



**20 & 21 October 2014
Athens, Greece**

**2nd South-Eastern Europe GEO Workshop
on Integrating Earth Observation Data
and Services for monitoring the
Environment, protecting the citizens and
stimulating the regional economic growth**

**The Activities of SRTI-BAS related to
GEO initiative**

**Hristo Nikolov
Research scientist
Space research and technology
institute - BAS**



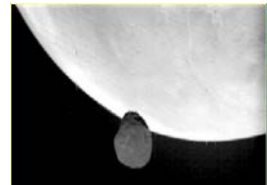
BEYOND



**GEO GROUP ON
EARTH OBSERVATIONS**

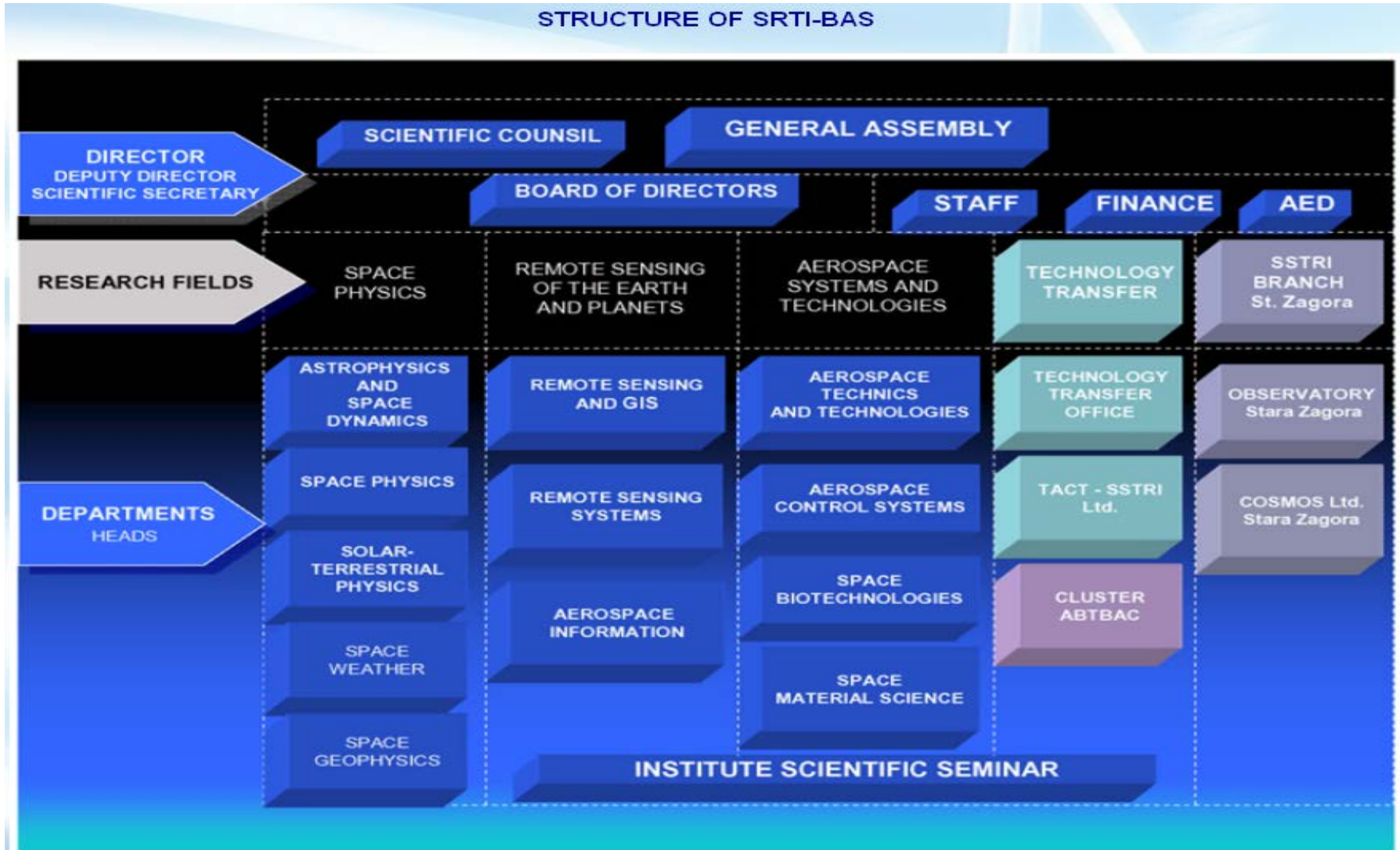
Space research and technology institute – short history

- The Bulgarian scientists started its participation in space research activities 1969 becoming part of INTERCOSMOS program;
- In 1972, after the launch of first Bulgarian instrument P-1 onboard Intercosmos-8 satellite we became the 18-th space country;
- Two Bulgarians has flown in space - in 1979 the first cosmonaut Georgi Ivanov, and in 1988 the second – Alexander Alexandrov;
- For its 1300 anniversary in 1981 Bulgaria implemented two satellite programs: “BULGARIA 1300-I” (space physics) and “BULGARIA 1300-II” (remote sensing) onboard METEOR-PRIRODA satellite;
- After year 1989 scientific equipment has been developed for several space mission projects – GRANAT, ACTIVE, PHOBOS (1989), APEX (1990), PRIRODA (1996), R-400 (2000);
- Bulgaria had experiments on the MIR Orbital station providing several sets of research equipment (1990-2001), incl. Spektar-15, Spektar-256, NEUROLAB-B, SVET Space Greenhouse;
- In the period of 2005-2009 SRTI has participated with 15 instruments in the scientific programs of: 4 manned space flights, 1 Moon mission, 2 spacecrafts, 2 HotPay rockets etc.

