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General exchange of views and introduction to reports submitted on national activities

INTERNATIONAL COOPERATION IN THE PEACEFUL USES OF OUTER SPACE: ACTIVITIES OF MEMBER STATES

Note by the Secretariat*

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* This document has not been formally edited. It will be edited, translated into all official languages of the UN and distributed as document A/AC.105/816/Add.1 after the forty-first session of the Scientific and Technical Subcommittee.

Algeria

[Original: French]

1. In its first year, the Algerian Space Agency (ASAL) set itself the task of implementing a programme aimed at introducing space technologies and applications in the sustainable development process, using them in the preparation of national plans and/or regional projects in the planning and environment, agriculture, mining and petroleum geology and telecommunications sectors.

2. In the field of infrastructure and technological facilities, Algeria plans to implement projects included in the national space programme, aided by international cooperation. The establishment of a unit for the development of microsatellites and Earth observation and telecommunication satellites is a priority.

3. Two memoranda of understanding on cooperation have been signed with South Africa and Argentina, focusing mainly on the transfer of know-how. Discussions are at an advanced stage with other countries such as the United Kingdom of Great Britain and Northern Ireland and France on space technologies.

4. One of the first activities of ASAL was the organization in Algiers, on 14 and 15 July 2003, of an Algerian Satellite (AlSAT-1) seminar for users with the objective of explaining to business circles the importance and usefulness of remote sensing—through AlSAT-1 images—for the gathering of knowledge and the monitoring of natural resources and the environment, land use planning and the management of natural disasters. In addition to economic sector operators and national research institutions, certain space agencies at the international level took part in this scientific gathering, including those of the United Kingdom, France, Argentina, South Africa and Nigeria.

5. With the successful launching of the three microsatellites belonging to Nigeria, the United Kingdom and Turkey in September 2003, the constellation to which AlSAT-1 belongs is in the implementation stage. Coordination meetings of the Disaster Management Constellation have taken place to decide on the mechanisms for exchange of data between the different systems.

6. ASAL has set up an integrated project concerning the reduction of earthquake risk, based mainly on space techniques, remote sensing and the Global Positioning System (GPS). Five research institutions concerned with these problems are involved in the implementation of this project, in which international partners are encouraged to participate.

7. The national institutions are the Centre for Research in Astronomy, Astrophysics and Geophysics (CRAAG), the National Centre for Space Technology (CNTS), the National Institute of Cartography and Remote Sensing (INCT), the National Earthquake Engineering Centre (CGS) and the Centre for the Development of Advanced Technologies (CDTA). On the international side, the Strasbourg Institute of Physics of the Earth (EOST) in France, the Earth Sciences Department of the University of Trieste (Italy) and the company Atlantis Scientific Inc. (Canada) are ready to contribute towards the success of this project.

8. The use of active, passive, medium, high and very high resolution sensing for the preparation of detailed thematic cartographic material is envisaged. A seismic monitoring network based on GPS positioning techniques has been designed. Around 40 permanent GPS stations will thus cover the northern part of Algeria, which is subject to relatively high earthquake risk.

9. Regarding forest fires, a quasi-continuous programme for the monitoring of forest areas was set up by ASAL during the summer of 2003. Thanks to AlSAT-1 data, a precise quantification has been carried out and has allowed the assessment of the damage caused in an area where more than 30,000 hectares of forests have been affected by fires.

10. A project aimed at equipping services such as the Directorates-General for Forests and for Civil Defence, with observation and monitoring units based on the use of satellite data, is being implemented.

11. With regard to land use planning, an agreement has been signed between the Ministry of Land Use Planning and the Environment and ASAL. It provides for the use of satellite imagery in general, and AlSAT-1 data in particular, in the drawing up of national and regional plans for land use.

12. ASAL has begun considering the implementation of a teaching programme focused on space technology for the Ministry of National Education, intended for schools and training institutes. ASAL also intends to organize open days for secondary school students, in order to introduce them to space sciences.

13. CNTS, a centre of excellence for graduate and post-graduate education, contributes to strengthening national capacities in the space field by training engineers and technicians in geographical sciences and preparing graduates for a Master's degree in space technology. The Centre had planned to resume offering a Master's degree in space instrumentation in the academic year 2003-2004.

14. Agreements have been signed between ASAL and the Ministry of Higher Education and Scientific Research. They concern procedures for making AlSAT-1 data available to the university community (teachers, research workers and students). Their objective is to encourage the use of AlSAT-1 images and remote sensing in the faculties and laboratories of Algerian universities.

15. CNTS is the pilot agency for the awareness-raising programme entitled "space technologies and applications", included among the national research programmes. CNTS has also been entrusted with more than 20 research and development projects in areas relating to microsatellite technologies, space instrumentation, satellite-based location and positioning, Earth observation and space information.

16. Several topographic maps on the scale of 1:200,000 have been produced from Landsat 7 images. INCT has introduced remote-sensing images in the process of map revision for the Saharan part of Algeria. Tests using AlSAT-1 data in map revision on this scale have been completely successful.

17. In the context of a project for the unification of North African geodetic reference systems—a component of the African Reference System project resulting from the recommendations of the Economic Commission for Africa—Algeria took an active part in the work of the third workshop, which was held in Rabat, Morocco, in October.

18. The recommendations of this workshop confirmed those of the second workshop held in Algiers in 2001. They concern the establishment of permanent GPS stations and the adoption of the international geodetic system known as the International Terrestrial Reference Frame. INCT, in cooperation with CNTS, is responsible for managing the project in question.

19. As a member, Algeria has participated actively in the work of the United Nations Committee on the Peaceful Uses of Outer Space, as well as in the groups responsible for the implementation of the recommendations of the Third United Nations Conference on the Exploration and Peaceful Uses of Outer Space (UNISPACE III).

20. Algeria began the process of acceding to the legal instruments governing space activities, including the five United Nations outer space treaties, and is making preparations for the introduction of implementing national legislation.

21. Regarding the implementation of the recommendations from the World Summit on Sustainable Development, held in Johannesburg in 2002, Algeria began work on several projects utilizing space technologies and geographical information systems as research tools in integrated development projects on the basis of the norms in force with regard to environmental protection.

22. Algeria celebrated World Space Week from 8 to 10 October in Constantine (in eastern Algeria) with an event organized by the Sirius Astronomy Association (a non-governmental organization). National institutions such as ASAL, the University of Constantine, CNTS and INCT took part.

Argentina

[Original Text: Spanish]

1. The National Commission on Space Activities (CONAE) of Argentina held several activities associated with the peaceful uses of outer space in 2003. These are described below.

2. The first meeting of the joint CONAE- United States National Aeronautics and Space Administration (NASA) Science Team for the Satelite de Aplicaciones Cientificas-D (SAC-D)/Aquarius mission was held in Mar del Plata from 18 to 20 March.

3. The first technical meeting of CONAE and the National Oceanic and Atmospheric Administration of the United States was held in Buenos Aires from 20 to 21 May. The aim of this meeting was to analyse possible areas of cooperation between the two institutions.

4. CONAE and the Centre National d'Études Spatiales (CNES) of France held a working meeting on floods at the Gulich Institute for Advanced Space Studies in Cordoba province, from 2 to 4 July. The meeting resulted in the establishment of a cooperation project to develop flood early-warning tools using space-based information.

