Bulgarian Academy of Science

Solar-Terrestrial Influences Institute

Self-evaluation Report (2004-2008):

Current Status and Prospective/Future Development of Solar-Terrestrial Influences Institute at the Bulgarian Academy of Sciences

Sofia

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Self-evaluation Report (2004-2008): Current Status and Prospective/Future Development of Solar-Terrestrial Influences Institute at the Bulgarian Academy of Sciences (STIL-BAS[1])

I. Current status, based on last five years achievements

1. Name of the research unit, date of establishment, organization structure

Till November 17, 2008, Solar-Terrestrial Influences Institute at Bulgarian Academy of Sciences was well known as central Solar-Terrestrial Influences Laboratory (STIL-BAS). The decision to change of the statute from laboratory to institute was taken by the Management council of BAS. This decision was based on BAS' interior regulations foreseen the development of central laboratories into institutes, if they have outstanding achievements.

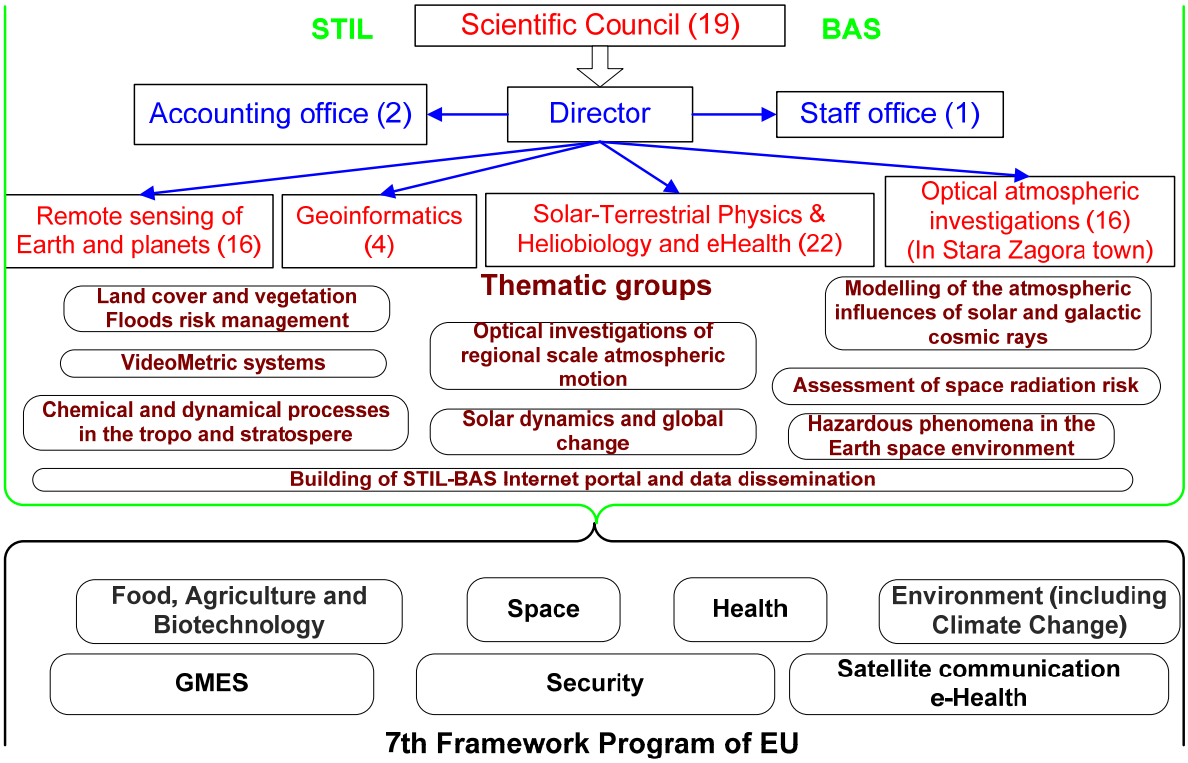

Fig. 1. Organization Chart of STIL-BAS

The STIL-BAS organization chart is presented in the first 3 rows of the block-diagram in Figure 1. During the years this structure proves to be too rigid to follow the dynamic in solar-terrestrial sciences and space research development. As a result at present 9 thematic inter-Institute groups are organized. The scientific research areas of **thematic groups** closely correspond to 7FP Space, Security, GMES[2], Health and other thematic priorities.

STIL-BAS **human potential** is 77 people, including 49 scientists of international recognition, 2 full and 1 corresponding members of BAS, 5 with Doctor of Science degree and 20 PhD, 6 Senior research scientists I degree (Professors), 11 Senior research scientists II degree (Docent) and 34 Research scientists. 28% of the scientific staff is female. Presently the mean age of STIL-BAS researchers is around 51 yrs. *(More details in Annexes 6 and 7.)*

[1] Nevertheless that the "new" abbreviator of the institute should be "STII-BAS" the scientific council of the institute decided to keep the "old" one - "STIL-BAS" because of its well known meaning in the scientific community and in Internet. For example Google (http://www.google.com/) "found" result for "STIL-BAS" are about 2820 documents, while for "STII-BAS" there are no relevant documents.

[2] Full list of the acronyms meaning is presented in Suffix 3.

The Scientific Council coordinates STIL-BAS research. It consists of 19 well known Bulgarian scientists, from STIL-BAS, other BAS institutes and Bulgarian universities, allowing the coordination of scientific activities at wider national level.

38 PhD students were trained in STIL-BAS in the period 2004-2008.

2. Areas of activities and/or mission description

Brief History: STIL-BAS is an independent scientific organisation, found in 1990 by the Management council of BAS, to study the newly emerging area of solar-terrestrial influences as possible reason for global change as well as to meet the social needs for multidisciplinary study of relationship between events on Sun and their effects on geospace. Initiators of creating of STIL-BAS were the famous Bulgarian scientists Prof. Kiril Serafimov and Prof. Dimitar Mishev. Prof. Dimitar Mishev was Head of STIL-BAS till his death in 2003. The staff includes highly motivated scientists with large expertise in space research, participating in numerous space experiments on INTERCOSMOS series of rockets and satellites, two BULGARIA –1300 space research projects, interplanetary probes such as Vega-Haley and Phobos-1/2, and in the scientific programs of the first and second Bulgarian cosmonauts, including in the programs focused on psychophysiological and adaptation mechanisms during space flights with different duration. Since 1990 STIL-BAS participates in extreme amount of space experiments, including development of instruments, data processing, analyses and interpretation of data for international space projects: APEX, ACTIVNY, KORONAS-F, INTERBALL-1/2, Mars-96 interplanetary probe, BION-12 satellite, and International Space Station (ISS). Recently STIL-BAS takes part in several international projects: NATO SfP-977999 project 2000-2002; two contracts of 5FP "Plasma Processes in Near Earth Space, INTERBALL and Beyond"; Collaborative linkage grant with NATO 2002-2003, NATO-CLG Project 2003-2004 and coordinates the SSA project START of 6FP, 2004-2006, The "Bulgarian-ITU pilot project for Septemvri region of Bulgaria" in the field of implementation of eHealth technologies in rural areas, 2004-2006 and the INTAS project "Optical investigation of regional scale atmospheric motion and its influences", 2003-2006.

Mission: Today STIL-BAS is the largest, high quality national centre with multidisciplinary approach to fundamental space research and its application in solar-terrestrial physics, in situ and remote investigation of the geospace, planets and interplanetary space, study of global change and ecosystems and heliobiology and telemedicine/eHealth. Today STIL-BAS participates in 18 international projects, including 14 with European Union states, and has 10 bilateral agreements with foreign scientific institutes. Its researchers, in cooperation with scientists from EC, participate in a number of space experiments such as: ESA leaded facilities BIOPAN, EXPOSE, MATROSKA and Plasma-Wave Complex for ISS Columbus module and Russian segment, FOTON and BION-1M satellites, Indian Moon satellite CHANDRAYAAN – 1, NASA Deep Space Test-Bed Facilities and Phobos sample return mission. STIL-BAS has 12 multilateral agreements for joint work with scientists from Germany, Norway, Netherlands, Italy, Spain, Russia, Japan and USA, and participates in 3 large international projects for study of Global change. STIL-BAS is one of the scientific users of FP6-2002-Infrastructures-1 ALOMAR eARI project. STIL-BAS has 15 contracts with the National Scientific fund and 3 grants from BAS.

The **areas of activity of STIL-BAS** are well shown in Figure 1.

3. Relation of the research areas and topics with the research policies and programs approved by the General Assembly of BAS, and with national and/or EU research priorities

STIL-BAS research areas are related to the following BAS research priorities: space research and technologies, environment (natural resources and global change), security, medical and biological investigation,state of the art physical technology, information and communication technologies.

The relations of STIL-BAS research areas with the 7th Framework Programme (7FP) for Research and Technological Development of EU are well seen in the Organization Chart in Figure 1. The rank list of STIL-BAS priorities in 7FP is:

- Specific Programme Cooperation thematic area "Space":
  - Activity: 9.1 Space-based applications at the service of European Society;
    - *Validation of GMES services and products*
    - *Development of upgraded capabilities for GMES*
  - Activity: 9.2. Strengthening the foundations of Space science and technology;
    - *Research to support space science and exploration*
    - *Space technology*
    - *Space transportation*
  - Activity: 9.3 Cross-cutting activities
    - *International Cooperation*
- Specific Programme Cooperation thematic area "Environment (including climate change)";
  - Activity 6.1 Climate Change, pollution and risks
    - *Sub-Activity 6.1.2 Environment and health*
      - *Health impacts of climate change*
    - *Sub-Activity 6.1.3 Natural Hazards*
      - *Risk assessment and management*
  - Activity 6.3 Environmental technologies
  - Activity 6.4 Earth observation and assessment tools for sustainable development
- Specific Programme Cooperation thematic area "Security";
- Specific Programme Cooperation thematic area "Health";
- Specific Programme Cooperation thematic area "Food, agriculture and fisheries, and biotechnology".

4. <u>Leadership</u> – description based on the Organization chart with the names and titles of all leaders elected or appointed (directors, deputy directors, scientific secretaries, heads of <u>structural units</u> according to the Organization chart, chairperson of the scientific council, etc)

Sen. Res. Sci. I degree, Dr. Sc. Tsvetan Dachev is Chairman of the scientific council, Director of STIL-BAS and leader of Solar-Terrestrial physics department of STIL-BAS. He obtained PhD in 1979, Post Doc in Space Physics Research Laboratory at University of Michigan, USA in 1992. He was principal investigator (PI) of a number of space instruments on rockets and satellites, MIR and International Space Station. Now he is PI and co-investigator of spectrometric experiments for ESA EXPOSE and BIOPAN facilities on ISS and on FOTON M2/3 satellites, Indian Moon satellite Chndrayaan-1, BION-1M satellite and PHOBOS-Ground interplanetary and "Skafander" projects. Dachev has published over 90 articles in refereed journals.

Sen. Res. Sci. I degree, Dr. Sc. Irina Stoilova, MD, Scientific secretary and Vice Chairman of the Scientific Council, leader of Heliobiology and eHealth thematic group; PhD 1976; Dr. Med. Sci. 1991; Assoc. Prof. 1985; Full Prof. 2006; Post Doc: Faculte de Medicine, Montpellier; Visiting Scientist: Medico-Biological Inst., Moscow, 1986-1988. Participated in the International Space Programme "INTERCOSMOS" 1986-1996; leader of numerous international projects with Russia, Belgium, Italy. Author of 3 books related to the professional interests in the Neurophysiology of the Extreme Impacts, Space Physiology, Heliobiology and more than 100 scientific papers in these fields. Membership: Int. Brain Research Org. (IBRO); Europ. Neurosci. Assoc.; Planetary Soc., USA.

Sen. Res. Sci. Nencho Petkov, Ph.D. is Deputy Director of STIL-BAS and Head of Stara Zagora Department. He has participated in a number of international projects for investigation of the atmospheric emissions on rockets, satellites and space stations. He leads Bulgarian participation in two NATO-CLG and in INTAS Projects.

Sen. Res. Sci. Doyno Petkov, Ph.D. is Deputy Director of STIL-BAS and leader of Remote Sensing Department. He is responsible for optical measurements, optical data collection, processing and interpretation; participation in the development of concept of practical application new synergetic remote sensing technology for raised groundwater and seepage detection by using jointly spectral microwave and optical approach; writing reports and papers; hosting foreign participants and visiting specialists and students; participation in workshops, sharing experience and knowledge with partners and scientists from abroad.

Sen. Res. Sci. Anton Stoimenov, Ph.D. is the Head of Geoinformatics Department of STIL-BAS. During the last three decades he leads a number of national and international programs and projects in the field of remote sensing image processing and GIS science and technology.

Prof. Dr. Sc. (Academician) Stoycho Panchev has 45 years teaching experience in Atmospheric Physics (meteorology) in the Faculty of Physics of Sofia University, former head of Department of Meteorology and vice president of BAS. He was organizer and co-organizer of many national and international scientific meetings. His books are translated in English, Russian and Chinese.

Prof. Dr. Sc. (Corresponding member) Peter Velinov is leader of the Modelling of the atmospheric influences of solar and galactic cosmic rays thematic group and a member of Commissions C and D of COSPAR. He was active participant in projects of DAAD, DFG and programmes: Middle Atmosphere Programme of SCOSTEP to ICSU, COST, and bilateral collaboration with Germany, Russia and Finland etc. Velinov has published over 300 papers in refereed journals and international proceedings.

Prof. Anatoly Shutko, Ph.D. has over 40-year expertise in microwave propagation, passive and active remote sensing of land and water surfaces, including soil moisture and depth to shallow water table determination and detection of areas with water seepage through dikes and levees. He has led a number of International Research Programs and projects. He has part-time positions in NASA Centre for Hydrology, Soil Climatology and Remote Sensing at Alabama University, USA and in the Institute of Radio Electronics at the Russian Academy of Sciences. Prof. Shutko is a member of IEEE Chapter on Geosciences and Remote Sensing.

Sen. Res. Sci. I degree, Dr. Sc. Liubomir Simeonov was a team member of CELIAS (Charge, Element and Isotope Analysis System) of ESA/NASA scientific satellite SOHO. At present he is a Co-I of the SNMS-ToF mass spectrometer system for chemical and structural nano-analysis of the Institute for Surface and Thin Film Analytics at the Technical University of Kaiserslautern, Germany. Director of three NATO scientific meetings on Environmental Security (Advanced Study Institute CBP.EAP.ASI.981563 in 2005 and ESP.MD.ASI.983351 in 2008; Advanced Research Workshop ESP.EAP.ARW.982527 in 2007).

Sen. Res. Sci. Rolf Werner, Ph.D. is head of the thematic group "Dynamical and chemical processes in the Troposphere and Stratosphere". He obtained his Ph.D. at the Technical Institute, Leipzig, Germany, in 1982. He has participated in the international VEGA project for the investigation of Halley comet, in the INTERBALL space project and in a number of ARI and eARI FP5 and FP6 projects in cooperation with ALOMAR, Norway. He has taken part in national projects. Since 2000 he leads a contract with ISAC - CNR, Italy.

Sen. Res. Sci. Alexander Bochev, Ph.D. is heading Geospace magnetic field working group. Post Doctorial Fellowship: Instit. De Physic du Globe, Paris, France. PI or Co-PI of a number of space magnetic field experiments aboard satellites BULGARIA 1300, KORONAS-I, APEX and INTERBALL-Au. Coordinator of projects with: IRF, Swedish Inst. Space Physics, Kiruna; Indian Inst. of Geomagnetism, Bombay, India; Inst. Experimental Physics, SAS, Kosice. Member of IAA, COSPAR commission and European Magnetosphere Satellite Network (EMSNET).

Sen. Res. Sci. Rumiana Kancheva, Ph.D. is a member of the Scientific Council of STIL-BAS and head of the working group "Land Cover Spectral Characteristics" within the Remote sensing department. She is engaged in soil and vegetation spectral data acquisition, processing and

interpretation. She has participated in international programs and projects dealing with scientific research and application of remote sensing technologies in land cover assessment as well as with integration of data from different sources for soil and crop state evaluation. She is a national coordinator within the Multilingual Space Dictionary Study Group of the International Academy of Astronautics.

Sen. Res. Sci. Lachezar Mateev, Ph.D. works in the field of mathematical and computer modelling in solar-terrestrial physics. He participated in DAAD and DFG joint research projects between BAS and Institute for Astronomy and Astrophysics, Eberhard Karls University of Tuebingen, Germany. He has Ph.D degree in mathematics and publications in applied mathematics and solar-terrestrial physics. He takes part in joint projects between BAS and Russian and Finnish Academies of Sciences.

Sen. Res. Sci. Ilko Iliev, Ph.D. has scientific interests in development and using of spectrometric and fluorometric devices and systems for remote sensing of the atmosphere, Sun and nature objects (plants, ground, rocks, and minerals). He participates in national and international projects for investigation of the atmospheric aerosol, spectrometric and fluorometric investigation on the cultural plants subject to physical or chemical stresses.

Sen. Res. Sci. Dora Krezhova, Ph.D. is a member of the Remote Sensing department and has participated in a number of international projects as one of the key designers of space instruments on rockets and satellites. She leads a project on the application of modern spectrometric remote sensing techniques in studying of the impact of stress factors on agricultural vegetation. She has contributed to a number of publications in refereed journals and proceedings of international and national congresses and conferences.

Sen. Res. Sci. Katya Georgieva, Ph.D. is the leader of the thematic group "Solar dynamics and global change". She is the regional coordinator for the countries of the Balkan, Black Sea and Caspian Sea region for the program of the International Heliophysical Year, and is a member of the European Steering Committee for this program. She is an active participant in different international programs related to space weather and space climate. She is the organizer and co-organizer of several international scientific meetings.

Sen. Res. Sci. Veneta Gineva, Ph.D. has participated in a number of international projects: BULGARIA 1300, the VEGA project for the investigation of the Halley comet, in the INTERBALL space project and in a number of FP6 eARI projects in cooperation with ALOMAR, Norway. She leads several national projects.

Res. Sci. I degree Malina Jordanova, MD, Ph.D. is author and co-author of over 90 papers and more than 100 presentations, Vice-Rapporteur for Question 14/2 of International Telecommunication Union, was a post-doc in Max-Planck Institute for Human Development and Education, Germany. Currently she is focusing on eHealth and ICT applications in healthcare. At present coordinates a project devoted to telepsychology, funded by Bulgarian national science fund. Since 2002 coordinates the annual Educational program of Med-e-Tel (The International eHealth, Telemedicine and Health ICT Forum for Education, Networking and Business, http://www.medetel.lu).

Res. Sci. I degree Penka Stoeva, Ph.D. is leader of two joint space research projects of BAS and RAS and IHY National Coordinator for Education and Public Outreach. She participates in a number of national and international programs and projects in the field of spectrometry, cometary and earth atmospheres, solar corona, and archaeoastronomy and speleology. She is an organizer and a participant of scientific research expeditions, national and international science symposiums and conferences. She is also an editor of proceedings and reviewer of papers. She is member of COSPAR, SEAC and ICHA, IAU Working Group on Astronomy and World Heritage, UIS Commission on Physical Chemistry and Hydrogeology of Karst.

Res. Sci. I degree Svetla Dimitrova, Ph.D. participates in a number of international projects with Azerbaijan, Russia, Greece for investigation of space weather (solar activity, geomagnetic activity, cosmic rays intensity variations) and meteorological weather on human health

(physiological and psycho-physiological status and different cardio- and brain-vascular diseases morbidity and mortality). She is an author of over 60 scientific papers, and is nominated as a Bulgarian representative in COST Action BM0704.

Res. Sci. I degree Jordanka Semkova is leader of a group experienced in development of scientific instrumentation onboard of manned and unmanned space flights, data processing and analyses, development of methods and tools for charged particles measurements. Co-I and PI of a number of space experiments and projects for investigation of charged particles in space in the period 1981-2008. Co-I of two 5FP contracts. Presently is PI of Liulin-5 experiment on ISS and of Liulin-Phobos experiment on Phobos-Soil Sample Return Mission. Semkova is author of more than 50 articles in refereed journals.

Res. Sci. I degree Borislav Tomov has great experience in field of development of spectrometric instruments and in scientific data processing and analysis from experiments on aircrafts, satellites and rockets. He was Principal investigator of Liulin-R instrument launched on HotPay-2 rocket in January 2008. He has published over 50 articles in refereed journals.

Res. Sci. I degree Yury Matviichuk has over 30 years of experience in space research instruments development, test facilities and scientific data processing. Now his interest is oriented to dosimetric spectrometric measurements on board of satellites and rocket as well as on ground based dosimetric research using modern methods of data acquisition. He has published over 30 articles in refereed journals.

Res. Sci. I degree Alexander Krumov is head of Videometric Systems research group specialized in development of instruments and systems for the purposes of optical remote sensing. He has participated as leading designer and responsible constructor of instrumentation in a number of national and international projects for investigation of Earth surface and planets. Currently he leads research related with new remote sensing technology based on plant fluorescence imaging, and carries out the international collaboration in this area.

Res. Sci. I degree Rositza Koleva[3] is leader of the Hazardous phenomena in the Earth space environment thematic group. She is PI of the AMEI-2 experiment of the international INTERBALL project and co-investigator in several space instruments on satellites, MIR and International Space Station. She was organizer and co-organizer of a number of national and international scientific meetings and leader of several national and bilateral research projects. Koleva has over 90 papers in peer review journals and international proceedings.

5. Researchers and other personnel. Analysis of personnel and personnel development in the period 2004-2008. Separate information about the young researchers

5.1. Analysis of personnel and personnel development in the period 2004-2008

The leading researchers in STIL-BAS are listed in the above item. In the period 2004-2008:

- Prof. Dr.Sc. Peter Velinov was elected for Corresponding Member of Bulgarian Academy of Sciences in 2004.
- 2 scientists obtained Doctor of Sciences Degree: Liubomir Simeonov and Tsvetan Dachev and were elected by the National Accreditation Commission (VAK) for Sen. Res. Sci. I degree;
- 5 Res. Sci. I degree - Lachezar Mateev, Ilko Iliev, Dora Krezhova, Katya Georgieva and Veneta Gineva, were elected by the scientific council of STIL-BAS to the higher status of Senior Researchers. 2 others (Malina Jordanova and Penka Stoeva) are in procedure;
- 4 scientists from the staff obtained Ph.D. degree: Svetla Dimitrova, Jordan Tassev, Katya Georgieva and Peter Tonev. 2 others: Jordanka Semkova and Rositza Koleva, are in procedure.

[3] Further in the text of the report the titles of STIL-BAS scientist will be omitted.