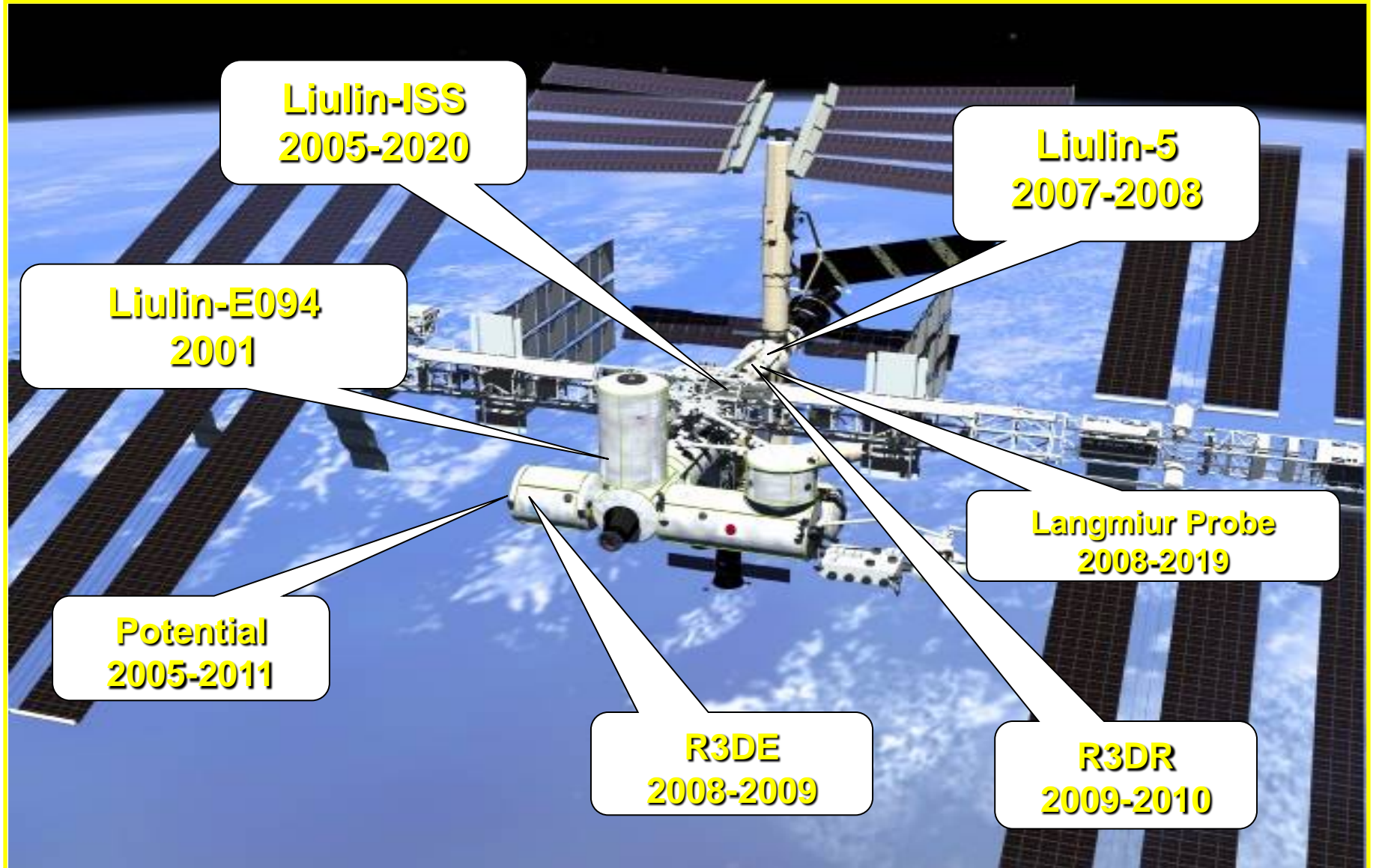


Mission and structure of SRTI

The mission of SRTI-BAS is the conduct of fundamental and applied studies in the field of space physics, remote sensing of the Earth and planets, and in aerospace systems and technologies.



SRTI experiments on the International Space Station



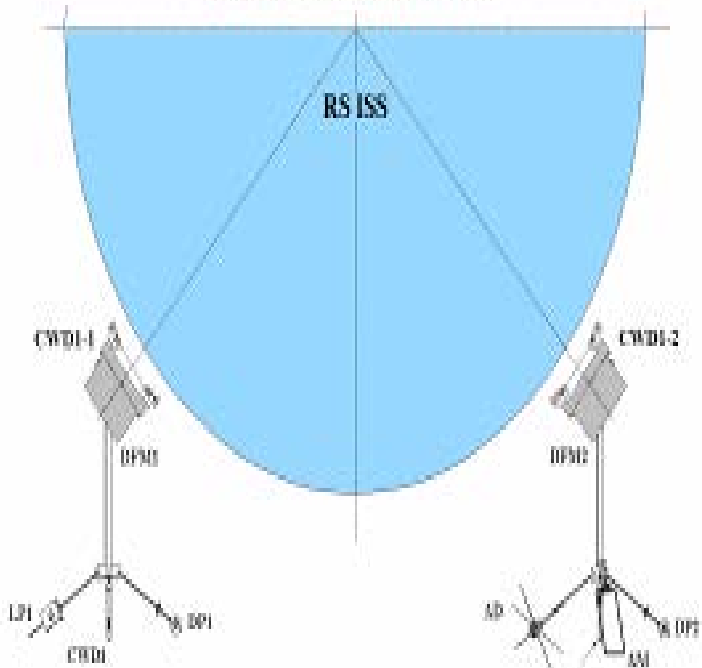
"Potential" Project at the ISS

Body charge of space vehicles: Russian *Obstanovka* Experiment onboard the International Space Station. DP1 and DP2 equipment aims determining the body potential on the station. The international consortium includes scientists from Russia, Ukraine, Hungary, Great Britain, Bulgaria, Poland and Sweden.

"Obstanovka" experiment is providing a database of electromagnetic fields and plasma-wave processes in the vicinity of large space objects (satellites and space stations). The equipment was mounted on the ISS on April 19 2014

Scientific experiment "OBSTANOVKA - 1 stage" onboard the International Space Station: a tool to study the interaction between the large body and surrounding ionospheric plasma.

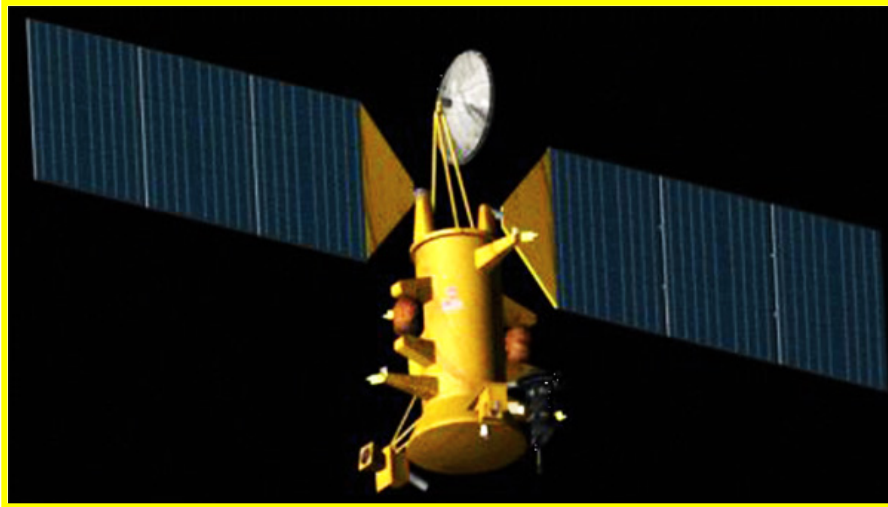
(Leading institution - IKT RAS (Russia))



