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Committee on the Peaceful Uses of Outer Space

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

Note by the Secretariat

II. Replies received from Member States

Czech Republic

[Original: English]
[6 January 2011]

The Czech Republic, as a country in Central Europe, has been focusing its space science and technology efforts towards its broader involvement in European structures. Space-related activities in the Czech Republic are coordinated by the Czech Space Office (CSO), which was founded in November 2003 as a private non-profit organization, when the Czech Republic became a European Cooperating State of the European Space Agency (ESA). CSO provides support to the Czech science, education, business, and research and development sectors, as well as serving as the first point of contact with the international space community. CSO carries out a broad range of activities at the national and the international levels, such as coordination, consulting, negotiations, networking and planning. It also represents the Czech Republic at international events and in various European space organizations.

For a small country such as the Czech Republic, international cooperation is the most efficient approach for benefiting from space science and technology. CSO coordinates Czech relations with the international, and particularly European, space community. CSO takes every opportunity to show the current and potential benefits of space technology for the national economy and society. CSO is financed by the Czech Ministry of Education, Youth and Sports. The mission of CSO is to increase the participation of Czech organizations in national and international space projects and to support the Czech space community in getting access to information of a technical, scientific or administrative nature.

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CSO maintains relations with main European space industry players, such as EADS Astrium and Thales Alenia Space, as well as with other key space companies and agencies, such as the *Centre national d'études spatiales* (CNES) and the German Aerospace Center (DLR). The Czech Republic is fully engaged in the development of European space policy and the European space programme through its participation in the High Level Space Policy Group of the European Union (EU) and by providing consultancy services during the preparation for the meetings of the EU Space Council. The first EU-ESA International Conference on Human Space Exploration took place in the vicinity of Prague, at Štiřín Castle, in October 2009.

Prague became a world centre of astronautics again after 33 years, when it hosted the 61st International Astronautical Congress (IAC), which took place from 27 September to 1 October 2010, bringing together more then 3,000 experts from all over the world. IAC also attracted more than 2,000 visitors from the Czech general public, secondary schools and universities. IAC has grown into a big event over the years, with exhibitions and other events, such as the United Nations/International Astronautical Union workshop and the Space Generation Congress. The local organization of the 61st IAC was entrusted to CSO.

In November 2008, the Czech Republic became the eighteenth ESA member State and committed itself to contributing approximately 45 million euros to ESA programmes until 2013. Currently, more than a half of the total budget for space-related projects in the Czech Republic is funded through ESA. ESA membership has opened up new opportunities for Czech companies and institutions, and their involvement in ESA projects has increased significantly from the level of the five previous years, when the Czech Republic was a European Cooperating State of ESA.

The Czech Republic recognizes the enormous benefits of space for its economy and consequently for the lives of all its citizens. It also puts emphasis on using space to understand the environmental challenges we face in managing natural resources, advancing in many technological areas and developing useful space applications for humankind. The Czech Republic would like to further enhance its involvement in many areas of astronautics, space science and their applications on Earth, which is clearly demonstrated by its requests to participate in ESA optional programmes.

Space science is a discipline exploring near and distant space, the solar system and the Earth's interaction with outer space. The Czech Republic has been involved in the two current space science missions investigating the Earth's magnetosphere and exploring the solar system, as well as in the missions under preparation to be launched in the next decade. These include the missions to the Sun and Mercury as well as astrophysics observatories. Two Czech academic institutes have been involved in the preparation process to provide instruments for the planned ESA Solar Orbiter mission. Providing the mission is successful, this will be the most valuable contribution of the Czech Republic to Sun research from outer space. The Czech Republic is also participating in the ESA BepiColombo mission to Mercury, with scientists from Charles University, Prague, taking part in the development of an electron analyser.

