United Nations A/AC.105/857/Add.2

General Assembly

Distr.: General
7 April 2006

Original: English/Russian/Spanish

Committee on the Peaceful Uses of Outer Space

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

Note by the Secretariat

Addendum

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V.06-52745 (E) 210406 210406

II. Replies received from Member States

Argentina

[Original: Spanish]

1. The National Commission on Space Activities (CONAE) of Argentina assumed the Chair of the Committee on Earth Observation Satellites (CEOS) in November 2005. The twentieth plenary meeting of the Committee will take place in Argentina in November 2006.

2. CONAE represents Argentina at the intergovernmental Group on Earth Observations (GEO), the international initiative for the creation of the Global Earth Observation System of Systems. It took part in the Third Earth Observation Summit and the European Space Conference, held in Brussels from 16 to 18 February 2005.

3. A joint meeting between the CEOS Working Groups on Calibration and Validation and on Information Systems and Services was held on the premises of the CONAE Teófilo Tabanera Space Centre (CETT) in Córdoba Province, Argentina, from 7 to 11 March 2005.

4. As a member body of the Charter on Cooperation to Achieve the Coordinated Use of Space Facilities in the Event of Natural or Technological Disasters (International Charter "Space and Major Disasters"), CONAE was responsible for coordination of the Charter from April to October 2005. In addition to the meetings of the Board and the Executive Secretariat of the Charter, CONAE organized a regional seminar attended by representatives of bodies involved in emergency management in Latin America with a view to providing more information on the functioning of the Charter and the mechanisms for activating it. In addition, CONAE will provide training to regional experts in order to enable them to act as project directors when emergencies occur.

5. CONAE participated in the meetings of the Board and the Executive Secretariat of the Charter, held in Bangalore, India, from 4 to 7 October, and also attended a seminar in the same city to mark the Charter's fifth anniversary.

6. CONAE took part in the International Seminar on the Use of Space Technology for Disaster Management: Prevention and Management of Natural Disasters, held in Algeria from 22 to 26 May 2005 under the auspices of the Office for Outer Space Affairs of the Secretariat and the European Space Agency (ESA).

7. An Earth Observation Partnership of the Americas seminar was held on 2 and 3 June in Buenos Aires. The seminar brought together 60 representatives of various agencies from the American continent involved in Earth observation and also representatives of various relevant international bodies.

8. The workshop on capacity-building in Latin America: Earth observations in the service of water management was held in Buenos Aires from 26 to 28 October 2005. It was attended by 100 representatives of agencies involved in water management in the region. The workshop was supported, on the Argentine side, by CONAE and the National Water Institute and, from the United States of America, the National Aeronautics and Space Administration and the National Oceanic and Atmospheric Administration, as well as the Integrated Global Observing Strategy Partnership, CEOS, the Global Energy and Water Cycle Experiment, the

International Hydrological Programme of the United Nations Educational, Scientific and Cultural Organization (UNESCO), the World Meteorological Organization and GEO.

9. The cooperation agreement between CONAE and the Italian Space Agency on the development of the Italian-Argentine Satellite System for Emergency Management (SIASGE) was signed in Rome on 7 July. SIASGE, a cooperation project between Argentina and Italy, involves the formation of an extended constellation of satellites using the latest radar technology, an extensive training programme for satellite information users and the development of computer tools and space data transmission networks. The technology will allow access to information that is crucial to the prevention, monitoring, mitigation and assessment of natural and man-made disasters, such as fires, floods, hurricanes, avalanches, oil spills, crop pests, desertification, droughts and earthquakes. The space segment of SIASGE comprises a constellation of six satellites, four belonging to the Italian COSMO-SkyMed mission and two to the Argentine observation and communications satellite (SAOCOM).

10. The United Nations/Argentina/European Space Agency Workshop on the Use of Space Technology for Human Health was held at CETT from 19 to 23 September. The Workshop, attended by representatives of more than 20 American countries, focused on two topics, telemedicine and landscape epidemiology, which were subsequently adopted as region-specific projects. Work began on developing the project on epidemiological surveillance in the region, with satellite data and training provided by CONAE.

11. The Fifth Workshop on Education in Remote Sensing in the Common Market of the Southern Cone was held at the CONAE facilities in Córdoba Province from 11 to 13 November. At the Workshop, which was organized jointly by the National University of Luján and the Society of Latin American Specialists in Remote Sensing (SELPER), CONAE made a presentation of the Spanish version of the software Terraview, adapted for use in the countries of the Common Market of the Southern Cone and developed in the framework of cooperation between CONAE and UNESCO. The software will be distributed free of charge for educational purposes.

12. CONAE participated in the International Conference on the Use of Space Technologies for the Conservation of Natural and Cultural Heritage, held in Campeche, Mexico, from 28 November to 2 December 2005 as part of its activities in the context of the space agencies' open initiative on the use of space technologies to support the World Heritage Convention. CONAE continued to develop its activities relating to the Iguazú National Park and Inca Trail (Qhapac Ñan) projects.