5. A symposium on space technology applications for health was held at the Gulich Institute for Advanced Space Studies in Cordoba province and at the Argentine Ministry of Health in Buenos Aires, from 7 to 11 July. The symposium was organized by CONAE, the Argentine Ministry of Health and CNES. Its aim was to develop new epidemiological surveillance tools and to investigate and develop methods for monitoring public health and the environment using space-based information to construct early-warning systems, including modelling. It resulted in the establishment of a cooperation project with two main thrusts: (1) monitoring of leishmaniasis, Hanta virus, Argentine haemorrhagic fever and malaria; and (2) a study of dengue in Salta province, Argentina. The work will be concentrated in the subtropical zone of northern Argentina and the Pampa Húmeda (wetlands) zone.

6. An expert workshop on "Space Technology for Flood and Fire Disaster Management" was held at the Gulich Institute for Advanced Space Studies in Falda del Carmen, Cordoba province. This meeting, jointly organized by CONAE, the United Nations Office for Outer Space Affairs and the European Space Agency (ESA), was attended by experts from the region, who worked on the establishment of a cooperation project to develop early-warning tools for disasters caused by floods and fires in the region. It was attended by participants from Argentina, Bolivia, Brazil, Chile, Paraguay and Peru, along with representatives from Ecuador, France, Mexico, Spain, Venezuela and ESA.

7. Three years after the launch of Argentina's Earth observing satellite, Satelite de Aplicaciones Cientificas-C (SAC-C) and the formation of the Morning Constellation for Earth Observation, together with Landsat 7, Earth Observing-1 (EO-1) and Terra of the United States, the researchers met to present their project findings in Buenos Aires from 3 to 5 December.

Participation in international initiatives

8. CONAE acceded to the Open Initiative by space agencies on space technologies to support the World Heritage Convention at a ceremony held in Paris on 16 July, and is already designing two projects connected with Iguazú National Park and the Inca Trail (Qhapac Ñan).

9. CONAE acceded to the International Charter "Space and Major Disasters" at a ceremony held in Paris on 16 July. CONAE participates by providing SAC-C satellite images (Multispectral Medium Resolution Scanner, High Sensibility and High Resolution Technological Cameras) and the services of the Cordoba terrestrial station when necessary. Through the Gulich Institute for Advanced Space Studies, it also allows for the participation of researchers from the agencies forming the Federal Emergency System.

10. CONAE presented a project proposal for the development of emergency and health early-warning tools at the meeting of the Education, Science and Technology Working Group of the Forum for East Asia-Latin America Cooperation in San Jose, Costa Rica, from 11 to 12 July.

11. Argentina also participated in the Earth Observation Summit on 1 August in Washington, D.C. CONAE is a member of the Group on Earth Observations.

Cuba

[Original: Spanish]

1. The accession of Cuba as a full member of the Committee on the Peaceful Uses of Outer Space in late 2001, in accordance with General Assembly resolution 56/51, was an incentive for all organizations and institutions working on the development of space activities in the country.

2. The space research and applications carried out in Cuba in 2003, described below, have provided a valuable contribution to progress in the country's sustainable development.

1. Space meteorology

3. In November 2001, a Swiss High Resolution Picture Transmission/Geostationary Operational Environmental Satellites (HRPT-GOES) Skyceiver station was installed at the Institute of Meteorology of the Ministry of Science, Technology and the Environment to receive signals from circumpolar and geostationary satellites. This new acquisition represents a remarkable technological advance that has revolutionized the reception and processing of satellite images.

4. Cuba can now obtain images with a spatial resolution of one kilometre and a temporal resolution of 15 minutes, which permits high-precision tracking and monitoring of weather systems. Images are currently received from the satellites of the National Oceanic and Atmospheric Administration (NOAA) of the United States and the Geostationary Operational Environmental Satellites (GOES), which provide an extensive range of data.

5. The images produced by this new technology have made it possible to diagnose and monitor weather systems and to track their movements in greater detail. The spatial and temporal resolution achieved by the new Skyceiver station has significantly improved knowledge of the morphology and structure of weather systems and provided the information necessary to identify their position, morphology, intensification, weakening, direction and speed of travel. This ensures the preparation of high-quality daily forecasts and special warnings.

6. The new images were successfully used to monitor tropical cyclones during the cyclone season in 2002 and 2003 and provided decisive diagnostic and forecasting information at crucial times during those events.

7. The images also improved the conditions under which frontal systems could be monitored and made it possible to establish factors associated with increased or diminished activity and to predict future movements.

2. Remote sensing

8. The images received at the installed HRPT-GOES Skyceiver station have been very useful for important activities such as Earth remote sensing and environmental monitoring and control.

9. Forest fires can be identified twenty-four hours a day and their size and movement determined by calibrating channel 1 and 3 images, with the result that the area involved can be defined with greater accuracy and hot spots in the images detected with relative precision.

10. During 2002 and 2003, a large number of forest fires were detected. This provided the forest ranger corps with timely and accurate information, permitting rapid detection and extinction, and in this way preventing substantial financial loss and environmental damage.

11. Satellite imagery was also used to monitor dust storms originating in the Sahara, which move westwards over the Atlantic. By determining their speed of travel, it was possible to predict the time of their arrival in the Lesser Antilles and their movements until they reached the east coast of Cuba.

12. A system has been acquired for the specific determination of solar radiation by means of low-resolution images, and software is currently being developed to measure solar radiation with high-resolution images, which will make it possible to plot maps of this magnitude.

13. Work is also being carried out on developing software to detect the dumping of hydrocarbons in the vicinity of Cuba by means of satellite images obtained with the new equipment.

14. In 2003, work proceeded on enhancing the use of satellite imagery for topographical and thematic purposes, by assimilating new types of images and specially designed software, and devising basic methodologies and technologies that can be used by industry, teaching bodies and scientific institutes to solve geoscientific and engineering tasks.

15. The airborne video system and video map production technology have been developed as low-cost alternatives for various operational studies. Methodologies have been devised for producing space maps and orthoimages and updating medium-scale topographical maps, all of which improve the remote-sensing services available and extend their field of applications.

16. Work is being undertaken on technologies for space-time studies of hydrographic basins and specific applications have been carried out in support of precision agriculture, as well as studies of forest cover and integrated mountain development.

17. Progress was made in the training of specialists, through Bachelor and Master degree courses and the inclusion of remote sensing in some engineering curricula. Work began on establishing a national project aimed at introducing this specialization in agronomy study programmes.

18. In 2003, work continued on the characterization of the space-time variability of the sea surface temperature in waters of the continental shelf and seas adjacent to Cuba, using space images with greater space and time coverage from the advanced very high resolution radiometer (AVHRR) on board the NOAA-12 and NOAA-14 satellites.

19. With the use of images from the Landsat-7 satellite, space maps of the south Cuban platform, covering the Canarreos and Jardines de la Reina archipelagos, have continued to be generated with a view to determining the location of coral reefs.

3. Space sciences

20. In the area of space sciences, the Institute of Geophysics and Astronomy of the Ministry of Science, Technology and the Environment continued its optical and radioastronomical observations of the Sun and its monitoring of the ionosphere and geomagnetic field in Cuba. The data obtained continued to be relayed to centres around the world.

