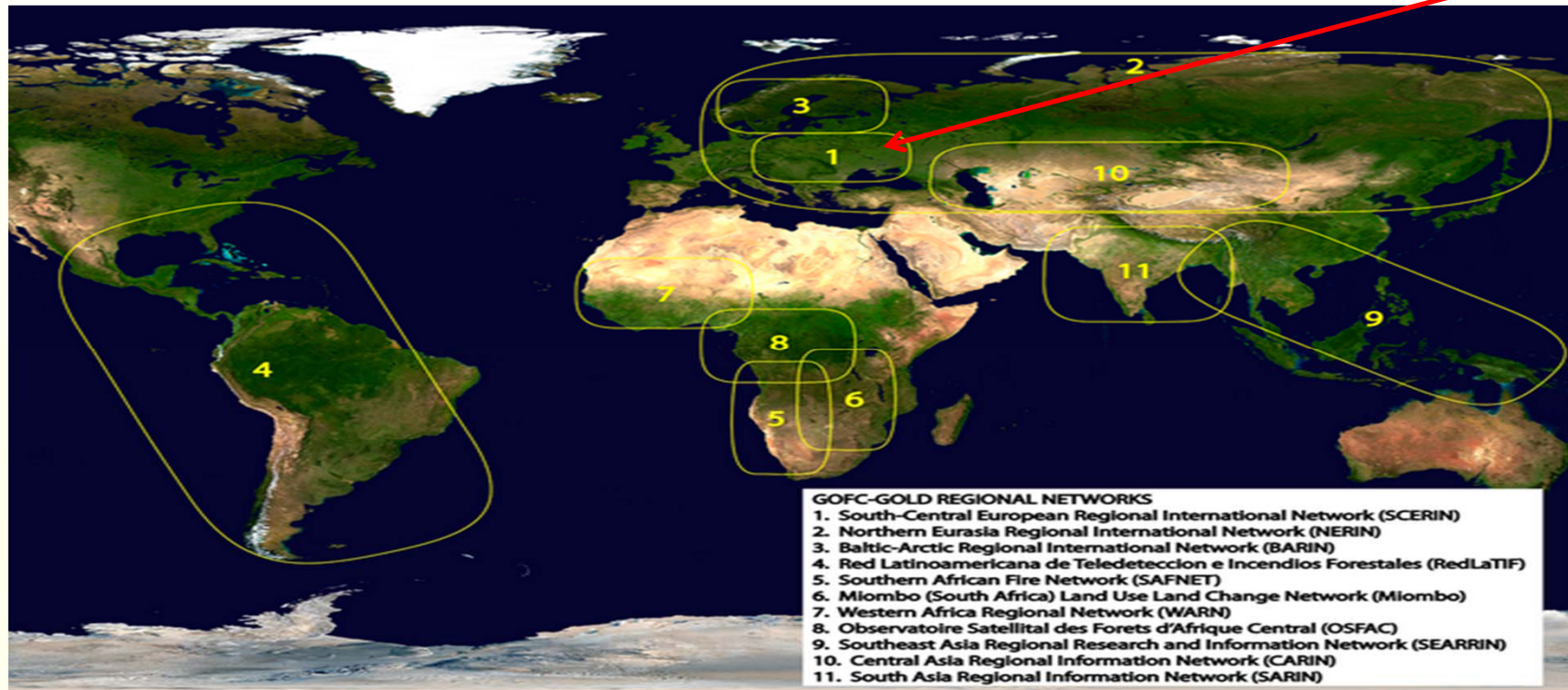


Overview of EARSeL activities, as relevant to SCERIN



CERTH
CENTRE FOR
RESEARCH & TECHNOLOGY
HELLAS

Dr. ioannis Manakos
Researcher



Information
Technologies
Institute

Chairman of the
EARSeL SIG in LU/LC



European
Association of
Remote Sensing
Laboratories



...acknowledgements

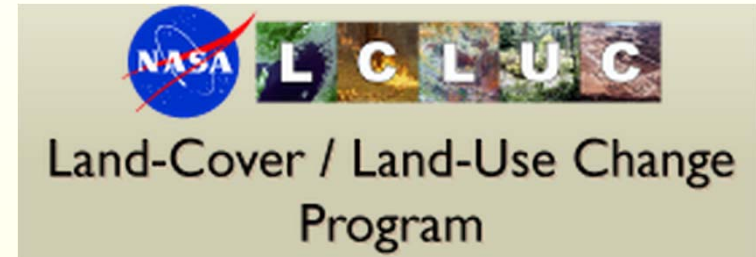


My special thanks for the honor, the invitation, and the chance to introduce and discuss ideas and experiences with you to

The Representatives and Actors of the



&



The Organizing Committee (Profs. and Drs.)

