



SpaceEU – conference; Session - “FP7 countries’ Space activities”

Space Activities in Bulgaria

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Member of the Intergovernmental working group on Space



28-29.02.2012; BRUSSELS

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Bulgarian national Space Strategy / Programme / History

Space History of Bulgaria:

- Bulgarian Space Research and Development Technologies program was started in 1969 by the Bulgarian Academy of Sciences /BAS/ in response to contemporary trends for studying Space. BAS staff participated in INTERCOSMOS program space experiments, Bulgaria 1300 space research project in 1981, interplanetary probes Vega-Haley and Phobos-1/2, and in the scientific programs of two Bulgarian cosmonauts (1979 and 1988).
- The National astronomical observatory –Rozhen (1981) and the Satellite Space Station - Plana (1978) are the biggest observatory and satellite station in South East Europe and the Balkans.
- Since 1990 different teams participate in 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, Space Greenhouse SVET, BION 1,2 satellite, International Space Station (ISS), Indian Moon satellite CHANDRAYAAN, Probe-V and Phobos-Ground probe. 2000-2002 Bulgarian organizations have taken part in the DLR project in the Shuttle mission of NASA. Based on its results a 3D model of Bulgaria was created.
- Today Bulgarian space players have many multilateral agreements for joint space research in solar physics, in situ and remote sensing the Earth and planets, deeply space, study of global changes, key space technologies and they participate in the large European programs such GMES, FP6, FP7, etc.



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Bulgaria in Space – Main capacities of Space R&D and industry in Bulgaria

- EO Data Receiving/Management Station (Up-Down links);
- Space Observatory - largest telescope on the Balkans;
- Space physics, Engineering – all aspects
- Capacity in EO data processing, modeling & simulation, GIS/Risk analyses;
- Radiometers, EO sensors development; national navigation network;
- Micro Satellites Payload System Development;
- UAVs, small aircraft design and production;
- Data mining & analyses systems; Reference land cover databases;
- EO Data validation trough network of test sites in the country.
- Data acquisition and processing



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Milestone EU projects – last 5 years

- GEOLAND
- SAFER
- MyOCEAN
- BULGARISK-Bulgarian-French cooperation
- BULCOVER/CORINE/INSPIRE/DQA + MONITORING land cover & land use changes
- AEROFAST
- TeleSCOPE
- XMM-Newton X ray space telescope
- EU COST ESO803
- RISK MANAGEMENT – Integrated approach
- CROSS-BORDER COOPERATION BUL-RO PROJECT
- Others, including links (as example – URBAN-API, URBAN-NEXUS, etc)...

EU and international resources / Cooperation and Networking

- HORIZON 2020
- MFF-GMES Budget/Cohesion Fund/Structural Funds -Regional Unit/Center for Integrated Risk and Security Management for South East Europe (RURSE) - European-Mediterranean Network
- DANUBE STRATEGY
- GMES-ESA&EEA/GALILEO/ GNSS
- European Economic Area / NF
- SEE + Cross border Bilateral Programs
- Others with NASA, RFSA-Roscosmos (including national programs and budget)



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Major targets for the future / potential collaboration fields

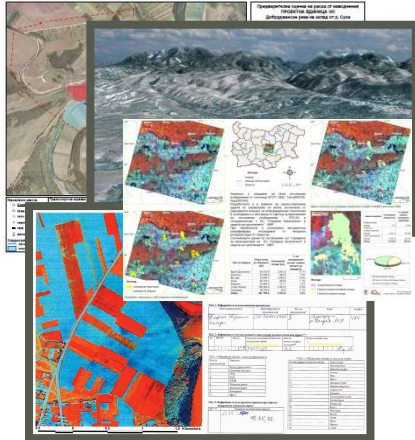
- Bulgaria in PECS – target - member of ESA;
- Regional Office/Center for Integrated Risk and Security Management for South East Europe – target - European-Mediterranean Network – target - GEOSS
- Integration between Space and in-situ data and services – target national and regional operative capacity
- Mini and micro satellites – target real time data acquisition for the region (Spatial data acquisition for SEE region - Satellite ground station, Sofia)
- Innovations, high technologies - Sensors, drones, UAV, radiometry, etc.
- Intelligent information system for prevention and early warning (Open source platform) – Blue Gene supercomputer and “cloud” network
- Data mining and foresight
- Data quality assessment & Permanent land cover & land use monitoring and data harmonization using reference databases (LCCS/CORINE methodology)