21. By accessing the many databases posted on the Internet concerning astronomical observations carried out in various countries, several major comets have been studied using existing visual observations.

22. Some characteristics of the Hyakutake (1966), Hale-Bopp (1997), S4-LINEAR (1999) and A2-LINEAR (2001) comets were determined. In the case of the latter, its light curve was defined on the basis of 758 observations in 25 countries, including those carried out in Cuba. Its absolute magnitude was found and from this value the maximum size of its nucleus was calculated at 7 ± 2.5 km. In all the objects analysed, there was a significant change in the rate of brightening, a phenomenon that occurs at a distance of between 1.5 and 4 astronomical units from the Sun. This moment, known as the point of water outgassing, determines the star's apparent subsequent brightness.

23. During the period under review, research continued on the relationship between the Sun and the Earth and, in particular, on coronal mass ejections (CMEs), a solar phenomenon that is responsible for most of the perturbations in geospace.

24. CMEs, which may be classified in various ways, were analysed when occurring at short time intervals and resulting from the same magnetic scenario, i.e. successive emissions (components) of a single event. The CMEs with successive emissions that were studied provided information of fundamental importance in the diagnosis and forecasting of the climate of circumterrestrial space.

25. In the area of the Earth-Sun relationship, research continued on solar wind-magnetosphere coupling. With the use of non-linear analysis techniques, time series of component z of the interplanetary magnetic field and component x of the solar wind flow velocity were studied during the occurrence of magnetic clouds and in the hours before their arrival. The results obtained made it possible to estimate the predominant physical mechanism during the solar wind-magnetosphere coupling (in particular magnetic reconnection and viscous interaction) and to analyse plasma dynamics during the occurrence of each event.

26. The variations in the equatorial and low-latitude ionosphere in parts of America and Asia-Oceania were studied using data obtained by vertical sounding from Earth at the F2 layer critical frequency from 14 ionospheric stations located within an American sector at around 75°W between latitudes 36.6°S and 32.2°N and from 19 ionospheric stations in the region of Asia (11) and Oceania (8) close to meridian 120°E and in the latitude range from 34.7°S to 49.6°N. The variability indices were calculated in accordance with the recommendations of the 2002 International Reference Ionosphere (IRI) Task Force Activity. The study made it possible to establish the variability behaviour of foF2 (the highest frequency which will reflect from the main (F2) layer of the ionosphere on a vertical propagation path) in the regions examined.

4. Distance learning

27. Distance learning has become more widely established in Cuba through the broadcasting of courses on television on a number of subjects, at different educational levels and through lectures specializing in various topics, which help to improve the general knowledge and culture of the population at large. This has been aided by the distribution of televisions and video recorders to all primary and secondary schools in Cuba.

5. World Space Week

28. World Space Week was marked in Cuba by a large number of activities, including the official opening ceremony at the National Museum of Natural History, under the auspices of the Ministry of Science, Technology and the Environment; the showing of films and videos on space with commentaries by experts from the Institute of Geophysics and Astronomy; the organization of night-time observations with manual telescopes by local amateur groups; and, the holding of the Second National Workshop on Outer Space and its Peaceful Uses at the National Capitol.

Finland

[Original: English]

1. Administration

1. The Finnish bodies involved in space activities and the new Finnish space strategy are fully described in document A/AC.105/788.

2. There are 50 companies and research units in Finland that do business in satellite equipment supply chains or study space technology. There are seven universities in Finland that study remote sensing or space science. Navigation technology and new services are developed by 30 companies and seven research units in Finland. More information can be obtained by accessing the following websites:

http://www.tekes.fi/eng/publications/Space_Directory_2003.pdf

http://www.tekes.fi/eng/publications/Mobile_Location_Directory_Finland.pdf

2. Outlook

3. The history of Finland's space activity and its outlook are fully described in document A/AC.105/788.

3. Budget trend

4. The Finnish space budget has remained the same since 1995, though the share devoted to European Space Agency (ESA) programmes has increased during this period. ESA's contribution accounted for the main part of the budget in 2003. State parliamentary elections were held in March 2003. For the next few years, the Finnish space budget will remain at a constant level.

5. Finnish space funding comes mainly from the National Technology Agency (Tekes). Its contribution amounted to 19 million Euros in 2003. Several other ministries also fund space activities.

4. National activities

6. Finland's main interests in space are described fully in document A/AC.105/788.

7. Finland participates in the ESA-European Union (EU) joint Galileo programme. Navigation and location based services are expected to play a key role in the third generation mobile telecom network services. Financial contribution to the development of the European satellite navigation constellation is about 15 million Euros, allowing for significant industrial participation in the satellite and ground segments of Galileo. In addition to investments in the Galileo, large investments are foreseen in the development of end-user technologies and applications, taking full benefit of the interoperability of the Global Positioning System (GPS) and Galileo.

8. The Antares space science programme is described in document A/AC.105/788. The total cost of the programme is about 17 million Euros.

9. AVALI is a space technology programme pushing Finnish industry into commercial space in the sectors of satellite navigation, telecommunications and remote sensing. Spin-offs, i.e. on-ground applications of space technology, are important aspects of this programme, which started in 2002 and will continue until 2005. The total cost of the programme is at least 15 million Euros.

10. New programmes are being planned in the fields of satellite remote sensing and space science.

5. Ongoing international programmes and projects

11. Finnish involvement in ongoing international space programmes and projects is shown in table 1.

Table 1

Finnish involvement in international space programmes and projects

Organization or Country	*Finnish involvement*
ESA	
Atmospheric Dynamics Mission (ADM)- Aeolus	Power supply units, instrument electronics
Cluster II	Power supply units, 2 instruments
CryoSat	Power supply units
Environmental Satellite (ENVISAT-1)	Participation into Global Ozone Monitoring by Occultation of Stars (GOMOS) instrument: Global Ozone Measurement Equipment (GOME) data

Organization or Country	*Finnish involvement*
	processor upgrade and ground segment
Galileo (Global Navigation Satellite System (GNSS)-2)	Participation in pre-development
The Gravity Field and Steady-State Ocean Circulation Mission (GOCE)	On-board software
Herschel	Primary mirror polishing
Huygens	Saturn's Titan moon lander: radio altimeter and atmospheric instrumentation
Integral	Participation in the Joint European X-ray Monitor (2 detector units), flight software validation
Mars Express	Power supply units, participation in instruments
Meteosat Second Generation (MSG-1)	On-board software validation
MetOp-1	Power supply units for Global Ozone Measurement Equipment (GOME)
Planck	Participation in low frequency instrument; cryostat control unit
Rosetta	Primary structure, power distribution system's units, Contributions instruments
Small Mission for Advanced Research in Technology (SMART-1)	Space Potential, Electron and Dust Experiment instrument; demonstration of a compact imaging X-ray spectrometer/X-ray solar monitors
Soil Moisture and Ocean Salinity (SMOS)	Participation in radiometer instrument
Solar and Heliosphere Observatory (SOHO)	Two instruments: Costep-Erne Particle Analysis Collaboration and Solar Wind Anisotropies
Venus Express	Power supply units, participation in the Energetic Neutral Atoms Analyser instrument
X-ray Multi-Mirror Mission Newton	Telescope tube structure and Mirror Thermal Control Unit
Belgium/ESA	Space debris detectors and their data processing units on Project for on-Board Autonomy Mission