Ioan Vasile Abrudan | Petya Campbell | Jana Albrechtova | Garik Gutman



The Transilvania University of Brasov,
Faculty of Silviculture and Forest Engineering



...and to the local contact Assoc. Prof. Mihai-Daniel NIȚĂ

...facilitating the communication, and supporting my participation at this Capacity Building Workshop



...a few words about CERTH-ITI



Research units

- Image and Signal Processing
- Computer & Cognitive Vision
- Pattern Recognition and Machine Learning
- Human Computer Interaction
- Virtual and Augmented Reality
- Artificial Intelligence
- Security and Surveillance
- Biomedical Applications
- Environment, Geoscience and Remote Sensing
- Communications and Networking
- Multimedia, Database and Information Systems
- Social Media Analysis
- e-Government
- Cultural and Educational Technology
- Integrated Commercial Solutions



European Projects: Horizon 2020

- ➔ [ECOPOTENTIAL](#) — Improving Future Ecosystem Benefits through Earth Observations (2015: H2020-SC5)
- ➔ [SARAFun](#) — Smart Assembly Robot with Advanced FUNCTIONalities (2015: H2020-ICT-2014-1)
- ➔ [SWIMing](#) — Semantic Web for Information Management in Energy Efficient Buildings (2015: H2020-EeB-2014)
- ➔ [InLife](#) — INdependent LLiving support Functions for the Elderly (2015: H2020-RIA)
- ➔ [PATHway](#) — Technology enabled behavioural change as a pathway towards better self-management of CVD (2015: H2020 PHC-RIA)
- ➔ [CloudLightning](#) — Self-Organising, Self-Managing Heterogeneous Cloud (2015: H2020 - FoF - IA)
- ➔ [SatisFactory](#) — A collaborative and augmented-enabled ecosystem for increasing SATISfaction and working experience in smart FACTORY environments (2015: H2020 - FoF - IA)
- ➔ [RAWFIE](#) — Road-, Air- and Water-based Future Internet Experimentation (2015: Horizon H2020 – ICT FIRE+)
- ➔ [RAMCIP](#) — Robotic Assistant for MCI Patients at home (2015: H2020 PHC-RIA)
- ➔ [myAirCoach](#) — Analysis, modelling and sensing of both physiological and environmental factors for the customized and predictive self-management of Asthma (2015: H2020-RIA)
- ➔ [ProsocialLearn](#) — Gamification of Prosocial Learning for Increased Youth Inclusion and Academic Achievement (2015: H2020 ICT - IA)



+11 more approved



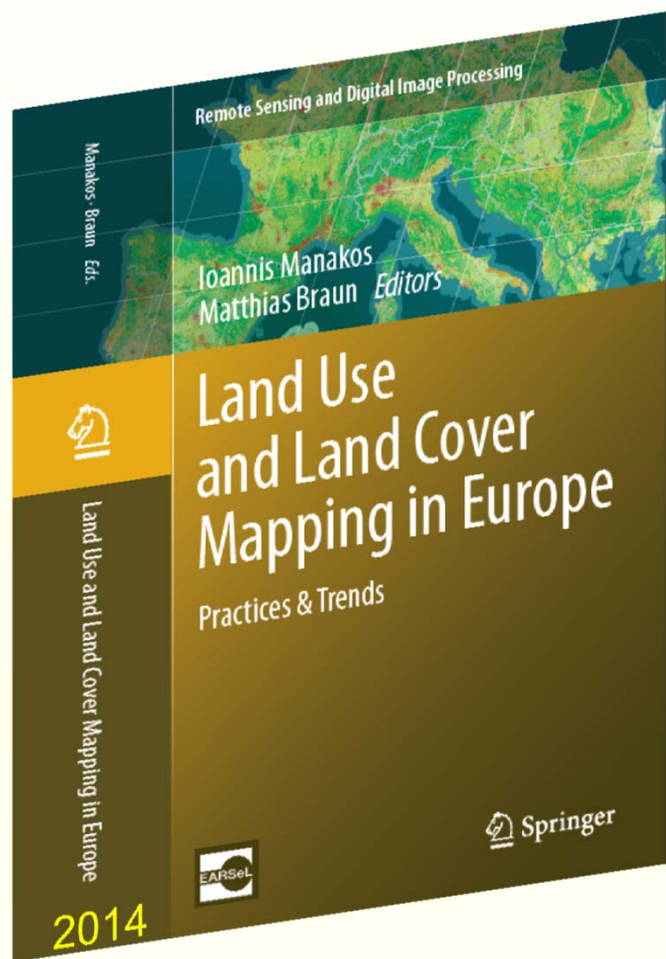
...a few words about remote sensing @ CERTH-ITI