13. Framework cooperation agreements were signed with La Serena University, Chile, the Government of the Fourth Region of Chile and the University of Costa Rica.

Belarus

[Original: Russian]

1. The space system for remote sensing, which is being developed by the Republic of Belarus, consists of a space segment and a ground segment.

2. The space segment comprises the production of remote sensing satellite "BelKA", built jointly with the Federal Space Agency of the Russian Federation. In particular, in 2005 Belarusian scientists developed and produced special equipment for that spacecraft. BelKA was tested in comprehensive ground trials and its launching has been scheduled for 2006.

3. The ground segment comprises the establishment of the system's telecommunications infrastructure. Through high-speed optical-fibre channels, stations receiving space information are integrated into a common network to which are also linked the various Belarusian bodies that use the information. Those bodies include the Ministry for Emergency Situations, the "Belgosles" state forestation association and the Committee on Land Resources, Geodesy and Cartography at the Council of Ministers.

4. Currently, a 3.7-metre (m) mirror-diameter antenna is used to receive, from the Meteor-3M satellite, space photographs for preliminary processing and for the creation of a databank.

5. In 2005, a new, 9 m mirror-diameter antenna complex was set up in Minsk, permitting the reception of high-speed flows of remote sensing information from BelKA and, in future, from Russian remote sensing spacecraft.

6. Technology for receiving and processing space photographs was developed with a view to solving problems in various applications.

7. The Belarusian-Russian programme entitled "Development and use of prospective space facilities and technologies in the interests of economic and scientific development of the Union State" (referred to as "Kosmos-SG" and, below, as "the Programme") was launched in the last quarter of 2004.

8. The Programme pursues the following main objectives:

(a) Creating, within the Union of Belarus and the Russian Federation, a common scientific, technological and information framework in the area of space engineering;

(b) Using as effectively as possible, and developing further, the space potential of the Russian Federation and Belarus with a view to addressing social and economic issues and solving problems in fundamental and applied science and in technology;

(c) Providing, on a common basis, science-oriented technology for various research, technological and economic sectors in the Russian Federation and Belarus;

(d) Creating permanent jobs for highly qualified staff in the enterprises and organizations of the Russian Federation and Belarus.

9. There are four main thrusts of joint work under the Programme. One is the creation of a single system for providing Russian and Belarusian users with remote sensing space information by developing a common databank, a high-speed telecommunications system and basic technologies for theme-based processing of that information. Two consist in the development of a new technological and instrument base for microsatellites and a telemetric and measuring system for outer space. The fourth main thrust is the development of the ground segment of an inter-State navigational information system of extended precision.

10. The Second Belarusian Space Congress was held at the United Institute of Informatics Problems of the National Academy of Sciences of Belarus (NAN) in Minsk from 25 to 27 October 2005. The Congress was organized by NAN, the Institute and the National Space Council at the Council of Ministers of the Republic of Belarus.

11. The aims of the Congress were:

(a) To discuss new findings in space-related areas;

(b) To prioritize targets with respect to the development of space resources and technology;

(c) To broaden international cooperation in the area of space research;

(d) To broaden the scope of joint efforts undertaken by the business communities of Belarus and other countries, firms, companies, scientists and experts involved in the implementation of space programmes;

(e) To broaden the scope of partnerships between governmental and civil organizations, enterprises and entities exemplifying various types of ownership that have an interest in space research and exploitation.

12. During the Congress, 94 reports were presented by Belarusian, Russian, Swiss and Ukrainian scientists. The reports covered the following areas:

(a) New materials for space technology;

(b) Satellites and send-receive equipment;

(c) Processing of terrestrial surface images;

(d) Geoinformation systems and their applications;

(e) Environmental monitoring and emergency situations;

(f) Space technology and education;

(g) Space technology applications.

13. As part of the work accomplished at the Congress, working parties discussed issues related to joint space-technology projects and programmes that may be undertaken in the future.

14. The conclusion of an intergovernmental agreement with the Russian Federation on the development of a joint system for remote sensing is under consideration.

15. Steps were taken in 2005 to establish useful contacts with Ukraine in the area of space technology. Accordingly, a group of Belarusian scientists presented reports at the Fifth Ukrainian Space Research Conference and junior researchers from Belarus participated in a training seminar on space research for young scientists held in Kiev. Furthermore, an agreement for scientific and technical cooperation was signed in May 2005 between the United Institute of Informatics Problems of the National Academy of Sciences of Belarus, the main user of Kosmos-SG in the Republic of Belarus, and the Space Research Institute of the National Academy of Sciences of Ukraine.

16. Issues related to a space-technology joint project with Ukraine are under study.

17. In 2005, the work of the National Space Council consisted mainly in coordination activities and in the resolution of issues related to the development of the Belarusian space system for remote sensing and to the launching of the Belarusian-Russian programme Kosmos-SG.