5.2. Information about the young researchers

There are only 3 young researchers below 35 years in the staff of the institute now. This fact has a simple explanation: When STIL-BAS was created in 1990 the staff included relatively young researchers around 35-40 but with great experience in space research. Unfortunately, at that time, the common opinoin that space research is not necessary for Bulgaria was very popular. 18 years later the staff members are 18 years older, i.e. ~ 53-58. During the 18 years period, BAS administration **never** opened a new position for young scientist. The positions of retired staff were automatically closed by BAS administration. What is also very important, even if we will have a free position, no one will apply for a month salary of 260 leva (~ 132 €) for a young researcher.

Now we are at same situation. In the newly created by the Ministry of education and sciences "Project of strategy for development of Bulgarian science" http://www.minedu.government.bg/opencms/opencms/left_menu/documentsproject/2008/proekt_strategia_nauka-2008.pdf space sciences are not in the "strategic" list, though **SPACE was** one of the thematic priorities of 6th Framework Program (6FP) of EU and continues to be a thematic priority in 7FP till 2013. Bulgaria, and in particular the Ministry of education, will continue to pay the participation fee for 7FP including for priority **SPACE,** but will not develop in priority the space science in the country. We hope this situation will improve during the final strategy document creation.

6. Formal and informal bilateral and multilateral co-operation and relations with other research establishments:

6.1 Within the Academy (examples of complementary and interdisciplinary approaches)

STIL-BAS support complementary and interdisciplinary working groups with the following BAS institutes:

- Institute of electronics - Working group on "Spectrometric remote investigation of the Sun-Earth system";
- Institute of psychology - Working group on "Telemedicine and eHealth";
- Geophysical institute - Working group on "Telemedicine and eHealth";
- Institute of plant physiology – Working group on "Spectrometric remote investigation of the Sun-Earth system";
- Space research institute – Whole institute.

STIL-BAS is the organizer of the BAS interdisciplinary seminar on "Nonlinear dynamics, chaos and fractals". The seminar is leaded by Acad. Stoicho Panchev;

STIL-BAS is the organizer of the BAS interdisciplinary seminar on "Space weather and its influences on the Earth". The seminar is leaded by Petar Velinov.

6.2 At national level (complementary and interdisciplinary approaches; involvement of university and industrial partners)

STIL-BAS support complementary and interdisciplinary cooperation with the Agricultural faculty of the Thracian university in the Stara Zagora town.

6.3 In Europe and world wide (internationalization of the research; participation in the construction of European research area; regional collaborations in Central and Eastern Europe).

Recently STIL-BAS participates in several framework programs' international projects: Contracts of 5FP "Plasma Processes in Near Earth Space, INTERBALL and Beyond" and Support Participation of Scientists From Eastern Countries in the EU Funded "Plasma Processes in Near-

Earth Space: Interball and Beyond (Interball'2002)" Conference, ICA1-CT-2002-60002. Bulgarian Space National Contact Point (NCP) for 6FP was Tsvetan Dachev. For 7FP another STIL-BAS scientists is Bulgarian Space NCP- Doyno Petkov. During 2004-2006 T. Dachev and STIL-BAS http://start.stil.bas.bg/index coordinated the SSA project "Stimulate Aerospace Research and Technology in Central and East Europe" (START) http://ieeexplore.ieee.org/xpl/freeabs_all.jsp?arnumber=1512696.

Now we are involved in 2 accepted and funded 7FP projects:

1. AEROcapture for Future spAce transportation (AEROFAST) with 12 participants (business and academia) from 9 EU MS – leader ASTRIUM SAS, France. Total cost of AEROFAST is 2.95 Million Euros. Project leader from STIL-BAS is Hristo Nikolov.

2. Cooperation of space NCPs as a mean to optimise services (COSMOS) with 32 participants (business and academia) from 25 EU MS – leader DLR, Germany. Cost of COSMOS is 2 Million Euros. Project leader from STIL-BAS is Doyno Petkov.

In the Specific Programme: Capacities, Theme: Research Potential Restrictions to Participation: EU's Convergence regions and outermost regions. Specific support action FP7-REGPOT-2008-1 we have one not accepted project. Coordinator of the project is STIL-BAS scientists Rolf Werner. The project will be actualised and will be proposed again in a new 7FP call.

In the Specific Programme: Environment, Call identifier: FP7- ENV 2008-1, Activity: 6.4, Sub activity: 6.4.1.4.1 we participate in the project: "A Cooperative Model for Earth Observation Operating Capacity Development in the Black Sea Basin" leaded by TUBITAC, Turkey. The project was not accepted but will be actualised and will be proposed again in new 7FP call.

In NATO SfP and security program STIL-BAS participates with: **1.** NATO SfP-977999 project in 2000-2002; **2.** Collaborative linkage grant with NATO 2002-2003; **3.** NATO-CLG Project 2003-2004; **4.** 2005 NATO Advanced Study Institute by lectures published in Chemicals as Intentional and Accidental Global Environmental Threats, Simeonov, L., Chirila, E. (Eds.); 2006, Proceedings of the NATO Advanced Study Institute on Chemicals as Intentional and Accidental Global Environmental Threats, held in Borovetz, Bulgaria, 16-27 November 2005, ISBN 978-1-4020-5096-1; 2007 NATO Advanced Research Workshop by lectures published in Soil Chemical Pollution, Risk Assessment, Remediation and Security Simeonov, L., Sargsyan, V. (Eds.); 2008, Proceedings of the NATO Advanced Research Workshop on Soil Chemical Pollution, Risk Assessment, Remediation and Security, Sofia, Bulgaria, 23-26 May 2007, ISBN 978-1-4020-8255-9; **5.** 2008 NATO Advanced Study Institute ESP.MD.ASI 983351, Exposure and risk assessment of chemical pollution – Contemporary methodology, Borovetz, 1-10 July 2008. http://www.stil.bas.bg/asi_2008/index.html. The proceedings are in press. The last 3 NATO events were organized and the proceedings are edited[4] by STIL-BAS scientists – L. Simeonov.

STIL-BAS scientists – Marianna Gerdjkova coordinated the INTAS project "Optical investigation of regional scale atmospheric motion and its influences" during 2003-2006.

Since 2001 till now STIL-BAS is partner of Luxexpo, Luxembourg in Med-e-Tel (The International eHhealth, Telemedicine and Health ICT Forum for Education, Networking and Business http://www.medetel.lu/index.php). STIL-BAS scientist Malina Jordanova coordinates the Educational program of the yearly meetings. She is editor of the Med-e-Tel Proceedings editions 2006, 2007 & 2008 and of "Global Telemedicine/eHealth Updates: Knowledge Resources", Vol. 1, Publ. Luxexpo, Luxembourg, 2008, ISSN 1998-5509, pp. 431, illustrations and tables 118 www.medetel.lu/download/2008/Proceedings_2008_Sample_Pages.pdf. The number of represented worldwide countries at Med-e-Tel varies in different years between 54 and 63. Med-e-Tel editions 2007 and 2008 were accredited by the European Accreditation Council for Continuing Medical Education (EACCME) to provide Continuing Medical Education (CME) activity for medical

[4] Full list of the books published abroad and edited by STIL-BAS scientist is presented in Annex 2.

specialists in EU www.uems.net. EACCME credits are recognized by the American Medical Association as well as in some other countries in Middle East and Asia.

Since 2005 STIL-BAS scientist Katya Georgieva is a regional coordinator for Balkan/Black Sea Region (Armenia, Azerbaijan, Bosnja-Herzegovina, Bulgaria, Croatia, Georgia, Greece, Romania, Russia, Serbia and Montenegro, Turkey, Ukraine) of The International Heliospheric Year (IHY) initiative http://ihy2007.org/organization/ihy_regional.shtml. A number of conferences were organized by STIL-BAS http://www.stil.bas.bg/IHY/, the last one was „First results from IHY" 4th UN/ESA/NASA/JAXA conference [5], Sozopol, June, 2008. K. Georgieva is an editor of the International journal "Sun and Geosphere", abstracted in: SAO / NASA Astrophysical Data System

More details about the scientific co-operations of STIL-BAS are presented in Annexes 1 and 11.

Development in the period 2004-2008; Assessment of the importance of international cooperation

As seen from the previous paragraphs significant intensification of STIL-BAS activities in the construction of European research area and in regional collaborations in Central and Eastern Europe is observed in the period 2004-2008.

STIL-BAS will continue its efforts for further development and extension of various European and regional scientific cooperation.

7. Organization of the research process at the unit: team work, individual research activities, seminars, quality control, supervision of junior researchers, institutional planning and reporting, description of the internal procedures of evaluation etc.

The research process in the unit is governed by the Research council, which takes all decisions in connection with the o**rganization of the research process.** The **team work** is leading principal in the organization of scientific research. New teams are organized in both up-down and down-up ways. **Individual research activities** are also approved by the council. STIL-BAS seminar is leaded by Prof. Peter Velinov. Usually the seminar takes place once per month. Both new scientific developments and works connected with the procedures of development of the scientific career of unit members are objects of the seminar.

The unit **internal evaluation procedures** are well developed. Attestations of scientists are performed every 5 years. Suffix 2 presents STIL-BAS Attestation card. From it is obvious that all scientific activities are evaluated by well-developed numerical scale. Thus scientists' activities are presented as a number. The latter gives the possibility to rank scientists at the end of attestation.

8. Participation of the unit in different educational activities. Analysis for the period 2004-2008. Critical assessment of these activities. PhD training should be considered separately and should include critical analysis of the conditions and quality of this training.

STIL-BAS scientists are lecturers in the following universities:

Acad. Kiril Boianov: Sofia University "Saint Saint Kliment Ohridski", lectures on "Computer grids and telecommunications";

Acad. Kiril Boianov: Sofia Technical University, lectures on "Computer grids";

Acad. Kiril Boianov: New Bulgarian University, lectures on "Global grids";

Acad. Kiril Boianov: University of National and World Economy, lectures on "Computer architectures";

Sen. Res. Sci. Alexander Bochev, Ph.D.: Mining and Geology University, lectures on "Planetary geophysics";

[5] Full list of the scientific events organized by STIL-BAS scientist in 2004-2008 period is presented in Suffix 1.

Res. Sci. Hristo Nicolov: New Bulgarian University, lectures on "Information technologies".

Res. Sci. Denitsa Borisova: Mining and Geology University, lectures on "Remote sensing in geophysics" and on "Digital image processing".

Res. Sci. Malina Jordanova, Ph.D, coordinates the educational program of the yearly Med-e-Tel meetings since 2001. The editions 2007 and 2008 http://www.medetel.lu/index.php were accredited by the European Accreditation Council for Continuing Medical Education (EACCME) to provide Continuing Medical Education (CME) activity for medical specialists in EU www.uems.net. EACCME credits are recognized by the American Medical Association as well as in some other countries in Middle East and Asia.

STIL-BAS scientists Penka Stoeva is Education and Public Outreach coordinator for Bulgaria of the International Heliospheric Year (IHY) 2007 – 2009 - United Nations Basic Space Science Initiative. All the Astronomical Observatories and Planetaria, and teachers from all over Bulgaria have been tutored to participate in the world initiatives Solar Week, Sun-Earth Day,Yuri's Night, World Astronomy day and World Space week; a lot of lectures, public talks and exhibitions have been organized. Stara Zagora became a host of IHY Space Weather Monitor – SID (Sudden Ionospheric Disturbances), numerous of educational materials have been adapted and translated in Bulgarian. http://www.lesia.obspm.fr/IHY/pages/contacts-bulgaria.html

9. Services of particular national importance connected to:

A) Operation of national, state and governmental institutions and supporting their functioning:

During the period October 2003 – October 2006 STIL-BAS, together with the Institute of psychology-BAS, participated in the management of the scientific part of „Septemvri Telecentre Project". The project was coordinated by Bulgarian Ministry of Transport and Telecommunication and International Telecommunication Union, UN, Geneva, Switzerland. The project has twin objectives to test and evaluate the effectiveness of new technologies (2.4 GHz wireless communication net) in rural and remote areas as well as provide a platform for the wide introduction of multimedia services such as telemedicine, teleeducation, etc. The developed net and telemedicine services were officially introduced by the premier-minister of Bulgaria in July 2004.

Since 2005 STIL-BAS, under the supervision of Bulgarian Ministry of foreign affairs, is regional coordinator for Balkan/Black Sea Region (Armenia, Azerbaijan, Bosnja-Herzegovina, Bulgaria, Croatia, Georgia, Greece, Romania, Russia, Serbia and Montenegro, Turkey, Ukraine) of the International Heliospheric Year (IHY) initiative http://ihy2007.org/organization/ihy_regional.shtml, supported by UN resolution 60/99, January 6, 2006.

In 2006, at the request of Bulgarian Ministry of Foreign Affairs, STIL-BAS has provided expert investigation of the Black Sea shore region between Bulgaria and Rumania. For the professional help the Minister sent an official letter of grateful acknowledgement to BAS President.

In monographic stile, for the first time, Acad. St. Panchev with co-authors presented 2 books to Bulgarian readers with a new interdisciplinary science – Sociophysics. Special chapters of them are devoted to the analysis of situation in Bulgaria. (For more details see Annex 2, p. 2.3.2.)

B) Different regional initiatives and infrastructures in the country

In 2007, at the request of the European Environmental Agency and Bulgarian National Environmental Agency at Bulgarian Ministry of Environment and Water, STIL-BAS defined the optimal time intervals for coverage of the territory of Bulgaria by the French satellites SPOT 4, SPOT 5 and Indian IRS satellite. As a result 72 scenes from the above mentioned satellites were selected and used in the Bulgarian part of CORINE 2006 project.

In 2007 under the governing and with financial aid from the State agency for information technologies and communication, scientist from STIL-BAS, Nederland and Russia performed "Pilot project for preventative management of natural risks". The results confirmed the efficiency of the developed in STIL-BAS and Russia multi sensor UHF system for floods and forest fires prevention. Prof. Shutko proposed a Map of possible Bulgarian regions for UHF air investigation.

10. Overall academic achievements or reputation of the research unit illustrated by all data for the period 2004-2008 with special stress on:

For achievements in the field of space research the President of Republic of Bulgaria on 15th of April 2004 present with the highest state medal – "Stara Planina" I degree - Acad. Dimitar Mishev (posthumously) and with the medal of the President: T. Dachev, D. Petkov, N. Petkov and A. Stoimenov.

The National Science Fund for Contract № HZ-1102/01 "Investigation of Dose and Flux Dynamics in Tissue-Equivalent Phantom onboard the Russian Segment of The International Space Station by Liulin-5 Instrument" granted First Award of 2005 year.

The unit **academic achievements and reputation** are illustrated by the number of the citation in electronic media and in Bulgarian newsletters. The news connected with the launch in space of new Bulgarian instrument (There are 8 similar events for the period.) were well reflected by the electronic media and newsletters. There are over 150 publications concerning STIL-BAS instruments developed and launched in space. Example: the classification of "Duma" newsletter from 30 December 2008 rank the launch of Bulgarian Instrument RADOM on the Indian Moon satellite Chandrayaan-1 on 22nd of October 2008 as the second significant scientific event in 2008. http://www.duma.bg/2008/1208/301208/obshtestvo/ob-8.html

10. A. up to five most important scientific achievements

10.A.1. Modelling of the influence of solar and galactic cosmic rays on the system ionosphere/atmosphere and generation of post-lightning electric currents and fields

A new generalized theory for the galactic (GCR), anomalous (ACR) and solar cosmic ray (SCR) interactions with the ionospheres and atmospheres of Earth and planets is created (Velinov et al., 2004a, doi:10.1016/j.asr.2003.04.017), (Velinov et al., 2004b, doi:10.1016/j.asr.2003.04.016).

This model is applied for the lower ionosphere in the Earth environment. For this purpose the differential spectra modelling in the ionospheres of Earth and outer planets during solar maximum and minimum is accomplished (Velinov et al., 2005, http//:www.ann-geophys.net/23/3043/2005/), Buchvarova and Velinov, 2005, doi:10.1016/j.asr.2005.04.002), (Buchvarova et al., 2005, doi:10.1142/S0217751X05029794).

Some analytical approximations of the Bohr-Bethe-Bloch formula in five energy intervals are derived in this improved model. More precise expressions for the energy decrease law of the penetrating particles and their ionization effects are obtained. The full composition of the GCR and ACR is taken into account, namely: protons, helium He, light L, medium M, heavy H and very heavy VH nuclei. The electron production rate profiles are modeled at altitudes from 15 to 120 km. The calculations are made for modulation potentials in the interplanetary space: 400, 700 and 1200 Megavolts (MV) (minimal, moderate and maximal solar activity, respectively) (Velinov and Mateev, 2008a, doi:10.1016/j.jastp.2007.08.049).

The improved model is applied for calculation of the ionization profiles from SCR for the major solar proton events from 20 January 2005 (GLE 69) and 23 February 1956 (GLE 05). Prompt and delayed SCR spectra from satellite measurements are used. The ionization profiles, created by GCR during quiet and disturbed (Forbush decreases) conditions are computed. These results are used for the corresponding ozone production rate profiles calculation. A comparison between the analytical model and the Monte Carlo simulation (CORSIKA code) is made. The analytical model is more precise for altitudes above 35 km, where the electromagnetic interactions dominate. Under

that altitude the nuclear interactions have more important contribution and the CORSIKA Monte Carlo code must be applied (Velinov and Mateev, 2008b, doi:10.1016/j.asr.2007.12.008).

A model is created of the post-lightning electric fields **E** and currents **J** in the strato/mesosphere and lower ionosphere due to a thunderstorm. The generation of **E** and **J** depends on the ionization by GCR, ACR and SCR. It is shown that **E** and **J** is influenced significantly on the geomagnetic latitude. A criterion is formulated of the conditions of a breakdown initiation in the lower ionosphere by the electric fields. A new formula is obtained for the electric currents **J** flowing from a thunderstorm into the ionosphere (Tonev and Velinov, 2004, doi:10.1016/j.asr.2003.05.042), (Tonev and Velinov, 2005, doi:10.1016/j.asr.2005.04.079), (Tonev and Velinov, 2007, doi:10.1016/j.jastp.2007.07.001), (Velinov and Tonev, 2008, doi:10.1016/j.asr.2007.12.006). *(The text is prepared by P. Velinov and P. Tonev.)*

10.A.2. Study of the influence of chemical and dynamical processes on the stratospheric ozone and nitrogen dioxide

The main research objective is the study of the chemical and atmospheric dynamical processes by means of optical investigations. One of our basic instruments is a UV-VIS spectrometer – the GASCOD-BG instrument. This instrument was developed by the Institute of Science of the Atmosphere and Climate in Bologna, Italy, for monitoring of stratospheric trace gases (e.g. NO_2, O_3 etc.) deploying Differential Optical Absorption Spectroscopy (DOAS). The spectrometer was installed at Stara Zagora 1999. A UV spectrometer – Photon – allows the determination of the overhead total ozone column (TOC) by direct solar light measurements. N_2O, the precursor of NO_2, and O_3 are greenhouse gases. Their long time variations are related to the changing atmosphere due to climate change. Satellite data were used as well to provide analysis.

- During the report period the seasonal components of the NO_2 and O_3 time series for the Stara Zagora location, necessary for the determination of long time trends, were determined (Werner et al., 2006, doi:10.1016/j.asr.2005.12.002);
- It was proved that the variability of ozone on a 10-day time scale is related to strong planetary wave activity and is caused by intrusion of poor ozone air masses from low latitudes and rich ozone air of polar origin. Extreme values in NO_2 and O_3, not a member of the general statistical ensemble, were identified in the time series and it was estimated that approximately 30% of them are generated during thunderstorms lightening, generally over the Northern Adriatic Sea (Werner, 2006, http://www.shao.az/SG/v1n1/SG_v1_No1_2006-pp-43-46.pdf);
- The 27-day rotational solar variability was analysed by application of wavelet transforms to study trace gas responses. (Werner et al., 2006, *Sun and Geosphere,* http://www.shao.az/SG/v1n1/SG_v1_No1_2006-pp-39-42.pdf). The O_3 and NO_2 responses to short term solar rotational variations were studied using wavelets. During a period of months relative changes of 1-2% for O_3 and 4-5% for NO_2 were found over Stara Zagora with time lags of only several days to the solar variation (Werner et al., 2006, doi:10.1016/j.asr.2005.12.002);
- TOMS zonal averaged total ozone concentration (TOC) has shown that for periods of several months the ozone variations at the tropic have a 27-days period, which was almost in phase with the rotational solar activity variations, suggesting that the ozone variations in these time intervals were solar generated.(Werner, 2007, doi:10.1016/j.jastp.2007.08.022);
- The satellite TOMS-Earth-Probe and SCIAMACHY-Envisat data for the Bulgarian region are in good agreement with the Photon ground based data (Mendeva et al., 2006, http://www.iac-paper.org). The analysis of the ozone long term data has not shown a statistically significant trend and no ozone layer recovery process was established, however the ozone layer was stable during 1996-2005 (Mendeva et al., 2005, doi:10.1016/j.asr.2005.01.038, Mendeva et al., 2008, FSR, Gogosheva et al., 2008, doi:10.1016/j.asr.2008.03.029);
- By SCIAMACHY and GASCOD TOC data an ozone minihole was found in March 2005 over the Balkan Peninsula, including the Bulgarian Rila mountains. Low TOC at high altitudes and

the relatively high Sun position caused an immense UV-index, dangerous for the human health. (Werner et al., 2008, doi:10.1016/j.asr.2008.03.028);

- The NO_2 GASCOD-BG data were used for the data evaluation of the SCIAMACHY instrument on board ENVISAT (Kostadinov et al., 2004, http://envisat.esa.int/workshops/acve2/papers/EPOSCIK.pdf);
- Analysing the ALOMAR lidar ozone profile data set, Andenes, Norway, and the ozone sounding profiles of the Sondankylä station, Finland, and the Ny Ålesund station, Svalbard, Norway, a second ozone maximum was found in the yearly mean, related to the tropopause inversion layer. http://www.stil.bas.bg/FSR/PDF/TOP5Werner_Rolf225207.pdf;
- A new method was developed based on Hovmöller diagrams to determine the wavelengths and the phase velocities of gravity waves observed by lidar measurements (Werner et al., 2007, doi:10.1016/j.jastp.2007.05.013);
- A statistical analysis of ozone data and proton flux data depending on the proton energy for the period of the 15-28 January 2005 event was provided. An ozone decrease with solar cosmic rays (SRC) increase is observed in the polar regions, accompanied by temperature decreases. At lower latitudes an ozone increase is registered during solar cosmic rays increase. (Tassev et al., 2008, http://www.stil.bas.bg/FSR/PDF/TOP5Tassev_Yordanov1991625.pdf). *(The text is prepared by R. Werner and J. Tassev.)*

10.A.3. Investigations in the field of solar dynamics and global change

When studying the solar influences on climate, usually a correlation is sought between the long-term variations in the number of sunspots and in global temperature. Until a few decades ago this correlation was high, but recently the sunspot activity decreases while temperature continues increasing, which is an argument in favour of the human role in climate change. However, sunspots are a manifestation of the solar toroidal field, and do not reflect the solar activity related to the solar poloidal field. Every 11 years the fields transform from one to another. An important element of this dynamo process is the solar meridional circulation including a surface flow toward the poles and a deep counterflow toward the equator. The long-term variations in these flows, as well as in the solar poloidal and toroidal fields are not known from direct measurements. These long-term variations have been derived based on solar and geomagnetic data and reconstructions. It is found that the poloidal field is determined by the speed of the surface flow, and the toroidal field by the speed of the deep flow. This result is the first empirical proof of the solar dynamo theory, and it indicates the regimes in which the solar dynamo operates recently and during grand minima of solar activity. It is demonstrated that global temperature is highly correlated to the solar poloidal field in the whole period of instrumental measurements – the last 150 years, and it is found that the solar activity agents related to the solar poloidal field influence climate through changes they induce in the large-scale atmospheric circulation. In summary, it is shown that a great part of climate change is due to the changing solar dynamics, and that the role of the Sun in climate change is strongly underestimated, consequently the human factor is strongly overestimated in some political documents.

