

"UN/USA REGIONAL INTERNATIONAL MEETING ON THE USE AND APPLICATIONS OF  
GLOBAL NAVIGATION SATELLITE SYSTEMS (GNSS)"

13-17 December 2004, Vienna, Austria

# THE PROGRESS OF THE GNSS ACTIVITIES IN ROMANIA IN 2004

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# MEMENTO



**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.**



# GENERAL NEEDS AND GOALS OF ROSA'S GNSS ACTIONS

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



# COOPERATION ACTIVITIES CONCLUDED OR STARTED IN 2004



• PROJECT ADAM (Assimilation des Données par Agro-Modélisation)

• Project FAO-TCP/ROM/2801-3001 (2002-2004)

“Land Cover/Land Use Inventory by Remote Sensing for the Agricultural Reform”

(The target of this project was the production of land cover maps an associated database of the whole country and detailed land cover/land use maps for few areas of particular interest)

• Project FAO-TCP/MOL/2903 (A) (2002-2004)

“Building capacity in inventory of land cover/land use by remote sensing”

(The general objective of the project is an increased agricultural production by provision of essential data at medium scale for land redistribution and agricultural planning process suitable to the local conditions)



**PROJECT ADAM (Assimilation des Données par Agro-Modélisation)**

*SCIENTIFIC INTERNATIONAL INTEREST*

**Project FAO-TCP/ROM/2801-3001 (2002-2004)**

**“Land Cover/Land Use Inventory by Remote Sensing for the Agricultural Reform”**

*NATIONAL PUBLIC INTEREST*

**Project FAO-TCP/MOL/2903 (A) (2002-2004)**

**“Building capacity in inventory of land cover/land use by remote sensing”**

*REGIONAL INTEREST*



# ACTIVITIES STARTED / REALISED IN 2004





## National R&D Programme

New projects with GNSS topics evaluated and accepted

## Workshops/Conferences

- EURISY Conference “*The Danube and Europe: Integrated Space Applications in the Danube Basin*”, 23-25 June, Mamaia–Romania ; Co-sponsored by: Romanian Space Agency, United Nations Office for Outer Space Affairs, European Space Agency
- National Conference Aeronautics and Space

## Related GNSS initiatives

- GNSS portal (hosted by Intergis)
- Extended GNSS Permanent Stations – Network (EG-PSN)



# NATIONAL “AERONAUTICS AND SPACE” R&D PROGRAMME



# NATIONAL "AERONAUTICS AND SPACE" R&D PROGRAMME

## Call for offers 2004

In the framework of R&D programme new GNSS projects are developed by ROSA centres, affiliated institutes, universities and specialised companies :

- **Telemedicine in the Danube Delta**
- **RS seaside monitoring**
- **RS classification for forestry**
- **Dust content evaluation by aerial and space RS**
- **Satellite images for flood models**
- **Monitoring of water resources using IR thermal MW satellite data for the security of the citizen**
- **Portable GPS surveying and monitoring system**
- **Airborne spatial topographical data recorder and processing system**



# Workshops / Conferences



**EURISY Conference “*The Danube and Europe: Integrated Space Applications in the Danube Basin*”, 23-25 June, Mamaia– Romania**

**Purpose (Objectives, Aims)**

The Conference covered:

- scientific / technical definition on regional items identification and on how space technology could support their management,
- on-going and future space technology projects and initiatives in the region,
- trends and aspects of applications for the European scale projects, as GALILEO / EGNOS, GMES, ENVISAT, ARTES, EU Water Framework Initiative

## National Conference “Aeronautics and Space”

- Any team responsible with the realization of a project has to present annually the activities.
- This traditional event facilitates the establishment of new partnerships.
- Tools as satellite imagery, navigation and positioning, telecommunications and their integration in geographic information systems are analyzed and allows the participants to propose new research topics.

## Related GNSS initiatives

- **GNSS portal (hosted by Intergis)**
- **Extended GNSS Permanent Stations – Network (EG-PSN) by ANCPI**

# The discussion forum supporting the participation of interested individuals/organizations to the development of GALILEO project

The screenshot displays the Intergis website, which serves as a discussion forum for the GALILEO project. The page is titled "GNSS" and features a navigation menu with "Home", "News", "Forum", and "Topics".