Organization or Country	*Finnish involvement*
Canada	Radarsat etc. remote sensing related collaboration
Denmark	On-board Data Handling Unit for Roemer spacecraft
Sweden	Microwave instrument on the Odin satellite
France/ESA	Participation in NetLander Mars-landers for the Centre National d'études spatiales (CNES) Premier 2009 mission. The mission was cancelled by CNES. Work discontinued in Finland, too.
Netherlands/National Aeronautics and Space Administration (NASA)	Ozone Monitoring Instrument on the NASA Earth Observing System Aura spacecraft
Italy	X-ray instrument hardware for the X-ray Astronomy Satellite
USA/NASA	NASA Two Wide-angle Imaging Neutral-atom Spectrometers (TWINS) mechanisms
	NASA Cassini mechanisms, participation in the Cassini Plasma Spectrometer instrument
	NASA High Energy Transient Explorer II X-ray instrument
	International Space Station debris instrument
	NASA Contour; instrument participation – mission failure after launch in 2002
	NASA Near Earth Asteroid Rendezvous X-ray instrument – mission ended successfully in 2001 NASA Stardust instrument participation
	NASA Magnetospheric MultiScale (MMS) instrument participation
Japan	International Space Station X-ray instrument
Russian Federation	Silicon X-ray Array for Spectrum-X-Gamma – project in hibernation
	Radioastron very long base interferometry instrument – project in hibernation
	MetLander Mars-landers
China, France, Germany, Italy, Russian Federation, Spain, Switzerland, United Kingdom of Great Britain and Northern Ireland, United States	Alpha Magnetic Spectrometer; particle physics experiment on the International Space Station (Search for antimatter)
	Finland: silicon tracker, ground support and data handling

12. Finland's space debris research activities are fully described in document A/AC.105/817.

Germany

[Original Text: English]

Goals and Strategies 2003, the German Aerospace Center's publication on its current research and development activities and programmes, published in June 2003, will be distributed during the forty-first session of the Scientific and Technical Subcommittee of the Committee on the Peaceful Uses of Outer Space, from 16 to 27 February 2004.

Hungary

[Original Text: English]

1. Administration

1. There are three entities involved in the governing of space activities in Hungary, according to the following task share:

(a) *Hungarian Space Office (HSO)*: Independent government office established in 1992, presently under the supervision of the Minister for Informatics and Communications. Apart from the co-ordination of national space activities, HSO is in charge of conducting and co-ordinating the international space activities of Hungary, namely relations with the European Space Agency (ESA), bilateral relations and relations with the United Nations, the European Union and the Space Agency Forum;

(b) *Hungarian Space Board (HSB):* Inter-ministerial body to help the work of the Minister in charge of supervising space activities. The Board drafts the cornerstones of Hungarian space activities; and

(c) *Scientific Council on Space Research (SCSR):* Advisory body of HSO that provides the scientific background on all Hungarian space activities.

2. Overview

2. Space activities in Hungary started during the 1950s, and then with the establishment of the Intercosmos programme, these activities evolved in a special direction. Hungary has been a member of the United Nations Committee on the Peaceful Uses of Outer Space since the establishment of that body in 1959. During the 1980s, Hungary started bilateral co-operation activities with Western European countries, mainly in the field of space science.

3. After the termination of the Intercosmos programme, Hungary entered into a General Framework Agreement with ESA, and with that ESA became the main focus of the country's space activities.

4. In 1998, Hungary became a full member of ESA's Programme de Développement d'Expériences scientifiques. In 2003, Hungary was granted a European Cooperating State (ECS) status by ESA, the aim of which is to become a Member State after some preparation period. Through the ECS status, Hungary can participate indirectly in almost all of ESA's programmes. Apart from its relations with ESA, Hungary has a government-level cooperation agreement with the United States and the Russian Federation, and an agency-level cooperation agreement with the Ukrainian, Indian, Polish and Romanian space agencies.

3. Budget trend

5. With its new ECS status, the Hungarian Government has already increased the space budget, and now the ESA contribution accounts for the main part of that budget. The Hungarian space budget is funded by different sources: the ESA contribution comes from the Ministry of Informatics and Communications, and the national activities are financed from the budget of the Ministries of Education; Agriculture; and, Informatics and Communications.

4. National and international scientific and technological activities

6. Space activities are mainly carried out by university departments and research institutions. Following are the main areas of work and the key activities conducted under each area:

(a) Earth observation

(i) Remote sensing primarily in the area of agriculture and environmental protection/nature conservation;

(ii) Remote sensing, yield estimation;

(iii) Receiving and archiving the digital information from Meteosat and the satellites of the National Oceanic and Atmospheric Administration of the United States, to provide weather forecasters with the derived products and to carry out research and development work in the field of satellite meteorology; and

(iv) Synergistic use of synthetic aperture radar images and Microwave Radiometer data.

(b) Navigation

(i) Terrestrial applications of the Navigation system with timing and ranging (Navstar) Global Positioning System (GPS) in navigation, geodesy and geodynamics; and

(ii) Interference measurement of satellite based navigational system.

(c) Science

(i) Participation in international very long baseline interferometry (VLBI) and space VLBI projects, exploration of space VLBI applications in the field of geodesy and astrometry;

(ii) Whistler and trimpi research;

(iii) Aeronomy, physics of the upper atmosphere;

(iv) Physics of the magnetosphere;

(v) Planetary exploration and studies;

(vi) Non-linear analysis of the geomagnetic records of different time-resolution;

(vii) Investigation of the “fossil cosmic dust” of interstellar origin that occurred globally in the geological formations of the Permo-Triassic transition time;

(viii) Space physics related to the magnetosphere of the Earth, the heliosphere, the interaction of solar wind

with non-magnetic bodies and exploration of the magnetosphere of Jupiter and Saturn;

(ix) Solar-terrestrial relations;

(x) Space-related Solar research; and

(xi) Space astrophysics.

(d) Technology

(i) Lander Power Subsystem; and

(ii) Advanced Materials for Neutron Optics.

(e) Life sciences

(i) Use of visual working ability tests in hypobaric hypoxia;

(ii) Cardiovascular Adaptation and Readaptation in Complex and Simulated Circumstances of Stress;

(iii) Investigation of changes in sensory functions due to readaptation following simulated and real space flight;

(iv) The problem of optokinetic nystagmus disturbances in the model of microgravity;

(v) Antiorthostatic position modelling microgravity;

(vi) Changes in the brain electric activity in the course of visual field and the vestibular receptor stimulation;

(vii) Investigations on adaptive mechanisms of striated muscle tissues in relation to space life sciences;

(viii) Studies on adaptive changes of motor control system including related elementary neural mechanisms;

(ix) Alterations of perceptual processes in simulated hypoxic state;

(x) Studies of the gravitation effect at cellular level;

(xi) Preparation of samples from uracil, bacteriophage T7 DNA, bacteriophage T7 suitable for flight on the International Space Station (ISS);

(xii) Development of evaluation methods for changes induced by space parameters;

(xiii) Aeromedical diagnostic and qualification work, developing new examination methods and scientific research activity in the fields of space psychology and space medicine; and

(xiv) ISS dosimetry programme.