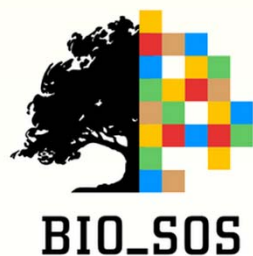
ioannis Manakos, Dr.

Centre for Research and Technology Hellas
Information Technologies Institute
Visual Analytics, Virtual & Augmented Reality Laboratory

European Association of Remote Sensing Laboratories
Special Interest Group in Land Use & Land Cover



| | |
|---------------|--|
| Life services | Biodiversity Habitats Health |
| Geo services | Land Cover & Land Use Agriculture Forestry |
| IT services | Modelling & Simulation Feature Extraction Uncertainty handling |





...a few words about NASA/ LCLUC & EARSeL LU/LC



First joint Workshop of the EARSeL Special Interest Group on Land Use & Land Cover and the



Berlin - Germany, March 2014

College Park – Maryland USA, April 2015

Representation at the LCLUC Spring Science Team Meeting 2015 by the SIG LU&LC of





...a few words about EARSeL



The principal focus of the activities since 1976 are to:

- stimulate and promote education and training related to remote sensing and Earth observation,
- form a bridge between technology and applications of interest to the wide user community,
- assist the sponsoring agencies in the development of new sensors and systems and in any technical matters of relevance,
- provide a network of experts for the agencies in Europe,
- carry out joint research projects on the use of remote sensing for research, monitoring and education,
- promote co-operation between remote sensing experts and the environmental managers and decision-makers.



A scientific networking platform fostering the exchange of ideas and experiences while utilizing remote sensing products and methods for tackling contemporary challenges in the following fields:

- ✓ 3D RS
- ✓ Coastal Zones
- ✓ Developing Countries
- ✓ Land Use & Land Cover
- ✓ Temporal Analysis
- ✓ Imaging Spectroscopy
- ✓ Geological Applications
- ✓ Urban RS
- ✓ Thermal RS
- ✓ Land Ice & Snow
- ✓ Forestry
- ✓ Forest Fires
- ✓ Education & Training
- ✓ Radar RS
- ✓ Archaeology & Cultural Heritage



Trends

Various resolutions
Different sensors
Diverse classification schemes

Multi-modal & -source data
Process automation
Web downstream services
Tailor made solutions

Pan-European layers (+ global & local components)
Variables for earth system monitoring
Free data policy

Assets or Issues

- Multiple applications
- International coordination
- Product validation
- Mission continuity

- Engagement of member states
- Research
- Standardization, Harmonization

- INSPIRE Directive: Key step to ensure compatibility among spatial data infrastructures
- CORINE Land Cover updates





...framework conditions



Society and policy driven studies

| | 5-10 year trends | 20+ years outlook | Progress to policy targets |
|--|-------------------------------|-------------------|--|
| Protecting, conserving and enhancing nature | | | No target |
| Terrestrial and freshwater biodiversity | | | No target |
| Land use and soil functions | | | No target |
| Resource efficiency and the low-carbon economy | | | |
| Ecology: Material resource efficiency and material use | | | |
| Water: Waste management | | | |
| Air pollution: Greenhouse gas emissions and climate change | | | |
| Marine: Greenhouse gas emissions and climate change mitigation | | | |
| Safeguarding from environmental risks to health | | | |
| Climate: Energy consumption | | | |
| Transport density: Water pollution and related environmental health risks | | | |
| Industrial pollution: Air pollution and related environmental health risks | | | N.A. |
| Water use and quality: Noise pollution (especially in urban areas) | | | |
| Urban systems: Indicative assessment of trends and outlook | | | Indicative assessment of policy targets |
| Climate change health risks | | | |
| Chemicals | | | |
| | Deteriorating trends dominate | | <input checked="" type="checkbox"/> Largely not on track to policy targets |
| | Trends show mixed picture | | <input type="checkbox"/> Partially on track to policy targets |
| | Improving trends dominate | | <input checked="" type="checkbox"/> Largely on track to policy targets |