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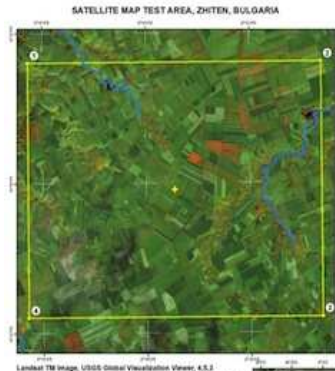
Space-based applications at the service of the European Society – BG partners



Remote Sensing Application Center-ReSAC

Applies Remote Sensing and GIS in agricultural and environmental management, land cover/land use, soil and forest inventory, water resources, environmental hazards, urban planning, infrastructure, participation in regional and international projects and cooperation. Partner in the major FP7 GMES Projects: Geoland2 and SAFER, as well as in downstream projects

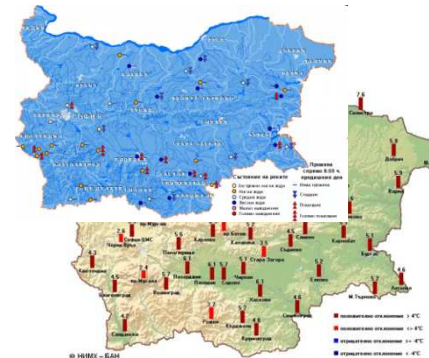
<http://www.resac-bg.org/>



Space Research and Technologies Institute (BAS)

- Solar-Terrestrial and Space Physics;
- High-energy astrophysics, galactic space rays;
- Medico-biological studies, space biotechnologies, heliobiology, telemedicine;
- Design, development and transfer of methods, instrumentation and technologies for remote sensing of the Earth, regional and global monitoring of the environment and security;
- Research in the field of obtaining and application of new superhard materials;
- Development of innovative aerospace instrumentation and technologies, as well as their transfer to economy.

<http://www.space.bas.bg/>



National Institute of Meteorology and Hydrology (BAS)
EUMETSAT member
<http://weather.bg/>



Institute of Soil Science “Nikola Poushkarov”

Test polygons with experimental stations for observation of soil and plants.

<http://www.iss-poushkarov.org>



Bulgarian Spatial Data Infrastructure(BSDI)

BSDI is a prototype of the geo portal as a free service for public benefit. One of its main objectives is to provide database services and user oriented operational capacity of Bulgarian organizations. The geoportal was developed as a PPP between governmental structures and NGO’s for public benefit.

<http://bsdi.asde-bg.org/>

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Example - Structures, uniting organizations with capacity in Space applications

More than 40 institutes, universities, NGO's and SMEs in Bulgaria are contributing to the space activities

- Bulgarian Information Office for EO-GMES



GMES - Bulgaria aims to support the participation of Bulgaria and other member-states and candidate

countries in the European Earth Observation Program - Global Monitoring for Environment and Security. The establishment of a single national point called Bulgarian Information Office for GMES (BIOG) concentrate information, advisory and support activities related to GMES in one coordination structures. This should result in an increased efficiency and synergy.

<http://www.gmes-bg.org/>

- Cluster “Aero Space Technologies, Research and Applications – CASTRA”

CASTRA is an NGO representing industry, academic institutions, other NGOs and research institutes having capacities in the development of aero-space technologies and its application in innovative products and services.

<http://castra.org/>



- Inter ministerial working group under Resolution 826 in support of the initiative for Regional Unit for Risk and Security Management for South East Europe (RURSE)

- Task force expert group – BG, CZ, GR, PL, RO, SL



Proposed as the first-pilot bottom-up coordination structure of a possible future European – Mediterranean network for integrated risk and security management;

is an element of the balanced centralized & decentralized management of EO-GMES with priority user requirements and needs;

- Is based on harmonized and coordinated MS operational capacity;
- Is open towards reasonable integration with GALILEO, the Global Earth Observation System of Systems (GEOSS) and the Danube Strategy.

- Was proposed in Bulgaria, during the EU12 operational capacity workshops in Sofia, Bulgaria in 2010 and 2011.

The Bulgarian government has started the process of negotiation with Resolution 826/16.11.2011.

