

**"JOINT MEETING OF ACTION TEAM ON GNSS AND GNSS EXPERTS OF UN/USA REGIONAL WORKSHOPS AND INTERNATIONAL MEETING 2001-2002"**

**8-12 December 2003, Vienna, Austria**

# **GNSS implementation programme in Romania: applications of current systems and developments towards Galileo**

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## **PREAMBLE**

**The Romanian Space Agency (ROSA), as the national space R&D programme leading institution and international representative of Romania in major space related organizations and agreements, is developing and planning applications based on GNSS technology with a view to the specific national and regional level.**

# PROJECTION AT NATIONAL LEVEL

In the framework of R&D programme important projects and studies focussing on :

- specific natural disasters flood, land degradation and forest fires (project MONRISC), earthquakes (EVRISE),
- actions towards increasing security to environmental (MODVEGET, SISMIN, INSARCO), food security (ADAM, LCCS, LPIS-RO), and human risk generating factors (REAL TRACE)
- Applications integrating GNSS mobile and personal systems with communications infrastructure
- Transportation and aerospace professional systems development
- systems and studies for the Romanian participation to the GALILEO program

are developed by ROSA centres and the affiliated institutes, universities and specialised companies on a wide thematic basis. In fact, the Public Private Partnership (PPP) is considered the key of success of the development planning.



# Project EVRISE (Evaluation of seismic risk)

Use of VHR data integrated in a GIS linking the seismic sensors network by sat-telcom to the civil defence action team



**Downtown Bucharest**

**SPOT 5 supermode natural colors (2,5 m res) © CNES 2002**

## **PROJECTION AT REGIONAL LEVEL**

- Most of the projects are developed and achieved within international partnership and aiming at creating synergy among the regional initiatives of various institutions or groups of institutions able to prepare a joint implementation strategy**
- Main partners: ESA, the European Commission, CNES, NASA, other agencies**
- Cooperation with less developed countries is another purpose**

**ROSA has taken a regional lead in Europe in promoting the use of space technology for disaster management and natural resources inventory and makes all effort to further increase its use.**

**Particular developments focus on items as the Danube Basin and the national aerospace industry**



# The Danube Space



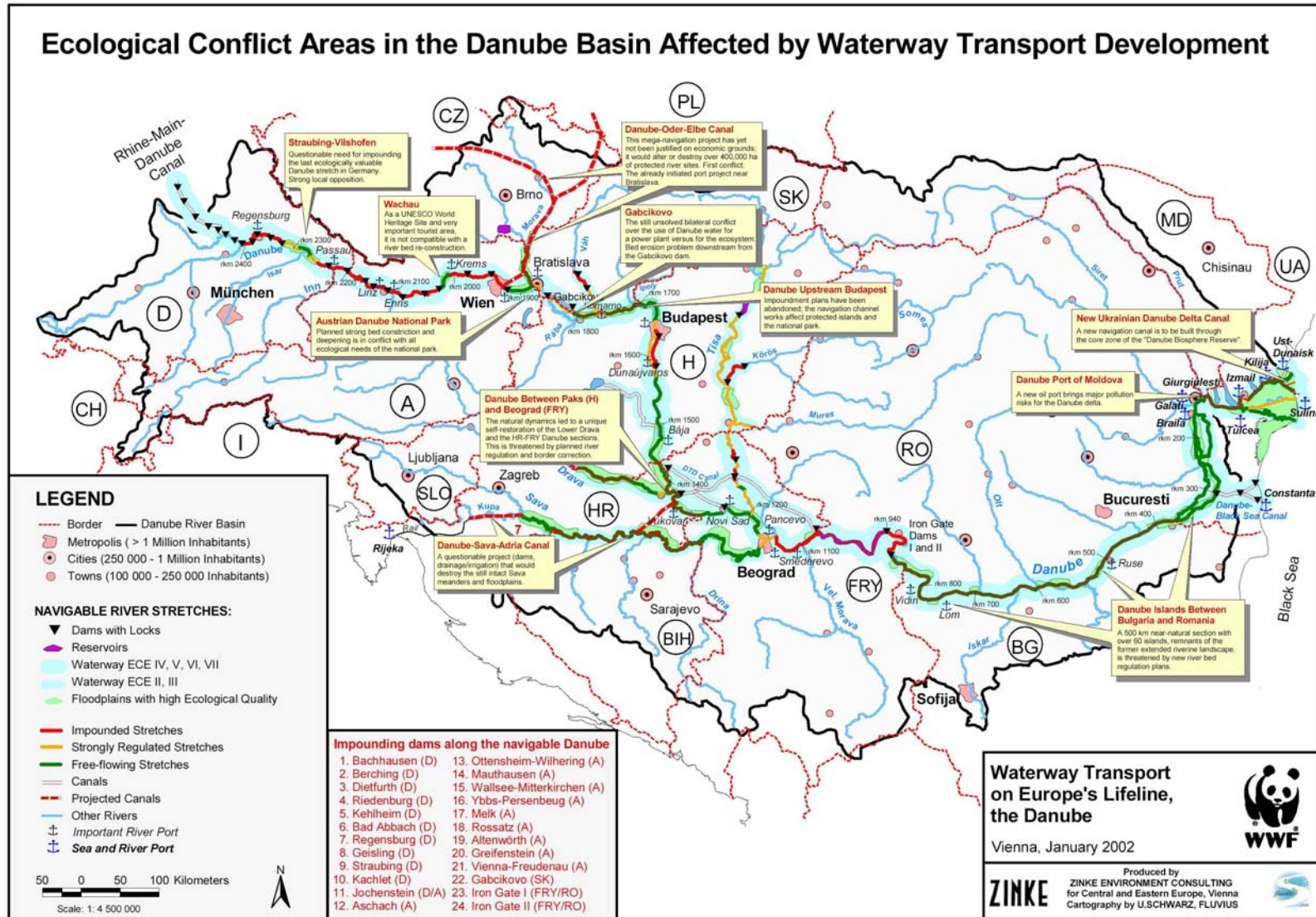
## The Core Countries

- Austria
- Bulgaria
- Czech Republic
- Germany
- Hungary
- Romania
- Slovak Republic
- Slovenia