THE EUROPEAN ENVIRONMENT STATE AND OUTLOOK 2015

SYNTHESIS REPORT

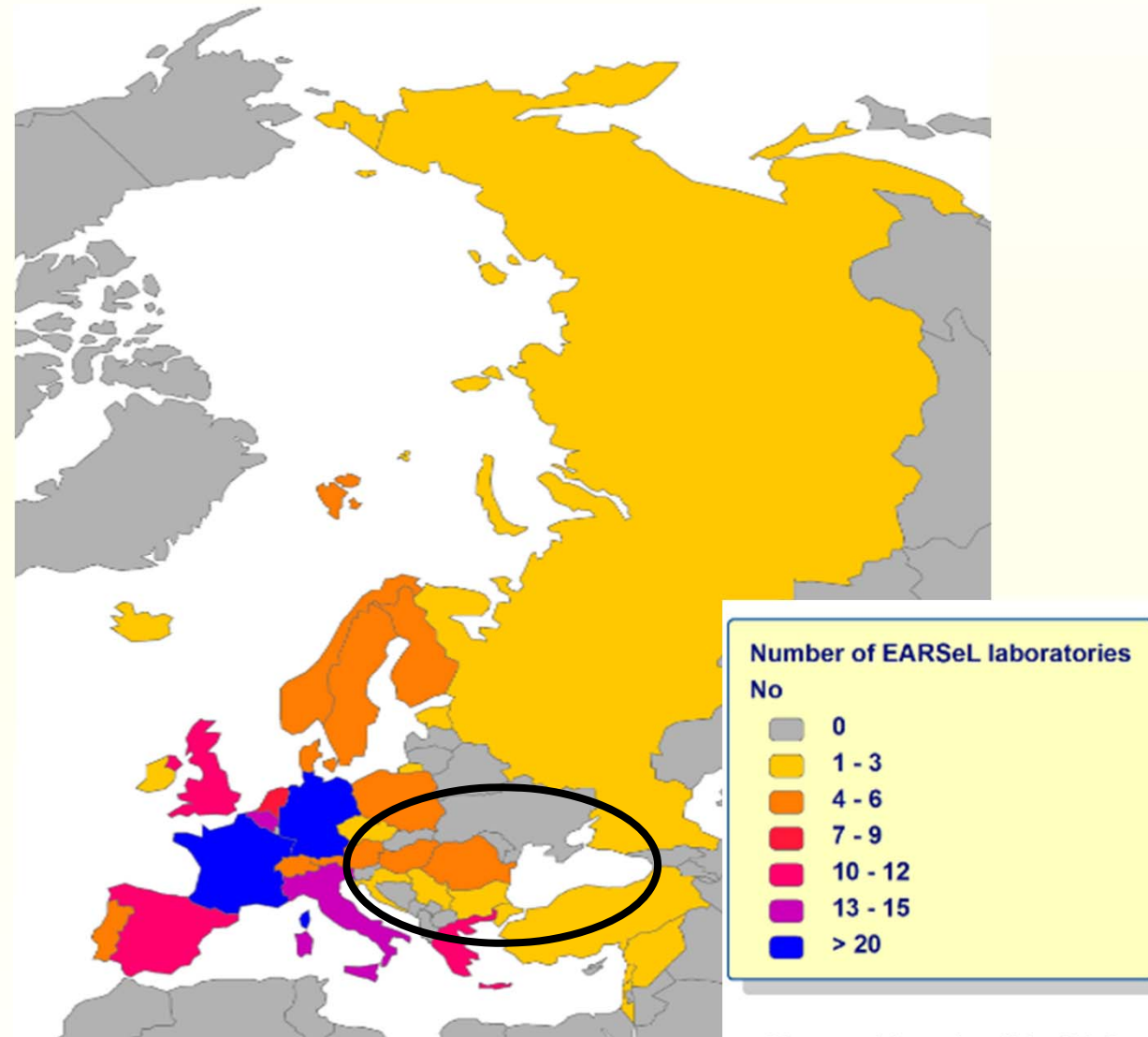
European Environment Agency
Kongens Nytorv 6
1050 Copenhagen K
Denmark

Emergence of needs for the EO industry



S3-1: Provide forum and opportunity for the SCERIN Focus Groups (FGs) to resolve specific issues (actions) as requested by the community and to enhance capacity building in the region.