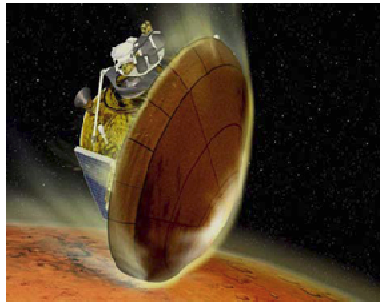
<http://www.gmes-bg.org/rurse/>



Space-based applications at the service of the European Society

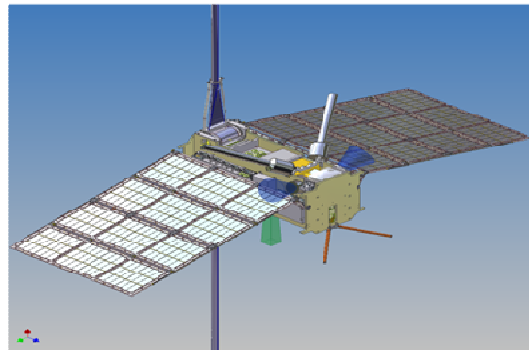
FP7 Project AEROCapture for Future spAce tranSPorTation

RADOM radiation meter on Chandrayaan-1 satellite 2007/2008 fly at 100 km over the Moon for 2 years, 120g, 76x86x25mm, 120 mW



Bulgarian “Balkansat” on Russian microsatellite platform “Chibis

Priorities in project: X-ray-gamma detector (RGD); ultraviolet detector (UVD); radiofrequency analyzer (RFA); digital photo camera (DPhC)



The Satellite Station

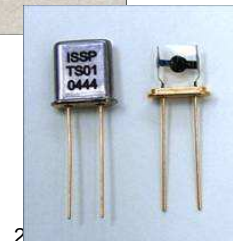
There are several antennas installed with different applications. Two antennas are of 18.3m diameter with capabilities for Telemetry, Tracking & Command (TT&C) and Data Up/Downlink operational services



The roof movable antenna (12m) can provide control and receive data from all kind of satellites on solar-synchronous end polar orbit

Multifunctional piezoelectric quartz sensors

Multifunctional piezoelectric quartz sensors, employed method of quartz crystal microbalance (QCM) for monitoring of gases contaminations, organic and inorganic substances at cryogenic temperatures. Institute of Solid State Physics - Bulgarian Academy of Sciences Point L- Bulgaria Ltd.

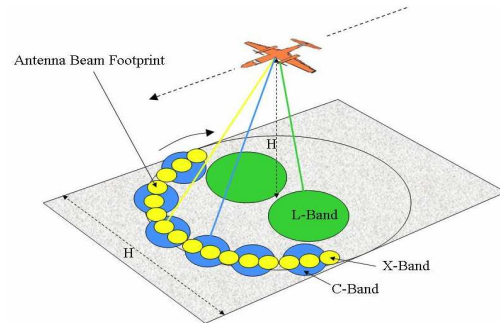


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Bulgaria: Space Highlights and Contribution
Space/In-situ sensors integration

Space Food - more than 30 years

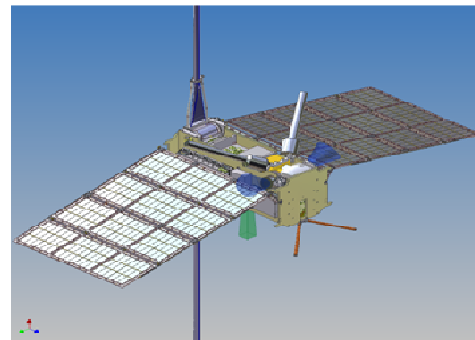


Initiative for EU-Mediterranean Network for Integrated Risk and Security Management for SEE

Bulgarian “Balkansat on Russian microsatellite platform “Chibis”