Cuba

[Original: Spanish]

1. Cuba has continued to carry out its space research and applications aimed at the peaceful use of outer space and is committed to strengthening strategies for its sustainable development. The key activities carried out in 2005 are described below.

1. Space meteorology

2. High-resolution satellite images have been an extremely valuable tool for the meteorological forecasts made by the Institute of Meteorology (INSMET) of the Ministry of Science, Technology and the Environment.

3. These accurate forecasts and the preventive evacuation measures implemented by the Civil Defence helped to protect the population and many areas of economic importance at risk from hurricanes Dennis, Katrina, Rita and Wilma.

4. Advances in meteorological research include the continued development and installation of new computer programs for the digital processing of meteorological data.

2. Remote observation

5. Remote observation of the Earth is being used in various fields of science, agriculture and industry, among others, with a view to achieving sustainable development in Cuba. Below are some examples of the applications implemented this year.

6. A map of the vegetation cover within the Almendares-Vento basin in Havana Province (scale 1:50,000) was produced. In order to map the vegetation, aerial photographs (scale 1:37,000) and classified Land Remote Sensing Satellite (Landsat) images were used, supported by field checks involving the characterization of units of vegetation. The region's semi-natural vegetation formations, main permanent crops and areas of pasture were demarcated. A description was provided of the vegetation formations found in areas that were still typical collection sites in the middle of the twentieth century.

7. In order to detect and monitor fires in any type of vegetation and also to diagnose and forecast the risk of fire, a short- and medium-term automated system was implemented in Cuba using remote sensing, through the joint work of specialists from INSMET and the National Institute for Space Research (INPE) of Brazil. The system is designed to detect fires using images from the satellites of the National Oceanic and Atmospheric Administration (NOAA) of the United States of America, the Geostationary Operational Environmental Satellites (GOES) and the Terra and Aqua satellites, which guarantee the spatial coverage of the entire country as well as high temporal frequency. Active fires and their locations, spatial distribution and evolution over time are detected using the method commonly

known as hot spot detection. Data on heat sources are extracted from satellite images through the digital processing of the images and the use of different multispectral algorithms. The data on the sources detected are consolidated using different geographical information systems (GIS). The data generated by the system are supplied to users through different types of notification and early warning system in almost real time (15 minutes after the satellite passes), primarily via the Internet and other network services.

8. NOAA and GOES satellite images have been used to analyse the impact of Saharan dust clouds on rain, tropical cyclone formation and health in the Atlantic region, the Caribbean Sea and the Gulf of Mexico because they are key to clarifying the role played by atmospheric contaminants in weather and climate processes. Dust clouds originating from storms in the Sahara Desert move beyond the African continent over the cooler, damper sea air, reaching altitudes of between 5 and 7 kilometres (km). Caught up in the trade winds, they move westwards across the Atlantic and can cover the distance to the Caribbean Sea in a very short time before continuing across the Gulf of Mexico.

9. The systematic observation of satellite images reveals the almost total absence of clouds at the centre of the Saharan air mass, which is also indicated by the marked temperature inversion in the air mass. The dust clouds must therefore inhibit cloud cover and thus negatively affect tropical cyclone formation and the rain process, favouring drought and not the opposite processes, as some authors have thought.

10. In 2005, an album of templates was produced for the interpretation of SPOT-5 Earth Observation Satellite images with 2.5-metre spatial resolution, which has made it easier to interpret the main components of the images and to update the map of Cuba (scale 1:25,000).

11. A spectral library was also established using the main land cover components of the relief on the topographical map. The library shows the spectral curves of the main land relief that can be identified in the image and that is represented in topographical maps, with a view to checking the digital classifications and photographic interpretation of the relief.

12. The high-resolution images taken at the INSMET station were used to continue detection and tracking of sea currents and to monitor oil spills at sea.

13. The Cuban chapter of the Society of Latin American Specialists in Remote Sensing (SELPER) has continued to implement numerous advanced training activities in technical areas.

3. Space sciences

14. In the area of space sciences, the Institute of Geophysics and Astronomy of the Ministry of Science, Technology and the Environment has continued to monitor the Sun, the ionosphere and the geomagnetic field in Cuba and to relay solar and geomagnetic data to centres worldwide.

15. A programme has been developed to diagnose solar events and forecast proton flux using the LabVIEW graphical programming language, which consists of seven main subprograms and makes possible the following: qualitative diagnosis, which determines whether or not the event is a proton event on the basis of the

radiation emission data; calculation of proton flux density at energies greater than 10 mega electronvolts (MeV), which also includes heliolongitude and solar wind parameters; calculation of the energy spectrum index, which indicates the correlation between the proton flux density and the particle energy; calculation of the time delay from the time at which the radiation event is recorded at its peak until the proton flux density start and peak reach the near Earth; and calculation of the relaxation time up to the level of 37 per cent after the peak. The program also makes it possible to display proton flux parameters in the form of a table and to calculate the time and date of the proton flux density start, peak and relaxation.

