Galil-EU - An approach for testing geo-informatics in a Large Field Demonstrator

Scope

To date, an important pillar in GMES/GNSS is not covered by regional innovation policy but which has the potential to boost GMES/GNSS related business: the geodesy sector. The geo-information community was amongst the first users and producers of GNSS/GMES data. Their requirements for accurate geo-information technologies, experience and tools are still increasing constantly, as a result of the expanding properties, options and services offered by the new satellite systems, i.e. EGNOS and Galileo. New instruments and equipment will provide highly precise data and improved timing for calculation of positions, also in conjunction with other sensors such as IMU and others.

The project aims at connecting geodesy and the transport sector, thus widening the scope of policy objectives, identifying new products, raising stakeholder awareness, adopting and implementing the technology and developing new products. By having high precision but high cost on the geodesy side and high volume but low cost demand on the transportation side the workshops of Galil-EU take them at one table for identifying synergies for mutual benefits and regional strengthening in the future.

To validate and guarantee the accuracy of the new solutions, the railGATE will be used to set up a test and validation environment for geodetic and high-accuracy products where accuracy of positioning becomes measurable: a highly precise reference system is being set-up by using dedicated tracks of the existing railGATE, a geodesic observation network and the latest state-of-the-art terrestrial Galileo infrastructure of railGATE. Its accuracy is in the range of ± 2 mm relatively to the observation poles of the laser scanners.

Thus position measurements can be done dynamically by using a moving platform vehicle where the device under test (DUT) can even get tested under acceleration conditions.

So, with using the synergies being identified at the workshops, new ideas on systems and products will be created. Finally, the devices and systems really can be tested dynamically at the reference tracks. Hence, this large scale demonstrator provides a seamless precondition for a seamless approach. Galil-EU provides a good infrastructure from testing to calibration and even up to the complete certification process of GNSS devices and applications.

Galil-EU Project Objectives

The basic idea of the proposal is to expand on current policy objectives and their implementation, i.e. automotiveGATE, railGATE and the Galileo Application Center, in order to include the geomatics sector, to make use of the specific know-how and demand for high-accuracy applications and finally to apply this technology to transport.

- Strengthen the development and international visibility of the regional industry using GMES, Galileo and EGNOS
- Work out the mutual opportunities and benefits of using GMES/GNSS in land transport and in geodetic with all relevant stakeholders and players in the region (NRW & EMR)
- Make use of the specific geodesy know-how and demand for high accuracy applications

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- Re-apply this technology back to transport, i.e. rail and road
- Requirements from vehicle industry, e.g. to realize upcoming safety assistant systems based on geo-information.

Galil-EU activities

Vision Building: to combine and consolidate the requirements and perception of the stakeholders from various disciplines to create a common picture of future needs and opportunities for the region.

Technological Road Maps: to find a way from existing products to the visioned future by using GMES/GNSS with the new possibilities and services of Galileo and EGNOS.

Business Opportunities: to manifest a substantial commercial basis by identifying the new and emerging products, processes and services which follow from the road maps.

Competence Centre: to offer a platform for generation of further projects, to ensure a sustainable use of the results of this project, to continue application of the targets of this project, such that the region remains an incubator for application of GMES, Galileo & EGNOS after finishing Galil-EU.

GNSS Reference and Calibration Field: a dedicated terminal loop with a length of about 550 m has been selected inside the railGATE facility at Wegberg-Wildenrath, Germany. Six referenced observation poles are being set up along the tracks carrying laser scanners or tachymeters in order to form a precise geodesic observation network. A special designed electrical driven rail vehicle is being built as transportation platform to carry the measurement equipment as well as the devices under test (DUT). While the vehicle is driving along the geodetic surveyed tracks the entire system forms a quasi 3D-invariant in space.

With this reference configuration any kind of positioning unit like GNSS receivers etc. can be tested even dynamically at an adjustable constant speed up to 25 km/h or even under accelerations. Beside of being part of the 3D-reference system, the vehicle will also be integrated into the well-defined environment of the railGATE facility by using the Galileo pseudolites system. Finally, inertia sensors (INS) are also mounted to the vehicle so all forces and accelerations can be measured at any time in any direction with time- and position-stamps along the test drive.

Galil-EU Consortium Partners

	website	Name of organisation Region	Country
	www.agit.de	Aachener Gesellschaft für Innovation und Technologietransfer mbH	Germany
Short description of key activities	AGIT mbH, project co-ordinator, is a public-owned regional development agency for the greater region of Aachen with app. 30 employees. AGIT is experienced in the management of European projects in FP7 and Interreg. Business development, technology transfer and finance and funding are core		

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	competences, also on a transnational level in the cross-border region. AGIT has very high project-related competences because of its experience in the fostering and support of entrepreneurship and regional development on the one hand and on the other hand its involvement in the GNES coordination activities of the North Rhine-Westphalian and German projects for railGATE, automotiveGATE and the Galileo Application Center for ground–based mobility.		
	www.geohaus.de	GEOHAUS - The value of Geo-Information	Germany
Short description of key activities	The “House of Geo-Information”, is a group of five owner-led companies with 120 employees in the field of geo-informatics, geodesy and survey, which is also participating in international projects. Dr. Schuster and the subsidiary GeoSAT started in the 1980s with the implementation of GPS-based GMES services in geodesy. Their unique and useful experience will integrated in the project. Additionally GEOHAUS is networked and embedded in the international GIS community. GEOHAUS will be responsible for the surveying segment of the competence centre.		
	www.itaps.info	ITAPS Sp. z o.o.	Poland
	ITAPS Sp. z o.o., an SME with app. 30 employees, develops innovative solutions for transportation, logistics and energy-efficient controlled drives. ITAPS has participated in several EU projects and will design and assemble the electric-driven gang-car.		
	www.hochschule-bochum.de/fbv.html	Bochum University of Applied Sciences	Germany
Short description of key activities	Bochum University of Applied Sciences, Geodesy Department, a higher education institution, will contribute its knowledge and laboratories for 3D laser scanning, photogrammetry and physical metrology to the setting up of the validation centre and disseminate the procedures in the European geodetic research landscape. Since the department was strongly involved in an analytical project in the Galileo Test Range Berchtesgaden, the professors have considerable experience in terrestrial test beds and are amongst the leading European experts in this field.		

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