Spatial Data Receiving and Satellite Control Space Station

Blue Gene SuperComputer for large volume scientific data computing

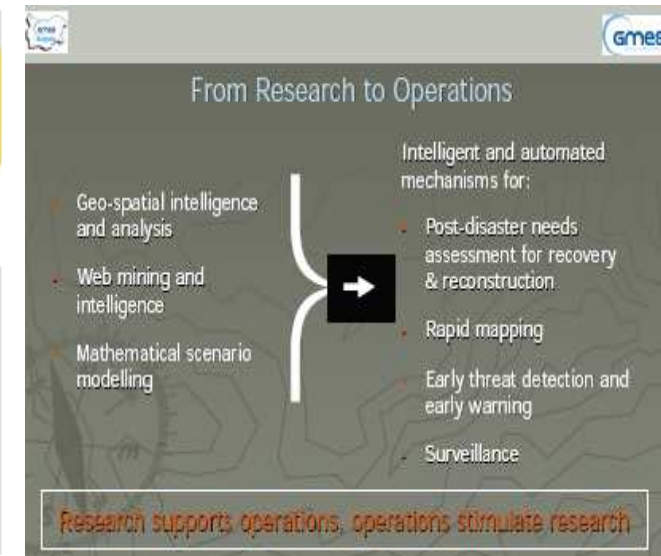
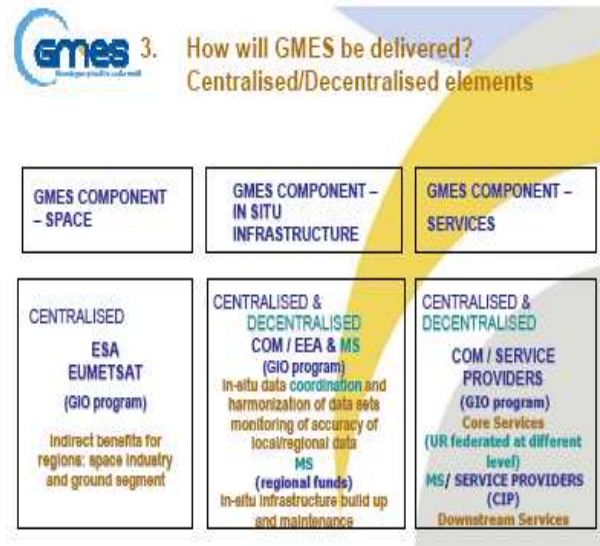


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Draft proposal for a Regional Unit/Center for Integrated Risk and Security Management for South East Europe (RURSE) - European-Mediterranean Network

Joint Capacity Building Program under the European Program GMES, GALILEO and the Danube Strategy



Rationale:

- **RURSE is proposed as the first-pilot bottom-up coordination structure of a possible future European - Mediterranean network for integrated risk and security management; it is an element of the balanced centralized & decentralized management of EO-GMES and is based on harmonized and coordinated MS operational capacity; it is open towards reasonable integration with EU program GALILEO, the Global Earth Observation System of Systems (GEOSS) and the Danube Strategy;**
- **The initiative was proposed in Bulgaria, during the EU12 operational capacity workshops in Sofia, Bulgaria in 2010 and 2012, organized by the Bulgarian government and joint consortium of research & educational, NGO's and business structures with the support of the European Commission – Directorate General “Enterprise and Industry”;**
- **The concept is under discussion and elaboration from a joint expert team, including experts from Bulgaria, Czech Republic, Greece, Poland, Romania, Slovenia; in cooperation and coordination with experts from the DG Enterprise and Industry – GMES Bureau and the JRC- Institute for Protection and Security of Citizen. Participation from other EU MS , EC structures, as well as from ESA and EEA is welcomed;**