16. A multispectral characterization of the waiting time of impulsive solar events with a very short duration was carried out. The potential relationship between waiting-time distributions and the stage of evolution of the radiation event was analysed within the parameters of the self-organized criticality (SOC) theory by adjusting the distribution of τ according to the law $F(\tau) = A\text{-}\tau$.

17. The behaviour of 16 meteor showers observed in the period 1995-1999 and in 2001 was analysed, with the mass and luminous intensity distributions determined for each individual year. Meteor swarms are described using power laws for the mass and luminous intensity distributions of the particles. Most swarms did not vary in scale according to mass and luminous flux. Data on the uniformity of the swarms was obtained by comparing the distributions of a given shower, using the mass distribution index β and the activity level of the shower for the period under analysis.

18. The variation in the mass distribution index for Leonids in the years 1999 and 2001 was also analysed. This parameter was found to increase at times of maximum activity, there being a relative increase in the number of small particles with a smaller mass, and thus a smaller size, compared with the number of larger particles, towards the interior of the cluster filaments.

19. A study was carried out of the variability of electron density for the bottomside profile of electron concentration, Ne (h), at fixed altitudes over Havana. Two periods of solar activity (high and low activity) and two climatic seasons (winter and summer) were considered. The programs used were NHPC (inversion of ionograms to electron density profile), version 4.30, and CARP (computation of average representative profiles), version 2.00. The results show that variability decreases as solar activity increases and over the course of the day; that there is less variability in winter than in summer; and that, in general, at fixed altitudes, variability increases above 220-240 km during the night and above 140-160 km during the day.

20. An energy model with similar dynamics to the magnetospheric-ionospheric system was developed using cellular automata. This involves simulating the behaviour of the magnetospheric tail using a 60×100 square matrix, ensuring that a small border of the matrix is closed (this corresponds to the sector of the Earth's current sheet) while the other borders are open. The status of a cell with the coordinates (i, j) at a time t is characterized by the stored energy Et(i, j). Each cell is connected to the ionosphere through the respective magnetic tube. When a cell exceeds the threshold value Emax, part of its energy is released into the neighbouring cells and into the ionosphere (Eionf), which is connected to the corresponding magnetic tube. The local reallocation of energy in the magnetosphere

causes a local change of conductivity in the ionosphere (the particles, pitch-angle diffused, are precipitated into the loss-cone along the field line and the atmospheric gases are ionized). The model is adjusted using the energy balance equation for the current ring, which takes into account the real Dst values.

21. The potential relationships between acute myocardial infarction, geomagnetic pulsations and variability in magnetic declination were explored. A total of more than 5,500 cases of heart attacks reported at five hospitals in the city of Havana in the periods 1970-1972 and 1992-2000 were used as examples. The local index of variability of Kappa (D) magnetic declination was established. Pc1-type geomagnetic pulsation data were obtained from the Soroa station and magnetic declination data from the Havana station, both in Cuba. The superposed epoch method was used and power spectra were calculated using the fast Fourier transform (FFT) method. It was found that: (a) senior citizens (>=65 years) and women appear to be more sensitive to an increase in the variability of magnetic declination; and (b) Pc1 geomagnetic pulsations seem to be associated with a lower incidence of heart attacks on the same day or the subsequent day.

4. Distance learning

22. Distance learning gained great momentum this year, with two Cuban television channels dedicated to broadcasting courses covering a range of subjects at the various educational levels, as well as specialized courses designed to enhance the population's general level of culture. In 2005, a course on basic astronomy was offered and was well received by the public, and 100,000 copies of a book on astronomy were printed in periodical form.

23. Courses have continued to be offered in different languages, with German, Italian and Portuguese introduced this year, as well as specialized courses and programmes in various subject areas that helped to broaden the population's knowledge and culture in general.

24. The Cuban chapter of SELPER has recognized the importance of the subject of remote sensing and the need to include it in study programmes. As part of that effort, a pilot project has been developed, entitled "Introducing the subjects of remote sensing and geographical information systems (GIS) in primary and secondary education". Its fundamental objective, as part of ongoing efforts to improve the level of culture in Cuba, is to promote the learning of those subjects from an early age. The project will help to improve teaching methods in geography, biology and other related science subjects and to train students to use the knowledge acquired from remote sensing and GIS to understand and take better care of the environment and to get to know our planet, since knowledge of those tools will enable them to work with images and maps for various purposes. It will also be very useful for the teachers participating in the project to master the new techniques, since they will acquire additional knowledge as well as learn new teaching methods for their subjects based on the use of remote sensing and GIS. This will make their classes more comprehensible, broadening the knowledge of children and young people by familiarizing them with space technology and improving teachers' own level of training.

5. World Space Week

25. World Space Week in Cuba was launched at a press conference, where it was announced that the Week would mark the fortieth anniversary of INSMET, in recognition of its efforts and achievements.

26. The press and radio reported on the objectives of World Space Week and the Fourth National Workshop on Outer Space and Its Peaceful Uses was held at the National Capital.

