The European Union Strategy for the Danube Region and Romanian Scientific Community
The Danube River is the largest river in the EU (~2 850 km in length); its drainage basin (~817,000 km²) is shared by eight EU countries (Germany, Austria, Hungary, Czech Republic, Slovak Republic, Slovenia, Bulgaria and Romania) and six non-EU countries (Croatia, Serbia, Bosnia and Herzegovina, Montenegro, Ukraine and Moldova) with a population over 115 million.

The region is facing numerous problems as: environmental threats, insufficient energy and transport connections, uneven socio-economic development as well as some life safety and security problems.
The Danube River is part of the largest river – delta – sea system of European Union. The other two components of the system are:

- **The Danube Delta** (~5 800 km²) shared by Romania (~80%) and Ukraine (~20%)
- **The Black Sea** (~420,000 km²) with six riparian countries: Bulgaria, Romania, Ukraine, Russian Federation, Georgia, and Turkey

The three components of the system (the Danube River, the Danube Delta and the Black Sea) strongly interact and influence each other.
The European Union Strategy for the Danube Region (EUSDR) was launched in June 2011. The main objectives of EUSDR are: (1) connectivity; (2) protecting the environment; (3) building prosperity; and (4) strengthening the Danube Region.

There are a number of international conventions and organisations in charge with the environmental and sustainable management of the Danube River – Danube Delta – Black Sea System that will contribute to the EUSDR. Among them are to be mentioned:

**For the Danube River:**
- **Environment:** 1985 - the Bucharest Declaration on Water Management of the Danube River; 1991 - the Danube River Protection Convention (DRPC); 1991 - the Environmental Programme for the Danube Basin (EPDRB); 1998 - the International Commission for the Protection of the Danube River (ICPDR)
- **Navigation:** 1856 - The Danube River European Commission; 1948 - the International Convention of navigation on the Danube River, signed in Belgrade; 1954 - the Inter-governmental Danube Commission established in Budapest, Hungary

**For the Danube Delta:** 1990 - the Danube Delta Biosphere Reserve (DDBR) and the Danube Delta Biosphere Reserve Authority (DDBRA); 1998 - the Danube Biosphere Reserve for the Ukrainian part of the delta (Kilia Delta).

The Scientific Support to the EUSDR, as it was defined by JRC, should to focus on:

- Environmental protection;
- Water use and agriculture development;
- Navigability;
- Energy production.

Romanian R&D institutes and higher education universities are interested to participate in the JRC’s project focused on Water-Agriculture-Energy-Ecosystems Nexus in the Danube Region.

Romania has also proposed a number of short and medium term as well as long term projects to support EU Strategy for Danube Region.

Among the long term projects we shall present the following:

   Case study: Danube River – Danube Delta – Black Sea System
2. MARINEGEOHAZARDS - Black Sea Early-Warning System

Case study: Danube River – Danube Delta – Black Sea System

The Danube International Centre will answer to the:

To Priority Areas of the E.U. Strategy for the Danube Region as:

- The Priority Area 7 - Specific Action of the Danube Strategic Action Plan already mentioned: “To strengthen the capacities of research infrastructure: To establish joint international research centres for advanced studies” - a project proposed by Romania focusing the Danube River and the Danube Delta.
- Connecting the Danube Region (added value – interconnection with ALL Europe);
- Protecting the Environment in the Danube Region;
- Building prosperity in the Danube Region;
- Strengthening the Danube Region

To Europe 2020 strategy – all 5 major goals (employment, innovation, education, poverty reduction and climate/energy)
The Danube International Centre for Advanced Studies for Rivers – Deltas – Seas is not only the solution to European political priorities – but also a needed and agreed research infrastructure from an ever increasing number of EU universities and R&D institutions
“The actors”

Initiative

Present

(Near) Future
“The actors” (institutions)
Major goals

- To improve the sustainable, innovative and adaptable management of wetlands, deltas, lagoons and coastal ecosystems by studying in deep the processes influencing the evolution environmental state of the River – Delta – Sea systems

- To develop knowledge based economy to support the economic growth of Danube – Danube Delta – Black Sea region without disturbing its natural biodiversity

- To increase the involvement of local communities in the sustainable management of wetlands
Scientific mission

• Assessing the river-delta-sea macrosystems` characteristics and reference state of environment

• Global climate changes and related consequences for river-delta-sea macrosystems

• Ecosystem response to climate change

• Effects of increasing human activities on river-delta-sea macrosystems

• Changes in Societal Demand on river-delta-sea macrosystems
Interconnected Scientific domains

Life sciences:
- Ecosystem assessment and monitoring; restoration strategies, nature conservation, modelling, simulation and hypothesis testing etc.

Earth sciences:
- Origin & evolution of D-DD-BS system; geodynamic processes; oceanography, hydrology and sedimentology; geo-hazards and risk assessment; modelling regional impact of climate change etc.

Socio-economic sciences:
- Assessing the changes in society demand; natural resources assessment and valuation; anthropogenic impact on ecosystems goods and services; development scenarios and measures for sustainable use
Additional issues

A. **Permanent education** – common international programmes will contribute to harmonising teaching systems across the D-DD-BS region; the ecological education will increase awareness on the environmental values and the need to preserve it.

B. **Environmental laws and regulations** – provides tools for the implementation of EU policy for environmental protection.