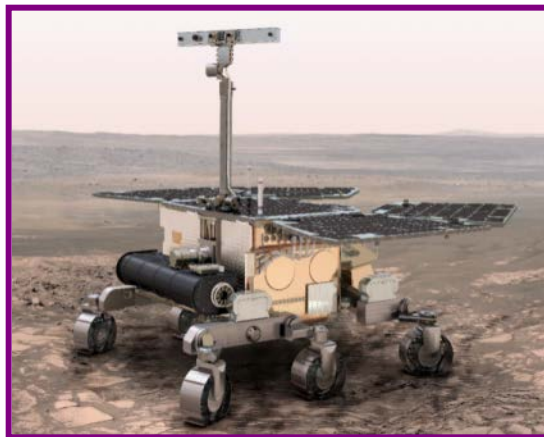
ExoMars Programme

SRTI has agreed with SRI-RAN and IMBP-RAS, Russia, our participation in the development of the FRENDO instrument. One new Liulin-F type equipment will be used at ESA ExoMars spacecraft (2016), two other on the landers in 2016 and 2018 and one on the rover in 2018.

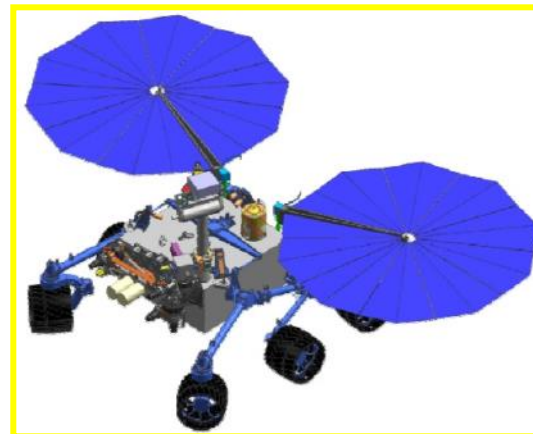
MarsTraceGasMission-Orbiter



Liulin-ML



ESA's ExoMars Rover



Mars Astrobiology
Explorer-Cacher (MAX-C) rover



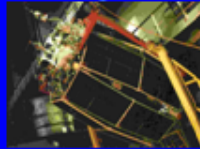
Liulin-MO

VITREOUS CARBON TECHNOLOGY

- Spherical probes with vitreous carbon holding for electric fields measurements aboard satellites and rockets.



"IC Bulgaria 1300" 1981



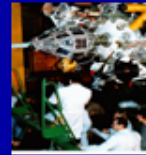
"IC 24", 1989



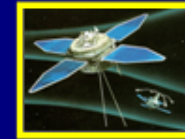
"Magion 2", 1989



"IC 25", 1992



"Magion 3", 1992



"Interball-2", 1996



"Magion 4", 1995



"Magion 5", 1996

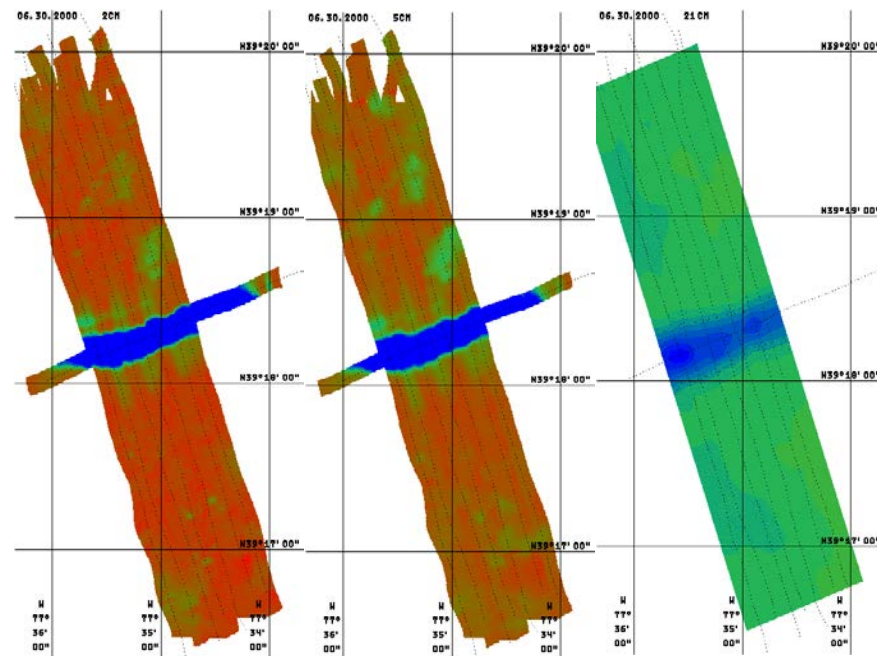
- Composite ceramic materials based on vitreous carbon as transplanting materials in the human organism.

- Supports, crucibles, fiberguide, elements and the details used at receptions the pure substances.

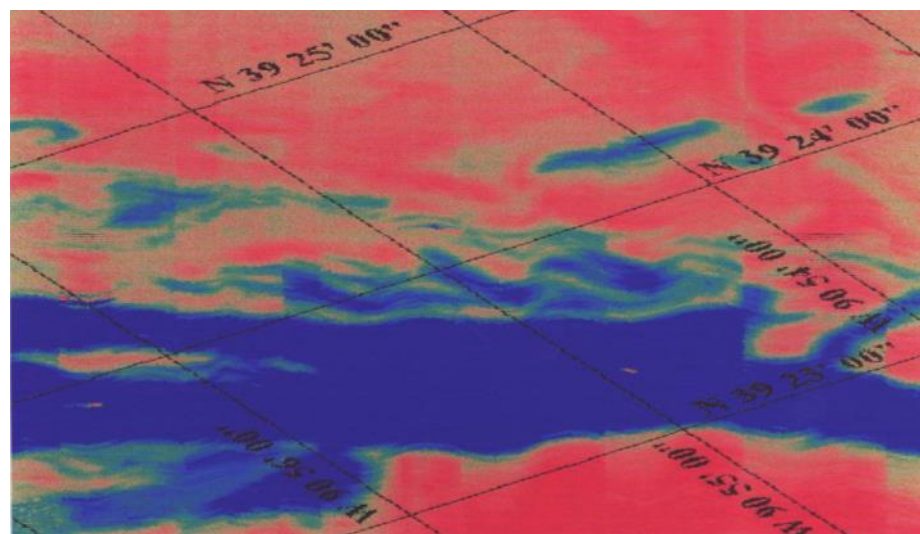
- Carbon hydrogen containing substance as donor of carbon for Powder Metallurgy (PM).