The Czech Republic participates in the European Programme for Life and Physical Sciences, ensuring Europe's strong position in research by developing

capabilities on the International Space Station (ISS), mainly using the Columbus laboratory as well as other ISS and additional research platforms. Part of this programme is the European Laser Timing (ELT) experiment, the main task of which is to synchronize the Atomic Clock Ensemble in Space (ACES) with others on the ground. The ELT payload in space includes a Single Photon Avalanche Diodes (SPAD) detector developed in the labs of the Czech Technical University Faculty of Nuclear Sciences and Physical Engineering. The one-year mission of a Czech medical doctor/researcher at Concordia station in Antarctica was part of the programme activities.

The Czech Republic actively supports all international Earth observation initiatives and the sharing of results, including the global Earth observation initiative, to which the Czech Republic provides its support through ESA and the European Organization for the Exploitation of Meteorological Satellites (EUMETSAT). At the last ESA Ministerial Council, in 2008, the Czech Republic committed itself to co-financing the ESA-managed Global Monitoring for Environment and Security (GMES) Space Component Programme. CSO makes all efforts to develop the GMES initiative to meet Czech requirements and closely cooperates with ESA to fulfil that goal. The Czech Republic also participates in the ESA Earth Observation Envelope Programme, involving new European missions that will improve the understanding of our planet. One of them, the GOCE gravity mission, will provide measurements to be used for analysis by the Czech Research Institute of Geodesy and Cartography. Many Czech teams are involved in collecting and analysing results from the largest and most sophisticated European Earth observation satellite, Envisat. Because of widespread cloud cover, Czech research teams use radar satellite data to monitor areas at risk of landslides and especially floods, the key environmental issues in the Czech Republic. The third ESA Earth observation programme, in which the Czech Republic is participating, is the Meteosa Third Generation Space Segment Development Programme, which promises a great number of opportunities for industrial development. The data from meteorological satellites are regularly used in national and regional weather forecasts by the Czech Hydrometeorological Institute.

Satellite navigation enables users to find out exactly where they are anywhere on the Earth using signals from orbiting satellites. Europe’s Galileo satellite navigation system will feature 30 satellites to provide the whole planet with a highly accurate global positioning system under civilian control. The Czech Republic already benefits from the applications offered by satellite navigation and actively supports the development of new technologies to exploit the potential of satellite navigation. The Ministry of Transport delegated to CSO the local organization of the European Satellite Navigation Competition. For seven years Czech institutions and companies have been submitting to competition their innovative ideas in the area of global navigation satellite systems (GNSS) applications.

The Czech Republic expressed its interest in becoming the seat of the European GNSS Supervising Authority, and the Czech Government is making efforts in that direction. Moreover, the Czech Republic participates in the ESA European GNSS Evolution Programme, which studies and develops technologies associated with future generations of the European Geostationary Navigation Overlay Service (EGNOS) and Galileo systems.

Satellite telecommunication is one of the oldest space service domains, and there is a mature and fully functional commercial market for it. The Czech Republic is fully aware of that, and therefore joined the ESA Advanced Research in Telecommunications Systems (ARTES) programme. Iris, a sub-element of the programme focusing on satellite solutions for air traffic management, is one of the ESA optional programmes with the greatest financial involvement of the Czech Republic. The Czech consortium, whose task is user terminal design, development and testing, is formed around the company Honeywell Czech Republic. Two software companies, Iguassu Software Systems and Evolving Systems Consulting, are also participating in the programme. Other sub-elements with Czech participation are ARTES 1, ARTES 3-4, dedicated to the development, qualification, and demonstration of telecommunication products, and ARTES 20, Integrated Applications Promotion, focusing mainly on the development, implementation and pilot operation of integrated space applications.