(f) Microgravity

(i) Heat Conductivity Measurement System Upgrade;

(ii) Universal Multizone Crystallizator Modular Upgrade;

(iii) Microstructure Formation in Casting of Technical Alloys under Diffusive and Magnetically Controlled Convective Conditions; and

(iv) Modelling and study of Nucleation and Phase Selection in Magnetic and Refractory Alloys.

5. Education and Outreach Activities

7. Apart from the scientific and technological activities, education and outreach are of the utmost importance in Hungary at the moment. The Hungarian Astronautical Society is in charge of the basic organisational work, namely the annual space-camp, student essay-contest and other conferences. HSO deals with the dissemination of information on ESA educational programmes. It is also the HSO that organises the annual national Space Day, and the annual Space Youth Forum. Every year, HSO publishes a book containing the annual reports, and every two years, it publishes an English version of that book.

Mexico

[Original Text: Spanish]

1. Ministry of Foreign Affairs

1. The Regional Centre for Space Science and Technology Education in Latin America and the Caribbean (CRECTEALC) was established in response to a recommendation by the Second United Nations Conference on the Exploration and Peaceful Uses of Outer Space (UNISPACE-82, held in Vienna) and in response to General Assembly resolution 50/27, adopted in 1995. In 1992, following a series of assessments, the United Nations Office for Outer Space Affairs (OOSA) recommended the establishment of two sites, one in Brazil and the other in Mexico, to serve as headquarters for the Centre in Latin America.

2. The signing of the agreement between the Governments of Mexico and Brazil on the establishment of the Centre took place on 11 March 1997, in Brasilia. The Mexican Senate ratified the agreement on 29 April of that year and the decree promulgating the agreement was published in Mexico's Official Gazette in 1998.

3. In both countries, the Centre is viewed as an institution offering the best possible education, research projects and applications and opportunities and experience to participants in all its programmes. The main objective of both offices is the development of skills and knowledge among university educators, the development of scientific research and applications on the basis of rigorous theory, research, applications and practice in the field, together with pilot projects in such aspects of space science and technology as may contribute to sustainable development in both countries.

4. The Mexico campus of the Centre was established in 2002 through a cooperation agreement between the Ministry of Foreign Affairs, the National Institute of Astrophysics, Optics and Electronics and the National Council for Science and Technology, and the Headquarters Agreement between the Government of Mexico and the Centre. Mexican experts finalized the curricula for master's degrees in remote sensing and geographical information systems. Courses will start at the Mexico campus in March 2004.

5. The legal infrastructure of the Centre was finalized in 2003. One significant step was the signing of the Cooperation Agreement between the United Nations and the Centre on 11 June 2003, following approval of the regulations of the Governing Board and the General Secretariat in August 2002.

6. On 23 October 2002, the Government of Mexico and the Centre also signed an agreement concerning the Centre's operations in Mexico. The agreement was approved by the Mexican Senate and entered into force on 16 August 2003. The agreement covers a number of issues, including the privileges and immunities required for the Centre to operate in Mexico.

7. In 2003, the General Secretariat submitted a project entitled "Space Education, Research and Applications in Latin America and the Caribbean" to the Special Multilateral Fund of the Inter-American Council for Integral Development and the Inter-American Agency for Cooperation and Development/Organization of American States (OAS) with a view to obtaining funding for Centre activities in 2004. Mexico supports the plan submitted by Brazil to strengthen the Centre's two campuses.

8. The fourth meeting of the Centre's Governing Board, which took place in Mexico on 31 October and 1 November 2003, took some important decisions concerning the strengthening of the Centre and its two campuses, in respect of both academic activities and the funding for these activities. The regulations governing the activities of the Advisory Committee were also approved. As for the question of extending the membership of countries participating in the Centre, it was agreed that an evolutionary approach should be adopted.

9. The first Information and Outreach Seminar on the Centre's activities took place in Mexico on 16 and 17 December 2003. Experts in space science education and research from Central America and the Caribbean took part.

10. At the Third Inter-American Meeting of Ministers of Education, held in August 2003, Mexico and the OAS signed the agreement offering member countries free use of the EDUSAT network.

11. Mexico supports the project "Distance Education via Satellite for Training Teachers: Education and Human Development in Rural Areas of the Hemisphere", proposed by Belize for incorporation in the OAS Partnership for Development programme.

12. Recognizing that international cooperation is a mechanism for strengthening peace, security and the promotion of human development by means of the peaceful uses of outer space, the Russian Federation and Mexico have signed the Programme of Technical and Scientific Cooperation 2003-2004 in support of a project entitled "Design and Construction of Small Satellites to Monitor the Earth's Surface".

2. National Autonomous University of Mexico

13. Given the close link between development and space activities, including the application and peaceful uses of space technologies and their role in strengthening peace, security and the promotion of human development through the peaceful uses of outer space, the National Autonomous University of Mexico (UNAM) takes part in programmes and projects relating to:

- Space law;
- Natural disaster prevention;
- Environmental protection and support for sustainable development; and,
- Education, research and development in space science, technology and applications.

14. In view of the importance of the principles that should govern State activities in the exploration and use of outer space, including the Moon and other celestial bodies, the UNAM Institute of Geophysics observed World Space Week 2003.

3. Federal Telecommunications Commission

15. The Federal Telecommunications Commission (COFETEL) has reported that in the period 2001-2002 it continued the process of international coordination on a number of satellite projects in accordance with the provisions of the International Telecommunication Union (ITU) Radio Regulations, the intention being to conclude negotiations with a number of other countries. The most notable aspects of this negotiation process are described below.

Orbital positions 109.2° W and 114.9° W with Canada

16. The orbital arc between 103° W and 123° W of the geostationary satellite orbit was the subject of trilateral negotiations between Mexico, the United States and Canada, with the result that, in

1988, Mexico obtained the opportunity of occupying and operating orbital positions 109.2° W, 113° W and 116.8° W. The satellites operated by Mexico were Solidaridad 1 at 109.2° W, Solidaridad 2 at 113° W and Morelos 2 at 116.8° W. Key developments since then are described below.

17. The first coordination meeting with Canada, which marked the formal inauguration of the coordination process to replace the Morelos 2 satellite, was held in July 1997. Since then, the Governments of Canada and Mexico have held a series of meetings to oversee progress in negotiations between the two countries' operators, with a view to reaching agreement on operational coordination.

18. In 1999, the operators Satmex, from Mexico, and Telesat, from Canada, reached an agreement to create capacity for the new Satmex 5 network, which became operational in January 1999. The agreement also covered new Canadian projects at the positions 107.3° W and 111.1° W (Anik F1 and Anik F2, respectively). In May 2000, at the operators' request, the administrations of Mexico and Canada signed an administrative coordination agreement to provide back-up for the agreement reached between the operators.

19. On 29 August 2000, the Solidaridad satellite (109.2° W) became inoperable. The Satmex company took action to replace the satellite as quickly as possible with one which was planned to become operational in April 2003 at the same orbital position of 109.2° W. Satmex proposed total coverage of the territory of the United States, with a satellite considerably more powerful than the former Solidaridad 1.

20. In order to accommodate Solidaridad 1's replacement (Satmex 6), Satmex informed the Mexican administration of the need to embark on a process of international coordination, both with ITU and bilaterally, including coordination with Canadian networks.

