Galileo And Umts Synergetic System

Title: Galileo And Umts Synergetic System
Acronym: GAUSS
Start date: 01-Dec-00
End date: 30-Nov-02
Project website: http://galileo.cs.telespazio.it/gauss/

Abstract:

The GAUSS (Galileo And UMTS Synergetic System) objective is to design and demonstrate the realistic feasibility of a system, which synergetically integrates navigation and communications, for providing enhanced and attractive location-based services. The main concept which the GAUSS project is based on, envisages the communication and navigation system components fitting within the general framework of S-UMTS (the satellite component of the 3rd-generation mobile communications system) and GALILEO. The technological issues of such a concept rely on the development of a Demonstrator, which integrates existing and available facilities with ad-hoc designed components. The former ones constitute the ground segment; the latter ones include the advanced user terminal and the innovative services and applications. The user terminal, part of the GAUSS demonstrator, will comprise a digital frontend capable of receiving all the required navigation and band segments with a single platform, and a CDMA (code division multiple access) modem complying with the current S-UMTS air interface standards. In absence of real Galileo navigation signals, the user terminal will depend upon GPS and GNSS1 signals. The demonstrator will include an existing communication gateway, the navigation signal augmentation facility and a real L-band satellite.
GAUSS
Galileo and UMTS Synergetic System

Funding: European (5th RTD Framework Programme)
Duration: 12/2000 - 12/2002

Transport themes: Freight transport, Intelligent transport systems (key theme), Transport management, Assessment and decision support

Background & policy context
GAUSS is a system, which integrates advanced communication and precise navigation, for providing reliable and effective location-based services oriented to transport and mobility applications (freight and fleet management, road safety and info-mobility, emergency assistance, dangerous goods transportation control, inter-modal transport).

The GAUSS system combines off-the-shelf and new developed technologies, using S-UMTS 3GPP compliant point-to-point and broadcasting packet-based communication and GNSS1-EGNOS accurate positioning. It has an open architecture ready to operate with the future GALILEO and UMTS, and further exploitation scenarios.

Objectives
GAUSS objective is to design and demonstrate the realistic feasibility of a system, for providing Location-based services, from the integration of Satellite Navigation and Communications, within the contexts of GALILEO and the UMTS technology. The services considered for GAUSS are based on low-bit rate transmission of small data packets carrying positioning & timing information, as required by typical Info-Mobility and Inter-Modality oriented applications.

The technological issues of such a concept rely on the development of a Demonstrator, with the purpose of building up a realistic implementation of the proposed GAUSS system. The GAUSS Demonstrator is based on the integration of existing infrastructures along with ad-hoc designed components, developed in the framework of the project itself. The former ones constitute the ground segment, the latter ones include the advanced user terminal and the applications.

In this context, GAUSS has a two-fold objective: new technological development and realisation of innovative applications oriented to info-mobility and inter-modality. The need for such developments does not only arise from the unavailability of the required equipment on the market, but also from the intention to realise, within the project, innovative equipment which will expectedly be strategic for the success of the proposed system.

Furthermore, the realised applications are purposely designed to make the best use of the resources of the GAUSS system, in terms of integrated Navigation and Communication capability.

A crucial phase of the GAUSS project is the demonstration campaign, having the objective of validating the developed applications with the direct involvement of users, specifically operating in inland-waterways and roads. Services for assisted vessel navigation and for management of transport over the Po river (Italy), will be thoroughly tested and assessed.

Methodology
In order to achieve the foreseen goals, GAUSS addresses the following main activities:
- Study and assessment the feasibility of a system, for providing Location-based services, from the integration of Satellite Navigation and Communications, within the contexts of GALILEO and the UMTS technology.
- Study and assessment of a reference model, integrating Navigation (GALILEO) and Communication (S-UMTS-compatible) functions (GAUSS Target System).
- Realisation of a Test bed, built up by exploiting existing facilities and performing new developments (the GAUSS Demonstrator), for validating the technical feasibility of the Target System.
- Development of applications for Info-mobility and Inter-modality, aimed at increasing safety and efficiency in transport and mobility management.
- Trial campaign, carried out in the real field, for proving the developed system and validating the user benefits and market opportunities of the provided services.