Slovakia

[Original: English]

1. Development of organizational structures

1. The Slovak Commission for Research and Peaceful Use of Space (SCRPUS) continued to participate in the administrative activities of the European Union (EU) space-related bodies. The Chairman of SCRPUS participated at meetings of the High Level Space Policy Group in Brussels as the representative of Slovakia and accompanied the Minister of Education of the Slovak Republic at the meeting of the EU Space Council in Brussels.

2. The first official contact between the European Space Agency (ESA) and the Slovak Republic started in the second half of 2005. It was agreed that negotiations would continue over the next period. The final goal of the negotiations is to formulate a draft cooperation agreement between ESA and the Slovak Republic.

3. The negotiation between the European Organization for the Exploitation of Meteorological Satellites (EUMETSAT) and the Slovak Republic on the status of future cooperation continued during 2005. As a result, Slovakia became a full member of EUMETSAT starting on 3 January 2006. It is a milestone not only for the country but for EUMETSAT as well, because Slovakia is the first country from the group of Central and Eastern European States to have achieved full membership in EUMETSAT.

4. The Slovak Republic became a member of the Group on Earth Observation at the Third Earth Observation Summit in Brussels in February 2005.

5. The members of SCRPUS participated in the international conferences for the joint European Commission and ESA Global Monitoring for Environment and Security (GMES) initiative, which were held in Berlin in September 2005 and in Warsaw in December 2005.

2. Space meteorology

6. The Slovak Hydrometeorological Institute (SHMI) is involved in the Common Project of Central European Countries (CONEX II) project. Development of nowcasting methods, based on distance measurements including meteorological satellite data and numerical weather prediction model outputs, are some of the topics of the project. The algorithm for fog and low cloud detection developed by the Central Institute for Meteorology and Geodynamics (ZAMG) of Austria, a partner of SHMI, was installed and later developed for more effective detection of low clouds and fog in critical conditions (dusk). Other algorithms, such as

convective storm detection, atmospheric motion vectors and forecasted satellite image products commenced with routine operation based on new data from the Meteosat Second Generation (MSG).

7. Sub-agreements between the Italian Meteorological Service (UGM) and members of Hydrological Satellite Application Facility (H-SAF) consortium were signed on 1 September 2005. H-SAF is a common five-year project of EUMETSAT and EUMETSAT member States, including Slovakia, with the aim of developing products for precipitation, snow cover and soil moisture from satellite data to support operational hydrology. SHMI is involved in the calibration and validation of precipitation products and hydrological validation. With regard to hydrological validation, there are five sub-catchments selected in the Slovak territory on which the H-SAF products will be tested by means of hydrological models and several impact studies of new products on operational hydrology will be developed.

3. Remote sensing

8. The Forest Research Institute (FRI) in Zvolen has performed activities focusing mainly on the research and applications of satellite and aerial remote sensing in the survey and monitoring of forest conditions.

9. Analysis of spatial distribution of damage to forests by abiotic agents was performed with regard to spatial distribution of forests derived from the Landsat Thematic Mapper (TM) satellite imagery. Wind was identified as the most harmful agent for the spruce forests. At the end of 2004, results of the previous work were confirmed. Slovakia was struck by a windstorm that caused enormous damage to natural resources. Extensive damage to forests caused by wind occurred above all in the High Tatra Mountains. The methods of aerial and satellite remote sensing were applied to discover the damaged forest areas promptly. The cooperation of FRI Zvolen at the international level for damaged area identification was characterized by data support to the Institute for Environment and Sustainability (IES) of the Centre Directorate-General (JRC) of the European Commission in Ispra, Italy, where an independent assessment of the extent of the calamity has been performed. Cooperation has also taken place at the national level. The visual interpretation of the disaster area was carried out using aerial photographs provided by the Ministry of Defence at Lesoprojekt Zvolen. The classification of the disaster area was performed at FRI Zvolen using Landsat TM/Enhanced Thematic Mapper Plus (ETM+) and SPOT 5 Multi Spectral (XS) satellite imagery. A large destroyed area was identified in the High Tatra Mountains, where 6,400 hectares (ha) of forest stands were destroyed and a further 3,900 ha of forest stands damaged. The total acreage of damaged forests interpreted from aerial photographs is 9,700 ha in the High Tatras. Large damage of forests has also been identified from satellite imagery in the Low Tatra Mountains, which showed a decrease by 4,100 ha of forests against the reference year 2003. Besides, damaged areas of forests were identified in the Orava region and in the area of the Slovenské rudohorie mountains.

10. Satellite remote sensing was applied for the spatial analysis of the Norwegian spruce forests dying in the Kysuce region. The time series analysis of Landsat TM/ETM+ imagery since 1990 to 2005 was carried out.