**modules:**

- Home
- News
- Downloads
- Forum
- Login
- FAQ

**the weather:**

Bucuresti / Inmih  
la 08:00 EET  
12 °C  
Vant: Calm --  
Umiditatea: 71 %  
Presiunea: 1021 hPa  
[Prognoza meteo \(5 zile\)](#)

**FORUMS**

**GNSS Surveying**

- GEOID MODEL**  
write problems you have due to lack geoid model  
write proposals to improve or develop it
- PROJECTION SYSTEM**  
write problems of transformation from WGS84 system into your own projection system

**DGNSS**

- PERMANENT GNSS STATIONS**  
Ideas about the development of a permanent GNSS network
- APPLICATIONS**  
opinions about the needs of high accuracy provided through DGNSS

**Monitoring Systems**

- no threads

**Navigation**

- no threads

**Intergis srl**

Under construction  
**Home**

The field of activity is in the range of services for all kinds of terrestrial measurements: geodesy, topography, high accurate GPS determination, etc.

**Forum si Portal GNSS - Posted by root**  
New GNSS FORUM!!!!!! (under construction)click here...  
News ID 5

**Project GALILEO - Posted by root**  
Sistemul "Pro-Galileo" este un sistem informatic specializat în colectarea, stocarea și diseminarea informațiilor legate de sistemele GNSS (Global Navigation Satellite System) în România. Acest sistem se bazează pe crearea unor baze de date despre sistemele GNSS, în special GALILEO, GPS, GLONASS, EGNOS și stocarea lor electronică. vezi site...  
News ID 4

Pages: 1

Intergis Site v2.0  
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Author: Cristian Vasile