EARSeL: The aims of the Association are to encourage European research and to promote concerted efforts in all disciplines of remote sensing, to facilitate exchange of knowledge between Member Laboratories, to identify priorities for research activities and to foster cooperation between Member Laboratories.



*Basemap data courtesy Natural Earth
URL: <http://www.naturalearthdata.com>

about 32 active EARSeL members in the area



FG1: Forest monitoring: disturbances, health and biomass

FG2: Land Cover Changes: agricultural land abandonment, urban expansion

FG3: Validation/verification network for support of current and future satellite NASA and ESA missions

FG1 relevant special interest groups (SIGs) with chairmen from the area:

- SIG Forest Fires: Prof. Dr. Ioannis Gitas ([Greece](#)) - [representative is present](#)
- SIG Forestry: Assoc. Prof. Piotr Wezyk ([Poland](#)) - [present](#)

FG2 relevant SIGs with chairmen from the area :

- SIG Land Use & Land Cover: Dr. Ioannis Manakos ([Greece](#)) - [present](#)
- SIG Urban Remote Sensing: Prof. Dr. Carsten Jürgens (Germany), Prof. Dr. Derya Maktav ([Turkey](#))

FG3 relevant SIGs with chairmen from the area :

- SIG Geological Applications: Prof. Dr. Konstantinos Nikolakopoulos ([Greece](#)), Dr. Christian Rogaß (Germany)
- *Relevance with aforementioned and all the rest 10 SIGs*



S3-2: Address SCE priority topics, with focus on 'Remote sensing in forest management and administration', 'Monitoring of protected areas', and 'Assessment of forest disturbance'.

EARSeL relevant forthcoming activity:




November 2-5, 2015: 10th EARSeL Forest Fire Special Interest Group Workshop. Limassol, Cyprus. Organised by Earsel, Cyprus Remote Sensing Society, Cyprus University of Technology, Aristotle University of Thessaloniki

The subject of the 10th EARSeL Forest Fire Special Interest Group Workshop will be **"Sensors, Multi-sensor integration, large volumes: New opportunities and challenges in Forest Fire Research"**. The workshop will **focus on the use of multi-scale sensors, including UAV, drone, aircraft, helicopter, Landsat/Sentinel, MODIS/PROBA and systematic observations through Landsat WELD and Sentinel 1/2/3 to conduct research in forest fires.**



EARSeL relevant forthcoming activity :

September 15-16, 2016: 3rd EARSeL SIG Forestry Workshop. Krakow,  Poland. Organised by University of Agriculture in Krakow, Faculty of Forestry, Institute of Forest Resources Management

Workshop topics:

- from **2D to 3D forest inventory and forest planning** using digital Photogrammetry
- image based stereomatching; LiDAR and Radar (ALS, TLS, MLS)
- **forest change: 4D time detection** of multi-temporal and multi-source information
- **forest mapping technologies** using very high ground resolution and hyperspectral sensors
- **automation of data processing** (e.g. GEOBIA, LiDAR point clouds classification)
- **state-of-the-art** remote sensing technologies: UAV-LiDAR and hyperspectral mapping, TLS, etc.
- **multi-source RS data integration**
- **mapping of forest decline/degradation/disasters**
- **modeling** application on **forest biomass**
- **monitoring of protected** forests, biodiversity, forest **services**.



S3-3: Review the requirements and availability of satellite data, products, and approaches for land cover monitoring in SCE.

Romania survey (source: Romanian Space Agency,
National Meteorological Administration of Romania):



- Gridded data series in **daily temporal resolution** and **0.1° × 0.1° spatial resolution** for: air temperature, total precipitation, wind speed & direction, sunshine duration, cloud cover, global radiation, relative humidity, surface vapor pressure, surface air pressure, snow depth
- Metadata catalogue of the **Climate Atlas of the Carpathian Region**
- Downstream **emergency response service** based on satellite data and GIS technology
- Satellite derived **vegetation indices** for vegetation state assessment and monitoring
- **Land Surface Temperature datasets for urban heat island** assessment and monitoring over Bucharest
- **Land cover/use database** based on Land Cover Classification System (LCCS) classification for the whole country (1:50000) and selected areas (1:25000)

Note for this presentation: Partial surveys and sample SCE countries are presented here



S3-3: Review the requirements and availability of satellite data, products, and approaches for land cover monitoring in SCE.