11. The expert for remote sensing from FRI has been working at JRC-IES since 2004. The project being carried out focuses on the analysis and processing of

medium spatial and high spectral resolution satellite imagery from the Moderate Resolution Imaging Spectroradiometer (MODIS) and the Medium Resolution Imaging Spectrometer (MERIS). FRI Zvolen prepared a special study on the acquisition, processing and utilization of imagery from the Advanced Spaceborne Thermal Emission and Reflection Radiometer (ASTER), above all for the identification of deforestation for JRC-IES. The study area was located in the Russian Far East, identified as a "hot" area with regard to illegal cutting and timber markets.

12. Research activities of the Institute of Geography of the Slovak Academy of Sciences (SAS) in Bratislava, in cooperation with the Slovak Environmental Agency in Banska Bystrica in the field of remote sensing during the period 2004-2005, were focused on the identification, analysis and assessment of the land cover changes in Slovakia by application of the Image and Coordination of Information on the Environment (CORINE) Land Cover 90 (CLC90) and CLC2000 data layers (derived from Landsat TM images).

13. The largest CLC changes in Slovakia were as follows: changes of forest into transitional woodland/shrub (580.3 square kilometres (km^2)); changes of transitional woodland/shrub into forest (529.3 km^2); enlargement of complex cultivation patterns by 165.5 km^2 (most of it at the cost of arable land, by 132.1 km^2); and enlargement of settlement, industrial, sport and leisure areas and transport units by 44.6 km^2, and water bodies with their inlet channels by 64.2 km^2 (http://atlas.sazp.sk).

14. The Slovak Environmental Agency (SAZP) was active in the following remote sensing projects/tasks during 2005: analyses of land cover mapping and changes; windstorm forest damage assessment; potential risk map of selected parasites; real time Global Positioning System (GPS) service; and participation in the GMES initiative. The Remote Sensing Department of the Slovak Environmental Agency is located in Banska Bystrica, and comprises four staff members who use the following products: Unix ArcInfo, Win ArcGIS, ArcView and ArcIMS of the Environmental Systems Research Institute, Inc.; Geomatica of PCI Geomatics; and many open source software supported by Defiant and Solaris. Further information is accessible at http://www.sazp.sk/DPZ; e-mail: dpz@sazp.sk.

15. CLC2000 was financed by the Slovak Ministry of the Environment and the European Environmental Agency. As a project subcontractor, the Institute of Geography of SAS in Bratislava was responsible for visual interpretation. The Remote Sensing Department of the Slovak Environmental Agency completed the following tasks: dereferencing of LANDSAT 7 ETM data over the whole Slovak territory; image enhancement for visual interpretation; producing a mosaic of cloud areas by aero survey datasets; geographical information system (GIS) processing of coverage and changes; topology building; statistical analyses; collection of meta-information; promotion of results through a website and on a CD-ROM; and development of a map service. All results are publicly available on the Internet at http://www.sazp.sk/corine and http://atlas.sazp.sk.

16. After the 19 November 2004 windstorm in the High Tatras region of the Slovak Republic, an assessment of the damaged forest area and volume was made in immediate cooperation between JRC, the Slovak Environmental Agency, FRI and the High Tatras National Park (TANAP). Several satellite data sources were used—

RADARSAT, LANDSAT ETM, SPOT4, MODIS and ASTER. GIS layers from CLC2000 along with data from the FRI Zvolen database were later used for an overall revitalization study for the High Tatras territory, coordinated by the Ministry of the Environment of the Slovak Republic.

17. "Spatial modelling of selected parasites" is a project based on cooperation with the Parasitological Institute of SAS in Košice and uses datasets collected by the Regional State Veterinary Service, the Institute of Public Health and SHMI. Multi-temporal analyses are carried out to find spatial relations and to develop risk maps of potential occurrences of selected parasites such as *Echinococcus multilocularis*, *Trichinella spiralis* and *Ixodes*. These parasites cause several diseases, especially alveolar echinococcosis, trichinellosis and Lyme borreliosis. Spatial time sequence analyses of precipitation, temperature, land cover and other relevant phenomena are being prepared for a model prototype. Results would be published in 2006-2007 in the form of an interactive map service on the Internet and as a wall calendar for hospitals (see also http://www.sazp.sk/parasites).

18. The Soil Science and Conservation Research Institute (SSCRI) in Bratislava has recently focused on the remote control of subsidized areas. The area-based subsidies play a key role in the agricultural sector and contribute to the prosperity of agricultural firms. The subsidies to the agricultural sector represent a major part of the European budget, which is also the reason why emphasis is placed on the control of the correct use of subsidies. The EC takes this fact into consideration and uses more methods of control. The most effective method is the Control with Remote Sensing (CwRS), which allows the control of large areas in a short time at a relatively low cost.

19. In the 2005 campaign, the total number of applications for area-based subsidies was 13,797; the number of applications controlled by remote sensing was 773 (5.6 per cent of all applications).

20. The Slovak administration decided to have three control sites:

(a) LEVI, defined by a square 20×20 km;

(b) RIMA, defined by a square 20×20 km;

(c) TREB, defined by a rectangle 20×25 km.