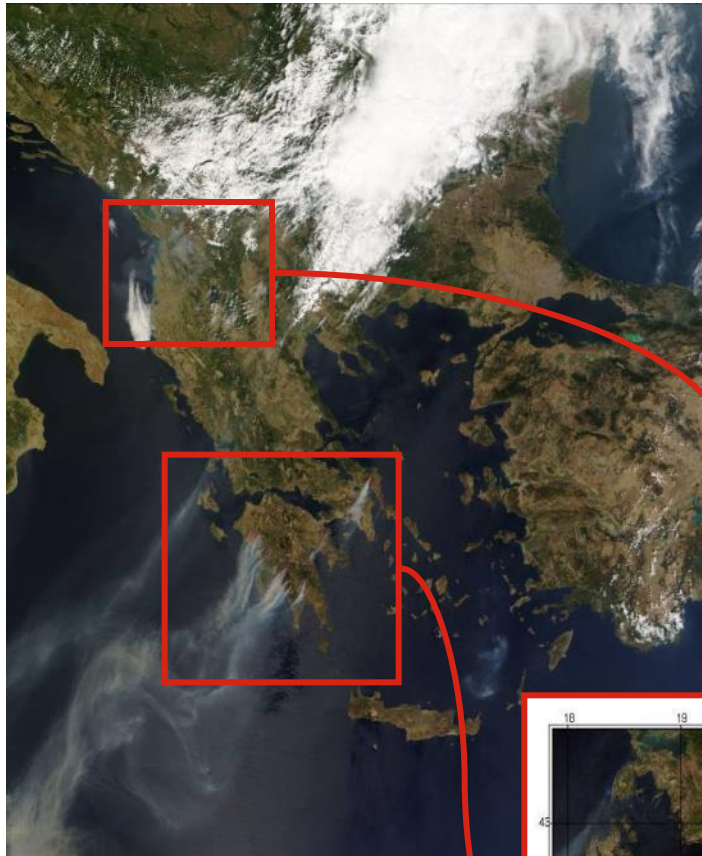
Soil moisture retrieval by passive radiometry



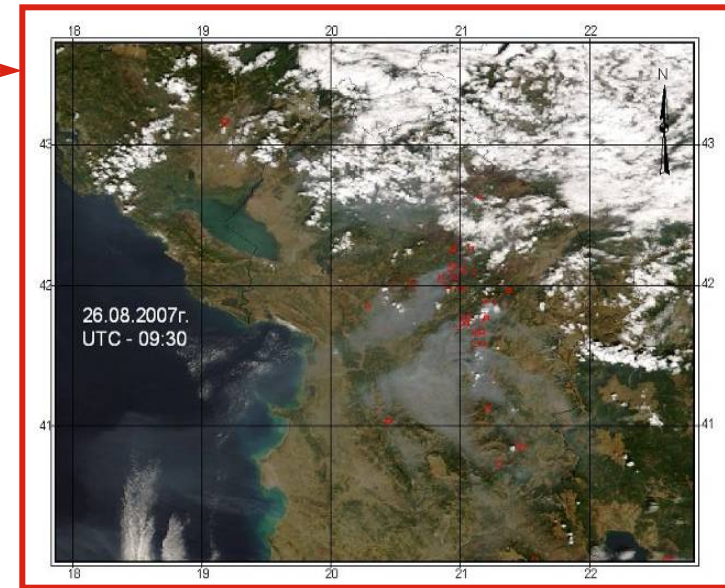
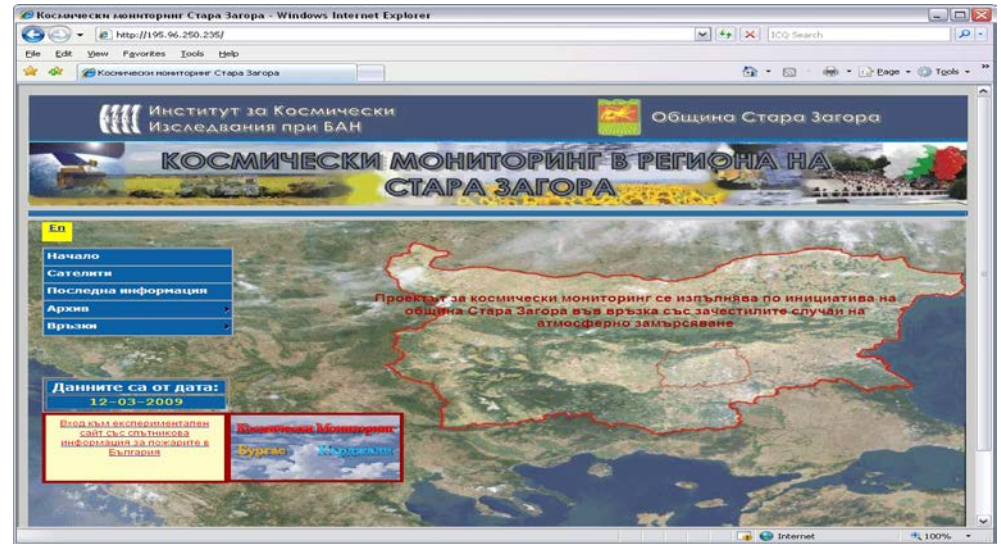
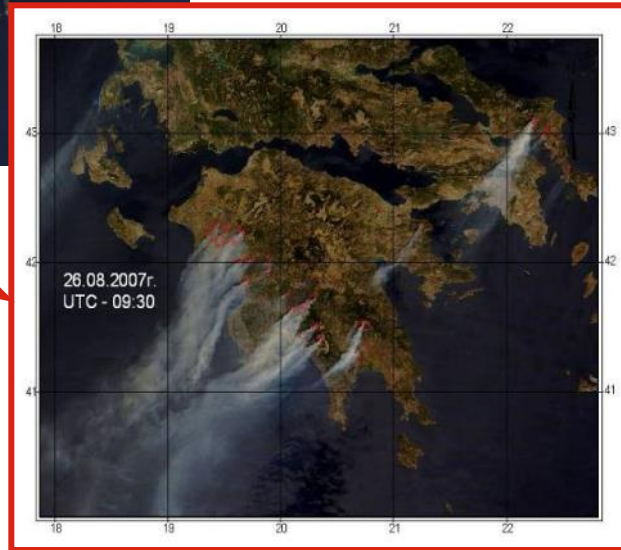
Maps of 2 cm, 5.5 cm, and 21 cm