The space industry is one of the emerging sectors in the Czech Republic. Several Czech manufacturing companies have been supplying mechanical and/or electronic parts and sensors for satellites. Apart from companies that have already proved their ability to deliver in the areas of space science and technology, there are many with the potential to transfer their technological skills to the space sector. Among the main Czech hardware capabilities are the following: materials thermal processing; high-precision mechanical parts and assemblies; mechanical, structural and environmental testing; high-quality opto-mechanical/-electronic devices; precise X-ray optical/mirrors/CCD cameras; radar; robotic systems and processes; and nanotechnology products. In the field of software development, the major skills include: flight/ground segment software development; complex software solutions; digital image processing; and signal processing. The Czech Republic is participating in two main ESA programmes for space technology development: the Basic Technology Research Programme and the General Support Technology Programme.

Philippines

[Original: English]
[13 January 2011]

2010 activities of the Philippines in international cooperation in the peaceful uses of outer space

Joint Project Team meeting 2010, conference on Sentinel Asia Project, Manila, 6 to 8 July 2010

The 2010 Joint Project Team meeting (JTPM) was a conference of about 100 experts from all over Asia, which focused on the Sentinel Asia Project. The Project is a collaboration of 52 member organizations from Asia that is aimed at helping to mitigate the devastating effects of disasters in the Asia-Pacific region through the use of Earth observation technologies, speedy Internet dissemination methods and Web geographic information systems mapping. Designed to make disaster-related data available to all Asian countries, Sentinel Asia complements the activities of existing disaster management regional agencies. Countries that do not

have their own satellite reception facilities will find Sentinel Asia very useful and valuable in information-gathering.

The 2010 meeting provided a venue to discuss important technical matters and administrative issues, including the promotion of Sentinel Asia as a partner in disaster management efforts. Sentinel Asia is a project under the Asia-Pacific Regional Space Agency Forum (APRSAF).

The 2010 JTPM was hosted by the Philippine Council for Advanced Science and Technology Research and Development, the Department of Science and Technology's lead agency in the development, integration and coordination of the national research systems for advanced science and technology, including space technology applications and information and communication technologies. Organizing the event was the Japan Aerospace Exploration Agency (JAXA).

Meeting of the National Disaster Coordinating Council and the United Nations Platform for Space-based Information for Disaster Management and Emergency Response, Quezon City, 9 July 2010

Shirish Ravan, Programme Officer of the United Nations Platform for Space-based Information for Disaster Management and Emergency Response (UN-SPIDER), met with National Disaster Coordinating Council (NDCC) officials and representatives from other NDCC member agencies to discuss the availability of space-based information and recommendations on how to strengthen collaboration for effective use of information for disaster risk reduction and management. Specific topics of the meeting were the following:

(a) Space-based information used during the 2009 typhoon season;

(b) Information preparedness for the upcoming 2010 typhoon season;

(c) Lessons learned from the past and how to improve in the future;

(d) Opportunities to access space-based information;

(e) Closer working relations with UN-SPIDER.

The meeting was chaired by Ronald I. Flores, Civil Defence Executive Officer. After presentations by Mr. Ravan on the activities of and support being provided by UN-SPIDER and Esperanza Cayanan, of the Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA), on satellite applications in meteorology and the use of satellites during tropical cyclone Ketsana, discussions on the use and availability of and opportunities to access satellite data took place. Suggested actions as a result of the meeting were as follows:

(a) Establishment by NDCC of a forum of the organizations that participated in the meeting to improve preparedness in terms of space-based and geospatial information;

(b) Coordination of NDCC with the mapping agency to make a budget provision for easy procurement of satellite images;

(c) Inter-agency coordination: NDCC needs to develop capacity to use the data coming from all sources and coordinate with the relevant agencies to use expertise effectively; the Philippine Institute of Volcanology and Seismology

(PHIVOLCS) will organize training on the use of data jointly with JAXA for the benefit of other agencies in the Philippines;

(d) Enhance cooperation with UN-SPIDER: NDCC, the focal point for UN-SPIDER, should work closely with UN-SPIDER, which has expressed its willingness to assist NDCC and offer technical advice to establish a mechanism in the country for effective use of space-based information for disaster management.

