possibility of holding a conference of EURISY in Ukraine in 2009.

53. As a result of the meeting, a working group was established to identify areas of cooperation between Ukraine and ESA in the exploration and peaceful use of outer space.

54. Also with a view to intensifying cooperation between Ukraine and the European Union on space-related matters, a framework agreement was concluded between NSAU and the German Aerospace Center (DLR) on 29 May 2008

in Berlin. The agreement is the legal foundation for space cooperation between NSAU and DLR on a basis of equality, mutual advantage and parity. The cooperation established by the agreement will cover areas such as: space science (astrophysics and the study of the solar system); the observation and study of climatic and environmental changes on Earth; the development and creation of orbital and suborbital platforms and the corresponding space instrumentation for observation of the Earth's surface, navigation, weightlessness studies, telecommunications and scientific experiments; space infrastructure; space law; the management of space activities; and training.

55. Pursuant to the framework agreement on space cooperation concluded between NSAU and CNES, in March 2008 representatives of the two entities signed a protocol on future cooperation in the welding of highly rigid alloys. In addition, a NSAU-CNES working group was established.

56. Preparations were completed for a Ukrainian-European space project under the European Union's twinning mechanism for the establishment of partnerships and exchanges of experience between public entities of Ukraine and of States members of the European Union. An official ceremony took place inaugurating the twinning project for intensifying Ukrainian space cooperation through collaboration between enterprises and organizations of Ukraine and States members of the European Union in space activities, including their developmental, legal, scientific and industrial aspects, in Kyiv on 22 April 2008. The main twinning project tasks include: education and training for Ukrainian space sector workers in areas such as space legislation, personnel policy and high-technology norms and standards; and cooperation in research under the European Commission's Seventh Framework Programme.

57. On 16 and 17 July 2008, at NSAU headquarters, a seminar attended by European experts was held on questions relating to the participation of Ukrainian specialists in research projects under the Seventh Framework Programme. At the seminar, a general presentation was given on the Programme and ways in which enterprises, institutions and organizations affiliated to NSAU might participate in the Programme were discussed. In the context of the twinning project, the first of six planned seminars on the legal framework for the space activities of European Union member States and Ukraine was held at NSAU headquarters from 27 to 29 August 2008. The basic aims of that first seminar, the topic of which was the institutional systems for space activities of France, Germany and Ukraine, as well as the European Union, were to familiarize participants with the present legal system for the regulation of space activities in European Union member States and to identify possibilities for cooperation between NSAU and ESA in the field of space law.

58. The third meeting of the supervisory board of the twinning project took place at NSAU headquarters on 11 September 2008. It was attended by project leaders from France, Germany and Ukraine, the permanent project adviser, NSAU specialists, European experts and representatives of the twinning project's administrative office. At the meeting, the third-quarter project report and a workplan for project activities during the fourth quarter were discussed and approved.

59. The scope of cooperation between Ukraine and Egypt continues to expand. A framework agreement between the Government of Ukraine and the Government of

Egypt on cooperation in the exploration and peaceful use of outer space was signed on 9 April 2008. With the signing of the agreement, a legal basis was created for space cooperation between Ukraine and Egypt.

60. In 2007, an ambitious project for the construction, launching and putting into operation of the Earth remote sensing satellite Egyptsat-1 was completed. The satellite was launched from the Baikonur space centre and placed in orbit by a converted Dnepr carrier rocket on 17 April 2007. A ceremony to mark the inauguration of the Egyptian ground control station for Egyptsat-1, in Cairo, which has taken over control of the satellite from the ground control station in Evpatoriya, was held on 10 April 2008.

61. The principal users of rocket and space technology and services offered by Ukrainian enterprises (in addition to Brazil, China, Egypt, France and the United States, which have been mentioned) are the following:

(a) The Republic of Korea: the manufacture of components and systems for the third-stage propulsion unit of the Republic of Korea's carrier rocket and for theoretical calculations in support of carrier rocket development and testing;

(b) India: the execution of a contract for the development of a 200-ton-thrust liquid-oxygen/kerosene engine for an Indian carrier rocket; the development of equipment for a production and test facility for the building of propulsion units; the construction of launching and other technical systems for Ukrainian carrier rockets at India's space centre; and scientific projects;

(c) Italy: the development and construction of an engine for the fourth stage of the Vega carrier rocket;

(d) Turkey: the establishment of an aerospace rocket complex; and the joint construction of observation satellites;

(e) Bulgaria: preparations for the signing of a framework agreement between NSAU and the Bulgarian Space Agency on cooperation in the exploration and peaceful use of outer space; and the signing of a framework agreement between the Government of Ukraine and the Government of Bulgaria on space cooperation.

62. With regard to cooperation with Kazakhstan, the following main directions and priorities of space cooperation between Ukraine and Kazakhstan were determined at a conference on modern space technologies held in Almaty, Kazakhstan, in October 2008:

(a) Monitoring and forecasting of space weather;

(b) Creation of scientific space instruments for studying Sun-Earth connections and the state of the ionosphere;

(c) Aerospace monitoring of the natural environment and of the ecological state of different land areas;

(d) Participation in the WSO/UV project;

(e) Creation of ground infrastructure for a high-precision satellite navigation system;

(f) Training, retraining and further training of professionals working in the space sector of Kazakhstan.