Satellite Navigation Applications in ARTES 5

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Overview of ARTES 5 Satellite Navigation Activities

running:

- NS 9.5 GNSS-1 Rail User Navigation Equipment
- NS 9.6 Integrated Navigation Sensor for Train and Cargo Control
- NS 9.7 Ship Heading and Navigation Sensor
- NS 1.2 Integration of EGNOS and Terrestrial Regional Networks

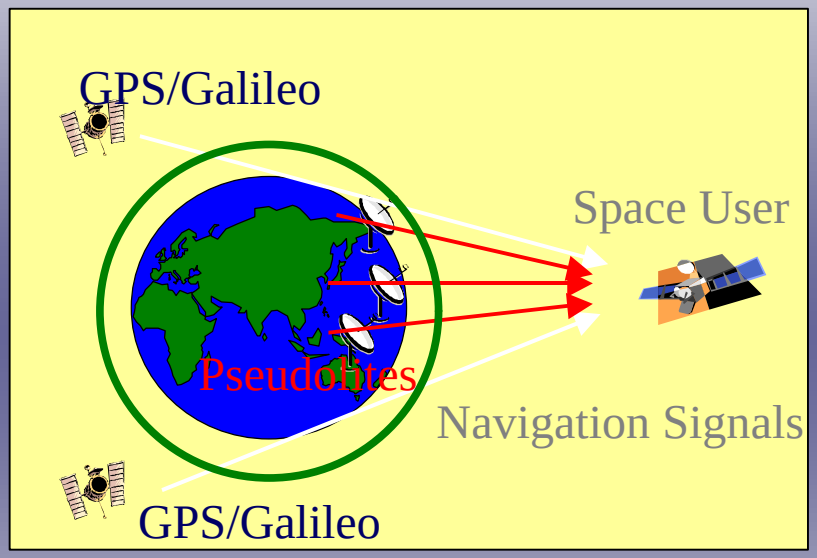
under negotiation:

- NS 9.3 Rx Processing Techniques for Advanced Navigation
- NS 9.4 Integrated GNSS and Mobile Communications Rx

planned:

- NS 14.1 Autonomous Real Time Spacecraft Orbit Control by GNSS
- NS 10.1 Intelligent Car Navigation
- NS 10.2 Novel Railway Control System
- NS 10.3 Automated Waterway Transport
- NS 10.4 Special GNSS Applications

Autonomous Spacecraft Orbit Control by GNSS



- **Relevance:**
  - 3-D accuracy at meter level
  - AOC capability
  - Low Cost Orbit Control

- **Objectives**
  - Definition of a Pseudolite Network GPS-like
  - Lab Demonstration
  - Road Map for future implementation

- **Planning**
  - Duration: 18 months
  - Starting beginning 2002
  - Budget 750 K€

General Considerations for Ground Applications

- The overall approach is to **develop or integrate technology in a end to end application**.
- The overall target application is defined but **broad and open to the initiative of industry**, which is expected to propose a specific application context for the field demonstration.
- The application requires high accuracy, availability, and reliability (i.e. EGNOS and hybrid systems): **Safety of life applications** are a must.
- The demonstration has to make use the **ESTB**.
- The activities should pave the way for **standardization and regulation** of the applications.

Intelligent Car Navigation (1)

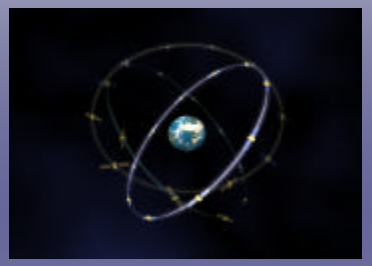
- Overall Target: **Advance Driver's Assistance based on GNSS for road vehicles.**

- Phase 1 (800 K€, 2002): **feasibility study** involving definition, analyses and simulations and tests to validate certain critical assumptions. The final output should be a road map providing a schedule and cost estimates for phase 2.

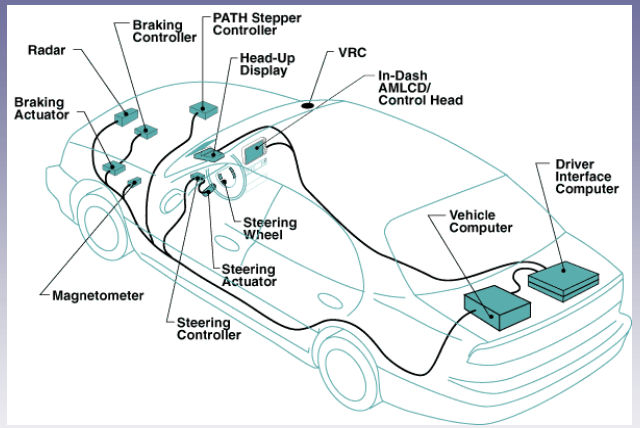
- Phase 2 (up to 8 M€): **demonstration** of the system not necessarily under ARTES-5 programme. It could require co-funding and co-operation with other parties.

Intelligent Car Navigation (2): Phase I

Comprehensive assessment of technical and “institutional” feasibility



Determine what is required from GNSS



Road map towards Field Demonstrations

Inland Water Navigation

- Overall Target: To carry out a **demonstration on inland water traffic control system based on satellite navigation.**

- Options (to be proposed by industry): design parameters of user equipment (**sensors to be integrated** and how), **communications** network (terrestrial or satellite), design of **control center**, find concrete **operator** and concrete inland waterways network convenient for make a **good case** and demonstration **for operators and regulators**.

- Planning: 2 M€ end 2002.

Novel Railway Control

- Overall Target: Establish a consolidated demonstration of railway control systems based on satellite navigation. The demonstration will be targeted towards the **consolidation of ongoing standardization efforts.**

- Options (to be proposed by industry): design parameters not yet fixed by available standards on railway control systems.

- Planning: 5 M€ 2002-2003 (TBC).

Special GNSS Applications

- Overall Target: These applications need to be truly **novel and forward-looking**, depend on the EGNOS or GALILEO signal and need to offer **good long-term exploitation prospects.**

- Options (to be proposed by industry): There is a lot of freedom in this activity to define any application not yet defined elsewhere, and within the frame of the overall target.

- Planning: 2 M€ 2002 (TBC).