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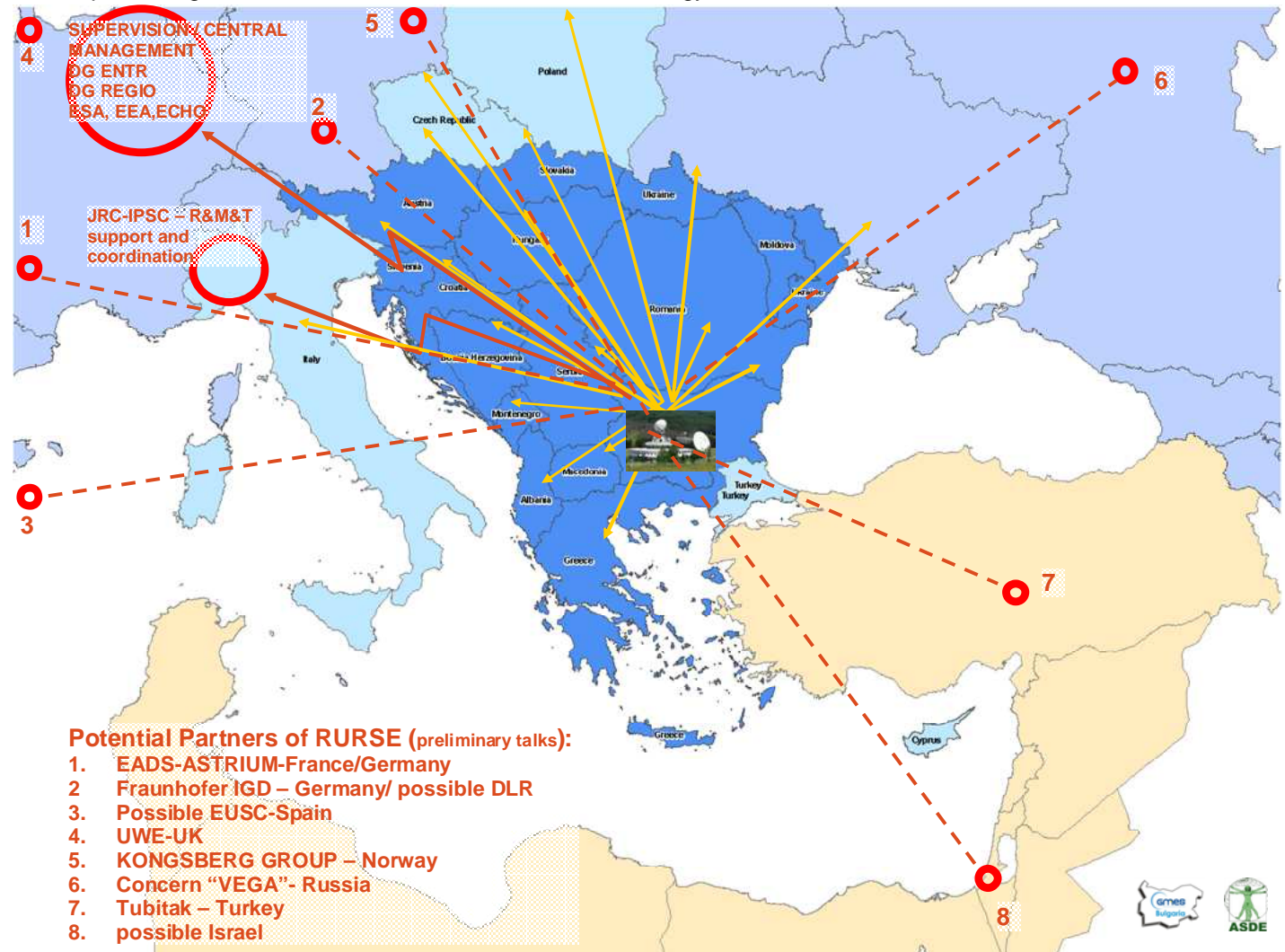
Draft proposal for a Regional Unit/Center for Integrated Risk and Security Management for South East Europe (RURSE)-European-Mediterranean Network

Joint Capacity Building Program under the European Program GMES, GALILEO and the Danube Strategy

RURSE Priorities

(agreed on the 4th of April, 2011, expert meeting in JRC-IPSC, Ispra, Italy):

- **natural (floods, forest fires, land slides & earthquakes) and anthropogenic disasters and crisis;**
- **maritime surveillance – sea water pollution, ship tracking, illegal immigration;**
- **strengthening in-situ infrastructure and real time data acquisition from space and in-situ components – possible integration with a capacity building program (ISECAD) under the Danube Strategy; Target – Ground satellite station – Bulgaria, as up-down link (GMES+GALILEO);**
- **land cover & land use permanent monitoring – stressing on in-situ critical infrastructure and assets status; Real time data acquisition/ quality & Improving Data access and integration;**