The following main scientific results were obtained in the period 2004-2008:

- Different solar drivers have different geoeffectiveness, and their long-term variations lead to long-term variations of the correlation between sunspot and geomagnetic activity of the correlation between sunspot and geomagnetic activity (Georgieva et al., 2006, doi:10.1016/j.pce.2005.03.003).
- How the solar rotation affects the solar wind - magnetosphere coupling (Georgieva et al., 2005, doi:10.1016/j.pss.2004.09.045).
- Magnetic clouds and not coronal mass ejections are the sources of the major geomagnetic storms (Georgieva and Kirov, 2006: http://crdlx5.yerphi.am/On-line_News/CRDSEE/Proceedings/SEE2005-final-book/part2.rar

- Impact of magnetic clouds on the middle atmosphere and geomagnetic disturbances (Georgieva et al., 2005, doi:10.1016/j.jastp.2004.07.025).
- The long-term variations in Earth's climate are better correlated to the long-term variations in the geomagnetic activity than to the long-term variations in sunspot activity (Georgieva and Kirov, 2006): http://www.shao.az/SG/v1n1/SG_v1_No1_2006-pp-12-16.pdf; Georgieva et al., 2005): http://sait.oat.ts.astro.it/MmSAI/76/PDF/969.pdf
- It is shown that the widening of the tropics observed in the last century is caused by the increased solar magnetic fields (Georgieva and Kirov, 2008): http://arxiv.org/abs/0803.1959
- The long-term variations in solar meridional circulation are found from geomagnetic data, and one class of solar dynamo models is confirmed (Georgieva and Kirov, 2008): http://arxiv.org/abs/physics/0703187
- It is found that the correlation between the long-term variations in global temperature and solar activity varies in consecutive secular solar cycles, and is determined by the North-South solar asymmetry (Georgieva et al., 2005): http://sait.oat.ts.astro.it/MmSAI/76/PDF/965.pdf
- It is found that the correlation between the long-term variations in the prevailing circulation in Europe and solar activity varies in consecutive secular solar cycles; the importance of different solar drivers on atmospheric circulation is studied (Georgieva et al., 2007, doi:10.1016/j.asr.2007.02.091). *(The text is prepared by K. Georgieva and B. Kirov.)*

10.A.4. Investigations in the field of heliobiology and eHealth applications

For the first time planned systematic measurements of a large group of healthy volunteers were performed in years of maximal solar and geomagnetic activity (GMA). The results obtained were indicative for the existence of relationship between cardio-vascular parameters and psycho-physiological state and GMA variations related to solar activity.

The comparison of the physiological reactions of healthy volunteers, examined in Sofia and Baku, and patients with hypertension, examined in Moscow, revealed a higher sensitivity of the persons with cardio-vascular disturbances and females to GMA changes.

Furthermore, it was established that the dynamic of morbidity and mortality from acute myocardial infarction (AMI) in Sofia region for a period of 9 years was increased during the periods with the most expressed GMA changes, estimated by local, planetary and middle latitudes GMA indices. It turned out that in 2000 and 2003 (years of maximal and post-maximal SA and GMA) the number of AMI incidences were with 25% larger in comparison to the other years. The database was expanded with similar data gathered for Baku. The results showed again an increment of AMI incidences with GMA increase for this also middle latitude region.

The results can be useful for prevention and control of the medicative procedures and regime for threatened or sick patients.

The main results for the last five years were published in 14 Journals abroad (e.g. doi:10.1016/j.asr.2005.03.153; doi:10.1016/j.jastp.2007.08.050; doi:10.1016/j.jastp.2007.08.053; doi:10.1016/j.asr.2008.09.006) and 22 contributions were presented at different International Conferences and Symposia abroad.

Since 2002 the group organizes, coordinates and executes the annual educational program of ***Med-e-Tel (The International eHealth, Telemedicine and Health ICT Forum for Education, Networking and Business*** www.medetel.lu/index.php). The Forum takes place in Luxembourg, G.D. of Luxembourg and serves medical practitioners, patients, citizens, healthcare institutions and governments from over 50 countries around the globe. It involves many different stakeholders who need to be brought face-to-face to share aspirations, learn from research and experiences, show the possibilities, understand the market and discover new applications. Med-e-Tel promotes and enhances cooperation opportunities, and is the place to establish global and local partnerships and contacts. Med-e-Tel's educational program is accredited by the European Accreditation Council for Continuing Medical Education (EACCME) to provide European external CME credits for medical specialists. The credits are recognized by the American Medical Association, too. Main results:

- Participation in creating and updates of free virtual library, collecting over 1000 abstracts and presentations (www.medetel.lu/index.php?rub=library&page=info), searchable by topic, year, country;
- Publication of series *Global Telemedicine / eHealth Updates: Knowledge Resources;*
  - Vol. 1, M. Jordanova, F. Lievens (Eds.), Publ. Luxexpo, Luxembourg, 2008, ISSN 1998-5509, pp. 431, illustrations and tables 118
  - Vol. 2 – in press, available on April 1, 2009 www.medetel.lu/index.php?rub=visitor&page=fees_conditions
- Med-e-Tel Proceedings 2006 -2008 (www.medetel.lu/index.php?rub=proceedings&page=info) are available electronically on CD-ROM (ISSN 1818-9334, extended version) and as hard copies (ISSN 1819-186X – 378) *(The text is prepared by I. Stoilova and M. Jordanova.)*

10.A.5. Investigations directed to study the Hazardous phenomena in the Earth space environment

In order to predict Space weather phenomenon, the processes of the solar wind - magnetosphere - ionosphere coupling should be understood. Our investigations were directed to understand different process in this coupled system and were carried out in cooperation with scientists from France, Check Republic, Slovak Republic, Italy, Russia and India. During the period 2004 – 2008 main scientific results were obtained in three particular areas.

1. **Field-aligned currents (FACs)** A new method for finite size current sheets identification from one-satellite measurements and has been developed and applied data obtained aboard of IC-Bulgaria-1300 satellite. Comparison of measured field aligned currents and those calculated by empirical and magnetohydrodynamic (MHD BATS-R-US) simulations shows a good agreement in currents' location, but the measured current intensity is higher than the modelled, and the measured current sheet size is smaller than the modelled. The discrepancy is explained with the difference between the individual nature of the satellite measurements and the statistical nature of the empirical models. The intensity of FACs in theoretical (MHD) models depends on the conductivity model of the auroral ionosphere accepted, thus leading to different results. [Danov 2008 doi:10.1016/j.jastp.2007.08.037; Danov and Koleva, *Sun and Geosphere*, 2007, http://shao.az/SG/v2n1/SG_v2_No1_2007-pp-39-42.pdf].

Field aligned currents were also identified in the central part of a cusp energetic particle event observed aboard Interball-2 satellite at an altitude of 3 Re [Bochev and Kudela, 2005, doi:10.1016/j.pss.2004.09.051].

2. Ultra low frequency (ULF) waves were studied on base of satellite and ground based measurements. PC5 oscillations were studied on base of multi-satellite and ground base data. Their simultaneous detection aboard satellites at different locations and on the ground proves their global nature and the data analysis permits to identify them as being compressional waves. In some cases Pc5 waves are accompanied by low energy proton dispersive structures (Bochev et al., 2008). Extensive study of ULF fluctuations with frequency around 1.8 mHz under different solar wind pressure conditions gives ground to reconcile their physical nature with the surface wave mode model in contrast to traditional interpretation in terms of magnetic field line resonances (Nenovski et al. 2007, doi:10.1016/j.pss.2006.04.038; Bochev et al., 2008).

ULF wave activity at the magnetopause observed by the Magion-4 subsatellite of the Interball-1 spacecraft reveals the existence of narrow-band waves of frequency ~0.33 Hz which occur mainly under northward interplanetary magnetic field conditions. The proposed generation mechanism associates these waves with the anisotropic ion fluxes registered just inside the magnetopause (Teodosiev at al., 2005, doi:10.1016/j.pss.2004.09.058).

3. Magnetospheric plasma populations. Plasma measurements in the high-latitude near-Earth outer magnetosphere, performed on board of Interball-1 satellite, often register the existence of regions of mixed magnetosheath - plasma sheet population with the presence of ionospheric ions. Both ion populations were nearly stagnant and plasma-sheet electrons are absent. These regions are observed under northward interplanetary magnetic field with substantial horizontal component. A detailed analysis of plasma and magnetic field data allowed to conclude that the mixed regions are formed on filed lines first reconnected to the magnetosheath magnetic field, then draped and convected tailward and secondary reconnected and closed [Koleva at al., 2006, doi:10.1016/j.asr.2005.03.087]

The orbit of Interball-1 allowed to investigate the plasma in the near magnetotail lobes, reaching distances from the neutral sheet up to 17 Re. The survey of 576 hours of lobe observations shows that the lobes are populated with plasmas of various origin and properties. A ubiquitous picture in the lobes is the registration of 'clouds' of anisotropic electrons with energies up to 300 – 500 eV with highly variable and complex distributions and no accompanying ions. These electrons originate in the solar wind, but in some cases an additional source earthward of the observations is present. [Koleva and Sauvaud, 2008, doi:10.1016/j.jastp.2008.03.025]. *(The text is prepared by A. Bochev and R Koleva)*

B) up to five most important applied results and/or realizations

10.B.1. Development, calibration, space qualification and application of new methods and instruments for space radiation measurements for investigation of space radiation risks to humans and technological systems in space and during aircraft flights

The most important applied results achieved by the thematic group "Assessment of the space radiation risk" are in the field of complex investigations of the radiation environment in the atmosphere, low Earth orbit and in the interplanetary space. During the period 2004-2008 a number of new methods and instruments were developed and applied in different space missions. Together with scientists from Germany, Italy and Czech Republic the group successfully participated in few international scientific competitions announced by ESA and ISRO. Presently it is involved in the following 7 ESA related experiments for assessment the radiation risks to humans and technological systems in space: **R3D-B2**, **Liulin-5**, **R3D-B3**, **Liulin-Photo**, **Liulin-R**, **R3DE** and **R3DR**. Beside that, STIL-BAS participates in 2 other experiments for space radiation investigation: **Liulin-ISS** and **RADOM** (see Annex 4 for more details). Four future space experiments are under development: ISS, Russian segment Plasma-Wave Complex OBSTANOVKA, **Langmuir probe**, August 2009; ISS, Space suit (Skafander), **Liulin-S**, September 2009; Phobos sample return mission, **Liulin-Phobos**, October 2009; BION M1 satellite, **Liulin-M1**, July 2010. Three more are in phase of evaluation: European Crew personal Active Dosimeter (EuCPAD) for ESA astronauts; Magia, Italian Moon mission; SAAM mini satellite, Collaboration between George Mason University (GMU) and Saint Louis University (SLU), and BAS. Instruments for estimation of the radiation risk in the Earth troposphere and stratosphere were also developed as spin off application by long-term collaboration with scientists from Nuclear Physics Institute of Czech Academy of Sciences, Czech Republic. As a result large database of aircrafts measurements (over 6000 flight hours) were accumulated and analysed between 2001 and 2008.

The following main scientific results were obtained in the period 2004-2008:

- A new method for analysis of the radiation environment by analysing the shape and slope of the deposited energy spectrum was developed (Dachev et al, 2008); http://www.stil.bas.bg/FSR/PDF/TOP1Dachev_Tsvetan2171316.pdf;
- The relativistic electrons observed for the first time at ISS were compared with similar on Foton M2/M3 satellite (Dachev et al, 2008); http://www.stil.bas.bg/FSR/PDF/TOP2Dachev_Tsvetan2181132.pdf

- Comparison between experimental data and predictions obtained by a preliminary simulation study with GEANT4 Monte Carlo code finalized the reconstruction of some components of the radiation field inside Foton capsule. Results from this comparison show an encouraging good agreement for both the proton and the neutron components (Damasso et al, 2008); http://www.stil.bas.bg/FSR/PDF/TOP1Damasso_Mario2211822r.pdf
- Simultaneous investigation of galactic cosmic rays on aircrafts and on ISS shows large similarity of the radiation fields at both altitudes (Dachev et al, 2005, doi:10.1016/j.asr.2005.05.073).
- Based of analysis of the calibration results of Lilin-E094 instrument the energy of the South atlantic anomaly (SAA) protons inside ISS was obtained (Dachev et al, 2006, doi:10.1016/j.asr.2006.01.001);
- In cooperation with scientists from NASA Langley Research Center were validated models of the radiation environment inside ISS by use of the Liulin-E094 data obtained on the American module Destiny at ISS (Nealy et al, 2007, doi:10.1016/j.asr.2006.12.029) and were revised the models for the distribution of the radiation in the SAA (Wilson et al, 2007, doi:10.1016/j.asr.2006.12.030).
- In cooperation with scientists from the Institute of Biomedical Problems, Russian Academy of Sciences a new method and a new dosimetric telescope Liulin-5 for investigation of depth-dose and flux distribution inside a human spherical phantom has been developed (Semkova, et al. 2007, doi:10.1016/j.asr.2007.01.008).
- Obtained are new results of the dynamics of depth-dose distribution, LET spectra and radiation quality factor inside a radial channel of the spherical phantom aboard ISS. The results are indicative of the GCR heavy charged particles and radiation belts protons contribution to the average quality factor and dose equivalent in the human body in space (Semkova, et al, 2008); (http://www.stil.bas.bg/FSR/PDF/TOP1Semkova_Jordanka2201211.pdf).
- A new charged particle telescope Liulin- Phobos has been developed to characterize the radiation environment in interplanetary and near- Mars space (Semkova, et al, 2008) (http://www.stil.bas.bg/FSR/PDF/TOP4Semkova_Jordanka2201235.pdf). *(The text is prepared by T. Dachev and J. Semkova.)*

10.B.2. Remote sensing for soil and vegetation state assessment

Remote sensing is already an operational tool widely used in vegetation studies for ecological monitoring, change detection and in agriculture for crop state assessment. A strong stress is being put on the accuracy of the retrieved information. This requires reliable indicators of plant growth and physiological status. The development of efficient means for data analysis is still one of the most essential issues. The importance of this issue is directly related to the ever-increasing amount of data provided by numerous sensors.

The use of multispectral and multitemporal remotely sensed data and the implementation of advanced data processing technologies results in the possibility of getting different information needed for decision-making in solving problems related to vegetation preservation and agricultural land use.

The application of satellite data requires knowledge of land covers spectral behaviour under different environmental conditions considering regional and local peculiarities. In this context detailed ground-based and airborne spectrometric studies complement the array of geo-spatial data products.

These studies are the most appropriate way of aiding the interpretation and providing a reference source for validation of remotely sensed data. Empirical modelling of various agricultural crops under different soil and ecological conditions has been performed in order to describe the

relationships between plant spectral and biophysical features and to derive sustainable spectral indicators of plant state.

The scientific results obtained in the period 2004-2008 are:

- Spectral models for crop state assessment considering soil and anthropogenic impacts (Kancheva and Borisova, 2005) http://www.isprs.org/publications/related/ISRSE/html/papers/695.pdf;
- Vegetation spectral response to stress conditions (Kancheva and Borisova, 2008) http://www.stil.bas.bg/FSR/PDF/TOP2Kancheva_Rumiana22508.pdf;
- Chlorophyll fluorescence as a plant stress indicator (Kancheva et al., 2008) http://d33.infospace.ru/d33_conf/2008_pdf/2/39.pdf;
- Spectral unmixing for information extraction (Kancheva and Borisova, 2006) http://www.itc.nl/isprsc7/symposium2006/proceedings/PS01_4.pdf;
- Granite reflectance spectra behavior depends to its rock-forming minerals (Borisova and Kancheva, 2006) http://www.iki.rssi.ru/earth/articles06/vol2-199-204.pdf. *(The text is prepared by D. Petkov.)*

10.B.3. Design and development of a multichannel VIS/NIR spectrometric system TOMS for operation onboard a remotely-controlled helicopter and used for soil and vegetation monitoring

Thematically orientated multichannel spectrometer (TOMS) is a multichannel VIS/NIR spectrometric system, designed for operation on board a remote-controlled airborne platform (helicopter), used for soil and vegetation monitoring.

The goal of the project is the working out of a multichannel spectrometric system in the visible and near infrared bands of the electromagnetic spectrum for remote sensing with the following purposes: recognition of main land covers (soils, natural and agricultural vegetation, water areas); state assessment of the studied objects.

The measurements will be performed in a main working regime - nadir, helicopter velocity – up to 20 km/h, height – up to 1000 m (optimal 200 m), flight duration - up to 30 min.

The components of the system are: multichannel spectrometer; optical device; digital camera (option); data control on-board system; on-board power supply device; fitting elements for installation of the system on board of the airborne platform; ground-based system for storage and processing of spectrometric data.

Technical specification of the spectrometric system: spectral VIS- NIR range (450 ÷ 900) nm; number of spectral channels 128 – 64; channel location even; spectral resolution (3 ÷ 10) nm; spatial resolution (1 ÷ 25) m^2; CCD line elements 2048; dynamic range of the system 4 x 104 and per scan 2000:1; exposure time (3 ÷ 60) ms; measurement flight duration (10 ÷ 30) min.

Main tasks: investigation of the relationships between the reflectance and biophysical features of the studied objects; development and validation of spectral-biophysical models for estimation of land cover parameters; soil state assessment – type, moisture content, surface texture; vegetation state assessment – type, phenomenological, growth parameters (biomass, etc), detection of stress situations.

The following scientific results were obtained in the period 2005-2008:

- Monitoring, detection and emergency mapping of risk water seepage areas (Shutko, A., R. Haarbrink, T. Coleman, F. Archer, R. Kancheva, D. Petkov et al., 2005) http://www.hho.edu.tr/RAST2005;
- Microwave radiometric remote sensing for emergency mapping of the areas with water seepage through levees and of the zones with dangerously high groundwater level, (Shutko, A., Yu.

Gulyaev, I. Chusov, I. Sidorov, E. Novichikhin, S. Golovachev, V. Krapivin, A. Haldin, L. Nazarov, Yu. Tishchenko, A. Chukhlantsev, S. Marechek, R. Haarbrink, Ts. Dachev, R. Kancheva, D. Petkov et al., 2005) www.fc.up.pt/earsel2005/index.html;

- Passive microwave radiometry for levee monitoring, (Shutko A., R. Haarbrink, D. Petkov, R. Kancheva et al., 2005) www.fc.up.pt/earsel2005/index.html;
- Synergetics in Remote Sensing Technology – Joint Use of Multispectral and Microwave Data, (Petkov D., R. Kancheva, A. Shutko, T. Coleman, A. Krumov, H. Nikolov, D. Borisova, 2006) http://www.cosis.net/abstracts/COSPAR2006/01258/COSPAR2006-A-01258.pdf;
- Spectral unmixing for information extraction (Kancheva and Borisova, 2006) http://www.itc.nl/isprsc7/symposium2006/proceedings/PS01_4.pdf;
- Simple methodologies for spectral emissivity measurement of rocks. (Danov M., D. Borisova, D. Stoyanov, D. Petkov, 2008). http://www.cospar-assembly.org/abstractcd/COSPAR-08/abstracts/data/pdf/abstracts/B08-0023-08.pdf. *(The text is prepared by D. Petkov.)*

10.B.4. Synergy of Remote Sensing and GIS

The main efforts of the Department of Geoinformatics research activities are concentrated in the field of Remote Sensing and GIS technologies application in a variety of Earth Sciences areas. The major results in this respect are in the field of Land Cover analysis, modeling, classification and mapping. Our participation in the worldwide recognized pan-European environmental projects CORINE Land Cover (CLC) 2000 and 2006 is the milestone of our work. In the GMES project CLC2006 32 EC and 6 EEA collaborating countries are taking part (http://terrestrial.eionet.europa.eu/CLC2006/. These two projects are implemented by our team after winning two International Tenders executed by the Bulgarian Ministry of Environment and Waters in 2003 and 2006. In the frame of these projects the following main results are obtained in the period 2004-2008:

Land cover/land use (LCLU) map of Bulgaria (111 000 km^2) in 1:100 000 scale and 37 categories were produced based on 1990-2000 and 2000-2006 LCLU changes. Raster IMAGE2000 database, CLC2000, CLCchange1990-2000 geospatial vector databases and Metadata are created in ESRI E00 format (http://nfp-bg.eionet.eu.int/ncesd/bul/clc/first.html).

New CLC compatible Nomenclature and 1:50 000 LCLU map/database of Bulgarian Coastal Zone is developed and available for public use (http://nfp-bg.eionet.europa.eu/ncesd/eng/clc/first.html).

Land cover/land use (LCLU) map of Bulgaria for 2006, CLCchange2000-2006 vector and IMAGE2006 raster geospatial databases and Metadata database (http://nfp-bg.eionet.eu.int/ncesd/bul/clc/meta.html) are created. The results of CLC2006-Bulgaria project are available for the public at Bulgarian Executive Environmental Agency website (http://nfp-bg.eionet.eu.int/ncesd/bul/K.Z.P/ind.html).