May 2000 – Credits: Orbimage



# Danube Navigation



# Transportation corridors around the Danube

RANDMR1393-4.3



SOURCE: EIB.





# Danube Delta



# The Danube-Black Sea Canal

- Built between 1975 and 1984, the canal links the Danube (south of the town of Cernavoda) with the Black Sea (at Agigea - Constanta South) and shortens the shipping route to Constanta by about 400 km.
- Two-way river traffic (around 75 million tons per year)
- 64.2 km long, 110-140 m wide and 7-8.5 m deep, and can receive ships with a draught of up to 5.5 m.
- By the opening for traffic in 1992 of the Main - Danube Canal on Germany's territory, a direct connection was created between the Black Sea and the North Sea (between the ports of Constanta and Rotterdam).
- The Canal shortened the maritime way to Bosphorus and the Middle East with 400 km



# GENERAL NEEDS AND GOALS OF ROSA'S GNSS ACTIONS

- **DEVELOPMENT OF:**
  - knowlege
  - infrastructure
  - applications
- **ENHANCE ACTIVITIES AT :**
  - national level
  - Regional level
- **SUPPORT RESEARCH ACTIVITIES**
  - Create links betwn universities, research institutes, services operators and industries
  - Start contracts for developing methodologies and standards in order to facilitate the use of GNSS in different domains of the Romanian
  - Develop educational tools

# THE CORE GNSS PROJECT (1)

***“Systems and studies for the Romanian Participation to the GNSS and GALILEO programs”***

- **Duration: 2002 – 2005**
- **Main objectives:**
  - **Identify applications and users of GNSS and Galileo systems**
  - **Create a Center for GNSS-Galileo Application to support the implementation of applications and the dissemination of GNSS potential to all possible users**
  - **Develop the Romanian strategy to further integrate GNSS applications and to future participate in the Galileo program in almost all phases**
  - **Develop technical and economical studies for proving to potential users the benefit of GNSS technology applied in different domain of the industry**



# THE CORE GNSS PROJECT (2)

The project “Systems and studies for the Romanian participation to the GNSS and GALILEO programs” is focused on building an understanding of the current needs, the current institutional environment and the current available space-based solutions, current trends, new innovative developments and initiatives and also institutional aspects that should be further considered :

1. Inventory of Romanian organizations with capabilities in GNSS and Galileo activities :

- R&D, equipment development and manufacturing, infrastructure
- Advanced technological research for the ground and space segment : atomic clocks, orbits, atmospheric corrections, interferences, a.s.o
- Technology and applications developers and integrators
- Primary users: services providers, public institutions ;
- Final users : terrestrial, maritime and air traffic, geodesy, cadastre, security, insurances ...

2. The need to continuously capacitate both the industry and the end-user and the need to develop solutions which are specific to the region.



# **SUBJECTS IDENTIFIED DURING THE INITIAL PHASE OF THE PROJECT**

## **NATIONAL NEEDS FOR INFRASTRUCTURE DEVELOPMENT**

- **Development of a more accurate geoid model for the Romanian territory ;**
- **Enlargement of the national control point network using GNSS technology ;**
- **Create a digital map of the Romanian territory based on a compatible projection system and format to be used in the GNSS applications ;**
- **Strengthening / developing the legal base and aspects for the use of GNSS applications ;**
- **Development of a pilot augmentation system for the differential GNSS applications**

## **REGIONAL NEEDS FOR INFRASTRUCTURE DEVELOPMENT**

- **Integration of the national GNSS network in the regional and European networks (EGNOS ?);**
- **Technical studies and first implementation steps to develop a GNSS monitoring system for the Danube river traffic and environmental problems.**



# FUTURE ACTIVITIES TO BE DEVELOPED (1)

- **New applications oriented to the citizen,**
- **Public services using GNSS,**
- **Surveying and mapping activities by using GNSS technology,**
- **Promote and support the integration of GNSS applications results with the new information systems: GIS, G3 communication modules,**
- **Developments of information technology support, as for the GRID distributed information systems, location based authentication a.s.o.**



## FUTURE ACTIVITIES TO BE DEVELOPED (2)

- **Development of common applications for:**
  - Road vehicle and naval traffic management
  - Navigation systems for terrestrial, marine and aerospace platforms
  - Emergency and disaster monitoring
- **Promote special GNSS applications in:**
  - Telemedicine
  - Entertainment
  - Robotics
  - Basic science
  - Precision farming
- **Participation of Romania in the European Galileo Satellite Radio-Navigation System**

**More Info at [www.rosa.ro](http://www.rosa.ro) !**





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The team of ROSA thanks for your attention !