Two sites were covered by IKONOS images (LEVI and TREB) and one site by QuickBird images (RIMA).

21. The number of satellite images used for this campaign was 20-14 high resolution (HR) images and 6 very high resolution (VHR) images (see table 1). All the satellite images were processed (geometrically corrected) by the experts of SSCRI.

Table 1
The high resolution and very high resolution satellite images used in the 2005 campaign

2005	*LEVI*		*RIMA*		*TREB*	
Autumn	17 January 2005 SPOT4 20 m		17 January 2005 SPOT4 20 m		30 March 2005 IRS-P6 LISS-III 23 m	
Spring 1	15 April 2005 SPOT5 10 m		22 April 2005 SPOT4 20 m		27 April 2005 SPOT4 20 m	
Spring 2	21 May 2005 SPOT5 10 m		21 May 2005 SPOT5 10 m		23 May 2005 SPOT5PAN 3 m	
VHR	20 May 2005 IKONOS-2 1 m	23 May 2005 IKONOS-2 1 m	22 May 2005 QuickBird 1 m	14 June 2005 QuickBird 1 m	14 May 2005 IKONOS-2 1 m	14 May 2005 IKONOS-2 1 m
Summer 1	17 June 2005 SPOT5 10 m	17 June 2005 SPOT5PAN 3 m	21 June 2005 SPOT5 10 m	21 May 2005 SPOT5PAN 3 m	16 June 2005 SPOT5 10 m	

22. CwRS performed by SSCRI represents the operational and real usage of remote sensing data. Results obtained during this process led to specific decision-making and financial consequences.

23. The method of CwRS turned out to be effective; large areas can be easily controlled in a short time and costs are relatively lower than on-the-spot controls. Geometric corrections of satellite images are very important constituents of CwRS. Other activities such as boundary check of the parcels and crop checks are done using these images. Use of satellite images with inappropriate geometric accuracy would lead to doubts in the evaluation and control of the applications chosen for CwRS.

4. Space physics and technology

24. The Institute of Experimental Physics, SAS in Košice, the Faculty of Mathematics, Physics and Informatics of Comenius University in Bratislava, the Astronomical Institute of SAS in Tatranska Lomnicka, the Geophysical Institute of SAS in Bratislava and other groups working in space physics continued both experimental and theoretical research of the physical phenomena in space. The results are based on the analysis of measurements in space by the instruments of those institutes as well as on analysis of measurements by other instrumentation on satellites. The main focus areas for research include magnetospheric physics, heliospheric phenomena and planetary explorations.

5. Space biology and medicine

25. The Institute of Experimental Endocrinology of SAS in Bratislava, the Institute of Normal and Pathological Physiology of SAS in Bratislava, the Institute of Biological and Ecological Sciences, Faculty of Sciences of Šafárik University in Košice, the Institute of Biochemistry and Genetics of Animals of SAS, the Institute of Measurement Sciences of SAS and other groups continued their exploration of various topics in the life sciences in space within the framework of projects involving wide international cooperation.

Turkey

[Original: English]

1. Turkey has gained experience in the know-how and infrastructure for designing and manufacturing low-Earth orbit (LEO) remote sensing satellites within the framework of the BilSAT research satellite project. That project was implemented by the Scientific and Research Council of Turkey-Information Technologies and Electronics Research Institute (TUBITAK-BILTEN) from 2001 to 2003. With a view to further improving its experience and infrastructure, a second mini-satellite project (RASAT) has been initiated by TUBITAK-BILTEN. In 2005, the process of designing RASAT commenced. Moreover, parts for its sub-systems were procured and the production of the engineering module of several sub-modules has started. Within the framework of the RASAT project, the design of a new lithium battery has been completed and the prototype has been built and operated successfully. One of the other ongoing processes is the research and development of a new generation satellite computer in space, which will also implement "spacewire" technology, a European Space Agency (ESA) standard.

2. One of the major milestones of the RASAT project in 2005 was the procurement of an airborne optical imaging system through an international tender. A multinational company won the tender and the contract was signed in 2005. BilSAT operated successfully throughout 2005 and many experimental payloads have been and are still being tested in space.

3. The Weather Forecasting Department, Remote Sensing Division of the Turkish State Meteorological Service (TSMS) has received satellite data from meteorological satellites and has also processed and distributed those data to the users for various applications with the Meteorological Satellite Ground Receiving System (MUYAS).

4. TSMS will receive the data from Europe's first operation polar-orbiting weather satellites (MetOp), which will be launched by the European Organization for the Exploitation of Meteorological Satellites (EUMETSAT) and ESA. TSMS is participating in the MetOp programme through EUMETSAT and ESA. The efforts to upgrade the hardware and software of MUYAS also continue.

5. Istanbul Technical University initiated efforts to establish a Space Systems Design Laboratory. Within the context of that initiative, work is under way for the establishment of a clean room of class 10,000 and the purchase of a space simulation chamber.