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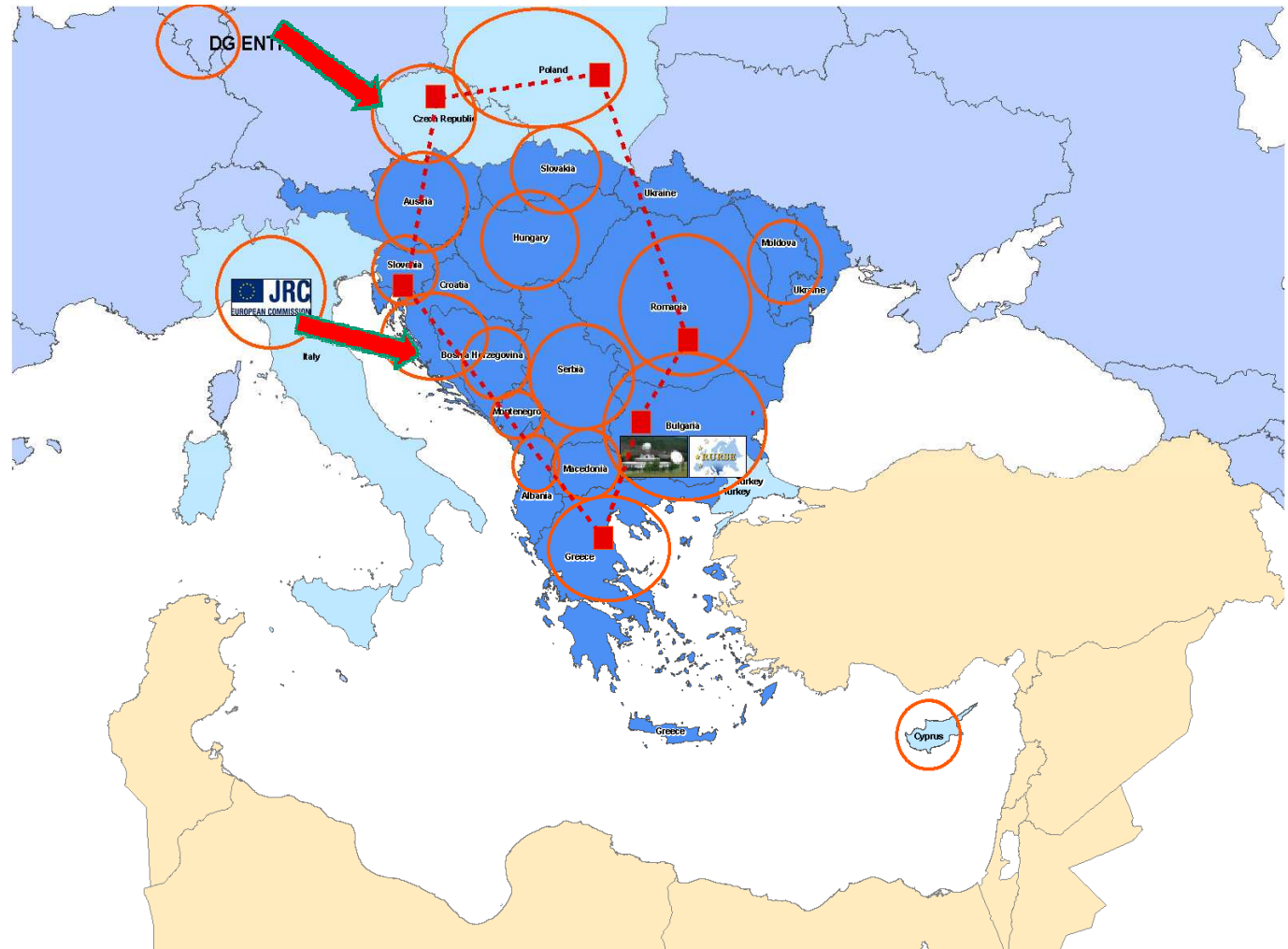


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Joint Capacity Building Program under the European Program GMES, GALILEO and the Danube Strategy

First steps :

1. Resolution of the Bulgarian Council of Ministers – RMS-826, from the 16.11.2011;
2. Preparation of a MoU of the countries, supporting RURSE;
3. A preliminary exchange of visions has been initiated by the European Parliament on support to regional cooperation and integrated risk management; Expected conference in Sofia- I half of 2012;
4. Registration of the Initiative Task force group – BG, GR, CZ, PL, RO, SL.. under the coordination of DG ENTR- GMES Bureau and JRC-IPSC;
5. Start of the negotiation process with EC; Parallel development of operational capacity and user-based risk & security management services;