21. Accordingly, a high-level meeting took place between Canada and Mexico on 16 and 17 January 2003, attended by Industry Canada and Telesat for the Canadian side and the Under-Secretariat of Communications, COFETEL and Satmex for the Mexican side. At the meeting, the Canadian administration offered to exchange the position 114.9° W, currently held by Canada, for the Mexican position 109.2° W.

22. The meeting resulted in a document entitled "Statement by the Department of Industry of Canada and the Secretary of Communications and Transportation/Federal Telecommunications Commission and agreement in principle between Satmex and Telesat", establishing the conditions for the exchange of the positions 114.9° W and 109.2° W between the two administrations, as well as containing various undertakings by the operators on the definition of the technical and operational parameters to be observed in drawing up a new coordination agreement.

23. Following the signing of the statement, the two administrations proceeded to draw up a formal memorandum of intent, with the aim of designating the orbital positions to be used by each country; to establish power levels and maximum operational parameters in each of the designated positions; and to coordinate the operations of the respective satellite networks for the positions thus assigned.

Orbital position 105° W with the Netherlands

24. Another aspect of COFETEL activities on international coordination in the satellite field relates to the process of coordination on orbital position 105° W. For that purpose, two satellite coordination meetings were held in Mexico City and The Hague on 9 and 10 January and from 13 to16 May 2002, respectively. At these meetings, the Governments of Mexico and the Netherlands agreed that, in order to achieve satisfactory coordination as fast as possible, the operators of the two countries' satellite systems should embark on the process of drawing up operational agreements to coordinate their respective satellite networks situated in the orbital arc and to move towards the establishment of administrative arrangements providing the Netherlands and Mexico with satellite capacity from the space station at the position 105° W.

Orbital position 77° W with the United States, Canada and Cuba

25. Another relevant international coordination procedure is that of the MEX-TDH1A and 1B satellite network in the orbital position 77° W. On 22 April 1996, the ITU Radiocommunication

Bureau received an application from the Mexican Government to modify the Region 2 Plan with regard to the MEX-TDH1A and 1B satellite network, which was intended to occupy the geostationary orbital position 77° W. A satellite coordination process with the administrations of Canada, the United States and Cuba was undertaken on that basis.

26. As a result of this process, the Canadian administration informed Mexico on 5 April 2000 of full coordination of the network in question, given that coordination with the administrations of Cuba and the United States had been completed in October 2001.

Slovakia

[Original Text: English]

1. At the 40th session of the Scientific and Technical Subcommittee of the United Nations Committee on the Peaceful Uses of Outer Space, which was held in Vienna from 17 to 28 February 2003, the members of national delegations were informed about the special activities of the institutes in the Slovak Republic in the use of space technologies for medical sciences and public health. A representative from Slovakia made a scientific presentation to the Subcommittee entitled: *"Results and Methods of Research of Vestibular Function in Space are Useful in Clinical Practice"*

2. In order to strengthen and extend friendly relations and to establish mechanisms that would facilitate the cooperation between scientific institutions in Slovakia and Austria, the Slovak Commission for Research and Peaceful Use of Space (the Slovak Space Agency) initiated the Austrian-Slovak Space Cooperation Talks at the Austrian Space Agency (ASA) in Vienna on 24 September 2003. Several topics for cooperation opportunities were presented at this meeting. It was decided that ASA and the Commission will coordinate these efforts for cooperation and will sign a Memorandum of Understanding. Several bilateral agreements on cooperation in research in space physics, meteorology and medicine were signed between institutions in the two countries.

3. Several research projects in the field of space activities are currently being implemented at the universities and institutes of the Slovak Academy of Sciences (SAS), within the framework of wide international collaboration.

I. Space Meteorology

4. The activities of the Slovak Hydrometeorological Institute (SHMI) focus on satellite information applications for flood forecasting, nowcasting and monitoring support.

International Project CEI Nowcasting

5. This international project of the Central European Initiative (CEI) is led by Austria and involves the participation of Croatia, Hungary, Slovakia and Slovenia. The project focuses on cooperation in the exploitation of meteorological satellites, radars and other distance measurements in the field of nowcasting and very short-range forecasting.

6. The main goals of the project are: exchange of knowledge, know-how, nowcasting and very short range forecasting algorithms, based on remote measurements. The satellite data, especially from Meteosat 7 and Meteosat Second Generation (MSG), data from radar measurements and outputs from numerical weather prediction models are considered as the basic inputs of these methods and techniques.

7. Products useful in interpretation of the remote measurements, automatic detection of convective cells and their tracking and forecasting are some of the essential and substantial results of the cooperation. Slovakia's contribution has been the development by SHMI of the method of automatic detection and tracking of convective cells in radar measurements and the needed software.

8. At the meeting of the project partners in Slovakia in March 2003, SHMI presented the results achieved in the work on cell detection and tracking system since the previous meeting. Those

results include the adaptation of the tracking software from radar to Meteosat-7 satellite data, the adaptation of the system for optimal parameters' tuning on the statistical set of data and the development of a universal visualization tool for the display and utilization of tracking outputs functional for satellite, radar data and also Thunderstorm Identification, Tracking, Analysis and Nowcasting (TITAN) method outputs.

9. During their meeting in Hungary in March 2003, the project partners presented individual results of the evaluation of developed nowcasting methods by means of the common evaluation tool. The results of the evaluation showed the advantages and disadvantages of each method, and the methods were discussed and compared. In SHMI, the following methods and products have been implemented into operation at this stage of the project: Atmospheric Motion Vectors (AMV), Forecasted Satellite Image (FSI), Convective Cell Detection (CCD) and for radar: testing of Weather Decision Technologies (WDT) nowcasting software.

Continuation in SAF on Hydrology Project Preparation

10. This activity has been undertaken in the framework of cooperation with the European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT) since 2001. In 2003, EUMETSAT established the Satellite Application Facilities (SAF) Hydrology Framework Working Group, which involved the cooperation of EUMETSAT member states and cooperating states including Slovakia, Hungary and Poland, with a mandate to establish and define the new SAF project. According to this working group, a long-term vision, reflecting user needs, scientific perspectives and relationships to Numerical Weather Prediction (NWP), should be defined. Current outcomes from the discussions of this working group are: the importance of time and space scales for flood forecasting, the important new developments on the European flood alert system and the development of monthly/seasonal forecasts.

11. On 6 July 1999, the agreement between EUMETSAT and the Slovak Government on the status of Slovakia as a cooperating State for a period of 5 years was approved. The examination of cooperation and possible accession of Slovakia as a full member State after 5 years is one of the important parts of this agreement.

12. The procedures for accession to EUMETSAT as a member State were initiated in September 2003 by SHMI.

13. Accession of the Slovak Republic as a member State to EUMETSAT will bring new opportunities for the exploitation of satellite data in Slovakia and their applications in meteorological and hydrological services and scientific research.

II. Remote Sensing

14. Participation continued in the *Image and Coordination of Information on the Environment (CORINE) Land Cover 2000 (I&CLC2000)* project. The aim of this project is to update the CLC90 database to that of 2000, as well as to identify land cover changes in Slovakia for the years 1990-2000 by application of satellite data. Around 55 % of the total area of Slovakia has been covered (the Institute of Geography of the SAS in Bratislava and the Slovak Environmental Agency in Banská Bystrica have participated in this project).