Greece survey:

- POSEIDON E1-M3A [Multidisciplinary observatory](#): Located at the eastern Mediterranean off-shore Crete island.
- PYLOS Southern Ionian [Sea water column & seabed observatory](#): Meteorological observations, oceanic observations in the surface ocean, observations in the water column and at the seafloor
- BEYOND: Real-time production maps of [active fires](#) every 5 minutes at a spatial resolution of 500m
- Dense network of automated [surface meteorological stations](#)
- ZEUS [lightning detection](#)
- Mobile [weather radar](#)
- [Hydrometric network](#)



S3-3: Review the requirements and availability of satellite data, products, and approaches for land cover monitoring in SCE.

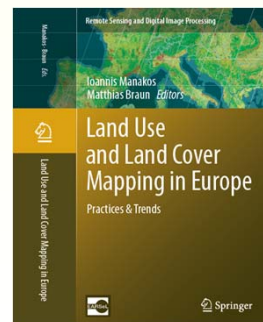
Bulgaria survey (source: Bulgarian Academy of Sciences):



- Observations on **flood events** (high-water) & **river-dam condition**
- Research & observations on other **extreme events**
- First European country where **LCCS version 1.0 LC mapping** was undertaken (14 LC digital maps, 5600 km²)
- National LC database using LCCS, currently available through a **national geoportal**

Moldova survey:

- **Land cover/use data** based on LCCS classification for the whole country (1:50000) and selected areas (1:25000)
- Comprehensive database for the whole country with the addition of **soil types**, **erosion features** and municipal/district boundaries





S3-3: Review the requirements and availability of satellite data, products, and approaches for land cover monitoring in SCE.

Turkey survey (source: University of Cukurova):



- Urgent [Monitoring after Earthquake](#)
- Upgrading [Seismicity Monitoring](#) Infrastructure Capacity in Marmara Sea
- [Micro seismology networks](#) operated under TURDEP project
- Baku-Tbilisi Tbilisi-Ceyhan Pipeline [Vegetation Cover Monitoring](#) Project.
- Absolute [radiometric](#) TUBITAK UZAY [contributions to GEO](#)
- Absolute [radiometric calibration](#) test site in Tuz Golu, Salt Lake
- Determination of [Snow Water Equivalent](#) In Eastern Anatolia
- Monitoring of [Coastal Erosion](#) using High Resolution Aerial Images, Kazanlı Mersin
- Installation of [disaster management](#) and [meteorological early warning](#) system in Rize Province
- [Natural Hazard Information](#) Systems
- [Meteorological Observation](#) System and [Early Warning](#) Systems (METSIS)
- [Continuously Operating Reference](#) Stations
- [River Monitoring](#) and [Climate Change Scenarios](#):
 - Land Evaluation Systems for Analyzing Climatic Risk in Agriculture; TAGEM Biodiversity Inventory; TAGEM River Monitoring & Pollution Control System
- Forest [Fire Identification and Monitoring](#) Systems based on computer vision methods
- [Flood Forecasting](#) System



S3-4: Outline the specific land-cover and land-use change research, applications and development needs in the SCE region.

Potential future products & applications towards GEOSS strategic targets {priorities}
(sources as aforementioned):

Romania

- DI-01 Informing **Risk Management and Disaster Reduction**:
 - Downstream emergency response service based on satellite data and GIS technology.
- WE-01 **High-Impact Weather Prediction and Information**:
 - Interoperable framework for geo-information management & forecasting of extreme meteorological events
 - Contribution to rounding off a national spatial data infrastructure (SDI)
 - Snow cover extent monitoring service
- SB-02 **Global Land Cover**:
 - New LC coverage every 3–4 years at low costs

Note for this presentation: Partial surveys and sample SCE countries are presented here



S3-4: Outline the specific land-cover and land-use change research, applications and development needs in the SCE region.

Potential future products & applications towards GEOSS strategic targets {priorities}
(sources as aforementioned):

Greece

- HE-01 Tools and Information for **Health Decision-Making**:
 - Air quality in-situ measurements
 - Satellite maps of PMs for the Mediterranean region
 - Mobile Application for monitoring air quality and alerting.
- WA-01 Integrated **Water Information** (incl. Floods and Droughts):
 - Stations for the continuous monitoring of surface flows along with a monitoring web application



S3-4: Outline the specific land-cover and land-use change research, applications and development needs in the SCE region.

