

# **STUDIES AND SYSTEMS FOR ROMANIA'S PARTICIPATION IN THE GNSS-GALILEO PROGRAMME**

**Programme: AEROSPATIAL**

**Project code: 22001**

**Contractual Authority: Romanian Space Agency - ROSA**

**Contractor: SC IAROM SA Bucharest-project coordinator**

**Partners:**

**-SC AEROSTAR SA Bacau**

**-INTERGIS GRUP SRL Bucharest**

**-TECHNICAL UNIVERSITY OF CIVIL ENGINEERING OF BUCHAREST**

Galileo-GNSS represented a major project, which proposed significant objectives, such as: highlight of economical areas which will benefit from European system Galileo, evaluate the conditions which must be accomplished by Romanian economy so that the system become operative on the whole Romanian territory, proposal for technical projects which prepares the achievement of conditions for Romania's adhering to the Galileo project, identify the areas in which Romania can participate with the own industry to the development of Galileo project, defining some major applications which economically stimulate the interest of industry for using the GPS-Galileo technology.

The Galileo programme was launched in March 2002 by European Council. Galileo will be the first civil satellite navigation and positioning system. Romania can offer special implementation conditions because of its size, diversity, geographical position, and a more pronounced development in the aerospace area compared to others candidate countries.

Within the framework of the project, spread out on a three-years period, were achieved many results, which covered many areas:

- Analysis of the technical, economic and political conditions for Romania's participation in the Galileo programme
- Studies regarding the development of the conditions and the infrastructure necessary for the implementation of the Galileo system in Romania
- Defining the requirements asked for developing a strategy for an actual participation to the Galileo programme and the working out of an adhering strategy, and also the identification of the main implementation measures.
- Experimentation of some GPS applications
- Organizing a Pilot Center for applications of the satellite navigation systems - ANSAT
- Organizing a local Center for Galileo applications.
- Creation of a web page for dissemination of information about the Galileo system
- Design of pilot applications for using the GPS technology in transport monitoring, and realization of prototypes: „MONITORING SYSTEM FOR MEANS OF TRANSPORTATION, USING THE GPS TECHNOLOGY” and „MONITORING SYSTEM FOR NAVAL TRAFFIC”, for improvement of solutions for real-time navigation, using differential corrections.
- Studies regarding applications in positioning, monitoring and navigation, using the GNSS-GALILEO technology
- Creation of a database system for dissemination of information about the Galileo programme in Romania
- Technical analysis of problems of interoperability of the Galileo system with the NAVSTAR and GLONASS systems
- Large databases were developed, comprising general and comparative information about the GNSS systems.
- Large participation to major national and international scientific events with papers focused on promoting the GNSS techniques
- It was developed a programme for teaching specialists from different domains of GPS-Galileo systems applications. Were maintained lectures about using the GPS technology for developing various applications, in September 2004.
- Were developed case studies:
  - ⇒ Performance of a measurement system of angular coordinates and space positioning of moving objects using GNSS technology
  - ⇒ Performance of a monitoring system for the city traffic
  - ⇒ Implementation of the geoid in accurate air navigation based on using the GNSS-GALILEO systems
  - ⇒ Use of the GNSS system in large rivers navigation

- ⇒ Use of the GNSS system in mountain rescue operations
- ⇒ Use of the GNSS system in special transports, environment protection and control.

During the project, data collected from the GPS permanent station at the Technical University of Civil Engineering Bucharest – Faculty of Geodesy were continuously used.

➤ **The project's stages:**

**Stage 1:** Definition of basic strategic directions for Romania's participation to the GALILEO programme;

**Stage 2:** Study about the technical and economical conditions for Romania joining to GNSS-GALILEO programme;

**Stage 3:** Definition of the Pilot Center for GALILEO Applications (ANSAT) - implementation stages;

**Stage 4:** Definition of the pilot applications;

**Stage 5:** Database development in the way of interoperability between the GALILEO system and the NAVSTAR and GLONASS systems;

**Stage 6:** Study and experiments about the interoperability between the GALILEO system and the two existing functional systems;

**Stage 7:** Performing pilot applications and training programmes for using of the GPS technology;

**Stage 8:** Finishing of pilot applications;

**Stage 9:** Elaboration of Romania's strategy for joining GALILEO programme and its means of implementation for the years 2005 – 2015;

**Stage 10:** Final report

➤ **Prototypes realized during the project:**

Prototype for „**Monitoring system for means of transportation, using the GPS technology**”

The system aim is applications for cars monitoring.

His functions are:

- vehicles interrogation
- position and speed determination and recording
- vehicle position display on map
- display informations about vehicle
- display warning messages
- data recording at periods setted from distance
- reports about vehicle circulation
- vocal messages exchange between controller and driver

The system consists of a fixed unit and 32 mobile units.



Prototype for „**Automatic system for ship identification and control and monitoring of naval traffic**”  
The system sought for a solution which correspond to basic requests: fluvial and seaport navigation in full safety, regardless of weather, visibility or others conditions, control, surveillance and even coordination of traffic by coast stations.  
For proving the system utility, it was developed a navigation experiment on Sulina channel, and the accuracy was in the interval of 2 – 4 meters.