Technical training on the satellite precipitation data application in the Sentinel Asia Project

In cooperation with JAXA, and as part of the Sentinel Asia Project, the technical training on satellite precipitation data application was conducted at PHIVOLCS, in Quezon City, on 27 and 28 September 2010. Participants included personnel from PAGASA, PHIVOLCS, the Office of Civil Defence, the National Mapping Resource and Information Authority, the Mines and Geoscience Bureau and other NDCC member agencies.

Application of space-based information on disaster management

PAGASA continued utilizing space-based information for disaster management support. PAGASA makes use of meteorological satellite data for weather and climate monitoring and flood forecasting. Satellite data instantaneously provide up-to-the-minute pictures of weather systems in the atmosphere, especially in areas where land-based observation is not available, such as over the Pacific Ocean. The meteorological satellite receiving facilities of the Philippines are as follows:

(a) National Oceanic and Atmospheric Administration (NOAA-AVHRR), polar orbiting satellite from the United States of America;

(b) Moderate-resolution Imaging Spectroradiometer (MODIS), polar orbiting satellite from the United States;

(c) Two Multifunctional Transmission Satellites (MTSAT), geostationary satellite from Japan; one is installed at the PAGASA Weather and Flood Forecasting Center in Quezon City and the other at Mactan PAGASA Station in Cebu City;

(d) Feng Yun Cast, geostationary satellite from China.

PAGASA has also installed a meteorological buoy that transmits real-time data with the aid of satellite communication facilities. Likewise, PAGASA will be using satellite communication for real-time transmission of data of automatic weather stations all over the country. The Broadband Global Area Network (BGAN) will be used for fast transmission of data. BGAN is a global satellite Internet network with telephony using portable terminals. The network is provided by Inmarsat and uses three geostationary satellites called I-4 to provide almost global coverage.

Capacity-building and training opportunities under the United Nations Programme on Space Applications

As a continuing activity of the International Year of Astronomy and for the promotion of astronomy to young students, the PAGASA and the Department of Science and Technology conducted the Regional Astronomy Olympiad at the

University of the Philippines on 19 February 2010. There were two categories: college level, with 5 regions participating, and high school-level, with participants from 10 regions. The top five winners in the high school-level contest participated in the International Astronomy and Astrophysics Olympiad, held in Beijing in October 2010, and received the honourable mention award.

Republic of Moldova

Exploitation of renewable energy resources in the Republic of Moldova and the development of a Moldovan Microsatellite

[Original: English]
[4 November 2010]

1. Introduction

The present report was prepared by the Technical University of the Moldova Institute of Electronic Engineering and Industrial Technologies of the Academy of Sciences of Moldova.

Land surface exploration is an area that is growing rapidly, and the number of space-image users is very large, in agriculture, geodesy, cadastre, ecology and environmental monitoring. The application of research and monitoring methods of captured images plays an important role in the national economy, but the high cost of images from space does not allow all users to benefit from the results. The high cost and the quality of such images is determined by many factors, both physical and technical, as well as by methods and processes of capturing images. Therefore, with the goal of providing solutions for the existing important problems of the national economy, the Academy of Sciences of the Republic of Moldova decided to promote some space technology projects in the framework of the programme on the exploitation of renewable energy resources in the Republic of Moldova and the development of a Moldovan microsatellite.

From 2007 to 2009, the following projects were ongoing:

(a) Investigation and development of navigation and control systems for the microsatellite;

(b) Development of microsatellite stabilization, orientation and attitude control systems;

(c) Development of an electrical power supply system for the microsatellite;

(d) Development of video monitoring and a distant Earth observation system;

(e) Development of materials, structures (including nanotechnologies) and electronic devices for operation in extreme cosmic conditions.

In 2010, the following projects were ongoing:

(a) Development of materials, structures (including nanotechnologies) and electronic devices for operation in extreme cosmic conditions;

(b) Microsatellite orientation, stabilization, navigation and electrical power supply systems;

(c) Orientation and stabilization methods for capturing images from long distances associated with real-time coding, compression, protection and transmission.