Potential future products & applications towards GEOSS strategic targets {priorities}
(sources as aforementioned):

Bulgaria

- AG-01 [Global Agricultural Monitoring](#):
 - Measurements of the actual state of the parcels for the agricultural subsidy within LPIS
 - A pilot web-GIS for testing of PROBA-V data for agricultural applications on Bulgaria & Romania
 - Aerial survey of the country in 2005–2006 with GSD of 50/50 cm and in 2010-2011 with GSD of 40/40 cm
 - Two national digital soil maps and soil datasets and maps
- BI-01 [Global Biodiversity Observation](#) (GEO BON), EC-01 [Global Ecosystem Monitoring](#), WA-01 [Integrated Water Information](#) (incl. Floods and Droughts):
 - In-situ data



S3-4: Outline the specific land-cover and land-use change research, applications and development needs in the SCE region.

Potential future products & applications towards GEOSS strategic targets {priorities}
(sources as aforementioned):

Bulgaria

- DI-01 Informing [Risk Management and Disaster Reduction](#), WE-01 High-Impact [Weather Prediction and Information](#):
 - Information of Floods, Earthquakes, Forest Fires, 3D models and disasters and accidents
 - Thematic information for a variety of risks from natural disasters in GIS format
 - In-house data center and ground-receiving station for reception of MODIS, METEOSAT data
 - Existing network for disaster response
 - Existing network for validation of climate and hydrology satellite data products
- HE-01 Tools and Information for [Health Decision-Making](#):
 - Daily Bulleting for Air Quality network
 - European Radioactivity Data Exchange Platform network
 - Daily Bulleting for Radiological Situation network
- IN-01 [Earth Observing Systems](#):
 - Support to INSPITE, GLOBCOVER, Copernicus



S3-4: Outline the specific land-cover and land-use change research, applications and development needs in the SCE region.

Potential future products & applications towards GEOSS strategic targets {priorities}
(sources as aforementioned):

Turkey

- SB-02 Global Land Cover:
 - Land use change maps
- EC-01 Global Ecosystem Monitoring:
 - Data on ecosystems dynamics

Note: FYROM, Albania, Serbia, Cyprus and further data are available upon request



S3-5: Inform about ongoing major scientific efforts and projects with possible contribution and follow-up activities of the SCERIN participants.

- Numerous **projects** supporting GEOSS and GEO in the Balkans and Eastern Europe during the last years
- However, infrastructures, services and EO capacities still **beyond expectances** in the region

| Regions | GEO members | Non GEO members |
|----------------|---|--|
| Balkans | Bulgaria, Greece, Romania, Serbia, Croatia | Albania, Bosnia and Herzegovina, FYROM, Montenegro, Kosovo |
| Eastern Europe | Russia, Moldova, Latvia, Estonia, Ukraine, Georgia, Armenia, Azerbaijan, Kazakhstan | Belarus, Lithuania |
| Central Europe | Croatia, Czech Republic, Austria, Germany, Italy, Hungary, Poland, Slovakia, Slovenia | |



S3-5: Inform about ongoing major scientific efforts and projects with possible contribution and follow-up activities of the SCERIN participants.

| |
|--|
| Project (Geographic cover) |
| Major outcomes |
| OBSERVE - Strengthening and development of Earth Observation activities for the Environment in the Balkan area (Balkan region) [01/11/2010 - 30/10/2012] |
| •The OBSERVE network |
| BALKANGEONET - Inclusion of Balkan Countries into Global Earth Observation Initiatives (Balkan region) [Nov. 2010 – Oct. 2013] |
| •A gap analysis of Balkan EO capacity •Roadmap for full inclusion of Balkan countries into GEO •A web-based Permanent Networking Facility |

Note: selected examples are presented



S3-5: Inform about ongoing major scientific efforts and projects with possible contribution and follow-up activities of the SCERIN participants.

GEONETCAB - GEO Network for Capacity Building (Southern Africa, French-speaking African region, Czech Republic and Poland) [11/01/2009 – 12/10/2013]

- Promotion of earth observation applications worldwide
- Translation of (sometimes very technical) achievements in a comprehensive language
- User guidance to training material and low-cost imagery & processing software

BEYOND - Building a Centre of Excellence for EO-based monitoring of Natural Disasters (South-eastern Europe) [01/06/2013 – 31/05/2015]

- Integrated observational solutions to allow multiple monitoring networks (space borne and ground-based) to operate in a complementary, unified and coordinated manner
- Archives & databases of long series of observations and derived higher level products
- Making these observations and products available for exploitation



S3-5: Inform about ongoing major scientific efforts and projects with possible contribution and follow-up activities of the SCERIN participants.