Series of team members' publications (http://www.stil.bas.bg/FSR/Proceedings.html) reveal our main scientific and technological achievements: *Bulgarian Participation in the Corine Land Cover 2006 Project (Stoimenov at al., 2008); Soil sealing part of CORINE Land Cover 2006 - Bulgaria project (Stoimenov at al.); Data Processing Problems and Solutions in the Frame of the CORINE Land Cover 2006 - Bulgaria Project (Dimitrov et al. 2008).*

Based on the results ofCLC2000 and CLC 2006 the following further activities are undertaken:

A. 4 international projects are started under **Republic of China and Slovak Republic** - Bulgaria Governmental agreements and Ministry of Science and Education National Scientific Fund – 3 joint projects with Slovak Institute of Geography and 1 joint project with Chinese University of Fujian:

1. Changes of the rural landscape in Slovakia and Bulgaria in 1990-2000 identified by application of the CORINE land cover data - funded by the Bulgarian and Slovak Academies of Sciences 2005-2006. Finalized.
2. Spatial Analysis and Assessment of Landscape Structure and Changes in Selected Regions of Slovakia and Bulgaria Based on Remote Sensing Data for the Period 1990 – 2006 – (*Contract No Bg-Sk-112/07*) – 2007-2009.
3. Investigation of multitemporal and multisensor satellite imagery for enhanced CORINE Land Cover classes recognition and mapping (case studies in Slovakia and Bulgaria) – 2008-2010 - funded by the Bulgarian and Slovak Academies of Sciences.
4. Change Detection of Land Use and Land Cover in Coastal Zones of China (Fujian) and Bulgaria Using Multitemporal and Multiscale Remote Sensing Data (Contract No D002-10/23.08.2008).

   The main scientific results are published in

   - *Spatial Analysis of Land Cover and Land Use Changes in Bulgaria for the Period 1990-2000 Based on Image and CORINE Land Cover Data (Vatseva at al. 2006)* http://www.zfl.uni-bonn.de/earsel/papers/356-363_vatseva.pdf
   - *Changes of the Rural Landscape in Slovakia and Bulgaria in 1990-2000 Identified by Application of the CORINE Land Cover Data (Case Studies – Trnava and Plovdiv Regions) (Feranec at al., 2006),* http://www.zfl.uni-bonn.de/earsel/papers/441-454_feranec.pdf

B. Many projects are implemented under contracts with governmental institutions and private companies – to mention some of them:

1. Selection of Potential Regional Landfill Sites on the Territory of Bulgaria – development of Methodology based on CORINE2000 database and GIS technology geospatial analysis and modelling. The results are implemented in 5 municipalities *http://www.sgem.org/2006/Album%202006/International%20Scientific%20Conference%20SGEM%202006/*
2. Optimization of the National NATURA 2000 network and scientific base for it's development – creation of Geospatial raster (satellite imagery, topomaps) and vector (national infrastructure, NATURA places, the Red book of Bulgaria etc.) database of 59 GB volume accessible through WebGIS implementation (http://www.e-ecology.bas.bg/) on servers based in our Institute.
3. Protected tree species and land cover mapping – for Golf courses and vacation villages build at Black Sea coast – under contracts with private companies. Data fusion for quality improvement of the computer aided satellite imagery interpretation. (Stoimenov 2005).

In parallel intensive education and teaching activities (incl. PhD students) are carried out by our team members in the field of Remote Sensing and GIS in collaboration with Bulgarian and 7 EC universities and colleges. Distance learning packages are developed in the frame of e-Gis+ project *(http://www.e-gis.org/)* financed by the Leonardo program. To support the research and education process a Geoinformatics Center is established with BAS special funding. Stationary, mobile and distant learning modes of education are provided. *(The text is prepared by a. Stoimenov.)*

10.B.5. Development building and testing of 5 Spectral Airglow Temperature Imagers for optical investigations of regional scale atmospheric motions

The global-scale dynamics of the upper atmosphere is an important indicator of the Earth's climate. The upper atmosphere is strongly coupled to the regions below, where effects such as tides and gravity waves originate. The observation and analysis of solar migration tides, planetary and gravity waves are very important for our understanding of dynamic and energetic processes in the mesopause. Such processes manifest in temperature waves, which can be obtained by high sensitive

spectrometers registering nightglow of some atmospheric molecules in specific molecular bands. By comparison of the registered molecular spectra with synthetic spectra the temperatures of altitude layers near the mesopause can be calculated.

- New versions of Spectral Airglow Temperature Imager (SATI) were developed in the Stara Zagora Department of STIL-BAS in collaboration with the CRESS Space Instrumentation Laboratory of York University, Toronto, Canada. Five SATI-4 instruments were manufactured in 2004-2008, which were destined for Canada, Kazakhstan and China. They were installed at different geographic locations and are operating very well (Petkov et al., 2008, *http://www.stil.bas.bg/FSR/PDF/TOP4Petkov_Nencho2261626.pdf*).
- Some innovations, technical and technological improvements of the SATI construction were applied. These instruments contained 4 or 6 interference filters. Improved algorithms for precise positioning were worked out. Different methods were developed and applied for the absolute energetic calibration and the instrument flat field calibration. They permit relatively easy and regularly to repeat calibration in non-laboratorial conditions (Atanassov et al., 2008, http://www.stil.bas.bg/FSR/PDF/TOP4Atanassov_Atanas2241735.pdf).
- New algorithms and approaches for the image processing and mesopause temperature determination leading to higher result precision were developed. Advanced algorithms for processing one whole night seances' information were developed for the determination of the mean nocturnal temperatures and for the periodic components retrieval. A program system was developed for organization and access to the SATI data including their processing. Up-to-date techniques of analysis of periodicity as Lomb-Scargle method and wavelet transform were implemented. The nocturnal temperature course was studied and wave-like processes with periods of the order of one hour at the mesopause level were identified. The obtained SATI-3 SZ mean nocturnal mesopause temperatures were compared with the ones of SATI-2 in Spain. A similar annual trend in both time series was obtained (Atanassv, 2008, *http://www.stil.bas.bg/FSR/PDF/TOP4Atanassov_Atanas2241745.pdf*). *(The text is prepared by N. Petkov and R. Werner.)*

C) Total number of citations appeared in the period 2004-2008.

378 citations.

Critical assessment of all data

II. Strategy and policies for future development

1. Envisaged development of research subjects and plans in short and long term including the perspectives for the future strengthening of interdisciplinary co-operations within Academy, at national level and internationally (in Europe and worldwide)

1.1. Envisaged development of research subjects and plans in short and long term

The research topics and plans of STIL-BAS closely depend on funding sources. The long-term STIL-BAS priorities (Refer to point 3 of this report) will be stable, especially as they are corresponding to 7FP priorities that are fixed till 2013. The short-term priorities will be in dependence on Bulgarian national science fund (BNSF) priorities. At this moment (January 2009) the BNSF funding priorities for 2009 do not exist yet. We will response to their call for projects mainly because the existing 8 funded projects (See part II of the Annex 1) will be finalized at the end of 2009.

1.2. Perspectives for the future strengthening of interdisciplinary co-operations within Academy, at national level and internationally (Europe and worldwide)

STIL-BAS will continue the existing co-operation with other research organizations in the Academy (Refer to 6.1 of this report). Since 2009 we are starting a new cooperation with the Agricultural faculty of the Thracian university in the Stara Zagora.

The existing cooperation in the field of "Fundamental space research" with the Russian Academy of sciences (V.1.-V.11. of Annex 1) is open till the end of 2010. We plan to keep it going further because of the amount of flight opportunities, which are traditional for us and are still not commercialised. Due to limited funding in the Academy, there is no chance for us to pay for the launching of STIL-BAS developed space instruments by other space agencies. We still hope that Bulgarian government will take the final decision and a Plan for European Cooperating State (PECS) will be signed with ESA till the end of 2009. The foreseen back-funding of PECS will give the necessary amount of money for **future strengthening of co-operations in Europe.**

2. Actual personnel policy as basis for personal development policy including both plans for improving PhD training schemes and PhD personnel recruitment.

2.1. Actual personnel policy as basis for personal development policy

The personnel development policy of STIL-BAS depends on the funding policy of the Academy and of the country. We hope that with the endorsement of the new "Strategy for development of Bulgarian science" new scientific positions will appear in the institute.

2.2. Plans for improving PhD training schemes and PhD personnel recruitment

As seen from Annex 8 for the entire period 2004-2008, 38 PhD students were trained in STIL-BAS. Unfortunately, the number of awarded PhD degrees is only 6. This is again good indicator of the small attractiveness of the scientific career in Bulgaria. The only way to increase the interest of young people is to increase the funding for science and the salaries of the scientists.

3. Financial situation. Sources of finance: budget subsidy, additional sources- public, private, international; cash flow and acquired or donated material assets (indirect, in kind and other type of individual support as for ex. through the international bilateral cooperation should not be considered); strategy and policy for attracting more funding

3.1. Sources of finance: budget subsidy, additional sources - public, private, international; cash flow and acquired or donated material assets

The main funding is coming from BAS and is governmental subsidy. Additional sources are from the Bulgarian national science fund (BNSF) and from other EU, NATO, INTAS, EORD (governmental) sources. There is no funding by public and private sources. Bulgarian business is not science consuming that is why the existing plans in the Ministry of education and science that 50% of the financing for Bulgarian science have to come from the business are unreal.

The financial situation for the period 2004-2008 is presented in Annex 1 and Table 1.

Year	Incomes (BGN, (1 BGN=0.51 EUR))			Salaries (BGN)		Long lasting Activities (BGN)	Number of refereed journals papers abroad	Number of launched in space instrum.
	Budget from BAS (without taxes)	From BNSF and other sources	From International projects	Salaries	Other payments			
2004	394289	39895	171639	328109	66969	18332	16	
2005	376739	186700	79170	333319	66388	19732	25	2
2006	415420	185059	47583	379798	72706	40038	42	
2007	471439	61421	163179	407189	52133	31748	34	2
2008	702639	260368	123202	494344	101823	51746	37+23 (in press)	4

Table 1. Finances for the period 2004-2008 in BGN

Only for comparison, the funding and the scientific activity of a very similar to our institute is shown below. (Please mention that no incomes from public and private sources are reported.)

http://www.mps.mpg.de/dokumente/publikationen/taetigkeitsbericht_2006+2007.pdf

„MAX–PLANCK–INSTITUT FUR SONNENSYSTEMFORSCHUNG, KATLENBURG–LINDAU, Report fur die Jahre 2006 und 2007, Update – Oktober 2008. The number of permanent positions decreased to 96 by the end of December 2007. Of these 26 were filled by scientists. The number of people working scientifically, through BMBF-financed scientists and through Ph.D. students, was nevertheless substantially greater, consisting of 138 on 31st December 2007. The basic funding of the institute comes from the **federal and state governments** and is allocated through the administrative headquarters of the Max Planck Society. For 2007 the figures are: **6.7 million** euros for personnel, **2.4 million** euros for materials, and **0.5 million** euros for capital investment. Special research needs were funded by BMBF (German Federal Ministry for Education and Research) and ESA. From DLR the institute received **7.8 million** euros in 2007. The corresponding sums from ESA were **0.3 million** euros." http://www.mps.mpg.de/services/publist/cgi/viewform.cgi 18 peer reviewed papers for the time 2004-2008 from the Iono-Atmosphere department http://www.mps.mpg.de/services/publist/db/ii-pub.html 18 papers in refereed journals in 2008 listed for the whole institute."

3.2. Strategy and policy for attracting more funding

STIL-BAS scientific council and personnel will keep the aggressive policy to obtain more funds for research from all possible sources and mainly from 7FP and BNSF. Unfortunately the salaries are fixed by the incomes from BAS and practically are not depending on scientific activity. The mean salary for the staff for 2008 was **277 € per month**. The salary of young scientist with high education is only **136 €**. With such salary the attracting of young motivated people is almost impossible.

4. Critical assessment of current structure of the research unit with the view of its future development

We will keep the policy of fast changing the structure of the working and thematic groups of the unit in dependence on the attraction of more funding for research and salaries.

5. Innovation potential of the research unit – patents, advanced technologies, prototypes, applications, perspectives for strengthening the relations with industry and/or other sectors important for the economic development of the country. Critical assessment and future plans

5.1. Innovation potential of the research unit – patents, advanced technologies, prototypes, applications

The innovation potential of the research unit can be assessed by the content of Annexes 3 and 4. 17 different scientific products and inventions produced mainly for scientific applications over the period 2004-2008 are listed in Annex 4. The list of scientific products ready to be implemented in industry consists of 6 products (Annex 3). No patent activity is demonstrated for the period; nevertheless that the methodology of some of the instruments for assessment of the space radiation risk can be formally subject of patent. Unfortunately the developers declare that they don't have time and money to issue a patent and rely on the highly secured software inside the microcontrollers to prevent unauthorized multiplication of the products.

In the field of Geoinformatics productive relationship with the Ministry of Environment and Waters and the Ministry of Foreign Affairs are established. We won and completed international public errand tenders for EC level projects CORINE Land Cover 2000 and 2006. The databases created are widely used in may industries on National and European level.. A number of services are provided for the private sector only two of them to mention: methodology for selection of

potential regional landfill sites already applied in 5 municipalities and golf course and coastal zone resort villages planning.

5.2. Perspectives for strengthening the relations with industry and/or other sectors important for the economic development of the country

Our space instruments are highly sophisticated and specialized mainly for scientific use. We will continue the policy for our own fabrication of some devices under the demand of mainly scientific users from abroad.

Based on our current achievements steps should be made towards strengthening our cooperation with governmental structures and private sector. The focus will be on enlarging our applied research and development programs and active dissemination of information about our products and services.

5.3. Critical assessment and future plans

Our future plans are:

- To keep running the existing areas in fields of basic space research and its application in solar-terrestrial physics, in situ and remote investigation of the geospace, planets and interplanetary space, study of global change and ecosystems and heliobiology and telemedicine/eHealth;
- To develop the field of Space weather and climate and their influences on the health together with the eHealth direction. For this purpose we have foreseen a creation of National centre for space weather. The centre will provide national information and forecast services for the entire Bulgarian community. Preliminary discussions for support in the creation of the centre were performed with colleagues from Russian IZMIRAN institute.
- We will continue to act as regional coordinator for Balkan/Black Sea Region (Armenia, Azerbaijan, Bosnja-Herzegovina, Bulgaria, Croatia, Georgia, Greece, Romania, Russia, Serbia & Montenegro, Turkey, Ukraine) of the International Heliospheric Year (IHY) initiative.

6. Short view of the perspectives of the unit emphasizing its position within the research structure and the strategic views of BAS. Suggestions of what has to be done to meet the expectations of the society for the future role of the Academy

6.1. Short view of the perspectives of the unit emphasizing its position within the research structure and the strategic views of BAS

The perspectives of the unit are connected with:

- The existing 7FP Specific Programme Cooperation thematic area “Space” and the Global Monitoring for Environment and Security (GMES) program http://www.gmes.info/. We will continue the efforts to propose and to participate in the new calls for proposals;
- The SCOSTEP Climate And Weather of the Sun-Earth System (CAWSES) program http://www.bu.edu/cawses/ is another world wide initiative in which we will continue to participate;
- The International Living With a Star Program http://ilws.gsfc.nasa.gov/.
- The existing plans for participation in new space experiments on ISS, Phobos Soil Sample Return Mission 2009-2012, “Space suit” project and BION M1 satellite mission (See Annex 4.).

6.2. Suggestions of what has to be done to meet the expectations of the society for the future role of the Academy

Suffix 1

No	Title of the event	Place	From - to	Main scientific organizer
1	MED-e-TEL 2009 (The International eHealth, Telemedicine and Health ICT, Forum for Education, Networking and Business http://www.medetel.lu/index.php?rub=home&page=defaut)	Luxembourg, G.D. of Luxembourg	1-3 April 2009	Malina Jordanova
2	International Fundamental Space Research Conference http://www.stil.bas.bg/FSR/	Sunny Beach	23-28 September 2008	Tsvetan Dachev
3	NATO Advanced Study Institute on Exposure and Risk Assessment of Chemical Pollution - Contemporary Methodology http://www.stil.bas.bg/asi_2008/index.html	Sofia	1-10 July 2008	Lubomir Simeonov
4	UN/ESA/NASA/JAXA Workshop on the International Heliophysical Year 2007 and Basic Space Science "First Results from the International Heliophysical Year 2007" http://www.stil.bas.bg/UNBSS-IHY/	Sozopol	2-6 June, 2008	Katya Georgieva
5	Med-e-Tel 2008 (The International Educational and Networking Forum for eHealth, Telemedicine and Health ICT, http://www.medetel.lu/)	Luxembourg, G.D. of Luxembourg	16-18 April 2008	Malina Jordanova
6	NATO Advanced Advanced Research Workshop on Soil Chemical Pollution, Risk Assessment, Remediation and Security http://www.springer.com/environment/book/978-1-4020-8255-9	Sofia	23-26 May 2007	Lubomir Simeonov
7	Management Commitee Meeting and Scientific Event COST Action 724 "Developing the basis for monitoring, modelling and predicting Space Weather" http://www.stil.bas.bg/COST_BG/	Sofia	21-25 May 2007	Tsvetan Dachev
8	Med-e-Tel 2007 (The International Educational and Networking Forum for eHealth, Telemedicine and Health ICT, http://www.medetel.lu/index.php)	Luxembourg, G.D. of Luxembourg	18-20 April 2007	Malina Jordanova
9	International Symposium on Recent Observations and Simulations of the Sun-Earth System- ISROSES sponsored by ILWS,URSI, NASA, USNSF and EORD http://www.stil.bas.bg/ISROSES/	Varna	17-22 September 2006	Vania Jordanova, Ilia Roussev Tsvetan Dachev
10	Med-e-Tel 2006 (The International Trade Event and Conference for eHealth, Telemedicine and Health ICT, http://www.medetel.lu/index.php?rub=library&page=2006)	Luxembourg, G.D. of Luxembourg	5-7 April 2006	Malina Jordanova
11	International Heliophysical Year Regional planning meeting for the Balkan and Black Sea region http://www.stil.bas.bg/IHY/indexSOZ.html	Sozopol	06-08 June, 2005	Katya Georgieva
12	Eleventh International Scientific Conference Solar-Terrestrial Influences, http://www.stil.bas.bg/11conf/	Sofia	23-25 November 2005	Tsvetan Dachev
13	NATO Advanced Study Institute on Chemicals as Intentional and Accidental Global Environmental Threats http://www.springer.com/chemistry/book/978-1-4020-5096-1	Borovetz	16-27 November 2005	Lubomir Simeonov,
14	Med-e-Tel 2005 (The International Trade Event and Conference for eHealth, Telemedicine and Health ICT, http://www.medetel.lu/index.php?rub=library&page=2005)	Luxembourg, G.D. of Luxembourg	6-8 April 2005	Malina Jordanova
15	Scientific Workshop Bulgaria - Russia	Sofia	26-29	Tsvetan

	Collaboration in Space Science Past - Present – Future http://www.stil.bas.bg/		October 2004	Dachev
16	Workshop on Long Term Changes and Trends in the Atmosphere (A joint venture of IAGA & ICMA) http://www.stil.bas.bg/ws2004/	Sozopol	09-14 June 2004	Katya Georgieva
17	Med-e-Tel 2004 (The International Trade Event and Conference for eHealth, Telemedicine and Health ICT, http://www.medetel.lu/index.php?rub=library&page=2004)	Luxembourg, G.D. of Luxembourg	21-23 April 2004	Malina Jordanova

List of the scientific events organized by STIL-BAS scientists in the period 2004-2008.

Suffix 2

ATTESTATION CARD *

Assessment of scientific and organizational activities of STIL-BAS scientists for 5 year period

Names:
Position**:**
Department / Thematic group:

Activities	Rating points A	Number B	Total A.B
Scientific activity			
1. Publications			
1.1 Publications in international journals	1.0		
1.2 Publications in Comptes Rendus de l'Academie Bulgare des Sciences or in Journal of the Bulgarian Academy of Sciences	0.7		
1.3 Publications in Proceedings of International Conferences	0.8		
1.4 Published abstracts at an International conference	0.3		
1.5 Publications in Bulgarian journals	0.3		
1.6 Monographs (one author, published abroad)	10.0		
1.7 Monographs (several co-authors, published abroad)	8.0		
1.8 Monographs published in Bulgaria	5.0		
1.9 Electronic publications	0.6		
2. Applied Activity			
2.1. Development and delivery of space device or instrument: Primary Investigator / Team Coordinator Team member	 5.0 2.0		
2.2. Development and delivery of ground and/or technology device or instrument: Primary Investigator / Team Coordinator Team member	 3.0 1.0		
3. Presented Papers			
3.1 Keynote presentations at international conference	1.0		
3.2 Presentations at international conference	0.5		
3.3 Presentations at Bulgarian conference	0.3		
3.4 Presentations at a seminar abroad	0.3		
3.5 Presentations at a seminar in Bulgaria	0.2		
4. Scientific Degree			
4.1 PhD	3.0		
4.2 Dr. Sc.	8.0		
4.3 Ongoing procedure for defending PhD thesis	2.0		
4.4 Ongoing procedure for defending Dr. Sc. thesis	4.0		
5. Combination of Scientific and Organization Activities			
5.1 Organizing of scientific events abroad MSO / Coordinator Member of Scientific Committee	 5.0 1.0		
5.2 Organizing of international scientific events in Bulgaria MSO / Coordinator Member of Scientific Committee	 3.0 0.5		
6. Projects			
6.1 Projects with Bulgarian companies, funds, agencies MSO / Coordinator Member of Scientific Committee	 1.5 0.5		
6.2 Projects – EC, European organizations, NATO, INTAS, etc. MSO / Coordinator Member of Scientific Committee	 5.0 1.5		

6.3 Projects with foreign organizations where BAS is primary partner MSO / Coordinator Member of Scientific Committee	3.0 1.0		
6.4 Projects with foreign organizations where STIL-BAS is primary partner MSO / Coordinator Member of Scientific Committee	3.0 1.0		
7. Teaching Activities			
7.1 Tutor of BA or MA students	0.5		
7.2 Full time lecture course or a handbook for university students (only once)	5.0		
7.3 Reduced lecture course	3.0		
7.4 Conducting seminar or exercise (with students)	2.0		
7.5 PhD student tutor	2.0		
8. Reviews and Experts' Reports			
8.1 International or for foreign organizations	2.0		
8.2. In Bulgaria	1.0		
9. Awards			
9.1 International or from foreign organizations	8.0		
9.2 Bulgarian	6.0		
10. Member of:			
10.1 Editorial board of foreign and/or international journal	5.0		
10.2 Editorial board of Bulgarian journal	3.0		
10.3 Member of scientific council	0.3		
10.4 Member of boards, commissions, scientific counsels, etc. other than STIL-BAS scientific counsels	0.5		

11. Citations			
11.1 Citation from foreign authors during last 10 years	0.5		
11.2 Citation from Bulgarian authors during last 10 years	0.1		

12. Evaluation of the Head of Department or Thematic Group (from –5 up to +5 points)	
Total	

Signature (scientist):

Signature (Head of Department or Thematic Group):

The Attestation Card must be accompanied by:
- List of detailed bibliography of all publications,
- List of papers presented at conferences – in Bulgaria and abroad, details included;
- List of projects, lectures, list of students defending BA theses and/ or PhD theses;
- List of received awards, bibliography of citations.