These projects are in concordance with the national priorities concerning electronic data-processing for cadastral use; for landslide forecasting; for predicting the formation and movement of hail clouds; for monitoring land; and for the monitoring of forests, rivers, lakes, flood damage, hydrological services and others.

2. General objectives of the project

The project's objective is the development of a microsatellite in order to analyse orbit parameters; improve satellite control; to test the on-board computer and its basic components; and carry out research on the technologies of Earth observation, aimed at obtaining information about the land surface of the Republic of Moldova, in particular. Another important objective is to conduct, encourage and promote research and development in the field of space technology and contribute to the industrial development of the Republic of Moldova.

3. Microsatellite control and navigation systems

The navigation system is needed to ensure radio communication with microsatellites in two-band radio carrier frequencies in both directions and to control the work of a multispectral scanner from the terrestrial station and of the on-board computer on the basis of GPS and GLONASS. The project on the investigation and development of navigation and control systems for the microsatellite is implemented by the research team from the Faculty of Radioelectronics and Telecommunications. The on-board computer was designed to control the power and the satellite's multispectral scanner, to ensure monitoring and the functioning of the control systems, to maintain the thermal regime, to ensure the measurements of telemetry system interactions, to supply all the systems of the microsatellite with power and to ensure communication with the non-oriented microsatellite or with regard to other orientation problems. The following results have been obtained:

(a) Electric diagram of the on-board computer, which includes basic devices;

(b) Communication modems;

(c) Operating programs for the microcontrollers of the on-board computer;

(d) Electrical schemes of the emission-reception devices;

(e) Electrical schemes of the telemetric system;

(f) Operating model of the satellite navigation system;

(g) Operating model of the satellite control system.

4. Power supply system of the microsatellite

The power supply system of the satellite is intended for the generation, storage, distribution and regulation of electricity in all phases of the satellite

operation in orbit under cyclic programmes. The project on the development of a microsatellite electrical power supply system was undertaken by the research team from the Faculty of Energetics.

A number of autonomous electric power supply systems have been developed on the basis of photovoltaic panels with different power converters.

Simultaneously, a whole series of devices developed by the Institute of Electronic Engineering and Industrial Technologies (IIETI) was adapted in terms of digital signal processing, and the experience can serve as a basis for the implementation of a number of items for the collection and processing of data from spatial digital devices. Thus, technical solutions have been proposed, and the design and execution of mock demonstrational elements for a stabilized voltage converter correlated with the selection of the satellite solar battery panels was carried out.

5. Microsatellite orientation and stabilization

The project on the development of microsatellite stabilization, orientation and attitude control systems envisages the design of a conceptual diagram of the control, orientation and regulation mechanism based on the use of systems for attitude control (solar transducers, magnetometer) and for the realization of orientation motions (electromagnetic coils, pitch flywheel); the design of a control, orientation and regulation system for satellite flying trajectory (SDOSM) based on interaction with the magnetic field of the Earth; the design, research and simulation of SDOSM parts (magnetometer, solar transducer, mechanism for rectangular orientation with three degrees of liberty correlated isochronously with the three parts of the magnetic induction vector); mechanism of operational orientation with pitch flywheel; an inertial mechanism for passive operation and regulation of flight; the determination of functional characteristics of SDOSM parts; and modelling of the functioning of the orientation-regulation system.

The research team of the Department of Theory of Mechanisms and Machine Parts, involved in the implementation of this project, has various experiences of research on developing separate systems of driving mechanisms for the orientation and management of devices. The proposed electromechanical modules present special constructions with high-accuracy planetary transmission and special transducers for precise positioning of the space flight apparatus or of the basic units. In order to reduce production costs and weight and increase efficient operation under insufficient lubrication, the authors have developed two modules with electromechanical high-accuracy gears and sliding bearings, made of plastic. These modules have electromechanical constructive simplicity, satisfactory performance, harmonic dimensions, low weight and a low production cost.