15. Under the coordination of the Research Institute for Pedology and Protection of Soil in Bratislava, the preparation of an *Integrated Administrative Control System (IACS)* and its parts has continued, together with the registration of parcels (production blocks) of agricultural land, control of subsidies linked to agricultural land and crop yield forecasting by remote sensing data. Remote sensing activities of the Forest Research Institute in Zvolen continued through the *National Cooperative Programme on Assessment and Monitoring of Air Pollution Effects on Forest*, using Landsat Enhanced Thematic Mapper (ETM) data. Ikonos data were used for thematic mapping of stand and structural types of forest through the national project *"Research of Methods of Mountain Forest Management on the Principles of Sustainable Development"*.

III. Space Physics and Technology

16. Several institutions are involved in space physics research in Slovakia. Among them are the Institute of Experimental Physics SAS (IEP SAS) in Kosice in collaboration with the Technical University and University of P.J. Sarafik in Kosice; Faculty of Mathematics, Physics and Informatics of the Comenius University in Bratislava (FMPI CU); Astronomical Institute of SAS in Tatranska Lomnica (AI SAS); and Geophysical Institute of SAS (GI SAS) in Bratislava.

17. Measurements of energetic gamma rays and neutrons are carried out by SONG-M spectrometer (IEP SAS jointly with Moscow State University) onboard a low altitude, high inclination CORONAS-F satellite, which was launched in July 2001. More than two years of measurements of neutral emissions from the Sun allowed the observation of several tens of solar flares with hard X-rays and gamma rays. A strong emission of gamma rays was analyzed in the flare of 25 August 2001. This flare also produced neutrons observed at the same time on CORONAS-F and on the ground. The flares of 28 October 2003 were also observed in gamma rays by the SONG-M spectrometer on CORONAS-F.

18. At IEP SAS, the results have been presented in a series of papers and contributions at various international conferences. The topics cover the dynamics of energetic particles within the magnetosphere and near its borders, both from high apogee satellites (Interball satellite data compared with US Polar satellite measurements, statistical and case studies, comparison with Solar & Heliospheric Observatory (SOHO) data via collaboration with specialists in Hungary and Ireland) and low altitude orbits (CORONAS I measurements statistically analyzed and compared with US SAMPEX research satellite measurements, active particle data dynamics, Mir Space Station measurements). New data from CORONAS-F have been analyzed too. Relations of cosmic rays and cosmic energetic particles to space weather effects have been studied. Development of a neutral atom imager for Double Star mission (PI Prof. S.McKenna-Lawlor, Ireland) continues with the participation of the Institute.

19. At FMPI CU, the cooperative studies on cosmic ray products computations continue jointly with laboratories in the United States and in other countries.

20. At AI SAS, studies continue into solar and heliospheric processes, along with the cometary and cosmic dust research, using the satellite data from available foreign experiments. The international conference: “Solar Variability as an Input to the Earth’s Environment” was held from 23 to 28 June 2003 in Tatranska Lomnica, by scientists from AI SAS, in cooperation with other institutions (e.g. IEP SAS and GI SAS).

21. At GI SAS, space geophysics is being investigated with an emphasis on quantification, classification and forecasting of space weather development. The topic is of dominant interest to the solar-terrestrial physics community. In the field of geomagnetism, magnetic storm modelling is established on the basis of the international project on solar wind - magnetosphere coupling. Participation of GI SAS in the project made it possible to directly discuss possible contributors to the storm time magnetic disturbances with participants from the United States, the Russian Federation, Germany and some other countries.

IV. Space Biology & Medicine

Project: Postembryonic development of Japanese quails in the conditions of hypodynamy.

22. This project is being undertaken at the Institute of Animal Biochemistry and Genetics of the SAS, in Ivanka pri Dunaji.

23. The project is an extension of the previous research in the embryogenesis of Japanese quails under the conditions of microgravity, which was successfully performed from 1972 to 1999.

24. The first study of quail behaviour under microgravity conditions until the fifth day of post-hatching development raises a new issue in cosmic biology: the adaptation of the newly- hatched organism, which has no previous sensory and motor experiences, in a similar environment. This problem represents a case of primary adaptation to the environment, which in principle does not correspond to genetically coded stereotypes of orientation and motor behaviour. For solving this

problem, it is important to establish an experimental model for the study of the postembryonic development of Japanese quails under the hypodynamy conditions until their maturity.

25. The aim of the present study was to observe the effect of simulated weightlessness (hypodynamy) on some physiological parameters of blood plasma in Japanese quail chicks from hatching to the adult age. Hypodynamy was achieved by the suspension of quails in individual beds.

26. The results obtained represent the first study on potential differences in the intermediary metabolism of the Japanese quail reared under simulated hypogravity conditions and have shown increased concentrations of uric acid and plasma cholesterol levels and decreased lipid concentration in plasma in the hypodynamic quail.

Project: Accumulation and persistence of cytogenetic damage induced by radiation and other factors of space flight.

27. The research on this project is undertaken at the Institute of Biological and Ecological Sciences, Faculty of Sciences of Šafárik University in Košice.

28. On the basis of previous findings by the Institute of Biological and Ecological Sciences on the trans-generational transfer of directly detectable and latent radiation genomic damage of intact and regenerating liver from irradiated rat males to their progeny, the possibility of eliminating damaged cells by mitotic death during ontogenesis was studied. The elimination of cells was investigated in embryonic tissues and intact liver of irradiated rat male progeny at various stages of intrauterine and postnatal development by analysing chosen cytogenetic and molecular biological indexes (e.g. proliferating activity, apoptotic fragmentation of DNA, frequency of chromosomal aberrations). The directly detectable radiation changes quickly disappeared in embryos and new-borns during the course of ontogenetic development, so they were nearly absent in 7-day old offspring (prepared for publication). These findings suggest that the trans-generational transfer of the latent damage of the liver reflects a radiation induced increase in genomic instability.

Project: Changes of the function of the neuroendocrine system during exposure to simulated microgravity and hypergravity.

29. This project is performed in conjunction with the Institute of Experimental Endocrinology, the Institute of Animal Biochemistry and Genetics and the Institute of Measurement Sciences (IMS), all at the SAS in Bratislava.

30. The goal of this project is to undertake a series of experiments with rats exposed to hypokinesia or hypergravity for various time periods, with the blood sampled during hypokinesia or hypergravity being placed in a special centrifuge by using a canula and used to determine plasma levels of hormones, neurotransmitters and metabolites. At selected time intervals, the investigators plan to measure, in isolated organs and tissues, the content of neurotransmitters, hormones, production of hormones, activity of enzymes involved in the production of neurotransmitters and the expression of genes for coding these enzymes. The results will be used to evaluate the capacity of the organism to overcome several stress loads. For studies of the effects of hypergravity, the Electronic Equipment for Multiple Blood Withdrawal with Telemetric Control from small experimental animals has been developed and tested. The equipment consists of a telemetric transmitter (placed outside the room of the centrifuge) and receiver. Both transmitter and receiver are equipped by microcomputers. Before the start of the experiment, it was possible to pre-programme the time schedule (sequence) of blood withdrawal for every animal. It was also possible to measure the instantaneous gravitational force, using an accelerometric transducer placed near the box with telemetric data transmission. The preliminary tests on the functioning of the equipment were completed and the necessary quantity of equipment was produced by IMS.