KBoard Forum v0.4

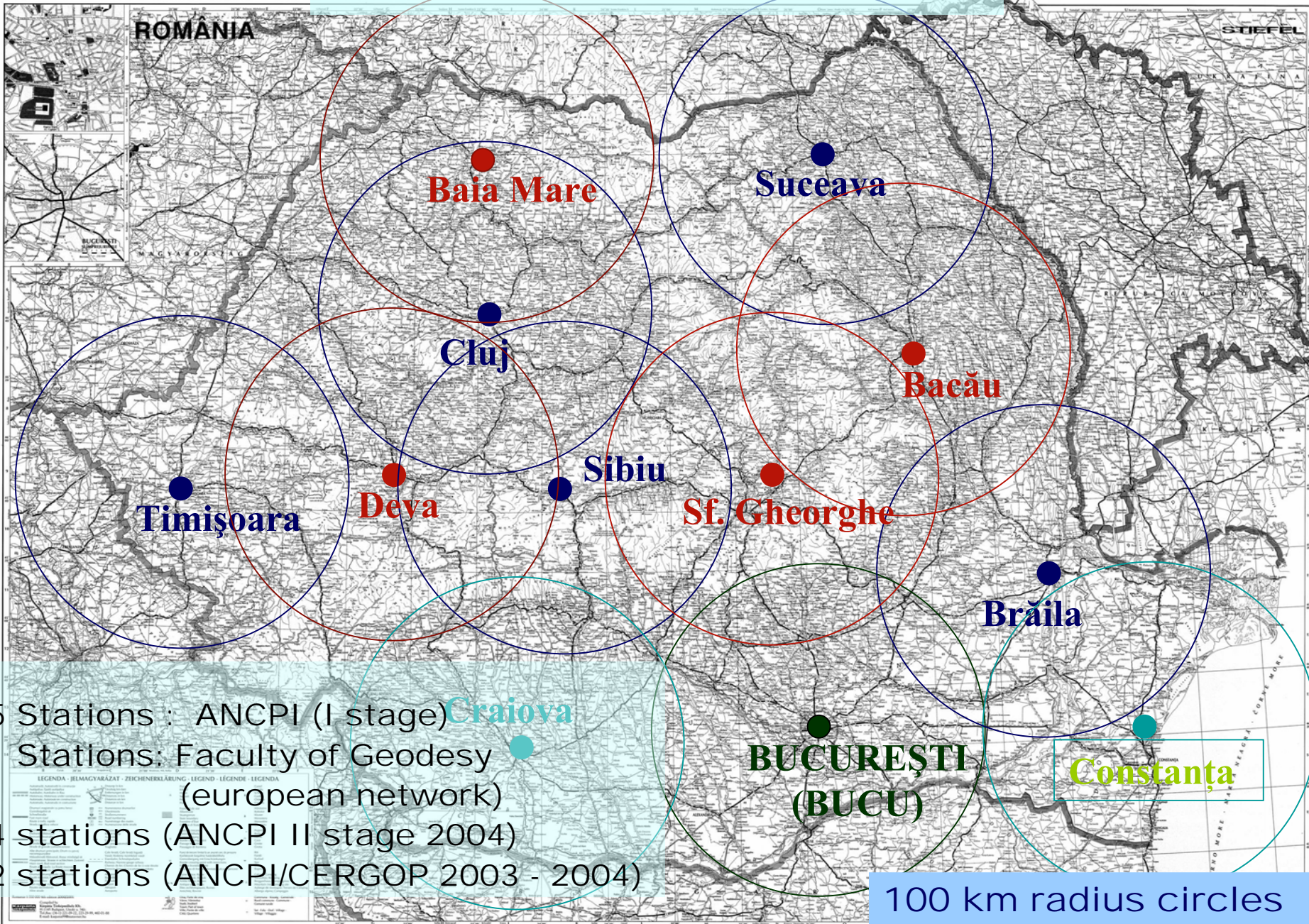


## **Objectives for the Extended GNSS PS-Network (EG-PSN)**

- **Modern national network;**
- **Active reference system;**
- **Uniform distribution of the GNSS PS in the whole territory of Romania;**
- **Integrated services – DGNSS+RTK+Meteo +...+ oriented applications;**
- **Connection of EG-PSN to the international PSN (EUREF-EPN, EGNOS, IGS, EUPOS);**
- **Cost recuperation by promoting several services ;**
- **Assurance of the future improvements and development of the specific applications.**



# PERMANENT GNSS STATIONS





# OUTLINE CRITERIA

- **Maintenance of the existing PSN at the 1.01.2004 (5+1);**
- **Distance between PS cca. 100km in the configuration of EG-PSN;**
- **Assurance of internet communication (internet/GSM);**
- **Monitoring and control from one central center;**
- **Assurance of international collaboration (EUREF, CERGOP2)**
- **Minimum costs for maintenance;**
- **Diversification of the employers and applications.**

# PERFORMANCES 2004

- **Purchase of new equipments for 5 PS ;**
- **Integration of all GNSS-PSN into one network via standard communication lines with new and adequate software;**
- **Purchase of new software for monitoring of all GNSS-PS and data processing *Spider (Leica), Bernese vs.5.0 (UT Berna);***
- **Bring up to date of the 5 old GNSS-PS (equipments and software);**



# PHOTOGRAMMETRIC DEVELOPMENTS

Frequently, the kinematic GNSS measurements are used in aero-triangulation, in three distingue epochs:

- **determination of the coordinates for the control points;**
- **monitoring and scheduling of the photogrammetrical fly;**
- **computation of the coordinates for the exposure centre of the photogrammetrical camera at the registration moment.**

**The GNSS technology was succesfully used in the framework of important photogrammetric projects, both with classical and digital camera systems. (Note: The first flight with a digital camera in Romania done on 04/04/2004)**

**In view to prove the possibility to use the extended permanent stations for photogrammetric determination of the exposure centers, even at a relative large distance, a specific surveying test was done.**

**Comparing determinations from PS located at different distances (one in the area of fly and the others up to 600 km distance), the test indicated less than 25 cm differences between the computation of the expose centers.**



# OTHER INITIATIVES



# SECURITY RESEARCH

- Constitution of an INTER-AGENCY COMMITTEE for SECURITY RESEARCH at national level
- MEMBERS : Ministry of Defense, Ministry of Interior and Administration, Special Services, Ministry of Education and Research ...
- EXECUTIVE LEADERSHIP : Romanian Space Agency. The decision of the Romanian Government proves that the SPACE activities constitute an important support for the security at national and regional level.
- The committee proposed an R&D programme for security containing space applications elements (including GNSS) to be financed in 2005 and fully compliant with the similar EC initiative.



## **In fact the GPS, Galileo, GMES projects / applications used in**

- **sensitive areas (sensitive awareness),**
- **antiterrorism,**
- **crisis management,**
- **interoperability,**
- **computer terrorism (possible localization and validation using GNSS tools ?),**

**have to become the scientific / technical support for this field of research.**

The simultaneous coordination of the Space and Security R&D activities by ROSA introduces a new political concept.

The adoption of this new strategy will increase the role of space activities at national, regional and international level.





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**The team of ROSA thanks for your attention !**