If the lists are not attached to the attestation card, the latter will not be accepted and approved!

Notes: The Attestation cards are distributed only in electronic format and must be filled in! Scientist that undergo attestation procedure have to fill the cards in, print them, attach the above mentioned lists of publications, citations, etc., and submit all document to the Team Leaders or Head of Departments. Team Leaders or Head of Departments have to check the information in the cards, include their evaluations (Row 12) and submit the cards to the Attestation Commission. STI-BAS Scientific Council will approve or reject the report of the Attestation Commission and ranking of scientists.

Suffix 3

List of Acronyms

ACR – Anomalous Cosmic Rays
ACTIVNY – name of an international space project, coordinated by Russia
AEROFAST - AEROcapture for Future spAce transportation, *project of 7th FP*
ALOMAR - Arctic Lidar Observatory for Middle Atmosphere Research
ALOMAR eARI – name of a 6th Frame Programme -Infrastructures-1 project
AMEI-2 – Analyser of Mass and Energy of Ions, experiment of INTERBALL space project
AMI - Acute Myocardial Infarction
APEX – name of an international space project, coordinated by Russia
ASTRIUM is an aerospace subsidiary of the European Aeronautic Defence and Space Company (EADS), based in Portsmouth and Stevenage, England
BAS – Bulgarian Academy of Sciences
BION-1M – name of a Russian satellite
BIOPAN – name of a facility on the International space station
BNSF - Bulgarian national science fund
CAWSES - Climate And Weather of the Sun-Earth System, a programme of SCOSTEP
CCD – Charge Coupled Devicec
CELIAS - Charge, Element and Isotope Analysis System of ESA/NASA scientific satellite SOHO
CHANDRAYAAN – 1 - name of an Indian Moon satellite
CLC – CORINE land cover
GMA – Geomagnetic Activity
CME - Continuing Medical Education
Co-I – Co-Investigator
CORINE – a land cover project of the European Environment Agency
CORSIKA – COsmic Ray SImulations for Kascade*, a program for detailed simulation of extensive air showers initiated by high energy cosmic ray particles*
COSMOS - Cooperation of space NCPs as a mean to optimise services, *project of 7th FP*
COSPAR – Committee on Space Research
COST - European Cooperation in Science and Technology
DAAD – German Academic exchange service
DFG - German Research Foundation
DLR – Institute of Robotics and Mechatronics, Germany
Dr. Sc. – Doctor of Sciences (Doctor habil.)
Dr. Med. Sc. – Doctor of Medical Sciences
EACCME - European Accreditation Council for Continuing Medical Education
EC – European Community
eHealth – electronic health
EMSNET - European Magnetosphere Satellite Network
EORD – European Office for Research and Development
ENVISAT – ESA Earth Observation satellite
ESA – European Space Agency
EU – European Union
EXPOSE – name of a facility on the International space station
FAC – field aligned currents
FOTON – name of series of Russian satellites
FP – Framework Programme
FSR – International Conference on Fundamental Space Research, Sunny Beach, Bulgaria, 2008
GASCOD-BG – instrument for monitoring of stratospheric trace gases, installed in Stara Zagora
GCR – Galactic Cosmic Rays

GEANT4 - GEometry ANd Tracking, *a platform for the simulation of the passage of particles through matter, using Monte Carlo methods*
GIS – geographical information system
GMES - Global Monitoring for Environment and Security, *a European initiative for the implementation of information services dealing with environment and security*
GMU - George Mason University
IAA – International Academy of Astronautics
IAGA - International Association of Geomagnetism and Aeronomy
IAU – International Astronomical Union
ICHA - Inter-union Commission for History of Astronomy
ICMA - International Commission on the Middle Atmosphere
ICSU – International Counsel for Science
ICT – Information and Communication Technology
IEEE - Institute of Electrical and Electronics Engineers
IHY – International Heliophysical Year
ILWS – International Living With a Star programme
INTAS - International Association for the promotion of co-operation with scientists from the New Independent States of the former Soviet Union, *established in 1993 by the European Community*
INTERCOSMOS – former Space agency of the Socialist countries
INTERBALL – name of an international space project, coordinated by Russia
IRF – Swedish Institute for Space Research
IRS – Indian Remote Sensing satellite
ISAC – CNR - Institute of Atmospheric Sciences and Climate of the Italian National Research Council
ISRO - Indian Space Research Organisation
ISS – International Space Station
IZMIRAN - Institute of Earth magnetism, ionosphere and radiowaves propagation named after Nikolay Pushkov of the Russian Academy of Sciences
JAXA - Japan Aerospace Exploration Agency
KORONAS – name of international space project, coordinated by Russia
LCLU - Land cover/land use
LET – linear energy transfer
MATROSKA – name of a facility on the International space station
Med-e-Tel - The International eHealth, Telemedicine and Health ICT Forum for Education, Networking and Business
MHD - magneto hydrodynamic
MS – member state
NATO - North Atlantic Treaty Organization
NASA – National Aeronautics and Space Administration, USA
NCP – national contact point for FP
PECS – ESA Plan for European Cooperating State
PI – Principal investigator
PhD - Doctor of Philosophy, *an academic degree*
RAS – Russian Academy of Sciences
Res. Sci. – Research Scientist
SAA – South Atlantic anomaly
SATI - Spectral Airglow Temperature Imager
SAS – Slovak Academy of Sciences
SCOSTEP - Scientific Committee On Solar- Terrestrial Physics
SCIAMACHY- – SCanning Imaging Absorption SpectroMeter on Envisat satellite, *to perform global measurements of trace gases in the troposphere and in the stratosphere*

SCR – solar cosmic rays
SEAC - European Society for Astronomy in Culture
Sen. Res. Sci. – Senior Research Scientist
SLU - Saint Louis University
SOHO - Solar and Heliospheric Observatory, space ESA/NASA project
SPOT – a series of French remote sensing satellites
SSA – Specific Support Action
START - Stimulate Aerospace Research and Technology in Associate Candidate Countries, *a project of the Sixth Framework Programme*
STIL – Solar-Terrestrial Influences Laboratory
TOC – total ozone concentration
TOMS - Thematically orientated multichannel spectrometer
TUBITAC – Turkish Academy of Sciences
UIS – International union of speleology
UN – United Nations
UHF – ultra high frequency
ULF – ultra low frequency
URSI - International Union of Radio Science
USNSF - United States National Science Foundation
UV – ultra violet (radiation)
VEGA – Venus-Halley – an international space project to investigate the Halley comet, coordinated by Russia
VIS/NIR – Visible/Near Infrared

SCIENTIFIC PROJECTS IN 2004-2008

Solar-Terrestrial influences Institute – Acad. Dimitar Mishev

Number	TITLE OF THE PROJECT	PRINCIPAL INVESTIGATOR Partner organization or coordinator, number of participants from the unit and from other BAS units, number of PhD students	FUNDING provided by /institution, reg. № or code of the project/contract, etc./	RECEIVED FUNDING by the unit in BGN, or EUR, or USD	Relevance to industry and the economy /area of application/
I. Projects funded by BAS budget					
I.1.(scientific area)	**Remote sensing of Earth and planets**	**Sen. Res. PhD D. Petkov**			
I.1.1. (project)	Novel techniques and technologies in aerospace remote sensing	Sen. Res. PhD D. Petkov 4+3 from IPP			
I.1.2. (project)	Spectrometric remote sensing of the system "Sun-Earth"	Sen. Res. Sci. PhD I.Iliev 5+3 from IE+6 from IPPh			
I.1.3. (project)	Spectral characteristics of natural objects	Sen. Res. Sci.PhD R.Kancheva 5+4 SLGE+4 SU +1 UMG			
I.1.4. (project)	Videometric systems for remote sensing	Res. Sci. A. Kroumov 3+1 Texas Instruments+2 IPPh			
I.1.5. (project)	Social dynamics	Acad. DrSc St. Panchev 1+? + ?			
I.1.6. (project)	Investigation of the features of nonlinear systems in the real space – synthesis of close by structure chaotic systems for applied aims	Acad. DrSc St. Panchev 1+ 1 NIMH			
I.1.7. (project)	Development of INTERNET informational media and data base for remote sensing	acad. DrSc K. Boyanov			

	UHF radiometric investigations of the land cover, *Finished 2007*	Prof. A. Shutko, DrSc			
I.2. (scientific area)	**Solar-terrestrial physics**	**Prof. Ts. Dachev, DrSc**			
I.2.1. (project)	Investigation of ionizing radiation in the geosphere and heliosphere. Development of systems for the radiation monitoring.	Prof. Ts. Dachev, DrSc 5			
I.2.2. (project)	Investigation of GCR, SCR and XUV radiations in the Solar system and their impact on the ionization, electrical and chemical processes into the solar-planetary and solar-terrestrial physics	Corr. member P. Velinov, DrSc 9+1 GPhI			
I.2.3. (project)	Qualitative and quantitative investigation of the radiation dose in the aeronautics. Development, calibration and intercalibration of semi-conductor dosimetric monitors for charged particles	Res. Sci. J. Semkova 7			
I.2.4. (project)	Study of the dynamical processes in the magnetospheric plasma based on INTERBALL data	Res. Sci. Koleva 5			
I.2.5. (project)	Impact of geophysical, meteorological and space factors on physiological and psycho-physiological signs.	Prof. I. Stoilova, Dr.Sc, MD 4+1 GPhI			
I.2.6. (project)	Impact of the solar activity on the weather and the climate.	Res. Sci. K. Georgieva. PhD 3			
I.2.7. (project)	Investigation (within the near to surface space) onboard orbital stations (super large space instruments) of the wave processes of interaction with the ionosphere	Res. Sci. B. Kirov 4			
I.2.8.	Identification of energetic solar events based on SOHO and ACE data for the period 1988-2005	Prof. L. SimeonovDrSc			
I.2.9. (project)	Construction of ACTIVE WEB site of STIL-BAS	Res. Sci. D. Danov 2			

I.2.10 (project)	Investigation of the possibilities electronic health to be put into practice in Bulgaria, since 2007	Res. Sci. M.Jordanova, PhD 4			
I.3.(scientific area)	**Optical atmosphere investigations**	**Sen. Res. Sci. N.Petkov, PhD**			
I.3.1. (project)	Optical investigations of the atmosphere dynamics in regional scale. Device SATI-4	Sen. Res. Sci. N.Petkov, PhD - 9			
I.3.2. (project)	Study of small gaze components in the Earth atmosphere	Sen. Res. Sci. R.Verner, PhD - 4			
I.3.3. (project)	Project INTERBALL – data processing, correlation, actualization of database and album with results obtained by the study of auroral events with UV spectrometer UVSIPS as well as through the experiments UVAI , IMAP-3"and SKA-3.	Res. Sci. St. Spassov 8 + SRI-RAS + ITMO-Sc. Peterburg			
I.3.4. (project)	Some nEURtral gaze emissions from Halley comet and their space distribution.	Sen. Res. Sci., PhD V.Guineva - 4			
I.3.5. (project)	"Operational satellite investigations of temperature anomalies on the surface of closed and semi-closed sea basins and the evolution of the global Earth climate	Res. Sci. A. Manev 3			
1.3.6. (project)	Study of the middle atmosphere by means of optical methods and memorandum for cooperative investigations within 3 years beginning from 1.02.2005.	Sen. Res. Sci., PhD V.Guineva 2			
I.4. (scientific area)	**Geo-informatics, since 2007**	**Sen. Res. Sci. A. Stoimenov, PhD**			
I.4.1.	Geo-informatics methods and technologies for remote sensing of the Earth.	Sen. Res. Sci. A. Stoimenov, PhD 5+1 GI + 2 FTU			
I.4.2. (project)	Modern methods for satellite imagery analysis.	Res. Sci. V. Dimitrov 2+1 FTU			

II. Projects additionally funded by contracts with BNSF					
II.1 (project)	Integrated Investigation on Earth Ambient Charged Particles Field as an Agent in the Solar-Terrestrial Connections and theRadiation related Risk of Space Crews.	Res. Sci. J. Semkova	№ 1505/05 2005-2008	05-3200 06-3300 07-3300 08-23000	
II.2 (project)	Study of the radiance and reflectance characteristics of mixed spectral classes of rocks and minerals.	Res. Sci. M. Danov – IE-BAS Res. Sci. D. Borisoiva – STIL-BAS	НЗ-1502/05		
II.3. (project)	Thematic modeling with remote sensing of the soil-plant canopy in the frame of monitoring, diagnostics and prognostics.	Sen. Res. Sci., PhD R. Kancheva	№ НЗ 1410/04 с	04-4200 06-4700 07-1750 08-1750	
II.4. (project)	Early detection of damages of agricultural plants caused by abiotic stresses	Sen. Res. Sci. D. Krezhova, PhD- 3+5 IPPh +1 IE	НЗ 1404/07	04-3000 05-1200 06-1680 07-2450 08-1440	
II.5. (project)	Study of the motion, and the physical parameters of clouds by means of ground based video- and radar images.	Res. Sci. K. Bakalova	НЗ 1414/04	04-2800 06-3000 07-700 08-700	
II.6. (project)	Estimation of the radiation risk in the helio-sphere by means of multi –point measurements and analysis of the flow and cosmic radiation dose.	Prof. Ts. Dachev, DrSc	№ 1509/05 2005-2008	05-2800 06-2700 07-2850 08-27850	
II.7. (project)	Center for EURropean Dimensions of Bulgarian Space Research and Technologies, Finished 2008	Sen. Res. Sci. D. Petkov, PhD	№ 12/05 2005-2008	05-150000 07-15000	
II.8. (project)	Investigation (within the near to surface space) of the plasma wave processes of interaction of orbital stations (super large space instruments) with the ionosphere	Res. Sci. B. Kirov 4	№ 1511/05 2005-2008	05-2700 06-2800 07-2850 08 19350	

II.9. (project)	Investigation of processes in the field of the meso- pause by means of rocket measurements of the direct Leiman-Alfa radiation which penetrates in the atmosphere	Res. Sci. V. Guineva, PhD 2	№ 1515/05 2005-2008	05-2300 06-2200 07-1950 08-1950	
II.10. (project)	Influence of the Solar activity on patients with cardio-vascular pathology	Prof. I. Stoilova, Dr.Sc, MD 4+1 GPhI2 + 3 MPHMT "St.Anna"-Sofia	№ ЛІ-1530/05 2005-2008	05-3500 06-3500 07-1500 08-9500	
II.11. (project)	Investigation of ULF/VLS waves and longitudinal currents by means of satellite and ground based measurements.	Sen. Res. Sci. PhD D. Teodossiev Sen. Res. Sci. PhD A. Bochev SRI-RAS + STIL - BAS	№ /05 2005-2008		
II.12.	Tele-psychology for far away agricultural regions	Res. Sci. M. Jordanova, MD, PhD	№ ОХН 1514/2005	07-3000 08-17200	
II.13. (project)	3-D analysis and estimation of the structure and changes in the landscape for chosen regions of Slovakia and Bulgaria during the period 1990-2006 based on remote sensing data.	Sen. Res. Sci. A. Stoimenov, PhD	БС11207	07-5000 08-5000	
II.14. (project)	Collaboration in the management of multilingual databases, Finished 2008	Res. Sci. PhD M. Jordanova	СРП-108/07 ДО1- 779/09.10.07	07-4421	
II.15. (project)	Investigation of multitemporal and multisensor satellite imagery for enhanced CORINE Land Cover classes recognition and mapping (case studies in Slovakia and Bulgaria)	Sen. Res. Sci. A. Stoimenov, PhD 4 + 1 GI	№ 12/05 2005-2008	05-5000 BGN 07-5000 BGN	
II.16. (project)	Spatial analysis and evaluation of landscape changes chosen regions of Slovakia and Bulgaria during the period 1990-2006 based on remote sensing data	Sen. Res. Sci. A. Stoimenov, PhD 4 + 2 GI	БС112/07	07-5000 BGN 08-5000 BGN	
II.17. (project)	Change Detection of Land Use and Land Cover in Coastal Zones of China (Fujian) and Bulgaria Using Multitemporal and Multiscale Remote Sensing Data	Sen. Res. Sci. R. Vatseva, PhD 2 GI + 2 STIL	Д02 – 10/ 23.08.2008	08-5000 BGN	

	Study of magnetospheric boundary layers by Interball-1 data	Res. Sci. R. Koleva	НЗ-1106/00	04-2600	
	Investigation of Dose and Flux Dynamics in Tissue-Equivalent Phantom onboard the Russian Segment of The International Space Station by Liulin-5 Instrument. Finished 2008	Res. Sci. J. Semkova	№ НЗ 1102/01	04-3100	
	Metabolic activity of Chlamydomonas as modulator of the heavy metals in the plants, Finished 2006	Sen. Res. Sci. R. Kancheva, PhD	МОН Б-1306/03	04-2900 05-1800	
	„First results from IHY" 4th UN/ESA/NASA/JAXA conference, Sozopol, June, 2008, Finished 2008	Res. Sci. K. Georgieva, PhD	NFSR	08-122210	
	Experimental study of the self emission of mixed classes of mineralogical examples, Finished 2007	Res. Sci. D. Borisoiva – STIL-BAS	МУНЗ-1201/04	04-2000	
II	Total funding			493701.0 BGN	
III. Projects additionally funded by contracts with Bulgarian ministries, departments and firms					
III.1. (project)	Development of methods for estimation of renewable energy sources based on satellite data	Sen. Res. Sci. A. Stoimenov, PhD -3	Contract with Agency on energy sources		Yes
III.2. (project)	CORINE Land Cover 2004	Sen. Res. Sci. A. Stoimenov, PhD 4+ 1 GI + 1 FTU	Ministry of Environment and Waterst	04-68500 BGN	Yes
III.3. (project	Golf course and vacation villages projects support – vegetation and protected species mapping	Sen. Res. Sci. A. Stoimenov, PhD 3	Private companies Karamochev OOD and LandArt Ltd.	2006 – 2008 11300 BGN	
III.4. (project	Remote sensing methods to help the solution of problems, which arise with the delimitation of the sea regions in Black Sea between Bulgaria and Romania.	Sen. Res. Sci. A. Stoimenov, PhD 2+ 1 GI	Ministry of foreign affairs	07-900 EUR	
III.5. (project)	CORINE Land Cover 2006	Sen. Res. Sci. A. Stoimenov, PhD 2+ 1 GI	Ministry of Environment and Waters	08-97706 BGN	Yes

III.6.(project)	Restoration of the ecological set along the transport corridors in Bulgaria	Res. Sci. V. Dimitrov	Ministry of Environment and Waterst	08-1536 BGN	Yes
III.7. (project)	Remote sensing and GIS centre development and structuring.	Sen. Res. Sci. A. Stoimenov, PhD 5+1 GI + 2 FTU	Dedicated government fund	08-50000 BGN	
III.8. (project)	Methodology for determination of potential kaolin deposits using multi-spectral satellite imagery	Sen. Res. Sci. A. Stoimenov, PhD 4+1 GI	MULLER AD private company	08 – 5400 BGN	
III.9. (project)	NATURA2000 National network optimization and scientific foundations development	Prof. D. Peev, with 3 scientist from ISTI	Ministry of Environment and Waters	08 –5000 BGN	
III	Total funding			239442.0 BGN 900.0-EUR	
IV. Projects additionally funded by contracts and programs of EUR, NATO, UNESCO and other international organizations					
IV.1. (project)	Study of the short-term ozone and nitrogen dioxide variability at high latitudes	Sen. Res. Sci. R. Werner, PhD	FP6 ALOMAR eARI		
IV.2. (project)	Galactic and Solar Cosmic Rays Study by Rocketborne Space Radiation Spectrometer-Dosimeter- Liulin-R, Finished 2008	Prof. Ts. Dachev, DrSc	FP6 ALOMAR eARI	05-1900 EUR 08-5400 EUR	
IV.3 (project)	COST-724 Action: Developing the scientific basis for monitoring, modelling and predicting Space Weather Project: Investigation of the Space radiation effects on manned space Missions and on Aircrafts	Prof. Ts. Dachev, DrSc 4 Corr. member P. Velinov, DrSc.	COST		
IV.4 (project)	International Helio-physical Year: Education and Public Outreach	Res. Sci. P. Stoeva, PhD	IHY		
IV.5 (project)	Cooperation of space NCPs as a means of optimizes services (COSMOS) project	Sen. Res. Sci. D. Petkov, PhD	FP7	08-21234 EUR	

	Experimental Investigation of Radiation Dose Distributions onboard ISS for Estimation of the Radiation Risk in Long Duration Space Flights", Finished 2007	Res. Sci. J. Semkova 4	FP6, ESA-SURE.		
	START: Stimulate Aerospace Research and Technology, Finished 2007	Prof. Ts. Dachev, DrSc 8	FP6-2004-ACC-SSA	04-67900 EUR 07-17358 EUR	
	Optical investigation of regional scale atmospheric motions and their influence on the mesosphere / lower thermosphere / ionosphere region, Finished 2007	Res. Sci. Marianna Shepherd	INTAS	04-4900 EUR 05-4900 EUR 06-3577 EUR	
	Optical investigation of regional scale atmospheric motion and its influences, Finished 2004	Sen. Res. Sci. N. Petkov, PhD	Collaborative linkage grant with NATO	04-1200 USD	
	Septemvri Telecentre Project, Finished 2006	Prof. Ts. Dachev, DrSc 8	International Telecommunication Union	04-6000 EUR	
	Stratosphere Troposphere Exchange (STE) and the atmospheric subtropics-midlatitudes and the mid-highlatitudes interactions, Finished 2006	Sen. Res. Sci. R. Werner, PhD - 5	FP6 ALOMAR eARI	05-4100 EUR	
	Study of the ozone response to stratospheric-troposheric exchange events, and of inner gravity waves by observations of ozone, temperature, and wind fields at high latitudes, Finished 2007	Sen. Res. Sci. R. Werner, PhD - 5	FP6 ALOMAR eARI	05-4000 EUR	
	Study of the generation, Spatial and temporal development of auroral structures and related phenomena, Finished 2007	Res. Sci. V. Guineva, PhD 2	FP6 ALOMAR eARI	05-3900 EUR	
	Attenuation of Absolute Solar Lyman Alpha Flux - ASLAF, Finished 2007	Res. Sci. V. Guineva, PhD 2	FP6 ALOMAR eARI	05-6600 EUR	
	Education in GIS, Finished 2007	Res. Sci. T. Liubenov	Project Leonardo	07-12800 EUR	
	DFG Project 2004-2006: Galactic and solar cosmic ray influence on the ionized and neutral components of the planetary atmospheres, Finished 2006	Corr. member P. Velinov, DrSc.	DFG	05-6600 EUR 06-6600 EUR	