Project: Mechanisms of neuroendocrine, cardiovascular and metabolic adaptation to simulated microgravity.

31. This project was undertaken by the Institute of Experimental Endocrinology (IEE), Bratislava and the Faculty of Medicine, Lyon (France), in collaboration with a wide international contribution under the European Space Agency's (ESA's) "Long Term Bed Rest" project. Previous studies have

shown that microgravity during spaceflight induces changes of physiological functions that affect astronauts´ health and performance and the neuroendocrine and metabolic responses to various stressors. Spaceflight simulations such as short term or prolonged head down bed rest (HDBR) can mimic some of these changes and provide study conditions that are more accessible than those during spaceflight. Therefore, ESA, the Centre National d'Études Spatiales (CNES) of France and the National Space Development Agency of Japan (NASDA) are performing extensive studies using long duration bed rest. IEE is involved in the studies of the changes of plasma hormone levels during the bed rest.

32. The aim of the participation of IEE has been to investigate neuroendocrine response, especially the sympathetic nervous system, to stressors during bed rest of various durations. The results of the investigations have shown that plasma levels of typical stress hormone epinephrine were reduced during prolonged HDBR and exercise during the bed rest had no significant effects on plasma epinephrine levels. Plasma norepinephrine levels did not show significant changes during HDBR in both control and exercised probands. An elevation of plasma levels of catecholamines was noted after HDBR. These findings are in good agreement with urinary excretion of norepinephrine, which was highly elevated.

33. The purpose of the further study was to evaluate how a bout of endurance training would influence endocrine response after short lasting bed rest. There were differences in the response by several stress hormones to physical load – treadmill exercise after HDBR and endurance training failed to completely prevent changes in endocrine responses to stress loads seen after short-lasting HDBR, but it has been shown to diminish the negative effect of bed rest on growth hormone release and to augment the release of cortisol during exercise. This data demonstrates that simulation of hypogravity during HDBR or prolonged bed rest during the therapy of chronic illness could affect the neuroendocrine response to stress stimuli.

34. The data obtained is consistent with IEE's previous results from the exposure of human subjects to real gravity during space flights, which indicated activation of the sympathoadrenal system mainly during the readaptation period after landing. This data also supports the view that simulation of hypogravity during HDBR is a good model to study the effects of microgravity in human subjects. The scientists from IEE applied to participate in the next HDBR trial performed on women and organized by ESA.

Project: Influence of simulated microgravity on human postural responses to sensory stimulation

35. The goal of this project, which was performed at the Institute of Normal and Pathological Physiology of SAS, in Bratislava, was to investigate the role of altered sensory interaction in postural instabilities after spaceflight.

36. It is known that during spaceflight, visual influence on body orientation is increased. In 2003, the Institute of Normal and Pathological Physiology investigated the modification of postural responses to somatosensory stimuli by visual scene motion.

37. The Institute organized the 3rd International Posture Symposium entitled "Human Posture Control - Physiology, Disorders, Modelling and Balance Rehabilitation", with 57 active participants from 18 countries.

Turkey

[Original Text: English]

1. Scientific and Research Council of Turkey – Information Technologies and Electronics Research Institute (TÜBITAK-BILTEN)

1. The BILTEN Research Satellite Project was finalized in 2003. Flight Readiness Review was held on 3 June and the satellite was launched on 27 September from the Cosmodrome at Plesetsk in

the Russian Federation. The satellite was placed in a sun synchronous orbit at an altitude of about 686 kilometres, where it initiated sending images. The satellite has been designed to test some experimental payloads and software. Additionally, the images acquired by the satellite will be used for various scientific studies, including ecology, geology, forestry, urban studies and disaster management.

2. A satellite control ground station and various facilities required for design and manufacture of a small satellite, weighing upto 500 kilogrammes, have been established within the framework of the BILTEN project.

3. Research and development projects have been initiated to develop a flight computer, power storage and the real-time image processor GEZGIN in the Turkish remote sensing satellite BILSAT, to be used in future satellite projects. Studies on charge-coupled device electronics, which were initiated with the development of the multi-spectral camera COBAN, are also part of the on-going research and development.

2. Turkish State Meteorological Service (TSMS)

4. TSMS is a founding member of the European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT) and participates in all its activities, including satellite construction, launch, operation of satellites, data acquisition and product retrieval. Presently, TSMS has 206 automatic weather stations to observe the actual weather situation, in which data transmission is provided to the Ankara station by very small aperture terminals (VSATs) through the Turkish communications satellite TURKSAT.

5. TSMS plans to implement the Meteosat Second Generation (MSG) EUMETSAT satellite ground reception station in Ankara in the beginning of 2004.

6. TSMS, along with the World Meteorological Organization (WMO) and EUMETSAT, organized a regional workshop on satellite meteorology in Alanya, Turkey. Ten countries participated in the workshop, which was held from 22 to 25 September 2003. In 2004, TSMS intends to organize a workshop on advance topics with EUMETSAT in Alanya.

7. TSMS participates in MetOp, the European polar-orbiting satellite dedicated to operational meteorology, along with EUMETSAT and the European Space Agency (ESA). In addition, TSMS also plans to join the United States-France Jason Mission to investigate ocean resources by means of satellite data.

3. Aegean University

8. Astronomical research is being carried out at the Astronomy and Space Sciences Department of Aegean University. In this context, astrophysics, celestial mechanics, variable stars, stellar structure and stellar and solar magnetic activities are being carried out. In particular, the department has worked on stars that are somewhat older than the Sun and that show solar-like magnetic activity.

9. Due to the lack of Turkish scientific satellites, observations that support theoretical work have been made by ground-based telescopes at the Aegean University Observatory. In addition, data obtained by scientific satellites from other countries have been provided and have been combined with data obtained from telescope observations. Time-keeping and the coordinates of the observatory could be determined by global positioning system equipment connected to the telescopes at the Aegean University Observatory.

4. Istanbul Technical University

10. A satellite ground receiving station (SAGRES) was established by Istanbul Technical University, and was active in 2003 in order to receive images from various satellite systems to be used for scientific purposes. It has started receiving data from the French Spot and the Canadian RADARSAT Earth observation satellites, and has started providing scientific support, especially for mapping and city planning.

5. Establishment of the Turkish Space Agency

11. A need has arisen in Turkey for a space agency that would coordinate and control all civil and military space activities and direct all the activities within this field, in line with national policy. In this context, a draft bill for the establishment of the Turkish Space Agency was prepared in 2003. The Turkish Parliament is expected to approve the bill in 2004, thereby activating the national space agency.

12. Studies on the preparation of a draft national space policy have been initiated to coordinate the national space activities in the period leading to the establishment of the Turkish Space Agency.

6. Fairs and Conferences

13. In order to accelerate space activities performed in Turkey, two activities were held in Turkey in 2003:

(a) International Space Technologies Exhibition and Conference – SPACEAN 2003 was held in Ankara from 6 to 8 May; and

(b) International Conference on Recent Advances in Space Technologies – RAST 2003 was held in Istanbul from 20 to 22 November.