6. Istanbul Technical University informed the public about national space research, space-shuttle expeditions, space tourism, space engineering and rockets through the media with a view to creating a general public opinion on space activities. The University also initiated contacts with countries such as Italy and Ukraine for cooperation on space-related projects.

7. The 2006-2009 Strategic Plan has been prepared by the Space Engineering Department of Istanbul Technical University, which is continuing its accredited education on space technologies.

8. After the Bingöl earthquake in 2003, the General Directorate of Disaster Affairs (GDDA) of the Turkish Ministry of Public Works and Settlement applied to become an authorized user of the Charter on Cooperation to Achieve the Coordinated Use of Space Facilities in the Event of Natural or Technological Disasters (International Charter "Space and Major Disasters") in 2004, in order to receive pre- and post-disaster satellite images. GDDA also applied to become an authorized user of the Disaster Monitoring Constellation (DMC). TUBITAK-BILTEN is already a member of DMC.

9. GDDA participated in the United Nations/Algeria/European Space Agency International Seminar on the Use of Space Technology for Disaster Management: Prevention and Management of Natural Disasters, held in Algiers from 22 to 26 May 2005.

10. Light measurements of variable stars, binary stars, star groups and some astronomical objects in the solar system were carried out by lecturers and graduate students at Ankara University Observatory. In addition, international scientific research in some areas of astrophysics was also carried out. The major ongoing research topics are:

(a) Photometric analysis of the close binary stars;

(b) Intrinsic variable stars;

(c) Stellar spectra and analysis.

11. Turksat International Satellite and Cable TV Operator A.S. provide a number of services in the field of satellite communication and conduct research studies in new application fields for utility purposes.

12. Turksat provides reliable and economic uplink service for domestic and international television and radio broadcasters. In addition, it provides a service chain that makes possible information transfer in various forms with very small aperture terminal (VSAT) service through satellites.

13. Within the scope of the studies for the Galileo project, Turksat A.S. runs the three Ranging and Integrity Monitoring Stations (RIMS) at Golbasi campus and is an active participant in the project. With EUMETSAT, Turksat has proposed to set up three ground stations to be used for national satellites in Turkey.

14. In order to speed up the space activities performed in Turkey, the International Conference on Recent Advances in Space Technologies—RAST 2005 was held in Istanbul, Turkey, from 9 to 11 June 2005.

15. In 2005, a number of research and development projects related to space activities were launched, especially on satellite infrastructure for communication, reconnaissance and surveillance.

Activity plan for 2006

16. In 2006, the establishment of the Space Systems Design Laboratory (SSDL) will be completed at the Space Engineering Department, Faculty of Aeronautics and Astronautics, Istanbul Technical University. SSDL will contain a design office and a clean room where production of satellite subsystems and some of their tests and settings will take place. A space simulation chamber will be installed where thermal vacuum tests of the satellite and its subsystems will be carried out. The production of a cube-shaped satellite will commence within the framework of the CubeSat Project (http://cubesat.calpoly.edu/new/index.html), as a first applied product at the laboratory.

17. Istanbul Technical University will continue its projects on space technologies (space and space propulsion systems) together with its national and international partners, within the framework of the national space studies plan, which was announced at the meetings of the Science and Technology Superior Commission.

18. After assuming its responsibilities as an "authorized user" of the International Charter "Space and Major Disasters", GDDA will start sharing its knowledge with other relevant state institutions that also assume duties in case of natural disasters.

19. In 2006, the manufacture of the modules of the RASAT satellite will continue. BILTEN also seeks to improve its infrastructure for testing and manufacturing LEO satellites in 2006.

United Kingdom of Great Britain and Northern Ireland

[Original: English]

1. The 2005 UK Space Activities brochure was distributed during the forty-third session of the Scientific and Technical Subcommittee of the Committee on the Peaceful Uses of Outer Space, held from 20 February to 3 March 2006. The brochure is the annual publication of the British National Space Centre (BNSC) that covers the events and activities of the past 12 months and looks ahead to the coming year.

2. In 2005, space activities in the United Kingdom gained a higher profile than ever before, at times dominating the news headlines. The successful landing of the Huygens probe on the surface of Titan on 14 January 2005; the remarkable results from Mars Express throughout the year; the successful March 2005 launch of the UK-built communications satellite, Inmarsat-4, followed by the launch of the small but high resolution imaging satellite TopSat from the Plesetsk Cosmodrome in the Russian Federation in late October; and finally the Galileo In Orbit Validation Element Giove-A, built by Surrey Satellite Technology Ltd. and launched from the Baikonur Cosmodrome in Kazakhstan in late December, are just some examples of high-profile projects with significant involvement of the United Kingdom.

3. The BNSC partnership has now grown to 11 members and the process of updating the space policy of the United Kingdom will be stepped up in 2006. In the

first quarter of 2006, BNSC plans to hold public consultation as it completes its review of the implementation of the United Kingdom Outer Space Act; details of the review and much more, including a copy of the 2005 annual report, can be found on the BNSC website at http://www.bnsc.gov.uk.