IV	Total funding			170469.0 EUR 1200 USD	
V. Projects based on equivalent non currency interchange in the frame of inter-academician and inter- institutional collaboration					
V.I. Inter-academician collaboration					
V.1.	Study of the dose and flow dynamics within tissue equivalent human phantom onboard the Russian segment of the International Space station based on data obtained by the device Liulin-5 in the frame of the international experiment "Matroska-R"	Res. Sci. J. Semkova 7	IMBP-RAS 2006-2010	05-5100 EUR	
V.2. (project)	Study, based on INTERBAL data, of the processes of forming of magnetosphere plasma configurations	Res. Sci. R. Koleva 4	SRI-RAS 2006-2010		
V.3. (project)	Investigation (within the near to surface space) of the plasma wave processes of interaction of orbital stations (super large space instruments) with the ionosphere (code SITUATION).	Res. Sci. B. Kirov 4	SRI-RAS 2006-2010	04-5200 EUR	
V.4. (project)	Examination of the geo-efficiency of the Solar agents	Res. Sci. K. Georgieva, PhD 3	IZMIRAN-RAS 2006-2010		
V.5. (project)	Radiation remote sensing of the trace Earth-Mart in the frame of the project Phobos-ground	Prof. Ts. Dachev, DrSc Res. Sci. J. Semkova 11	IMBP-RAS 2006-2010		
V.6. (project)	"Balkansat" – development of micro-satellite platform for scientific research	Prof. PhD P. Getzov, PhD SRI-BAS Prof. Ts. Dachev, DrSc, STIL-BAS	SRI-RAS 2006-2010		
V.7. (project)	Project "INFRASTRUCTURE"	Res. Sci. Hr. Nikolov 6	IRE-RAS 2006-2010		
V.8. (project)	Project "Development of novel techniques for aerospace remote sensing	Sen. Res. Sci. D. Petkov, PhD 12	IRE-RAS 2006-2010		
V.9.	Medical-biological problems relevant too the Solar activity	Prof. I. Stoilova, Dr.Sc,	SRI-RAS		

(project)		MD – 4 + 54	2006-2010		
V.10. (project)	Examination (based on ground based and satellite observations) of optical events in the middle and upper atmosphere of the Earth and magnetosphere – atmosphere effects under the influence of helio-geo physical disturbances	Sen. Res. Sci. PhD P.Stoeva 6	ISTP-SO-RAS 2006-2010		
V.11. (project)	Investigation by means of space and ground based instruments, of the middle Solar corona at a distance of 5 solar radiuses and determination of the impact of the processes in the corona on the Sun-Earth interactions.	Res. Sci. Stoeva PhD 6	FIAN-RAS 2006-2010		
V.12. (project)	Project "Study of ELF/ULF waves and field-aligned current systems by satellite and ground based measurements"	Sen. Res. Sci. D.Teodosiev SRI Sen. Res. Sci. A. Bochev STIL Prof. P. Nenovski, DrSc GFI	Institute of Geomagnetism, Mumbai, India		
V.13. (project)	Design and mounting onboard the satellite Chandrayaan-1 of a 256-channel spectrometer for registration of the absorbed space radiation dose (RADOM)	Prof. Ts. Dachev, DrSc 4	ISRO, India	04-2500 EUR 05-4500 EUR	
V.14. (project)	Contract for collaboration with the Institute for nuclear physics at the Czech Academy of Sciences (CAS) - Testing and calibration of the instruments for aircraft radiation dosimetry	Prof. Ts. Dachev, DrSc 4	INP-CAS		
V.15. (project)	Application of the Differential optical absorption spectrometry for troposphere and stratosphere monitoring by means of ground based, balloon and satellite instruments.	Sen. Res. Sci. R. Werner, PhD - 5	ISAO, Italy		
V.16. (project)	Magnetic fields and energetic particles in the daily magnetosphere and boundary regions.	Sen. Res. Sci. A Bochev, PhD and Prof. Kudela, SAS	SAS- 2007 – 2008		
V.II. Inter- institutional collaboration					
V.17. (project)	Contract for construction and exploitation of the dosimeter "Liulin-ISS" in the content of the Russian segment of ISS	Prof. Ts. Dachev, DrSc 4	IMBP-RAS		

V.18. (project)	Development and calibration of Space Radiation Dose Control Systems	Prof. Ts. Dachev, DrSc 4	NIRS, Chiba, Japan		
V.19. (project)	Development of 3DE/ R and R3D-B3 instruments for experiments "ROSE/EXPOSE" on ISS and on Biopan 6 on Foton M3	Prof. Ts. Dachev, DrSc 4	University of Erlangen, Germany		
V.20 (project)	Impact of the cosmic rays on the ionization and electrical status of the atmosphere as well as on the generation of clouds and global climate changes.	Corr. mem. P. Velinov, DrSc 8	IZMIRAN-RAS		
V.21. (project)	Investigation of the possibilities virtual methods to be used for observation and diagnostics in the medicine; scientific-methodological support of the International forum for education and collaboration in the field of medicine based in Luxemburg	Res. Sci. M. Jordanova, MD, PhD 3	LUX-EXPO, Luxembourg	04-640 USD 05-400 USD 06-500 EUR 07-400 EUR	
V.22. (project)	Development and application of time-of-flight multi-pass reflection mode for particle detection in plasma based secondary nEURtral mass Chemical and structural analysis of solid surfaces and thin films with SNMS-TOF. Optimization of the analytical characteristics of the SNMS-TOF system	Prof. L. Simeonov, DrSc 3	Technical University, Kaiserslautern, Germany		
V.23. (project)	Correlation between the processes in the low and middle atmosphere and the influence of Solar activity on it.	Res. Sci. K. Georgieva, PhD	IAP-CAN		
V. 24. (project)	Space analysis and estimation of the structure and landscape changes in Slovakia and Bulgaria during the period 1990-2006 based on remote sensing data.	Sen. Res. Sci.Phd A. Stoimenov, PhD 2+2 GI SASc +2GI	GI-SAN		
V.25. (project)	Spectral analysis of the system "soil-vegetation" in the SHF, radiometric and optical ranges for chosen regions of the Earth surface.	Prof. DrSc A. Shutko	IRE-RAS		
V.26. (project)	Three-lateral memorandum among STIL-BAS, IMBP-RAS and NIRS-Japan for joint research on project "Liulin-Phobos".	Res. Sci. J. Semkova Prof. Ts. Dachev, DrSc 9	IMBP-RAS, NIRS-Japan	07-11400 USD	
V.27. (project)	Modelling of cosmic ray induced ionization in the ionospheres and atmospheres of the Earth and planets.	Corr. member P. Velinov, DrSc.	Sodankyla Geoph. Obs.,		

		3	University of Oulu, Finland		
V.28. (project)	Solar magnetic fields dynamics and solar-terrestrial influences, Finished 2008	Res. Sci. K. Georgieva, PhD	EORD	04-4480 EUR 05-6400 USD 06-16000 USD 07-10620 USD 08-12000 USD	
V.29. (project)	Project "Skafander"	Prof. Ts. Dachev, DrSc 4	Moscow State University	08-7500 USD	
V.30. (project)	International conference "Fundamental Space Research", Sunny Beach, Bulgaria, September 22-27.2008, Finished 2008	Prof. Ts. Dachev, DrSc 4	SKB IRE-RAS	08 23048 EUR	
	Thematic oriented multichannel spectrometer (TOMS), Finished 2006	Sen. Res. Sci. D. Petkov, PhD	NASA-CHSC	05- 10800 USD	
	Optical investigation of the atmospheric dynamics – SATI-4, Finished 2008	Sen. Res. Sci. N. Petkov, PhD	York University, Canada	06-16416 USD 07-11609 USD 08 7056 EUR	
	ISROSES conference, Finished 06	Prof. Ts. Dachev, DrSc	USNSF, NASA	06-26451 USD	
	COST-724 conference, Finished 07	Prof. Ts. Dachev, DrSc	COST	07-3000 EUR	
V	*Total funding*			55784.0 EUR 130236.0 USD	
Total	**Total funding**			**726143.0 BGN** **227153.0 EUR** **131436.0 USD**	
Total BGN				**1392624.0 BGN**	

List of the publications of the research scientists split up as follows:

2.1. Papers published in science journals
2.1.1 Abroad

2004

1. Bochev, A., I.I.A.-Dimitrova, Magnetic cloud and magnetosphere-ionosphere response to the 6 November 1997 CME. Multiscale processes in the Earth's magnetosphere: From INTERBALL to CLUSTER, Ed. J.-A. Sauvaud and Z. Nemecek, NATO Sci. Ser., II Mathematics, Physics and Chemistry-vol. 178, 195-204, 2004.
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2006

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2008

1. In the book: Abiotic Stress and Plant Responses, eds. Nafees A. Khan and Sarvajeet Singh, I.K. International, New Delhi, (ISBN: 8189866952), 2008 the Chapter 12 (pp. 217-230) is by STIL-BAS autors: Krezhova, D., T. Yanev, I. Iliev, S. Ivanov, L. Brankova, V. Alexieva, Detection of herbicide contamination in plants through changes in leaf spectral reflectance and chlorophyll fluorescence. http://www.buybooks.ro/sarvajeet-singh.cgi

2.3.2. Scientific books published in Bulgaria

2005

1. Vitanov, N., Z. Dimitrova, S. Panchev, Population dynamics and national security, The risks of national security in Bulgaria, ISBN 994-322-062-X, Academic publishing house, pp. 151, 2005.

2008

2. Vitanov, N., Z. Dimitrova, S. Panchev, Social Dynamics without formulas, The complex systems from man to te civilization, ISBN 978-954-322-270-4, Academic publishing house, pp. 357, 2008.
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2.4. Text-books and other training aids

2008

Bochev, A., Influence of the Sun on the Earth's and planets magnetic fields. Text book for master and PhD students, 100 pgs., 55 figures and 7 tables, STIL-BAS, 2008. National Library II 73694, 2008. http://pencho.bas.bg/pencho/ABochev

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2006

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2. Simeonov, L., Chirila, E. (Eds.) Chemicals as Intentional and Accidental Global Environmental Threats. Proceedings of the NATO Advanced Study Institute on Chemicals as Intentional and Accidental Global Environmental Threats, held in Borovetz, Bulgaria, 16-27 November 2005, Series: NATO Science for Peace and Security Series, Subseries: NATO Science for Peace and Security Series C: Environmental Security, ISBN 978-1-4020-5096-1, Published 2006, XX, Hardcover, 511 pages

2007

2. Jordanova M., Lievens F. (Eds) Med-e-Tel: The International Educational and Networking Forum for eHealth, Telemedicine and Health ICT, Proceedings, Luxexpo, Luxembourg, 2007, Paper copy ISSN 1819-186X, 361 pp, 99 illustrations, Electronic version (CD-ROM) ISSN 1818-9334, 485 pp., 115 illustrations.
3. Nakajima I., (Editor-in-Chief), Androuchko L.; Jordanova M., (Co-editors) Journal of eHealth technology and Application, Vol. 5, No 3, September 2007, Special issue dedicated to eHealth Applications for the Benefits of Rural and remote Areas, Published by Tokai University, National Institute of Information and Communications Technology, ISSN 1881-4581, pp. 137, illustrations 111
4. Simeonov, L., Sargsyan V. (Eds). Soil Chemical Pollution, Risk Assessment, Remediation and Security, NATO Science Series C, Environmental Security, ISBN-10:140208255X, ISBN-13: 978-1402082559, Springer, Dordrecht, in print in March 2008, pp 425.
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2008

1. Jordanova M., Lievens F. (Eds) Global Telemedicine / eHealth Updates: Knowledge Resources, Vol. 1, Publ. Luxexpo, Luxembourg, 2008, ISSN 1998-5509, pp. 431, illustrations and tables 118.

2. Jordanova M., Lievens F. (Eds) Electronic Proceedings Med-e- Tel 2008: The International Educational and Networking Forum for eHealth, Telemedicine and Health ICT, Publ. Luxexpo, Luxembourg, 2008, ISSN 1818-9334, pp. 613, illustrations and tables 160.
3. Simeonov, L.; Sargsyan, V. (Eds.) Soil Chemical Pollution, Risk Assessment, Remediation and Security, Proceedings of the NATO Advanced Research Workshop on Soil Chemical Pollution, Risk Assessment, Remediation and Security, Sofia, Bulgaria, 23-26 May 2007, Series: NATO Science for Peace and Security Series, Subseries: NATO Science for Peace and Security Series C: Environmental Security, ISBN: 978-1-4020-8255-9, 2008, XVIII, Hardcover, 397 pages. www.nato.int/science; www.springer.com
4. Simeonov and M. A. Hassanien (eds.), Exposure and Risk Assessment of Chemical Pollution - Contemporary Methodology, L. I. NATO Science for Peace and Security Series C: Environmental Security, Springer, Dordrecht, accepted in print 2009.

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2005

1. Panchev S. (Editor-in-Chief.) Solar-Terrestrial influences: Proceedings of the Eleventh International Scientific Conference, November 23-25, Sofia, Bulgaria, 2005.

2008

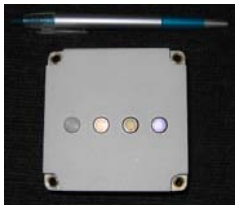
1. Dachev Ts. (Editor in Chief), Tishchenko Y., Savorski V. (Co-Eds) Proceedings of International conference: Fundamental Space Research, Recent development in Geoecology Monitoring of the Black Sea Area and their Prospects, Sunny Beach, Bulgaria September 22-27, ISBN 978 954 322 316 9, 446 pages, Sofia, 2008

Publications	**2004**	**2005**	**2006**	**2007**	**2008**
Abroad: Total:	**56**	**78**	**89**	**78**	**125**
In science journals	16	25	40	34	37+23 (in press)
Papers in full text in congresses proceedings	40	53	49	44	65
In Bulgaria: Total	**32**	**82**	**36**	**47**	**97**
In science journals	8	15	20	26	21+2 (in press)
Papers in full text in congresses proceedings	24	67	16	11	64

Table 1. Number of publications for the period 2004-2008

Annex 3.

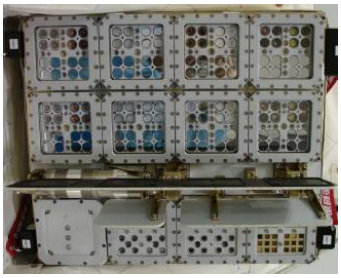
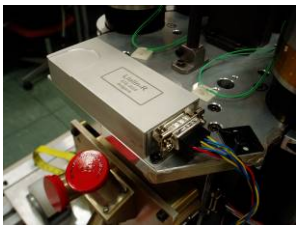
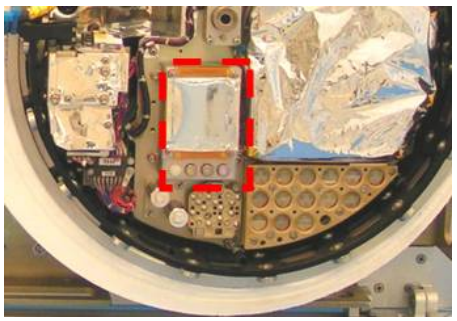
List of scientific products ready to be implemented in industry

No	Description of the product	Photography
1.	**Groundbased Spectral Airglow Temperature Imager** for investigation of dynamic processes in the mesopause at 87 and 94 km altitude. The instrument is fully automated and can work in Internet environment. The SATI instrument, which is Canadian know-how, has been developed in cooperation with researchers from Canada - Prof. Shepherd, Dr. Sargoychev, CRESS, York University, Toronto. As a result of this cooperation, five SATI instruments were produced, operating in Canada, Kazakhstan, China, and on the poles.	
2.	**LET spectrometer Liulin-6 with Internet module** main purpose is long term monitoring the doses and fluxes at the place of measurements and to post, store and transmit the obtained results via Internet http/ftp protocol. 84x40x40 mm, 120 g; LAN connection with Internet; 100 kilobait internal flash memory; 12 V AC/DC Power supply. Example of working online instrument at: http://130.92.231.184/ .	
3.	**Dosimetric system Liulin-5** for measurements of the LET spectrum, doses and fluxes from 3 detectors situated in 3 with different dept point of human phantom. The measured results are stored in SD/MMC card. Working since May 2007 in the Russian segment of ISS.	
4.	**Four channels UV and LET spectrometer with external power supply** 76x76x34 mm, 120 g. For continuous monitoring of UV and space radiation at spacecraft or aircraft altitudes with +9-+36 V insulated power supply and RS232 interface for management by PC. Working since February 2008 at ESA EuTEF platform of Columbus module of ISS.	
5.	**LET spectrometer with external power supply** 110x40x20 mm, 98 g. For continuous monitoring of the space radiation at space craft or aircraft altitudes with +9-+36 V insulated power supply and RS232 interface for management by PC. Working since October 2008 at Indian Moon Chandrayaan-1 satellite.	
6.	**Large size LET spectrometer with GPS** receiver for continues monitoring of the aircraft radiation environment and following specifications: Aluminum box 100x100x50 mm; Internal clock/calendar adjusted with the GPS receiver; 2 Li-Ion primary 3.6 V batteries; USB port for initialization/download data by PC; 1GB external MMC card; Optional work from external power supply 20-35 V DC with internal galvanically insulated DC/DC converter.	

Annex 4.

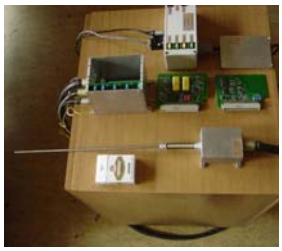
Table of the scientific products, inventions and patents produced over the period 2004-2008

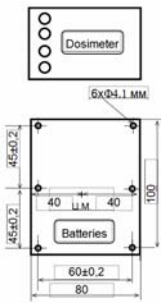
Heading	Registration number of the patent, etc.	User	Mode of participation of the scientific unit in the implementation	Mode of realization (e.g. marketing, implementation, etc.)	Effect of the realization	Transfer of technologies under contracts with industry
1. R3DR instrument - Four channels UV and LET spectrometer with external power supply 76x76x34 mm, 120 g. 256 MB MMC card for storage of the data. For continuous monitoring of UV and space radiation at ESA EuTEF platform of Columbus module of ISS [1-4]. http://www.esa.int/esaHS/SEMAVT9WYNF_index_1.html#subhead2, http://www.go.dlr.de/musc/expose/expose.php  *Fig. 1. EXPOSE-R and R3DR instrument (in the upper corner)*		European Space Agency-ESA	Successful participation together with DLR, Institute of Aerospace Medicine, Koln, Germany in Announcement of opportunity issued by ESA in 2000 for ESA EXPOSE facility	Flight model, will work after February 2009 at ESA EXPOSE-R facility at Russian Zvezda module of ISS	Scientific	No
2. RADOM LET spectrometer 110x40x20 mm, 98 g. For continuous monitoring of the Earth and Moon radiation environment [4, 5]. http://www.chandrayaan-i.com/chandrayaan1/how/payloads/radom.html  *Fig. 2 RADOM flight model instrument*		Indian Space Agency-ISRO	Successful participation in Announcement of opportunity issued by ISRO in 2003 for Indian Moon Chandrayaan-1 satellite	Flight model, working since 22 October 2008 at Indian Moon Chandrayaan-1 satellite	Scientific	No

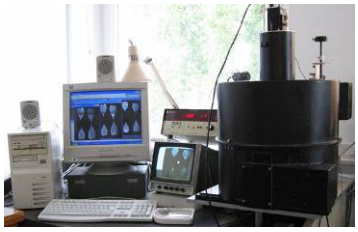
3. R3DE instrument - Four channels UV and LET spectrometer with external power supply 76x76x34 mm, 120 g. For continuous monitoring of UV and space radiation at ESA EuTEF platform of Columbus module of ISS [4, 6]. http://www.spaceflight.esa.int/users/file.cfm?filename=fac-iss-ef-eef-exp  *Fig. 3. EXPOSE-E and R3DE instrument (in the down-left corner)*		European Space Agency-ESA	Successful participation together with DLR, Institute of Aerospace Medicine, Koln, Germany in Announcement of opportunity issued by ESA in 2000 for ESA EXPOSE facility	Working since February 2008 at ESA EuTEF platform of Columbus module of ISS.	Scientific	No
4. Liulin-R spectrometer with external power supply 104x40x20 mm, 98 g for monitoring of space radiation at the rocket experiment HotPay-2, 2008. http://www.stil.bas.bg/FSR/PDF/TOP5Tomov_Borislav2242058.pdf  *Fig. 4. Liulin-R as mounted on the HotPay-rocket*		Andoya Rocket Range and ALOMAR observatory, Norway	Mutual research project of STIL-BAS with Andoya Rocket Range, Norway	Rocket borne Liulin-R spectrometer , flown up to 380 km altitude at HotPay-2 rocket on 31.01.2008	Scientific	No
5. R3D-B3 instrument - Four channels UV and LET spectrometer with external power supply 84x57x24 mm, 115 g. For continuous monitoring of UV and space radiation at ESA Biopan-6 facility at Foton M3 satellite [7, 8]. http://esamultimedia.esa.int/docs/foton/FOTON-M3_brochure.pdf  *Fig. 5. R3D-B3 instrument inside of Biopan-6 facility (red line area)*		European Space Agency-ESA	Successful participation together with University of Erlangen, Germany in Announcement of opportunity issued by ESA in 2004 for ESA EXPOSE facility	Flight model, worked 14-24 September 2007 at ESA EXPOSE-6 facility at Foton M3 satellite.	Scientific	No