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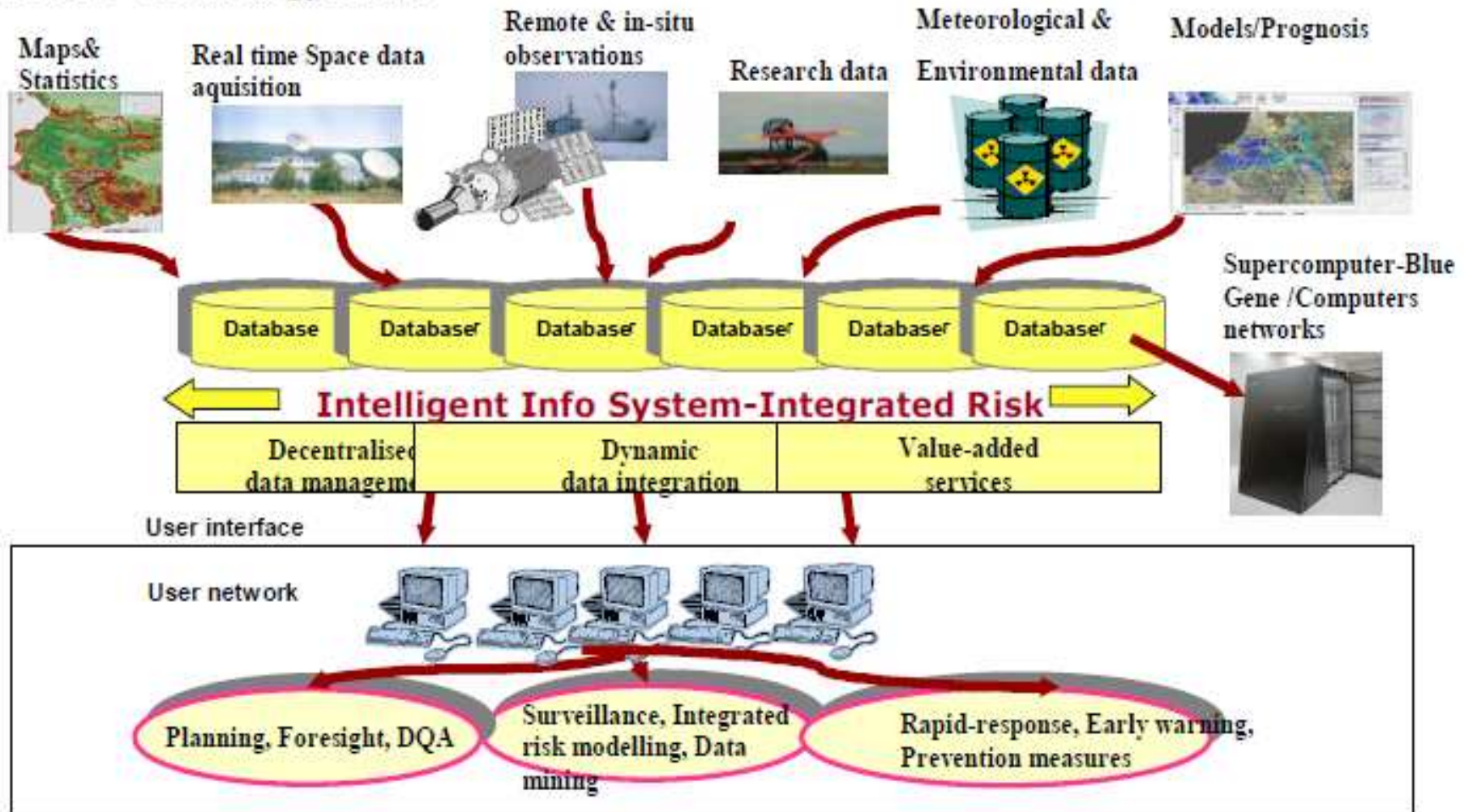
- **RURSE Governance** (just an idea, proposal to be discussed and approved)
- **RURSE is proposed as a pilot element of an EC coordination mechanism (decentralized management) for operational/services capacity on horizontal level** for a geographical region (SEE). **RURSE** unites states, not NUTS. **MS must develop their national operational capacity/services** and to provide their coordination, harmonization and transfer of information through a **single national structure, represented in RURSE** (note: in Bulgaria was discussed and accepted the idea of a public-private commission to the Administration of the Council of Ministers (ACM), as the tasks are not limited in the area of capacity of one ministry).
- **RURSE must foster building and integration of the operational** capacity and the user-based real-time data interpretation and services in the interest of the participating MS, European structures and the realization of EU 2020 strategy.
- **General supervision is discussed (expected) to be from DG ENTR** in coordination with DG REGIO (potentially DG ECHO and DG ENV). **RURSE** is proposed to be managed by a **Steering Committee**, uniting representatives from MS from SEE region and EU12, EC structures. The coordination office is proposed to be placed in Sofia, Bulgaria. The presidency of the Steering Committee will be on an yearly rotary principle.
- **RURSE is proposed also as a transfer mechanism of a possible GMES budget and other financial instruments** towards the SEE area under the selected priorities. **Funding has to be provided on European, Regional and National level.** There are possibilities of support from the Cohesion / Structural funds (example – the Danube Strategy mechanism); This task has to be developed jointly by all participants.
- **It is proposed that JRC provides research, methodological and technological support and coordination.** JRC is expected to cooperate with MS at non-operational matters to maintain the research and monitoring competence. Training of specialists and support to control mechanisms (example - DQA)