In the near future at the Technical University of Moldova the special stand for testing in vacuum conditions the orientation, stabilization and attitude control will be released.

6. Earth observations, video monitoring and telecommunications

The remote Earth observations from the satellites and the distribution of the remote sensing data should help to solve very important problems. Therefore, the project on the development of video monitoring and a distant Earth observation system is the central project of the Moldovan microsatellite programme. This

project is promoted by the Centre for Space Research at the Technical University of Moldova. The system of video monitoring and telecommunications was developed on the basis of a multicolour CMOS image sensor to ensure the exploration of the Earth's remote area with a resolution of 10-:-15m. It was decided that the system must be endowed with a multispectral scanner, which allows research of land surfaces in the visible and infrared ranges. Certainly, remote sensing with portable ground stations and low-cost space systems has an important role. A key feature of the space system is direct downlinking to one or more small ground stations, precluding the need for a centralized processing and distribution system. The advantages are real-time access to observations, smaller databases and ease of information distribution, even in areas not well served by communications systems.

7. Construction materials and microsatellite reliability

The project on the development of materials, structures (including nanotechnologies) and electronic devices for operation in extreme cosmic conditions is led by academician Kantzer Valery of IIETI. The main objectives of the project are:

(a) Research and development of new materials and elements of spatial devices and terrestrial station building blocks of the microsatellite;

(b) Design and implementation of verification stands in extreme conditions;

(c) Development and adaptation of materials and devices of IIETI, previously performed for other uses, for spatial devices, connected to technical requirements and operating in extreme cosmic conditions.

The project is structured on the basis of, firstly, work previously performed in IIETI, including some work related to missile equipment and cosmic technology. Important aspects of the Institute's profile have to do with the investigation of properties of materials at cryogenic and ultra low temperatures and with electronic devices and sensors, including the collection and processing of digital information.

8. Scientific results, implementation and the beneficiaries

The programme will contribute to the education of youth and a renewal of the scientific and industrial potential of the Republic of Moldova. It will create a liaison between students and the research laboratories and industrial sector; attract young inventors; create new jobs; preserve the intellectual potential of the country; develop scientific and technical directions of the national economy; and contribute to the professional orientation of pre-university graduates.

Besides educational, scientific and technical problems, this programme will allow us to solve a number of concrete problems of the national economy; to monitor the territory in order to measure soil moisture; to estimate cultivated agricultural land; to monitor and evaluate the degree of crop maturation; to perform various cadastral works; to monitor roads, forests, rivers and lakes; to determine the extent of a river's overflow; to obtain photo and video information on the country's districts of interest; etc. The scientific, technical and instructive potential of the country is determined by the possibility of realizing advanced technology and science-intensive projects.

The economic aspects of realizing such a complex project are very difficult to estimate. Monitoring the territory of the Republic of Moldova will allow us in the future to:

(a) Obtain high-accuracy images for cadastral works;

(b) Receive information about cultivated agricultural lands;

(c) Conduct environmental monitoring of regions;

(d) Oversee the processes of formation of clouds with the threat of hail and services for security against hail.

At present, the cost of providing these types of services on the world market can be as high as several thousand United States dollars. This instructive-educational project will help develop professional habits for students; will ensure continuous contact between science and the industrial domains; will increase the creativity of youth; and will allow the creation of new jobs, preserve the country's intellectual potential and be based on new scientific and technical fields in Moldovan agriculture. It will contribute to the guidance of graduates of pre-university educational institutions.

9. International cooperation in the framework of aerospace issues

At this stage of the programme, relationships will be expanded with several universities of the European Union, Germany, Romania and Russia, where similar projects have been performed. Cooperation activities in the framework of this programme are described below.

