



European Satellite Navigation Competition 2011

The DLR Special Topic Prize

„AUGMENTED NAVIGATION – EVERYWHERE!“



DLR German Aerospace Center

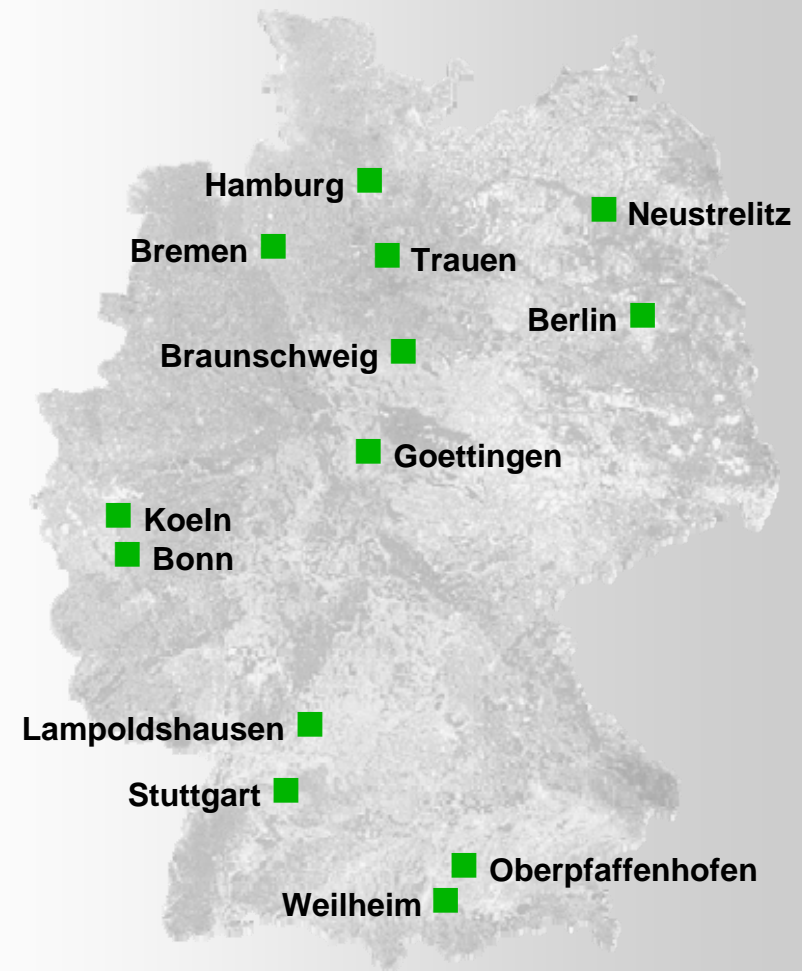


- Research Institution
- Space Agency
- Project Management Agency



Locations and employees

- 6,900 employees across
- 29 research institutes and facilities at
- 13 sites
- Offices in Brussels, Paris and Washington.





Guiding Principles – Mission

- To explore Earth and the Solar System; to conduct research into the preservation of the environment, into **mobility** and into **public safety**, and to address societal questions on behalf of public customers
- To **bridge the gap** between basic research and **innovative applications** and to transfer knowledge and research results to industry and the political sphere through mediation and consultation as well as through the provision of services
- To shape Germany's space commitment and represent its interests internationally as a governmental function
- To make a significant contribution towards enhancing Germany as a science and business location as well as to **stimulate growth in the European region**
- To **train young scientists** in order to **enhance Germany's innovative capability**



DLR Space Research: Communication/Navigation

Focus:

- Satellite communications: optical communications, transmission standards (DVB-S2/RCS), applications/services
- Navigation: [Galileo operation and operational support, applications](#) (including indoor navigation)

Highlights:

- [Galileo Control Center](#)
- LCT application on TerraSAR-X and NFIRE

Future:

- Development of GALILEO II technologies
- Safety-of-life applications (SoL)
- [Combination of communications, navigation and earth observation](#)





DLR's tasks as the National Space Agency

- Defining German space planning on behalf of the federal government
- Representing German space-related interests in the international arena, in particular in ESA
- Tendering, award and support of space projects in the context of the National Space Program
- Goal: Supporting Germany's leading role in GALILEO and GMES





DLR's strategic competencies (1)

Strategic product-related core competencies:

- Design of complex aerospace and transport systems
- Design of complex flight guidance systems
- Improving the performance and environmental friendliness of aerospace engines as well as energy systems
- Remote control and monitoring of aircraft and spacecraft
- Development and operation of remote sensing systems (Data acquisition, transmission, processing and evaluation)
- Remote sensing and telemetry
- Precautionary measures to maintain the health and capability of people in the mobile society



DLR Innovations – High-tech for the market

Competences, technologies and ideas from



Aeronautics Space Transport Energy Security

for new applications, products and services



DLR Prize 2011:



AUGMENTED NAVIGATION –



EVERYWHERE!