Air pollution monitoring in the cities Stara Zagora, Bourgas, Kardzhali



Fire in Greece

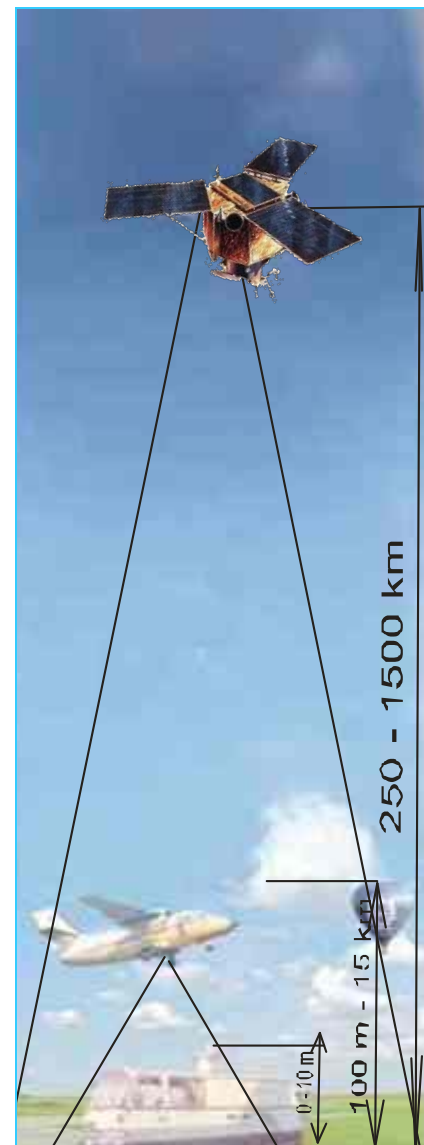
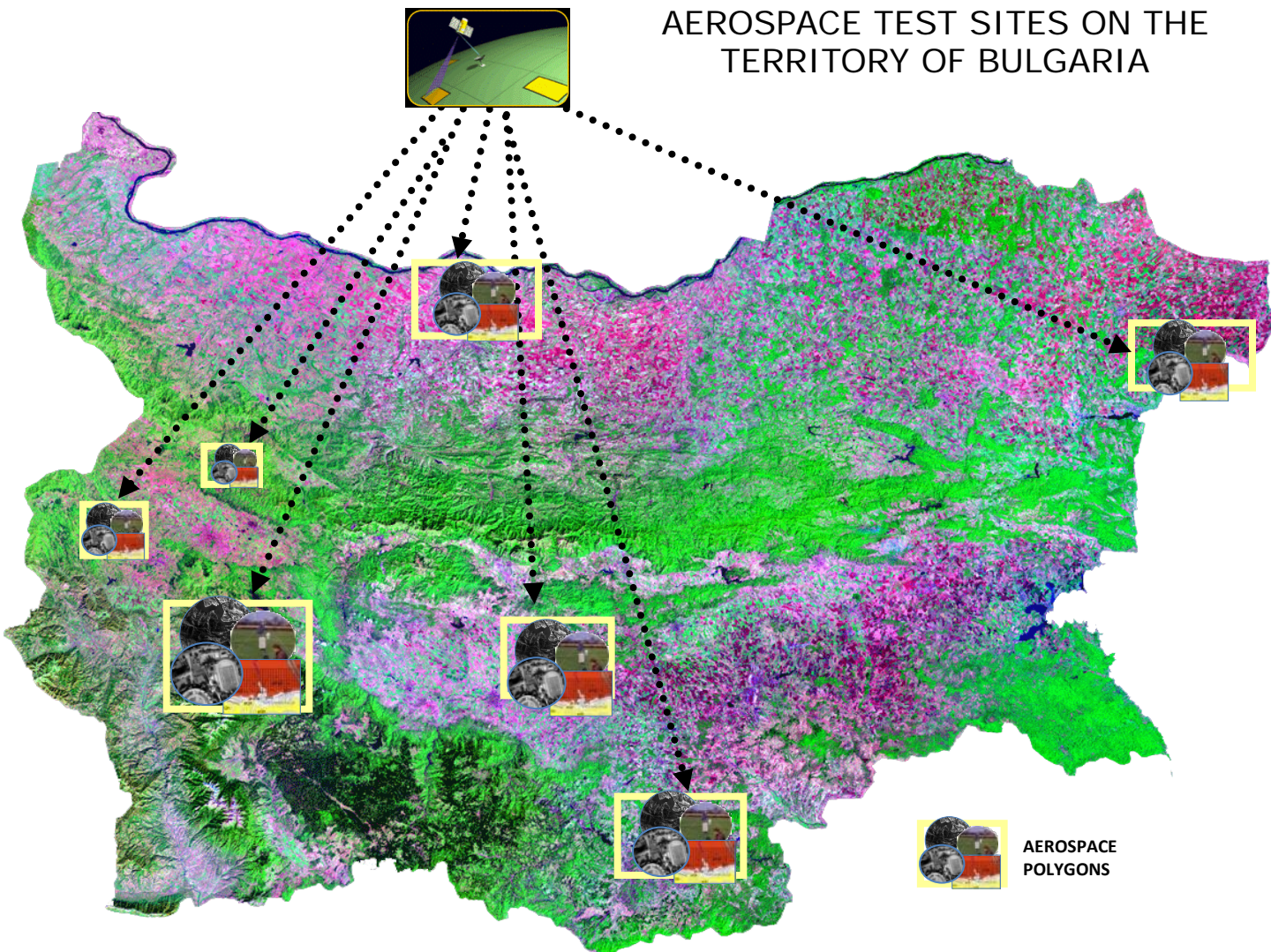


Fire in FYR Macedonia

Scientific-Information Complex for Aerospace Polygons

Under a contract NSF-B a project Establishment of a Scientific-Information Complex for Aerospace Polygons on the Territory of Republic of Bulgaria. Contract between the SRTI-BAS and the Scientific Research Fund.