6. Liulin-Photo instrument - 256 channels LET spectrometer with external power supply 110x100x50 mm, 450 g. For continuous monitoring of space radiation at ESA Biopan-6 facility at Foton M3 satellite [7, 8]. http://www.mlib.cnr.it/photo/photom3.html  *Fig. 6. Liulin-Photo (black box) above the Photo instr.*		Institute of Crystallography-National Research Council, Roma, Italy	Mutual research project of STIL-BAS with Institute of Crystallography Italy	Flight model, worked 14-24 September 2007 inside Foton M3 satellite.	Scientific	No
7. Dosimetric system Liulin-5 for measurements of the LET spectrum, dose rates, fluxes, and dose-depth distributions of electrons, protons and heavy charged particles at places of 3 critical human organs in a human phantom. The measured results are stored in SD card [10]. http://www.stil.bas.bg/FSR/PDF/TOP1Semkova_Jordanka2201211.pdf  *Fig. 7. Liulin-5 instrument*		IMBP-RAS, Roscosmos, Russia	Mutual space research project of STIL-BAS with IMBP-RAS	Flight model, Part of ESA-Russia "Matroska-R" project. Working in Russian segment of ISS since May 2007	Scientific	
8. Groundbased Spectral Airglow Temperature Imager for investigation of dynamic processes in the mesopause at 87 and 94 km altitude. The instrument is fully automated and can work in Internet environment. The SATI instrument, which is Canadian know-how, has been developed in cooperation with Bulgarian researcher living in Canada - Dr. Sargoychev, CRESS, York University, Toronto. As a result of this cooperation, five SATI instruments were produced and are operating in Canada, Kazakhstan, China, and on the poles [10]. http://stpl.cress.yorku.ca/SATI/  *Fig. 8. SATI-4*		Institutes in Canada, Kazakhstan, China	Mutual research project of STIL-BAS with CRESS, York University, Canada	Groundbased Spectral Airglow Temperature Imagers	Applied Scientific	No

9. Leiman-Alfa ASLAF detector for measurements of the direct solar radiation within the rocket experiment HotPay1, 2007. http://www.shao.az/SG/v1n1/SG_v1_No1_2006-pp-61-63.pdf  *Fig. 9. ASLAF*		Andoya Rocket Range and ALOMAR observatory, Norway	Mutual research project of STIL-BAS with Andoya Rocket Range, Norway	Rocket borne Leiman-Alfa detector, flown on not successfully launched HotPay1 rocket	Scientific	No
10. LET spectrometer Liulin-6R with Internet module for long term monitoring the doses and fluxes at ALOMAR observatory, Norway [4]. Working online at: http://128.39.135.6/index.html  *Fig. 10. Liulin-6R*		ALOMAR observatory, Norway	Contract	LET spectrometer Liulin-6R with Internet module	Applied Scientific	No
11. LET spectrometer Liulin-6MB with Internet module for long term monitoring the doses and fluxes at Beobal observatory Mousala peak, Bulgaria [4]. Working online at: http://beo-db.inrne.bas.bg/moussala/  *Fig. 11. Liulin-6MB*		Institute of Nuclear Physics and Nuclear Energy-BAS	Contract with Institute of Nuclear Physics and Nuclear Energy-BAS	LET spectrometer Liulin-6MB with Internet module	Applied Scientific	No
12. Liulin-ISS contains 4 miniature battery operated spectrometers with displays and Control and interface unit. It will to be used for 15 years in the Service Radiation Monitoring System of the Russian segment of ISS. Following information is able to be shown on the display: - Current dose in (μGy/hour); - Current event rate (Flux) (cm-2 s-1);- Accumulated from the "Switch ON" dose (μGy). [11]. http://ban.face-control.com/fce/001/0127/files/dachev.pdf  *Fig. 12.One of the spectrometers*		IMBP-RAS, Roscosmos, Russia	Mutual space research project of STIL-BAS with IMBP-RAS	Flight model, Part of Service Radiation Monitoring System. Working in Russian segment of ISS since September 2005	Scientific	

13. LET spectrometer Liulin-4I with Internet module for long term monitoring the doses and fluxes at Jungfrau observatory, Switzerland [4]. Working online at: http://130.92.231.184/  *Fig. 13. Liulin-6I*		Bern University, Jungfrau observatory, Switzerland	Contract with Bern University	LET spectrometer Liulin-6I with Internet module	Applied Scientific	No
14. R3D-B2 instrument - Four channels UV and LET spectrometer with external power supply 84x57x24 mm, 115 g. For continuous monitoring of UV and space radiation at ESA Biopan-6 facility at Foton M3 satellite [12]. http://www.spaceflight.esa.int/documents/foton/exposure-experiments.pdf  *Fig. 14. R3D-B2*		European Space Agency-ESA	Successful participation together with University of Erlangen, Germany in Announcement of opportunity issued by ESA in 2004 for ESA EXPOSE facility	Flight model, worked 1-12 June 2005 at ESA EXPOSE-5 facility at Foton M2 satellite.	Scientific	No
15. Liulin-Phobos - charged particle spectrometer for investigation of radiation environment at distances of 1-1.5 AU from the Sun and in the near-Mars space during Phobos Soil Sample Return Mission 2009-2012. http://www.stil.bas.bg/FSR/PDF/TOP4Semkova_Jordanka2201235.pdf  *Fig. 15. Liulin-F*		IMBP-RAS, NIRS-Japan, NIH-Italy	Cooperation agreement between STIL-BAS, IMBP-RAS and NIRS-Japan	Engineering model	Applied Scientific	
16. Langmiur probe experiment for Russian segment of ISS is a part of "Obstanovka" experiment developed by Russia and ESA for investigation of the near space environment of ISS. Will be launched in 2009.  *Fig. 16. Langmiur Probe*		SRI-RAS, Roscosmos, Russia	Mutual space research project of STIL-BAS with SRI-RAS	Engineering model	Applied Scientific	

17. Ground-based spectrograph designed and prepared for measuring the absolute intensity in green and red coronal lines during solar eclipses. Observations, simultaneously conducted with those of CORONAS-Photon/TESIS experiment in the XUV region, will give the unique possibility of determining the distribution of plasma light emission depending on the temperature [13].  *Fig. 17. Ground based spectrograph*		FIAN-RAS, Russia	Joint space research project "CORONA" of STIL-BAS and FIAN-RAS	Ground-based spectrograph. Trial observations conducted during the March 29, 2006 and August 01, 2008 total solar eclipses	Applied Scientific	
18. Liulin-S instrument is designed for the ROSCOSMOS project Space suit (Проект „Скафандр"). The project will be realized from ISS in the middle of 2009 when one out of services space suit of "Orlan" type will "thrown" out of ISS and will fall for about 6 months down to the Earth. Liulin-S together with other space radiation measurements instruments will monitor the suit's space environment.  *Fig. 18. Liulin-S technology system*		SINP-MSU, Roscosmos, Russia	Joint space research project with the Russian Skobeltsyn Institute of Nuclear Physics (*SINP*) of Moscow State University	Engineering model	Applied Scientific	No
19. Liulin-1M - Four channels UV and LET spectrometers with battery power supply for continuous monitoring of UV and space radiation at Russian BION-1M satellite. 2 different completes of "Dosimeter" and "Batteries" will be situated inside and outside of the satellite. The satellite is expected to fly for 1 month period in the middle of 2010.  *Fig. 19. Liulin-1M size-mass draft*		IMBP-RAS	Joint space research project with the Russian IMBP-RAS	Size-mass draft	Applied Scientific	No

20. Fluorescent Imaging System (FIS) for experimental studies of the influence of various isolated and combined natural and anthropogenic factors, simulated in laboratory conditions, on plant fluorescence emission, in relation with the realization of the FLEX (FLuorescence EXplorer) space mission of ESA.  *Fig. 20. Fluorescent Imaging System (FIS)*		IRE-RAS, Russia	Mutual research project of STIL-BAS with IRE-RAS, Russia	Laboratory experimental investigations since May 2004	Applied Scientific	No
21. SPS-1 Spectrometric System, (UV-VIS-NIR) Designed in STIL-BAS. Successfully used for the researches of the Earth atmosphere, Sun spectrum fine structure, plant chlorophyll and pigments absorption, fluorescence, in connection with the stress factors, heavy metals and herbicide contamination influence.  *Fig. 21 Spectrometric System (SPS-1)*		STIL-BAS IE-BAS IA-BAS	Mutual research project of STIL-BAS, IE-BAS and SRI-RAS	Engineering model	Scientific	No
22. Thematically orientated multichannel spectrometer (TOMS). The multichannel spectrometric system is designed to measure the reflected by ground objects solar radiation in the visible and near infrared range of the electromagnetic spectrum on board of a remotely-controlled airborne platform (helicopter). The measurements will be performed in a main working regime - nadir, helicopter velocity – up to 20 km/h, height – up to 1000 m (optimal 200 m), flight duration - up to 30 min.  GPS *Fig. 22. Thematically orienttated multichannel spectrometer (TOMS)*		STIL-BAS Alabama University USA,	Mutual research project of STIL-BAS and Alabama University with HSCaRSC - USA	Engineering flight model	Engineering model	No

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ANNEX 6

STAFF STRUCTURE OF SOLAR-TERRESTRIAL INFLUENCES INSTITUTE (SOFIA AND STARA ZAGORA) BY 31.12.2008

Name of the structural unit, laboratory, department etc. (according to the organizational chart)	Total staff		Including																			
			Research staff															Research supporting staff				
				Senior research fellows							Junior research fellows					Research degree holders					Technicians	Other staff incl. administration
	Number of positions	Number of occupied positions	TOTAL	Total number	including						Total number	out of them						Graduates without PhD	With vocation. Training	With secondary education		
					Acad.	Corr.-mem	Prof.	Sr. res.fell I degree	Assoc. Prof.	Sr. res.fell. II degree		res.assoc I degree	res.assoc II degree	res.assoc III degree	PhD holders without acad.ranks	DSc	PhD					
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		17	18	19	20	21	22	23
I. TOTAL STAFF	**77.0**	**77.0**	**48.5**	**15.5**	**1.5**	**1.0**	**0.0**	**2.0**	**0.0**	**11.0**	**33.0**	**30.0**	**2.0**	**0.0**	**1.0**	**5.0**	**20.0**	**13.5**	**3.0**	**1.0**	**5.0**	**6.0**
INCLUDING PART-TIME EMPLOYED					0.5													1.0				
II. STAFF BY STRUCTURAL UNITS	**76.0**	**76.0**	**47.5**	**15.5**	**1.5**	**1.0**	**0.0**	**2.0**	**0.0**	**11.0**	**32.0**	**30.0**	**2.0**	**0.0**	**0.0**	**5.0**	**20.0**	**13.5**	**3.0**	**1.0**	**5.0**	**6.0**
I. HEADQUATER	**3.0**	**3.0**	**3.0**	**3.0**	0.0	0.0	0.0	0.0	0.0	3.0	**0.0**	0.0	0.0	0.0	0.0	0	3	0.0	0.0	0.0	0.0	0.0
II. FINANCIAL DEPARTMENT	**3.0**	**3.0**	**0.0**	**0.0**	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**	0.0	0.0	0.0	0.0	0	0	2.0	1.0	0.0	0.0	0.0
III. ADMINISTRATIVE DEPARTMENT	**2.0**	**2.0**	**0.0**	**0.0**	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**	0.0	0.0	0.0	0.0	0	0	2.0	0.0	0.0	0.0	0.0
IV. REMOTE SENSING	**11.0**	**11.0**	**9.5**	**1.0**	1.5	0.0	0.0	0.0	0.0	3.0	**8.5**	7.5	1.0	0.0	0.0	2.0	5.0	1.5	0.0	0.0	0.0	0.0
V. GEOINFORMATICS	**4.0**	**4.0**	**4.0**	**1.0**	0.0	0.0	0.0	0.0	0.0	1.0	**3.0**	2.0	1.0	0.0	0.0	0	1	0.0	0.0	0.0	0.0	0.0
VI. SOLAR-TERRESTRIAL PHYSICS	**21.5**	**21.5**	**17.5**	**5.0**	0.0	1.0	0.0	2.0	0.0	2.0	**12.5**	11.5	0.0	0.0	1.0	3.0	7.0	1.0	0.0	0.0	3.0	0.0
VII. ATMOSPHERIC INVESTIGATIONS	**17.0**	**17.0**	**11.0**	**2.0**	0.0	0.0	0.0	0.0	0.0	2.0	**9.0**	9.0	0.0	0.0	0.0	0.0	4.0	4.0	0.0	0.0	2.0	0.0
VIII. MODELING LABORATORY	**1.0**	**1.0**	**0.0**	**0.0**	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**	0.0	0.0	0.0	0.0	0	0	1.0	0.0	0.0	0.0	0.0
IX. ADMINISTRATIVE DEPARTMENT - SZ	**9.0**	**9.0**	**0.0**	**0.0**	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**	0.0	0.0	0.0	0.0	0	0	1.0	2.0	1.0	0.0	5.0
X. SCIENCE AND TECHNICAL INFORMATION	**2.0**	**2.0**	**0.0**	**0.0**	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**	0.0	0.0	0.0	0.0	0	0	1.0	0.0	0.0	0.0	1.0

Human resources: **Chief accountant:**

Annex 7

BREAK DOWN OF THE PERSONEL BY AGE GROUPS BY 31.12.2008

research unit SOLAR-TERRESTRIAL INFLUENCES INSTITUTE (SOFIA AND STARA ZAGORA)

Number	**AGE GROUPS IN YEARS**											
	under 26	26-30	31-35	36-40	41-45	46-50	51-55	56-60	61-65	66-70	over 70	
Academicians	0	0	0	0	0	0	0	0	0	0	2	2
Corr.-members	0	0	0	0	0	0	0	0	0	1	0	1
Sr. research fellows I degree and Professors	0	0	0	0	0	0	0	1	0	1	0	2
Sr. research fellows II degree and Associated Professors	0	0	0	0	0	1	1	4	1	4	0	11
Research associates I degree	0	0	0	3	2	6	9	9	2	1	0	32
Research associates II degree	0	0	2	0	0	0	0	0	0	0	0	2
Research associates III degree	0	0	0	0	0	0	0	0	0	0	0	0
Specialists with higher education	0	1	1	2	1	1	2	4	1	0	1	14
												64

Human resources: **Chief accountant**:

Annex 8

INFORMATION ABOUT
PHD STUDENTS BY 31.12.2008

Research unit: Solar-Terrestrial Influences Institute

PhD STUDENTS BY 31.12.2008 (for the entire period 2004-2008)				**NUMBER OF AWARDED PhD DEGREES (for the entire period 2004-2008)**			
Total	including			**Total**	including		
	* N	* F	* W		* N	* F	* W
1	2	3	4	**5**	6	7	8
38	38		18	**6**	6		4

* N -number of National PhD students; F -number of Foreign PhD students; W - number of Women

Annex 9.

Participation of STIL-BAS scientists in teaching and training

Subject or topic	Lecturer	Degrees and titles	Institution of higher education	Total number of academic hours for the academic years
9.1. In institutions of higher education 9.1.1. Lectures and specialized classes 2004/2005				
Computer grids and communications	K. Boianov	Acad.	Sofia University	30
Computer grids	K. Boianov	Acad.	Sofia Technical University	24
Computer architectures	K. Boianov	Acad.	University of National and World Economy	45
Computer grids and communications	K. Boianov	Acad.	University of National and World Economy	45
Global grids	K. Boianov	Acad.	New Bulgarian University	30
Planetary geophysics Second part:: Magnetic fields and electromagnetic phenomena of the Moon and planets	A. Bochev	Sen. Res. Sci., Ph.D.	Mining and Geology University	25
Computer sciences	K. Palazov	Sen. Res. Sci., Ph.D.	High school of Telematics, Stara Zagora town	60
Operating systems	K. Palazov	Sen. Res. Sci., Ph.D.	High school of Telematics, Stara Zagora town	15
Information technologies	H. Nikolov	Res. Sci.	New Bulgarian University	90
9.1. In institutions of higher education 9.1.2. Practices and seminars 2004/2005				
Planetary geophysics Second part:: Magnetic fields and electromagnetic phenomena of the Moon and planets	A. Bochev	Sen. Res. Sci., Ph.D.	Mining and Geology University	25
Computer sciences	K. Palazov	Sen. Res. Sci., Ph.D.	High school of Telematics, Stara Zagora town	60

Remote sensing in geophysics	D. Borisova	Res. Sci.	Mining and Geology University	30
Digital image processing	D. Borisova	Res. Sci.	Mining and Geology University	30

9.1.3. Students preparing their bachelor or master theses – 1 Sofia University

Subject or topic	**Lecturer**	**Degrees and titles**	**Institution of higher education**	**Total number of academic hours for the academic years**
9.1. In institutions of higher education 9.1.1. Lectures and specialized classes 2005/2006				
Computer grids and communications Students Mural students	K. Boianov	Acad.	Sofia University	 45 30
Computer grids	K. Boianov	Acad.	Sofia Technical University	24
Computer architectures	K. Boianov	Acad.	University of National and World Economy	45
Computer grids and communications	K. Boianov	Acad.	University of National and World Economy	45
Global grids	K. Boianov	Acad.	New Bulgarian University	30
Planetary geophysics Second part:: Magnetic fields and electromagnetic phenomena of the Moon and planets	A. Bochev	Sen. Res. Sci., Ph.D.	Mining and Geology University	30
Computer sciences	K. Palazov	Sen. Res. Sci., Ph.D.	High school of Telematics, Stara Zagora town	90
Operating systems	K. Palazov	Sen. Res. Sci., Ph.D.	High school of Telematics, Stara Zagora town	15
Information technologies	H. Nikolov	Res. Sci.	New Bulgarian University	90
9.1. In institutions of higher education 9.1.2. Practices and seminars 2005/2006				
Planetary geophysics Second part:: Magnetic fields and electromagnetic phenomena of the Moon and planets	A. Bochev	Sen. Res. Sci., Ph.D.	Mining and Geology University	20

Computer sciences	K. Palazov	Sen. Res. Sci., Ph.D.	High school of Telematics, Stara Zagora town	60
Remote sensing in geophysics	D. Borisova	Res. Sci.	Mining and Geology University	30
Digital image processing	D. Borisova	Res. Sci.	Mining and Geology University	30

Subject or topic	**Lecturer**	**Degrees and titles**	**Institution of higher education**	**Total number of academic hours for the academic years**
9.1. In institutions of higher education 9.1.1. Lectures and specialized classes 2006/2007				
Computer grids and communications Students Mural students	K. Boianov	Acad.	Sofia University	 45 30
Computer grids	K. Boianov	Acad.	Sofia Technical University	24
Computer architectures	K. Boianov	Acad.	University of National and World Economy	45
Computer grids and communications	K. Boianov	Acad.	University of National and World Economy	45
Global grids	K. Boianov	Acad.	New Bulgarian University	30
Planetary geophysics Second part:: Magnetic fields and electromagnetic phenomena of the Moon and planets	A. Bochev	Sen. Res. Sci., Ph.D.	Mining and Geology University	30
Computer sciences	K. Palazov	Sen. Res. Sci., Ph.D.	High school of Telematics, Stara Zagora town	90
Operating systems	K. Palazov	Sen. Res. Sci., Ph.D.	High school of Telematics, Stara Zagora town	15
9.1. In institutions of higher education 9.1.2. Practices and seminars 2006/2007				
Planetary geophysics Second part:: Magnetic fields and electromagnetic phenomena of the Moon and planets	A. Bochev	Sen. Res. Sci., Ph.D.	Mining and Geology University	20

Computer sciences	K. Palazov	Sen. Res. Sci., Ph.D.	High school of Telematics, Stara Zagora town	60
Remote sensing in geophysics	H. Nikolov	Res. Sci.	New Bulgarian University	30
Digital image processing	H. Nikolova	Res. Sci.	Mining and Geology University	30
Remote sensing and reconnaissance satellites	A. Stoimenov	Sen. Res. Sci., Ph.D.	Military Academy	30
Introduction in GIS and Advanced GIS as instrument in data analysis	T. Liubenov	Res. Sci.	Institute for hydrology and meteorology, BAS	40
Engineering geodesy	M. Danailova	Res. Sci.	Architecture, building and geodesy University	72

Subject or topic	**Lecturer**	**Degrees and titles**	**Institution of higher education**	**Total number of academic hours for the academic years**
9.1. In institutions of higher education 9.1.1. Lectures and specialized classes 2007/2008				
Computer grids and communications Students Mural students	К. Boianov	Acad.	Sofia University	 45 30
Computer grids	К. Boianov	Acad.	Sofia Technical University	24
Computer architectures	К. Boianov	Acad.	University of National and World Economy	45
Computer grids and communications	К. Boianov	Acad.	University of National and World Economy	45
Global grids	К. Boianov	Acad.	New Bulgarian University	30
Planetary geophysics Second part:: Magnetic fields and electromagnetic phenomena of the Moon and planets	A. Bochev	Sen. Res. Sci., Ph.D.	Mining and Geology University	30
9.1. In institutions of higher education 9.1.2. Practices and seminars 2007/2008				
Planetary geophysics Second part:: Magnetic fields and electromagnetic	A. Bochev	Sen. Res. Sci., Ph.D.	Mining and Geology University	20

phenomena of the Moon and planets				
Remote sensing in geophysics	H. Nikolov	Res. Sci.	New Bulgarian University	30
Digital image processing	H. Nikolova	Res. Sci.	Mining and Geology University	30
Remote sensing and reconnaissance satellites	A. Stoimenov	Sen. Res. Sci., Ph.D.	Military Academy	30
Introduction in GIS and Advanced GIS as instrument in data analysis	T. Liubenov	Res. Sci.	Institute for hydrology and meteorology, BAS	40
Engineering geodesy	M. Danailova	Res. Sci.	Architecture, building and geodesy University	72

Annex 10.

Information about the expert activity of the scientists and the specialists with higher education from STIL-BAS:

10.1. List of councils, commissions and other expert bodies of external for BAS institutions (governmental and non-governmental), foundations, organizations, publishing houses and others, where scientists and specialists from the unit are participating. This information should be given as a total for the period.

Scientists from the unit are members of:

1. Scientific commission on Electro-technic, electronic and automatic commission of Higher attestation commission (HAC) of Bulgaria;
2. Coordination council on Informatics society to the Ministry council of Bulgaria;
3. Management council of “Evrika” foundation, Vice-chairman;
4. European Jury for international awards in the field of information technologies;
5. Management council of the Association for eLearning;
6. American meteorological unit;
7. UK royal meteorological unit;
8. International association on mathematical physics;
9. Specialized scientific council of HAC in Geophysics-cahirman;
10. Specialized scientific council of HAC in Geophysics-cahirman;
11. IST Advisory Group (ISTAG) to EC;
12. Chairman of Computer Society IEEE in Bulgaria;
13. Academy of electromagnetism, USA, Massachusetts;
14. Balkan ecological association, Greece;
15. Ukraine academy of sciences;
16. Intergovernmental commission on space research to the Ministry council of Bulgaria;
17. International academy on aeronautics, Paris;
18. European Society for Astronomy in Culture;
19. IAU – International Astronomical Union;
20. Bulgarian national academy of medical sciences;
21. International brain research organization (IBRO);
22. European association on neurosciences (ENA);
23. COSPAR commissions C and F;
24. National oceanographic commission.