In 2009 academician Ion Bostan and professors Dulgheru Valeriu, Secrieru Nicolae and Bostan Viorel participated in a conference in Bucharest. In addition, Mr. Bostan, head of the Moldovan aerospace programme discussed with Chris de Cooker, Head of the ESA International Relations Department, the future cooperation and involvement of Moldovan researchers in ESA aerospatial programmes. Mr. Bostan and Marius-Ioan Piso, director of the Romanian Space Agency, have discussed an agreement of bilateral cooperation promoting international relations in the field of high technology. The main areas of cooperation include the development of small satellites and ground control systems for satellites.

It has been established that we have similar needs at the regional level that demand some new solutions. For instance, we are ready to coordinate satellite programmes to address our specific needs and other developing areas that require special capabilities related to sensor parameters, such as specific spectral bands, spatial resolution, time resolution, cost of image, autonomy and investment level in ground equipment, and the expertise required for utilization.

Another field of cooperation is the exchange of experience in image data collection and processing for the purpose of monitoring flood damage in our region and for agricultural applications. The research team from the Technical University of Moldova, together with the team of the Institute for data communications systems from the University of Siegen, Germany, is working on the common project on orientation and stabilization methods for capturing images from long distances associated with real-time coding, compression, protection and transmission. To improve our experience in telecommunications, these problems have been discussed

with Karl Cristoph Ruland, head of the institute for data communications systems. It was decided to cooperate on the common problem, because the application of research and monitoring methods for captured images plays an important role in telecommunications and data-processing, but the high cost of space images does not allow all users to benefit from these results in exploring land surface in agriculture, geodesy, cadastre, ecology and environmental monitoring. High-qualitative images can be achieved with objective lenses with a big focal distance and with high resolution, which are installed on large aircraft (satellites, orbital stations, aeroplanes), but afterwards the cost of these images increases. Another situation is the case of small aircraft on which high-quality objective lenses cannot be installed. This, however, would lower the quality of images if the problem were to be treated traditionally. Important factors affecting the quality of images are not only lens parameters, but the dynamics of aircraft movement, lack of stability and object orientation, which can result in the essential distortion of captured images. Often, to get a result it is required to repeat an operation, which is not always possible.

It is proposed to solve the problem of capturing images complexly by using light aircraft, applying new technologies, methods and processes of orientation and stabilization of the aircraft, simultaneously capturing images, and compressing, codifying and transmitting data in real time to the recipient. This will increase the quality and will reduce the total cost of images. As a result, the images will be obtained without distortion, with a much smaller volume, coded in order to protect them and send them to recipients.

The representative of our team, Vladov Mihail from the Centre for Space Research of the Technical University of Moldova, made a presentation at the Conference “Scientific and technical centre of spatial missiles” in Samara, Russian Federation, and concluded a cooperation agreement. The protocol of intention on scientific and educational cooperation in the field of aerospace activities between Samara State University and the Technical University of Moldova includes:

(a) Implementation of joint research and development work in the aerospace field;

(b) Participation in the development and implementation of joint projects in the field of scientific-educational small satellites, including remote sensing of the Earth;

(c) Exchanges of university students and teachers;

(d) Joint participation in organizing and conducting conferences and seminars on topics of interest to both parties.

Also, there is an agreement between the Centre for Space Research of the Technical University of Moldova and the Institute for Space Research of the Bulgarian Academy of Sciences, concerning bilateral cooperation and the promotion of international relations in the field of high technologies. The main areas of cooperation include the development of small satellites and ground control systems of satellites.

Other representatives of our team, Bodean Ghenady and Blaja Valery, participated in the United Nations/Austria/ESA Symposium on Small Satellite

Programmes for Sustainable Development from 21 to 24 September 2010, where they established relationships with researchers from many countries.

10. Conclusion

The Moldovan satellite programme is at an early stage, but a number of promising results have been obtained for its successful implementation. We hope to cooperate with other countries in developing this instructive-educational programme, which will help to develop the professional skills of students, will ensure continuous contact between science and the industrial domains, will increase the interest of youth, will allow the creation of new jobs, will preserve the country's intellectual potential and will constitute a basis for new scientific and technical fields.