AEROSPACE TEST SITES ON THE TERRITORY OF BULGARIA



Testing PROBA-V and VEGETATION data for agricultural applications in Bulgaria and Romania (PROAGROBURO) - Under a contract between the SRTI-BAS and the Belgian Federal Science Policy Office (BELSPO), PROBA-V Preparatory Programme.

Partners on the Project are:

- The Space Research and Technology Institute – Bulgarian Academy of Sciences (SRTI–BAS),
- The Romanian National Meteorological Administration (RNMA)
- The National Institute of Meteorology and Hydrology – Bulgarian Academy of Sciences (NIMH–BAS)



The main objective of the PROAGROBURO Project is to assess the quality of the PROBA-V mission as a continuity mission to VEGETATION 1 & 2 by comparison and validation of SPOT-Vegetation and PROBA-V simulated data for assessing crop condition on chosen test sites for the territory of Bulgaria and Romania.

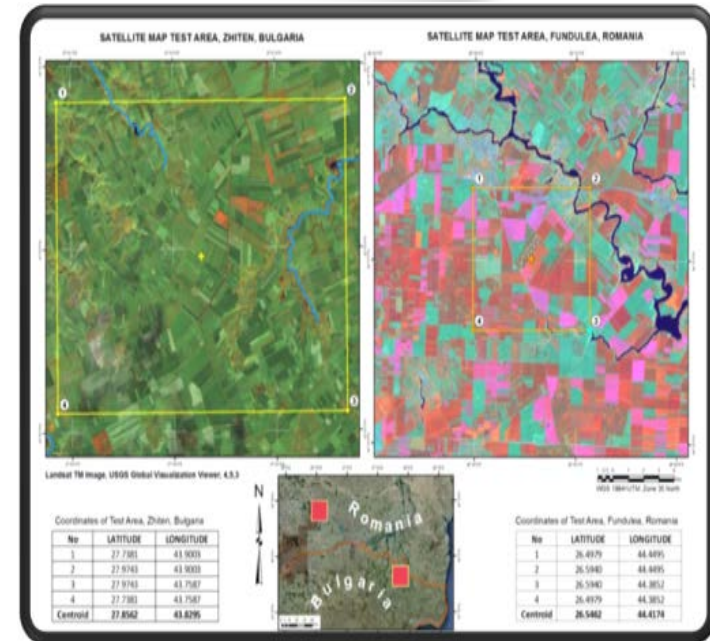
PROAGROBURO web site

<http://proagroburometeoromania.ro>

Study area

Zhiten, Bulgaria

Fundulea, Romania

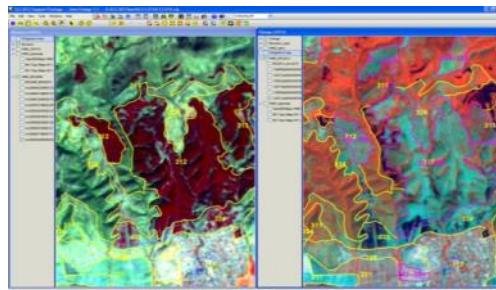


GIO Land 2012 project of the European Environment Agency (39 countries)

CORINE Land Cover (CLC) Bulgaria 1990, 2000, 2006 and 2012 projects

CLC Products:

- National CLC2012
- National CLC of Changes
- National revised CLC2006



CLC Map Legend: Example of
South-West Bulgaria

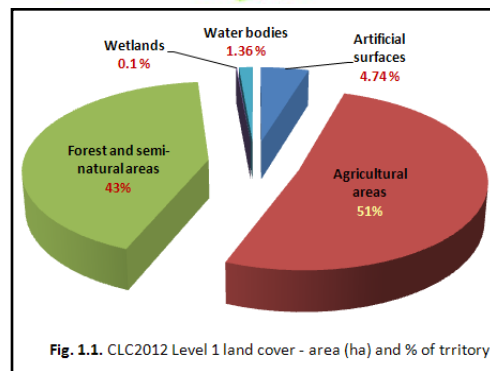
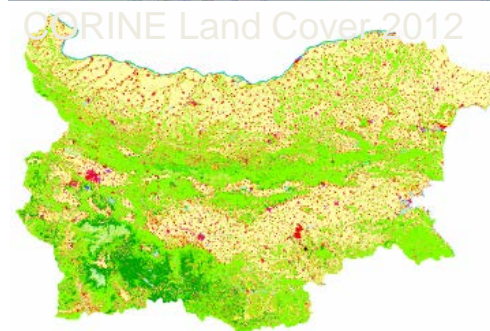
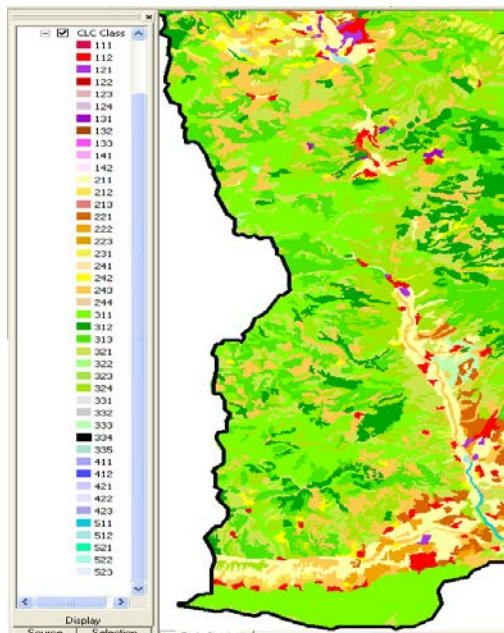
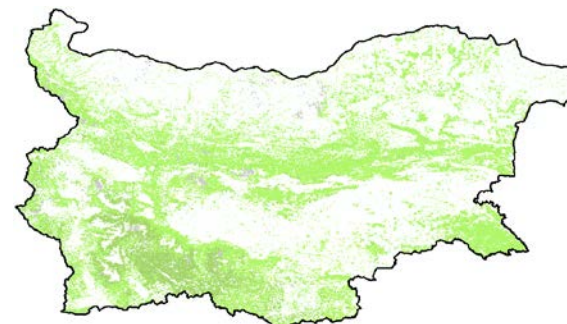


Fig. 1.1. CLC2012 Level 1 land cover - area (ha) and % of territory

High Resolution Layers 2012

Five pan-European high resolution layers (HRL) for the reference year 2012 with specific land cover characteristics: **imperviousness**, **forests (tree cover density and forest type)**, **permanent grassland**, **wetlands**, **permanent water bodies**.

These intermediate products form the input for **verification** and **enhancement** tasks that are implemented by separate countries.