Annex 11.

INFORMATION
on the international scientific activities
of Solar-Terrestrial Influences Institute
for 2004-2008

1. 1. List of **the international Project s** carried out by scientists/scholars from the unit **in the framework of the Academy's bilateral agreements:**

2004

No	With which country/ Under which agreement	Number of the Project (See Annex 1)	Project duration from-to	Used annual quota under the bilateral agreement	Realized visits during 2004 from-to Travel expenses covered by whom
1.	Russia	V.1.	99 - 05	3	1 ticket BAS
2.	Russia	V.2.	99-05	2	1 ticket BAS
3.	Russia and Hungary	V.3.	03-05	4	1 tickets BAS
4.	Russia and Hungary	V.4.	03-05	0.5	other sources
5.	Russia and Hungary	V.5.	03-05	0.5 a	other sources
6.	Russia	V.6.	03-05		
7.	Russia	V.7.	03-05		
8.	India	V.8.	03-06	12	1 ticket BAS
9.	India	V.9.	04-09		
10.	Czech Republic	V.10.	96-06	2	
11.	Italy	V.11.	03-06	2	
12.	France	V.11.a.	03-06	5	1 ticket BAS
13.	Italy	V.11.в.	03-06	6	1 ticket BAS

Total 13 visits
36.5 weeks

2005

No	With which country/ Under which agreement	Number of the Project (See Annex 1)	Project duration from-to	Used annual quota under the bilateral agreement (Weeks)	Realized visits during 2005 from-to Travel expenses covered by whom
1.	Russia	V.1.	06-10	1.5	1 ticket BAS
2.	Russia	V.2.	06-10	2	1 ticket BAS
3.	Russia	V.3.	06-10	2	2 tickets BAS
4.	Russia	V.4.	06-10	1	1 ticket BAS

5.	Russia	V.5.	06-10	1	1 ticket BAS
6.	Russia	V.9.	03-05	1	1 ticket BAS
7.	France BAS/CESR	V.17	03-06	30	1 ticket BAS
8.	Italy	V.18.	03-06	5	3 tickets BAS

Total 8 visits
43.5 weeks

2006

No	With which country/ Under which agreement	Number of the Project (See Annex 1)	Project duration from-to	Used annual quota under the bilateral agreement (Weeks)	Realized visits during 2006 from-to Travel expenses covered by whom
1.	Russia,PAH	V.13	06-10	1	1 ticket BAS
2.	Russia,PAH	V.1 V.6	06-10	2	1 ticket BAS
3.	Russia,PAH	V.7	2006-2008	2	1 ticket BAS
4.	Italy,CNR	V.19	2004-2006	2	1 ticket BAS
5.	Italy,CNR	V.19	2004-2006	2	1 ticket BAS
6.	Italy,CNR	V.27	2004-2006	2	1 ticket BAS
7.	Germany, DFG	V.24	Mutual research	7	DFG
8.	Germany, DFG	V.24	Mutual research	7	DFG
9.	Germany,DFG	V.26	Mutual research	4	other sources other sources
10.	Norway	IV.3	Mutual research	3.5	other sources
11.	Norway	IV.5	Mutual research	3	other sources
12.	Norway	IV.4	Mutual research	3	other sources
13.	Norway	IV.6	Mutual research	5.5	other sources

Total 13 visits
44 weeks

2007

No	With which country/ Under which agreement	Number of the Project (See Annex 1)	Project duration from-to	Used annual quota under the	Realized visits during 2004 from-to Travel expenses covered by whom

				bilateral agreement (Weeks)	
1.	Russia,PAH	V.1.	06-10	1	BAS
2.	Russia,PAH	V.1.	06-10	1	BAS
3.	Russia,PAH	V.1.	06-10	1	BAS
4	Russia,PAH	V.2.	06-10	1	BAS
5	Russia,PAH	V.11.	06-10	1	BAS
6	Russia,PAH	V.27.	06-10	1	BAS
7	Russia,PAH	V.12.	06-10	1	BAS
8	Russia,PAH	V.1.	06-10	1	
9	Russia,PAH	V.1.	06-10	1	BAS
10	Russia,PAH	1.7	06-10	1	BAS
11	Russia,PAH	1.1	06-10	1	BAS
12	Russia	1.1	06-10	1	BAS
13	Russia,PAH	1.8	06-10	1	BAS
14	Russia, PAH	1.8	06-10	1	other sources
15	Russia,PAH	1.7	06-10	1	other sources
16	Russia,PAH	1.7	06-10	1	BAS
16	Russia,PAH	1.7		1	BAS
17	Italy	V.17		1	other sources
18.	Luxembourg	V.21		1	other sources
19.	Luxembourg	V.21		1	other sources
20	India	ISRO		4	BAS
21	India	V.13.		1.5	other sources
22	India, ISRO	V.14.		1	BAS
23	India, ISRO	V.14.		1	BAS
24	Nederland	IV.4.		0.5	other sources
25	Nederland	IV.4.		0.5	BAS
26	Austria	V.13.		0.5	other sources
27	Austria	V.13.		1.5	other sources
28	Austria			1.5	other sources
29	Japan	V.19;V.27		1	other sources
30	Germany,DFG	V.22.		8	DFG
31	Hungary	V.8.		1	other sources
32	Hungary	V.8.		1	other sources
33	Hungary	V.8.		2	other sources
34	Hungary	V.8.		1	other sources
35	Thailand	V.13.		2	other sources
36	Thailand	V.13.		2	other sources
37	Thailand	V.13.		2	other sources.
38	Mexico	V.13.		3	other sources
39	Mexico	V.13.		3	other sources
40.	Norway	IV.1.		1	other sources
41	Norway	IV.1.		1	other sources
42	Norway	IV.1.		3	other sources
43	Norway	IV.2.		3	other sources
44	Norway	IV.2.		3	other sources
45	Swiss	IV.2.		1.5	other sources
46	Swiss	IV.2.		1.5	other sources
47	Slovak Rep.	III.2.		2	other sources

48	Slovak Rep.	III.2.		1	other sources
49	Slovak Rep.	III.2.		1	other sources
50	Slovak Rep.	III.2.		1	other sources
51	Slovak Rep.	III.2.		1	BAS

Total 51 visits
78 weeks

2008

No	**With which country/ Under which agreement**	**Number of the Project (See Annex 1)**	**Project duration from-to**	**Used annual quota under the bilateral agreement (Weeks)**	**Realized visits during 2008 from-to Travel expenses covered by whom**
1.	Russia,PAH	V.2.	06-10	1	BAS
2	Russia,PAH	V.11. V.10.	06-10 06-10	2	BAS
3	Russia,PAH	V.20.	06-10	1	BAS
4	Russia,PAH	V.1.	06-10	1	BAS
5	Russia,PAH	V.9.	06-10	1	BAS
6	Russia,PAH	V.3. V.4.	06-10 06-10	2.5	BAS
7	Russia	V.3.	06-10	2	BAS
8	Russia,PAH	V.8.	06-10	1	BAS
9	Russia,PAH	V.5.	06-10	2	BAS and STIL- BAS
10	Russia,PAH	V.5.	06-10	2	BAS
11.	Estonia	III.6.		0.5	other sources
12.	Belgium	IV.3.		1	other sources
13.	Belgium	IV.5.		0.5	other sources
14.	Belgium	IV.3.		1	other sources
15.	France	IV.5.		1	other sources
16.	Norway	IV.2.		3	other sources
17.	Norway	IV.2.		1	other sources

Total 17 visits
23.5 weeks

2. List of the international Project s carried out by scientists/scholars from the structural unit in the framework of: direct bilateral institute-to-institute agreements; intergovernmental agreements, EU and NATO programs;

2004

No	With which country/ Under which agreement	Number of the Project (See Annex 1)	Project duration from-to	Financial support to the Project : Overall Share for Bulgaria Share for BAS	Realized visits for the period from-to Travel expenses covered by whom
2004					
1.	USA	V.12.	02-06		
2.	Russia	V.13.	98-19		
3.	Japan	V.14.	98-06		
4.	Germany	V.15.	98-06		
5.	Germany	V.16.	98-06		2 BAS
6.	Luxembourg	V.17.	01-05	$640 for office expenses	2 other sources
7	Germany	V.18.	02-06		
2005					
1.	Germany	V.23.	98-06		2 BAS
2.	Luxembourg	V.24.	01-06	$400 for office expenses	2 other sources
2006					
1.	Germany	V.23.	98-06		2 DFG
2.	Luxembourg	V.24.	01-06	$500 for office expenses	2 other sources
2007					
1.	Germany	V.24.	98-10		2 DFG
2.	Luxembourg	V.23.	01-10	400 Euros for office expenses	2 other sources
2008					
1.	Germany	V.24.	98-10		2 DFG
2.	Luxembourg	V.23.	01-10	400 Euros for office expenses	2 other sources

3. Realized visits abroad for participating in scientific events (congresses, conferences and etc., described in the following table:

2004

Country	Total	Supported by (please enumerate the sources of number support)
India	1	All from the host country
Russia	1	Travel exp. STIL, All other from the host country
Russia	1	Travel exp. BAS, All other from the host country
France	1	Travel exp. COST-724, All other from the host country
France	1	Travel exp. BAS, All other from the host country
France	1	Travel exp. BAS-500 BGN, PROJECT START Project , and COSPAR
France	1	Project H3-1102, STIL- BAS
France	1	Project H3-1106, STIL- BAS and other sources
France	1	All from the host country
France	1	Travel exp. BAS, All other from the host country
Hungary	2	All from the host country
Italy	2	Travel exp. BAS, All other from the host country
USA	1	All from the host country
Austria	1	Project PROJECT START
Spain	3	Project
Russia	3	Travel exp. BAS, All other from the host country
Hungary	1	Travel exp. Other sources, All other from the host country
Italy	2	COST-724
China	1	All from the host country
Russia	1	All from the host country
Russia	1	Travel exp. Other sources, All other from the host country
Nederland	2	COST-724
Russia	1	Travel exp. Other sources, All other from the host country

Total 29 scientists

2005

Country	Total	Supported by (please enumerate the sources of number support)
Russia	1	Travel exp. STIL, All other from the host country
Russia	7	BAS, and PROJECT BNSF
Russia	2	PROJECT BNSF
Russia	1	Travel exp. BAS, All other from the host country
Japan	1	PROJECT START and NIRS
Japan	1	STIL- BAS and NIRS
Norway	3	Project eARI
Norway	1	All from the host country
Norway	1	Project eARI
Romania	1	STIL- BAS and host country
Romania	1	PROJECT BNSF
Romania	1	PROJECT BNSF
Hrvatska	1	PROJECT START
France	1	Travel exp. BAS, All other from the host country
France	1	STIL- BAS
France	1	PROJECT START
Greece	1	All from the host country
Greece	2	COST-724
Malta	1	
Belgium	1	PROJECT START
Belgium	1	STIL- BAS and host country
Nederland	2	COST-724
Nederland	1	COST-724 and PROJECT BNSF
Singapore	1	PROJECT START
USA	1	All from the host country
Austria	1	COST-724

Switzerland	1	COST-724
Germany	2	All from the host country - DFG
Armenia	1	All from the host country
Italy	2	All from the host country
Italy	2	BAS and CNR
Italy	1	BAS and CNR
Luxembourg	1	Lux Expo,Luxembourg
Latvia	1	PROJECT START
Poland	1	Travel exp. BAS, and PROJECT BNSF
Turkey	2	PROJECT BNSF
Turkey	1	PROJECT START-003348
Turkey	2	PROJECT BNSF
Turkey	1	Travel exp. BAS, All other from the host country
Turkey	1	PROJECT BNSF
Egypt	1	All from the host country

Total 57 scientists

2006

Country	**Total**	**Supported by (please enumerate the sources of number support)**
Nederland	1	All from the host country
Nederland	1	PROJECT BNSF
Nederland	1	Travel exp. BAS and PROJECT BNSF
Russia	1	Travel exp. BAS, All other from the host country
Russia	1	Travel exp. BAS, All other from the host country
Russia	1	Travel exp. BAS, All other from the host country
Norway	1	Project ASLAF
Norway	1	Project eARI
Norway	1	Project ASLAF
Norway	1	Project eARI
Luxembourg	1	MED-e-Tel
France	1	All from the host country
France	1	Project ИНИ-12/2005
Finland	1	Travel exp. Other sources, All other from the host country
UK	1	ИНИ-12/2005
Greece	1	PROJECT START
Brazil	1	Travel exp. Host country and other sources
Brazil	1	Travel exp. Host country and other sources
Germany	2	Host country and other sources
Germany	1	Host country and other sources
Germany	1	Project Corine
Germany	1	ИНИ-12/05
Syria	2	ИНИ-12/2005
Italy	1	All from the host country
Italy	1	ИНИ-12/2005
Italy	2	Travel exp. BAS, All other from the host country
Italy	1	Travel exp. BAS, All other from the host country
USA	1	Travel exp. EOARD, All other from the host country
Turkey	2	PROJECT START
Turkey	6	Travel exp. Other sources All other from the host country
Turkey	1	Н3-1414
Turkey	1	Travel exp. ИНИ-12/2005, All other from the host country
Turkey	1	COST-724
Turkey	1	ИНИ-12/05
Turkey	1	ИНИ-12/05 and Н3-1410/04
Turkey	1	ИНИ-12/05 and Н3-1414/04
Turkey	1	Н3-1414/04
Spain	2	ИНИ-12/05
Belgium	1	START
Sviss	2	All from the host country

Switzerland		All from the host country
Poland	2	All from the host country
Poland	1	ИНИ-12/05 and НЗ-1502/05
		ИНИ-12/05
Poland	1	Travel exp. BAS, All other from the host country
Poland	1	Travel exp. BAS, All other from the host country
Singapore	1	Travel exp. BAS and other sources
Singapore	2	EOARD, USA
China	1	Travel exp. BAS and other sources
China	1	НЗ-1505/06
China	1	ИНИ-12/05
Romania	2	All from the host country
Romania	3	EVA-ENV
Hrvatska	1	All from the host country
Hrvatska	1	Travel exp. НЗ-1509/05, All other from the host country
Belgium	1	COST-724
Belgium	1	From the host country and ИНИ-12/05

Total 71 scientists

2007

Country	**Total**	**Supported by (please enumerate the sources of support)**
India	1	Travel exp. BAS, All other from the host country
India	1	Travel exp. from the host country and START
India	1	ИНИ-12/05 and Travel exp from Ministry council
India	2	Travel exp. BAS, per diem START, hotel host country
France	1	START
Italy	1	ИНИ-12/05
Italy	1	All from other sources
Italy	1	EOARD, USA
Austria	1	STIL- BAS, 50% and EOARD, USA, 50%
Austria	2	EOARD, USA и and host country
Belgium	1	ИНИ-12/05-МОН
Belgium	1	All from the host country
Belgium	1	START
Belgium	2	COST-724
Hungary	1	Travel xp. other sources, All other from the host country
Hungary	2	Travel xp. other sources, All other from the host country
Luxembourg	1	All from the host country
Luxembourg	1	START
Nederland	2	START
Nederland	1	Travel exp. BAS, and Н31505/06
Russia	16	Travel exp, BAS, All other from the host country
Russia	1	Travel exp. BAS, All other from other sources
Russia	1	1514/05
Thailand	2	НЗ-1505/06, Registration fee from the host country
Thailand	2	НЗ-1505/06, Registration fee from the host country
Thailand	1	EOARD, USA, Registration fee from the host country
Mexico	2	EOARD, USA
Norway	2	START and eARI
Norway	1	eARI
Norway	2	eARI
Germany	1	ИНИ-12/05-МОН
Germany	1	All from the host country
Turkey	2	ИНИ-12/05 and НЗ-1410/04
Turkey	1	СС-1404/04
Japan	1	EOARD, USA
Slovenia	1	Travel exp. BAS, All other from the host country
Slovenia	2	Travel exp. BAS, and ”Corine-2000”, All other from the host country
Slovenia	2	Travel exp. 1255/07, All other from the host country
Slovenia	1	Travel exp. 1255/07, All other from the host country
Vietnam	1	НЗ-1505/06

Sviss	2	eARI
USA	1	START
Poland	1	Travel exp. BAS, All other from the host country
Greece	1	Travel exp. BAS, All other from the host country

Total 73 scientists

2008

Country	**Total**	**Supported by (please enumerate the sources of support)**
Hrvatska	1	COST
Portugal	1	ИНИ-12/05-МОН
France	1	ИНИ-12/05- and COSMOS
Czech	1	COSMOS.
Czech	1	All from other sources
Czech	1	All from other sources
Czech	1	Travel exp. BAS, All other sources
Austria	1	"Корине-2006"
Belgium	1	ИНИ-12/05-МОН
Belgium	1	COST
Belgium	1	ИНИ-12/05-МОН and COSMOS.
Belgium	2	All from other sources
Belgium	1	COST-ES0803 and START
Nederland	1	START
Russia	1	Travel exp. BAS, All other from the host country
Russia	1	Travel exp. BAS, All other from the host country
Russia	1	Travel exp. BAS, All other from the host country
Russia	2	Travel exp. BAS, All other from the host country
Russia	1	Travel exp. BAS, All other from the host country
Russia	1	Travel exp. BAS, All other from the host country
Russia	2	Travel exp. BAS, All other from the host country
Russia	1	Travel exp. BAS, All other from the host country
Russia	2	Travel exp. BAS, All other from the host country
Russia	2	Travel exp. BAS, All other from the host country
Luxembourg	1	START
Luxembourg	1	All from the host country
UK	1	All from the host country
Norway	1	№15-09/05 с НФ-НИ-МОН
Norway	2	№15-09/05 с НФ-НИ-МОН
Romania	2	ИНИ-12/05-МОН and COSMOS
Turkey	1	ИНИ-12/05 and НЗ-1410/04 – МОН
Japan	1	All from other sources
Slovakia	2	Ск112/07 с МОН
Slovakia	1	Travel exp. BAS, All other from the host country
Slovakia	1	Travel exp. BAS, All other from the host country
Estonia	2	e-GIS
Korea	2	EOARD
Canada	1	COSPAR and other sources
Canada	1	Travel exp. BAS, and НЗ-1505
Canada	1	START
Canada	1	All from other sources
Canada	1	ИНИ-12/05 с МОН and НЗ-1414/04 and COSPAR
Poland	1	START
Poland	1	ИНИ-12/05-МОН and COSMOS
Greece	1	All from the host country
Greece	1	Travel exp. BAS, All other from the host country

Total 56 scientists

4. Foreign scientists visiting the research unit

Category of visit and financial conditions	Russia	Ukraine	Italy	France	Czech	Germany	Poland	Hrvatska	Israel	Armenia	Turkey	Korea	Romania	Finland	Alger	UK	Switzerland	Azerbaijan	Brazil	Vietnam	Georgia
1. under a JPBAA	68	2	1	1	9			5					1								
2. under free quotas of JPBAA	20	2		2														2		2	2
3. Institute to institute agreement																					
4. On invitation extended by the unit	32						1								1	1					
5. At the expense of the sending institution				2	2	5	1				1					1	1				
6. Under an intergovernmental programme	8	7	1				1	5	2	3	3							3	2	2	4
At visitors' own expense	27	1	10	10	4	4	2	3	1	6	7	5	4	3		4	4	1			
TOTAL:	**155**	**10**	**12**	**15**	**15**	**9**	**5**	**13**	**3**	**9**	**11**	**5**	**5**	**3**	**1**	**6**	**5**	**6**	**2**	**4**	**6**

Category of visit and financial conditions	Egypt	Ecuador	India	Estonia	Iran	China	Malawi	Nepal	Nigeria	UAE	Romania	Puerto Rico	Sudan	Surinam	Togo	Sri Lanka	USA	Canada	India	Argentina
1. under a JPBAA	10		8		1						1								8	
2. under free quotas of JPBAA											1									
3. Institute to institute agreement																				
4. On invitation extended by the unit			1	1															1	
5. At the expense of the sending institution											1						1	2		1
6. Under an intergovernmental programme	1	1	1			1	1	5	2	1				1	1	1				
At visitors' own expense			3		1						1	1	1				2			
TOTAL:	**11**	**1**	**13**	**1**	**2**	**1**	**1**	**5**	**2**	**1**	**4**	**1**	**1**	**1**	**1**	**1**	**3**	**2**	**9**	**1**

Category of visit and financial conditions	New Zeeland	Swiss	Belgium	Norway	Greece	Luxembourg	Serbia	Ireland	Spain	Armenia	Slovakia	Japan	Dania	Latvia	Lithuanian	Malta
1. Under a JPBAA							1									
2. Under free quotas of JPBAA																
3. Institute to institute agreement																
4. On invitation extended by the unit	1											1			1	
5. At the expense of the sending institution		1	6	4							1			1		
6. Under an intergovernmental programme										3						
At visitors' own expense	1		14	1	2	4		1	2	4	1	1	1			1
TOTAL:	**2**	**1**	**20**	**5**	**2**	**4**	**1**	**1**	**2**	**7**	**2**	**2**	**1**	**1**	**1**	**1**

JPBAA- joint project of a bilateral inter academies agreement

Total 414 scientists visited STIL-BAS during 2004-2008.

Annex 12

List of scientists from the unit, participating in editorial boards

12.1. of journals in Bulgarian (the journal has to be indicated)

Acad. St. Panchev participates in the following editorial boards:
"Comptes Rendus de l'Academie Bulgare des Sciences"
"Bulgarian journal of meteorology and hydrology"
"Bulgarian physical journal"

Acad. K. Boianov is main editor of "Automatics and informatics journal" and participates in the in the editorial board of "Journal of technical thought".

Corr. member P. Velinov participates in the editorial board of the "Journal for aerospace research in Bulgaria".

12.2. of journals abroad (the journal has to be indicated

Acad. St. Panchev participates in the editorial board of the "Journal of the mathematical union", Calcutta, India

Acad. K. Boianov participates in the editorial board of the "Studies in Informatics and Control", Rumanian Academy of Sciences (Informatics and Control Publications);

Res. Sci. M. Jordanova, MD participates in the editorial board of the "Ukrainian Journal of Telemedicine and Medical Telematics"

Res. Sci. K Georgieva, Ph.D. is main editor of the journal "Sun and Geosphere"