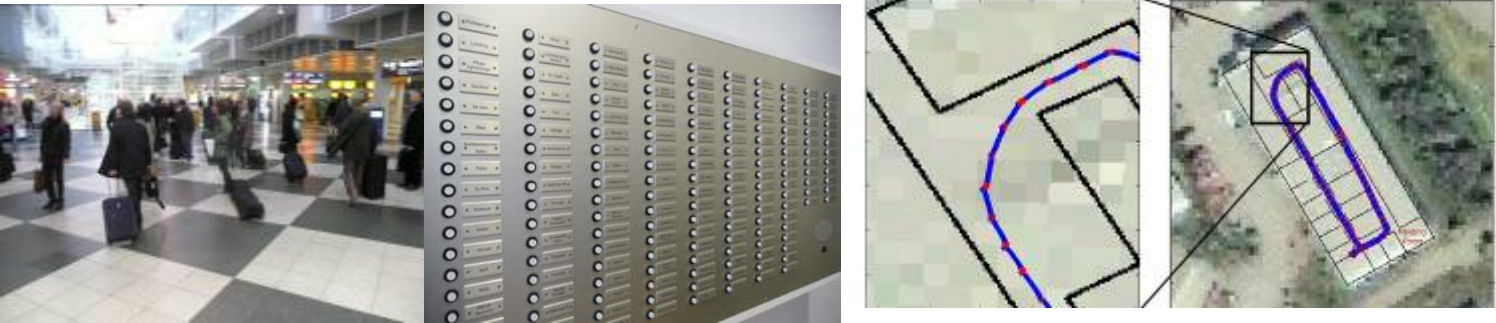


Main subjects of DLR Special Topic Prize 2011

1. EGNOS IN USE



2. MULTISENSOR-NAVIGATION





EGNOS – background information

- From blueprint to blue sky: EGNOS is operational
- Not only a precursor of GALILEO, but also of substantial value today
- GSA campaign “EGNOS: It’s there – use it!”
- Open Service (OS): Strongest user group is agriculture (precision farming)
- **Safety of Life (SoL) service declaration on 2 March 2011 in Brussels**
 - Official introduction in Europe
 - Usage during transatlantic flights started already successfully in Nov 2010
 - Mature status: Performance maps meanwhile cover whole Europe
 - ARAIM: Multi-constellation (GNSS) Advanced Receiver Integrity Monitoring
 - Gain of EGNOS is to make work all the actors together in European scale
- European solution positioned in the middle of the map (linking the Americas & Asia)
- Comparable to WAAS (Wide Area Augmentation System): The U.S. overlay system covering northern America is especially designed for air traffic
- Market: 54.500 receivers for LPV approach (Line Power Voice) sold from one supplier
- From dual frequency to integrated use of WAAS + EGNOS (future SDCM+MSAS)



Topic 1: EGNOS IN USE

Areas of search:

- **Distribution networks for correction data (TCP/IP with authentication)**
- **Safety-of-Life (SoL) Service – integrity and operational aspects**
- **Cross-links with GALILEO**
- **Interplay with other augmentation systems (WAAS, GBAS)**
- **Fusion of communications and navigation systems**
- **Applications (Outdoor tracking e.g.) and value-added services**

Need for AUGMENTED NAVIGATION – Everywhere!

A daily use case at Berlin Airport:

- **Pedestrian navigation with local information as a “moving target”**
- **“Site under construction” means difficult, unknown, rapidly changing environment**

An example – not an exception:

- **Majority of the citizens of industrial countries spend 90% of their time indoors**
- **Need for spatial knowledge: Driver enhanced mobility and time-efficient processes**

The typical challenge to be tackled:

- **Loss of lock, loss of location, loss of direction, Lost...and found!**



Wenn Sie mit dem Auto kommen, stehen Ihnen einige Parkplätze zur Verfügung. Sie können durch die Hausdurchfahrt unter B028 durchfahren und auf der Straße oder weiter hinten rechts auf den Parkplätzen hinter dem Konferenzzentrum parken.



Topic 2: MULTISENSOR-NAVIGATION

Areas of search:

- **Seamless navigation in mixed (and/or difficult) environments / indoor-outdoor transition**
- **Positioning without infrastructure**
- **Navigation with mobile radio systems & signals**
- **Deep indoor GNSS**
- **Indoor Maps**
- **Pedestrian step measurement**
- **Navigation with signals of opportunity**
- **Visual Navigation**



Multisensor based indoor navigation: Human Being as the best expert Everyone is processing multiple information – Intentional & unconcious





WANTED: Unlimited ideas to SEAMLESS NAVIGATION

- Augmented systems and signals
- New answers to further increasing dependency on localization
- Enabling a vastly extended future use
- Contributing through
 - technical breakthrough,
 - market value,
 - social or environmental benefit,
 - or increasing public safety.



The DLR Special Topic Prize

- One common objective:
 - The Prize leads to direct implementation together with the DLR
 - The winner will be honoured by a voucher for DLR services in the further development of their ideas (feasibility studies, concepts studies, prototype and business development)

- Winner:
 - **DLR Voucher* 50,000 EURO**

- Many chances:
 - All contestants underline their competence by participating
 - The final selection will additionally enjoy the benefit of a valuable quality seal as being distinguished as „Winner of the DLR Special Topic Prize“

* Note: 10,000 EURO is equivalent to one man-month



Selection criteria: The way to win

- Evaluation of proposals in terms of:
 - Key advantages
 - News value of the idea
 - Excellence in technology and / or service orientation
 - Comprising the fundamental strengths of GALILEO, EGNOS, MEMS...
 - Benefit for potential customers or the scientific community
 - Market attractiveness & competitiveness
 - Innovation character / new user segment
 - Value for operational use, process integration, gains in efficiency
 - Technical feasibility & practicability
 - DLR competences play a decisive role for further technical development of the idea towards an application, product or service and / or for market introduction through business planning



Call for YOUR advanced ideas & inspiration

- AUGMENTED NAVIGATION
 - Is heading in a new quality dimension
 - Means cross-functional usage
 - Offers added value in a diversity of application fields
 - Serves as background technology and / or as user interface
- The DLR Special Topic Prize 2011
 - Covers the key application fields
 - Promotes the integration into business processes and core tasks
 - Sharpens research results towards market readiness
 - Honours technologies and products as well as service innovations
 - Provides competences and capacities to succeed at customers
 - Targets AUGMENTED NAVIGATION everywhere with new ideas, technologies, methods, application products, solutions and services
 - Public organisations, enterprises and individuals to participate



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