Forest HRL products

Hyperspectral laboratory and *in-situ* measurements

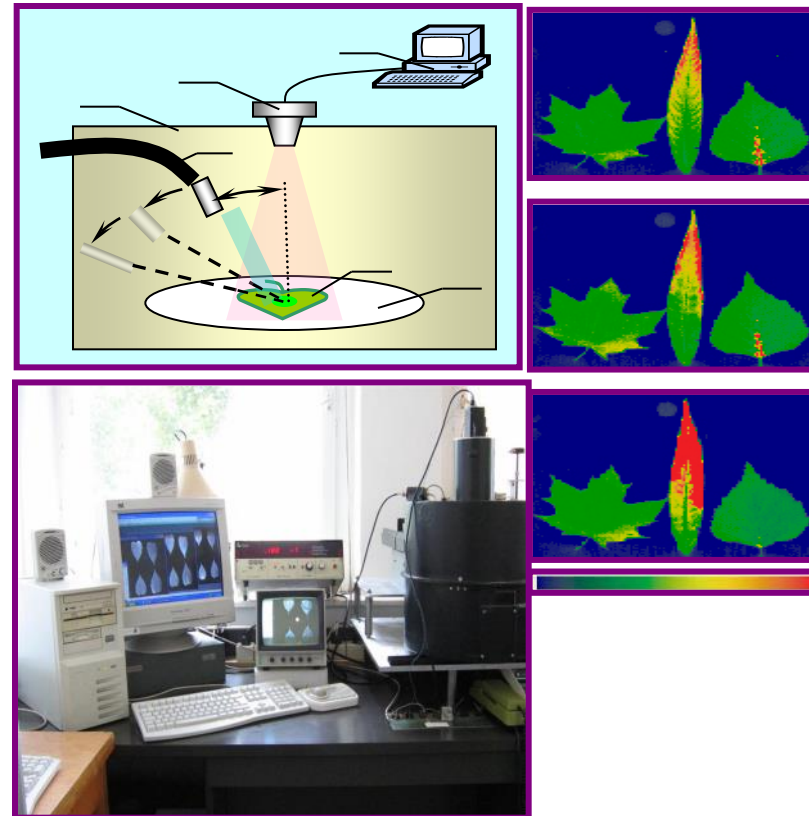
Multichannel Spectrometric System (TOMS 01)

Designed for remote sensing observation, development and validation of spectral-biophysical models for land cover features estimation and state assessment.

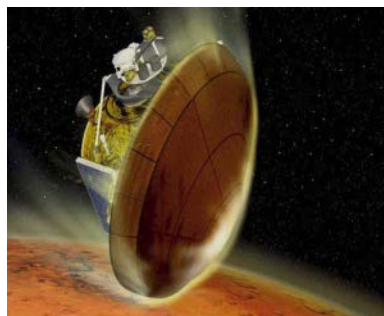
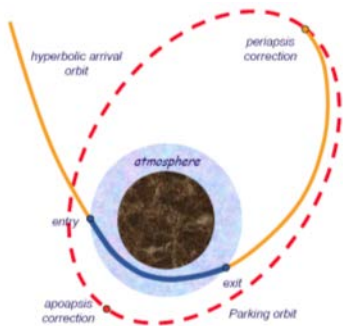


FPS-1

Imaging system for study of the fluorescence of vegetation in natural and stress conditions.

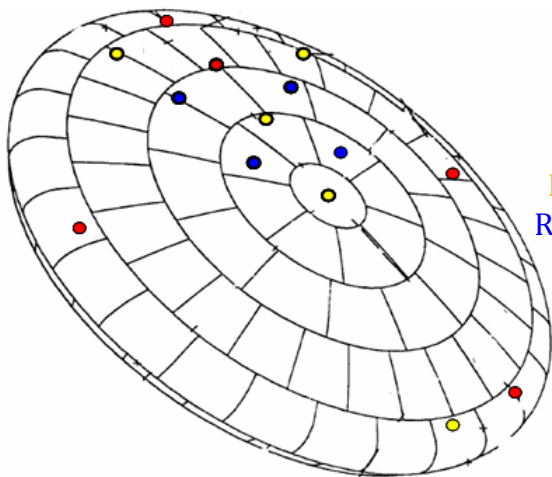


AEROcapture for Future spAce tranSporTation AEROFAST



Idea – to provide more payload for instruments

Goal - to prove a propulsion-free insertion into orbit

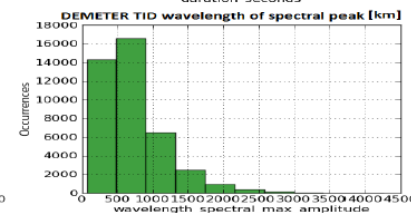
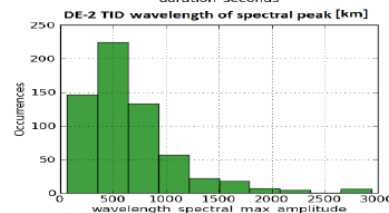
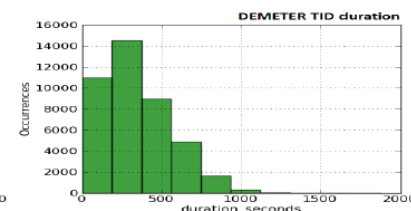
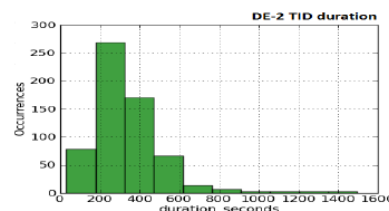


**Pressure, Heat Flux,
Pyroelectric Sensors
Resistance Temperature
Detector (RTD)**

Problem-oriented Processing and Database Creation for Ionosphere Exploration POPDAT

POPDAT project is aimed to provide “subject catalogues” of following data:

- Atmospheric Gravity Waves (AGW)
- Electromagnetic waves (EMW)
- Traveling Ionospheric Disturbances (TID)
- Traveling Ionospheric Disturbances in Total Electron Content (TID-TEC)



Ion density TID statistics for DE-2 (left) and DEMETER (right)

Cooperation of space NCPs as a means of optimizes services - COSMOS/COSMOS+



The is meant to identify and exchange good practice, elaborate and conduct training courses for the NCP staff, gather and provide up-to-date information on Space and neighbouring topics, improve project partner search and develop common concepts to raise awareness for Space in FP7 and the Space NCPs.