ENVIROGRIDS - Building Capacity for a Black Sea Catchment Observation and Assessment System supporting Sustainable Development (Europe, Asia) [01/04/2009 – 31/03/2013]

- Use of grid enabled computer technology to store and analyse environment data
- Early warning system to inform the citizens and decision-makers on environmental vulnerability and risks associated to selected Societal Benefit Areas

ECOPOTENTIAL: Improving future ecosystem benefits through Earth Observations (Europe) [01/06/2015 – 31/05/2019]

- Assessment of the status and ongoing changes of ecosystem functions and services in varied environmental conditions and for different protection levels for 22 protected i) mountain, ii) arid and semi-arid, and iii) coastal and marine ecosystem sites in Europe
- Definition of the needs of future protected areas
- Evaluation of cross-scale ecological interactions and landscape-ecosystem dynamics
- Common and open platforms & linkage to GEOSS
- Ecosystem Data Service related to the Copernicus space component (ECOPERNICUS)
- New ecosystem models able to make best use of EO and monitoring data



open to suggestions, listing mine below for

- common exercises initiation between FGs and SIGs, setting specific challenges and concepts to pursue and test;
- common publications (book, text releases, etc.);
- SEOS e-learning modules translation and enrichment (www.seos-project.eu);
- Joint events organization;
- Support for young scientists finding info and jobs, i.e. via a forum on the web;
- Others that you might think of.....

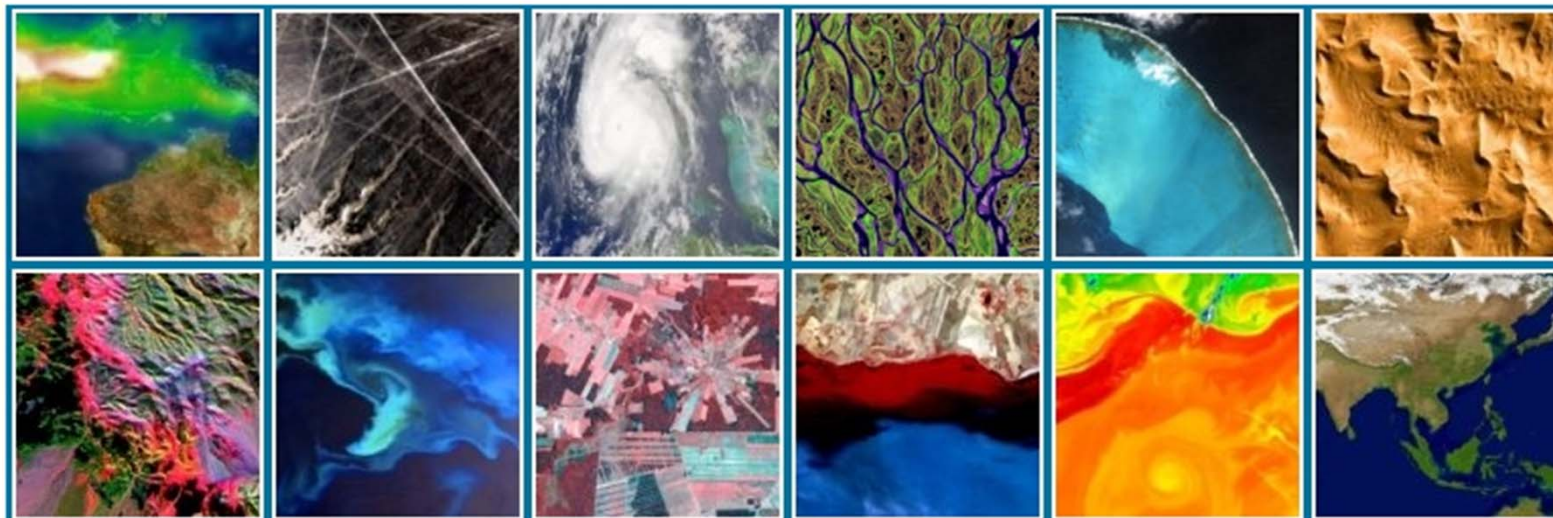


Figure Credit: www.seos-project.eu



At your disposal for discussion & cooperation

imanakos@iti.gr

My special thanks to my colleague,
Dr. Zisis Petrou :



and to the EARSeL Bureau, Council and Members

for their support :