C. **Green products and technologies** – focus on the valorisation of natural resources in the D-DD-BS system according to the sustainability principles.
Principles of Centre’s functioning as Pan-European distributed Research Infrastructure

The Centre will:

- become an ERIC (European Research Infrastructure Consortium) from the legal point of view
- have an international management
- have an International Scientific Board
- have an International General Council with participation of Stakeholders and NGO-s

The Danube International Centre for Advanced Studies on River – Delta – Sea Systems: case study the Danube River – Danube Delta – Black Sea System is considered by the Romanian Government as a project of national priority
Distributed Research Infrastructure

(Example of connecting hub and nodes in function of request)
Location of the Danube International Centre for Advanced Studies on River – Delta – Sea Systems
WHY DANUBE DELTA?

Position: interface between the Danube River (the most international river in the world, over 2 800km in length) and the Black Sea

Unique place:
- the largest delta of the European Union (~6 000 km²)
- less affected by human activities
- high biodiversity (over 30 types of ecosystems)

Conservation status:
- Ramsar site (1991)
- Biosphere Reserve
- UNESCO MAB Program
- UNESCO World Heritage site
WHY MURIGHIOL?

*Location:* placed on the Danube River (St. George arm, within the Danube Delta Biosphere Reserve, the location was selected from 11 sites)

*Access facilities:* by road and by the Danube River, immediate access to the Danube Delta, access to the coastal zone and to the Danube River.

*Land availability:* **Murighiol Local Council approved about 10 hectares area for the Centre**
Other already existing major facilities that will be used by the Centre since the beginning

R/V “Mare Nigrum” – 3 000 tdw

R/V “Istros” – for river and coastal sea research

Laboratory boat “Halmyris” for the Danube Delta research
Short term plan (end of 2013 - 2014)

Final **Version of the White Book** – a scientific and structural Framework Programme of the Centre

Drilling **reference borehole** (100 m depth) inside Murighiol Centre location

Designing, obtaining official approvals and starting works on **building No.1 of the Centre**

2014 – application of the Danube International Centre as **ESFRI ENV Pan-European Distributed Research Infrastructure**
Mid-term plan 2014 – 2020 (structural funds - construction)

Construction
  • Phase 1 – late 2014 – 2015
    - Basic constructions – to add to already existing facilities and infrastructures from other partner countries
    - Buildings for field research activities on the river – delta – sea system
    - Administrative building of the Centre and office building for scientists
    - Main logistics
Mid-term plan 2014 – 2020 (structural funds - construction)

Construction

Phase 2 – 2016 – 2017
- Specialized high-tech laboratories – as agreed in the ESFRI Proposal

Phase 3 – 2018 – 2020
- Specialized high-tech laboratories – as agreed and resulted from the Preparatory Phase.
- Research Vessels to replace existing fleet for studying the river, delta and sea
GENERAL VIEW OF THE DANUBE INTERNATIONAL CENTRE
2. MARINEGEOHAZARDS - Black Sea Early-Warning System

Romania-Bulgaria cross-border project with four participating institutes:
- from Romania: the National Institute of Marine Geology and Geo-ecology – GeoEcoMar and the National Institute of Earth Physics;
- from Bulgaria: the Institute of Oceanology – Varna and the Geological Institute - Sophia, both from the Bulgarian Academy of Sciences

The project MARINEGEOHAZARD is aimed at:
- implementing an integrated early warning system, accompanied by a common decision support instrument;
- increasing the regional technical capacity, for the detection, assessment, forecast and fast notification of risks related to natural marine geo-hazards for the western Black Sea;
- protecting local communities, the environment and the goods in the coastal area, related to the consequence of natural marine geo-hazards.
The Black Sea Early-Warning System – MARINEGEOHAZARDS is composed of two sub-systems:

• The EUXINUS sub-system or network - the Black Sea regional early warning system to marine geo-hazards able to survey and monitor the characteristics and the dynamics of water masses in the coastal sea, to monitor marine seismic events and to detect potential natural marine geo-hazards of risk;

• The GeoPontica sub-system/network - the first on-line geodynamic surveillance network in the entire Black Sea region providing information on:
  ▪ Vertical movements of the Earth crust as isostasy, epeirogenetic uplift, subsidence, sediment compaction;
  ▪ Horizontal movements of the Earth crust due to global tectonics (motion of the lithosphere plates) or relative movements of tectonic blocks;
  ▪ Changes of the mean sea level position.
The EUXINUS sub-system is composed of:

- 5 complex, fully automatic marine stations (buoys) with automatic equipment for measuring the characteristics and the dynamics of water masses at two or three water depth levels and tsunameters;
- real-time on-shore equipment (3 marine seismicity monitoring systems, 1 coastal gauge, 5 strong motion seismometers and 5 extensometers);
- specialized seismic devices operated from the Romanian R/V Mare Nigrum and the Bulgarian R/V Akademic (7 Ocean Bottom Seismometers and 1 Marine seismic acquisition system)
- Interconnected, national co-ordination Centres, located in Constanta, Romania and Varna, Bulgaria. The Centres are provided with common decision support software and technical means to evaluate and forecast marine geo-hazards.
The GeoPontica sub-system includes:

- 18 on-line geodynamic stations located along the Romanian and Bulgarian Black Sea coast;

- 2 coordination Centres located in Constanta, Romania and Varna, Bulgaria
The Marine-geohazards project will enter from the beginning major EU Observing Systems and ESFRI projects:

- GOOS – Global Ocean Observing System, specifically Black Sea GOOS, and GEOS – Global Earth Observing System
- EMSO European multidisciplinary seafloor observation infrastructure
- EURO-ARGO Research infrastructure for ocean science and observations
- European Plate Observing System (EPOS) - Research Infrastructure and e-Science for Data and Observatories on Earthquakes, Volcanoes, Surface Dynamics and Tectonics.
- LIFE WATCH - Science and technology infrastructure for biodiversity data and observatories
Thank you for your attention