COSMOS services:

- COSMOS Website with up-to-date information on relevant space topics
- COSMOS Newsletter helping you not to miss important news on space and FP7
- Events for partnering and information on space topics
- FP7-Space-Helpdesk for any questions related to Space in FP7

Telehealth Services Code of Practice for Europe - TeleSCoPE



The European Code of Practice for Telehealth Services being developed within the TeleSCoPE project offers a quality benchmark and will provide much needed guidance for telehealth and telecare service providers, clinicians, carers, purchasers and other interested parties. Its responds to the increasing number of calls for such a quality benchmark that arise from increasing healthcare needs due to demographic changes and the imperative to adapt service frameworks to respond to those needs.

Telehealth: Everywhere for Everyone



Towards a more complete assessment of the impact of solar variability on the Earth's climate (TOSCA) - COST Action ES1005



www.cost-tosca.eu

This action aims at assessing the various contributions of solar variability to the Earth's climate by bringing together solar physicists, space scientists, atmospheric scientists, climate modellers, paleoclimatologists, and more.

European Network Exploring Research into Geospatial Information Crowdsourcing: software and methodologies for harnessing geographic information from the crowd (ENERGIC) - COST Action IC1203



www.vgibox.eu/

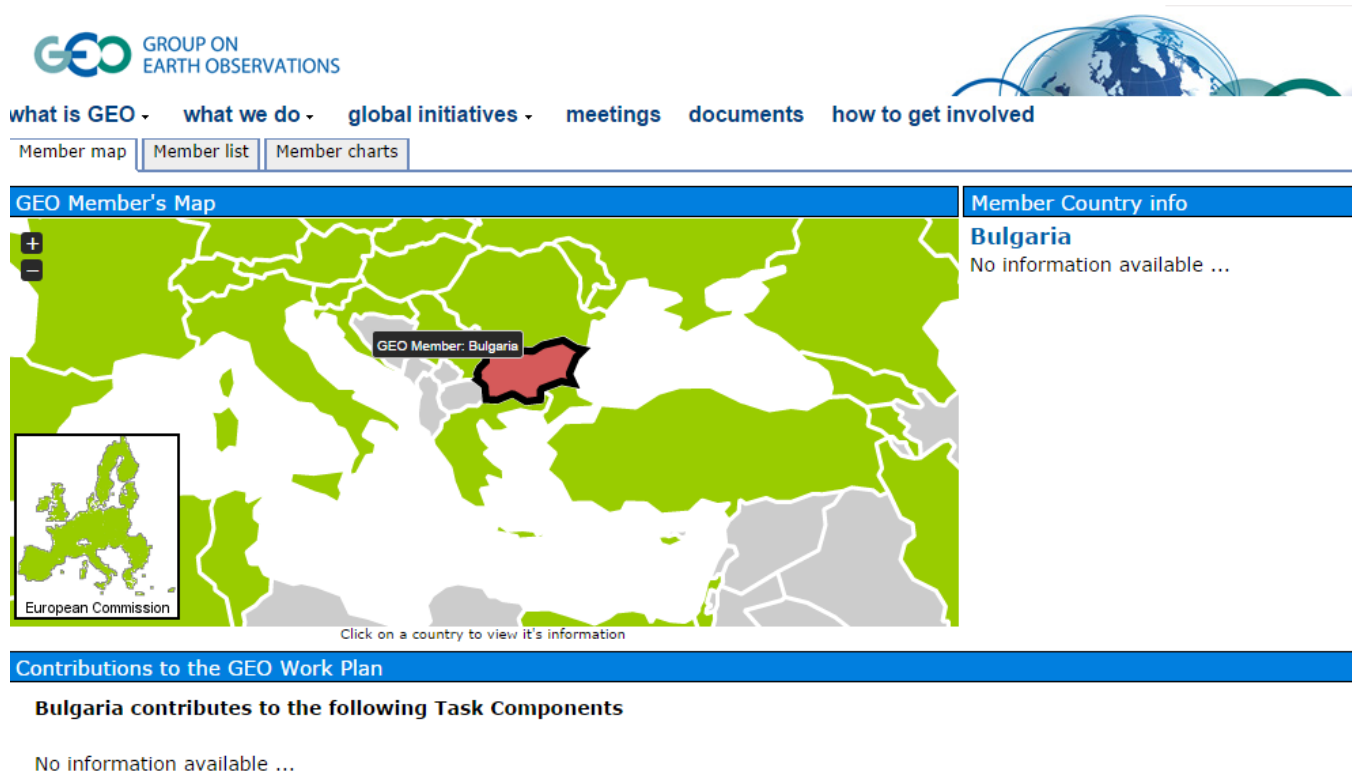
The main objective of the Action is to build an open and flexible VGI European network of scholars, young researchers and industry representatives who will share their experiences in order to transform user generated information into exploitable data.

PERSPECTIVES for cooperation with SRTI-BAS

- I. Support of the accession procedure for Bulgaria to the European Space Agency and participation in ESA projects;
- II. Active participation in Horizon 2020 calls and other international projects based on current high-tech developments and know-how gained;
- III. Inclusion in other initiatives at European and regional level (i.e. LIFE+, ETCP “BG-GR 2014-2020”)
- IV. Expertise support in the area of space science and earth observation provided to national and regional authorities;
- V. Active contribution to the rapid transfer of methods, equipment, data, results and technologies developed for space applications to industry and businesses, including SME’s via the existing Technology Transfer Office in SRTI.

Status of National Strategy related to EO activities

Status of intention or planning in participation in GEO (If not already member of GEO)



The screenshot displays the GEO website interface. At the top left is the GEO logo (GROUP ON EARTH OBSERVATIONS) and a navigation menu with links: what is GEO, what we do, global initiatives, meetings, documents, and how to get involved. Below the navigation are tabs for Member map, Member list, and Member charts. The main content area is split into two columns. The left column, titled 'GEO Member's Map', shows a map of Europe with Bulgaria highlighted in red and labeled 'GEO Member: Bulgaria'. An inset map of Europe is also present. The right column, titled 'Member Country info', shows 'Bulgaria' with the text 'No information available ...'. Below the map is a blue bar titled 'Contributions to the GEO Work Plan' with the text 'Bulgaria contributes to the following Task Components' and 'No information available ...'.

GEO GROUP ON EARTH OBSERVATIONS

what is GEO - what we do - global initiatives - meetings documents how to get involved

Member map Member list Member charts

GEO Member's Map

Member Country info

Bulgaria
No information available ...

Click on a country to view it's information

Contributions to the GEO Work Plan

Bulgaria contributes to the following Task Components

No information available ...



THANK YOU FOR YOUR ATTENTION!

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