Research Programme
FPS - IST - KA1 - Systems and services for the citizens

Leading institution(s)
European Commission, DG Information Society

Type of funding
Public (EU)

Key results
The trials demonstrated how the GAUSS technology and applications can improve mobility and transport management, by providing innovative services and creating favourable technical conditions for enhancing both the quality and the efficiency, while maintaining safety standards. The assessment, done with the important contribution of ARNI, participating as real user of the GAUSS technology and solution, verified the impacts that the GAUSS technology and applications produce, in terms of improved operational efficiency, service quality provision, working conditions and market opportunities.

Furthermore, market studies showed that there are many niche markets, mainly professional customers in the transport sectors, taking advantages for the usage of the GAUSS provided technology and services.

Policy implications
GAUSS results open the way to the development and exploitation of advanced technology supporting high quality, reliable and effective services to the citizens for the transport sector and whole mobility domain, in view of GALILEO and UMTS scenarios: emergency assistance, safety-of-life applications, fleet and freight transport management (rail, road, maritime and inland waterway), dangerous goods transportation and containers tracking.

Further development can be envisaged for exploiting the GAUSS solution towards other LBS related markets and for improving its performances and enhancing it towards other technologies (such as integration with terrestrial and wireless short-range technologies, and implementation towards GALILEO

http://www.transport-research.info/web/projects/project_details.cfm?ID=7080 05/04/2013
Benefits achievable by the use of combined secure telecommunication, advanced software technologies and GNSS navigation, for location-based services, in particular for safety-related applications;

- Advanced technology for supporting high quality, reliable and effective services to the citizens for the transport sector and whole mobility domain, in particular for safety-related applications;

Hence, the demonstration is expected to have impacts in terms of very promising next developments and exploitations of the results achieved in the GAUSS project, in terms of:

- Advanced technology for supporting high quality, reliable and effective services to the citizens for the transport sector and whole mobility domain, in view of GALILEO and UMTS scenarios: emergency assistance, safety-of-life applications, fleet and freight transport management (rail, road, maritime and inland waterway), dangerous goods transportation and containers tracking.

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Further development can be envisaged for exploiting the GAUSS solution towards other LBS related markets and for improving its performances and enhancing it towards other technologies (such as integration with terrestrial and wireless short-range technologies, and implementation towards GALILEO ready units).

GAUSS developed technology has a great potential, in particular should interoperability with terrestrial navigation and communication infrastructures be implemented, and in view of navigation infrastructures deployment (EGNOS operative and GALILEO systems). GAUSS is expected to boost the creation of reliable and effective services, capable of fulfilling the needs of different user classes for accurate and timely information exchange, collection, data processing and distribution. In particular the improved efficiency and safety will positively impact on the their operational activities, allowing a reduction of bottlenecks in inter-modality and an optimisation of the emergency assistance.

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- Advanced technology for supporting high quality, reliable and effective services to the citizens for the transport sector and whole mobility domain, in particular for safety-related applications;
- Benefits achievable by the use of combined secure telecommunication, advanced software technologies and GNSS navigation, for location-based services oriented to safe and efficient transport management applications.

Intelligent Transport Systems

Key findings:

The trials demonstrated how the GAUSS technology and applications can improve mobility and transport management, by providing innovative services and creating favourable technical conditions for enhancing both the quality and the efficiency, while maintaining safety standards. The assessment, done with the important contribution of ARNI, participating as real user of the GAUSS technology and solution, verified the impacts that the GAUSS technology and applications produce, in terms of improved operational efficiency, service quality provision, working conditions and market opportunities.

Furthermore, market studies showed that there are many niche markets, mainly professional customers in the transport sectors, taking advantages for the usage of the GAUSS technology and services.

Policy implications:

GAUSS results open the way to the development and exploitation of advanced technology supporting high quality, reliable and effective services to the citizens for the transport sector and whole mobility domain, in view of GALILEO and UMTS scenarios: emergency assistance, safety-of-life applications, fleet and freight transport management (rail, road, maritime and inland waterway), dangerous goods transportation and containers tracking.

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Final report

GAUSS Final Report (641 Kb)

Partners

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→ ASCOM;
→ ARNI;
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→ ERICSSON;
→ GMV;
→ SPACE ENGINEERING;
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