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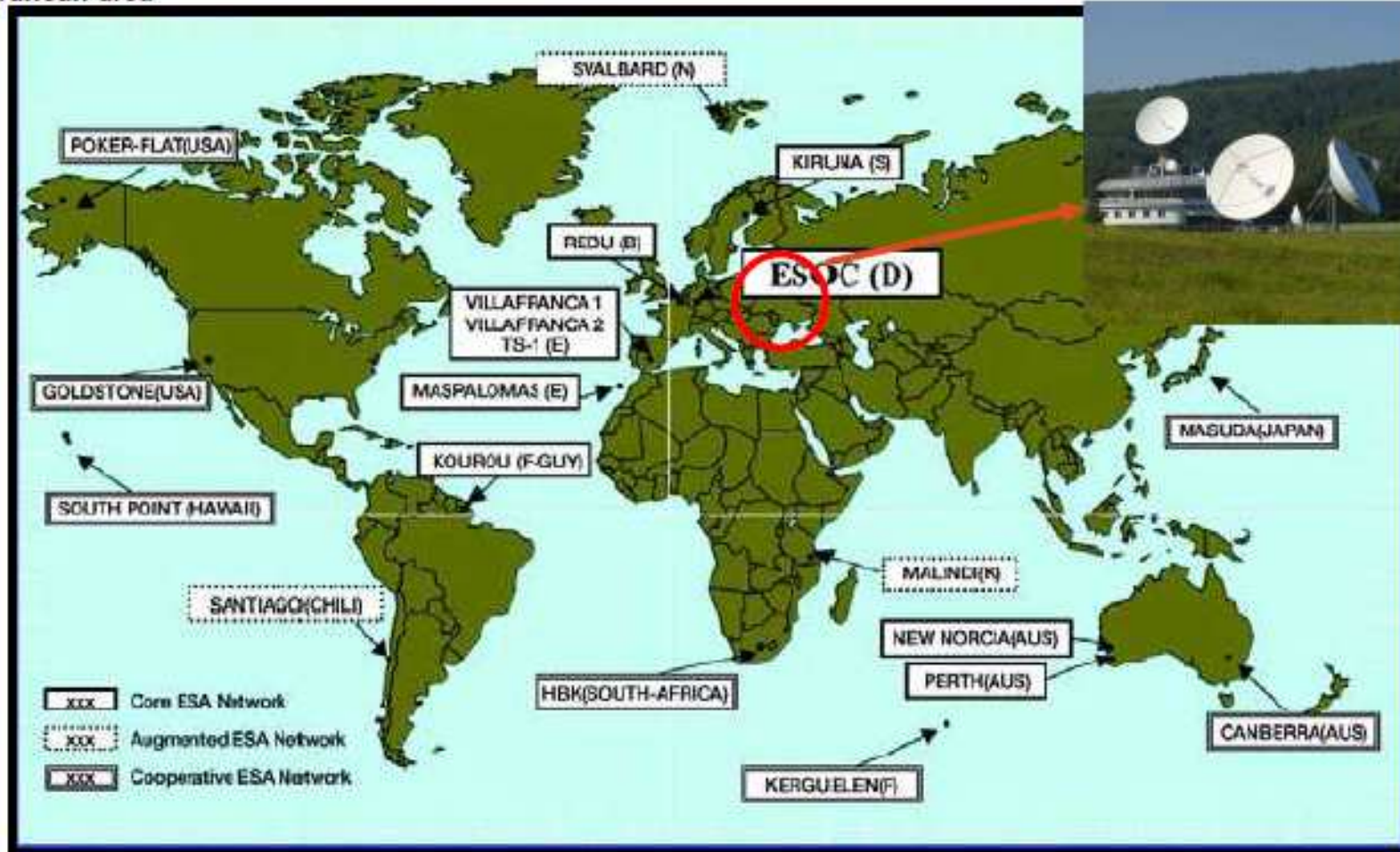
RURSE - Technology model



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RURSE- POSSIBILITY for REGIONAL SPACE INFRASTRUCTURE and INTEGRATION WITH OTHER PROGRAMS ; RURSE can provide strong support to core/downstream services in GMES, GALILEO-GNSS, DANUBE STRATEGY - through the integration of an existing satellite ground station and developed operational capacity for East Europe, including East Mediterranean area



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WISHING YOU GOOD HEALTH FOR THE 1ST OF MARCH – THE BULGARIAN TRADITION FOR SENDING OFF WINTER AND WELCOMING SPRING

THANK YOU FOR THE ATTENTION !

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