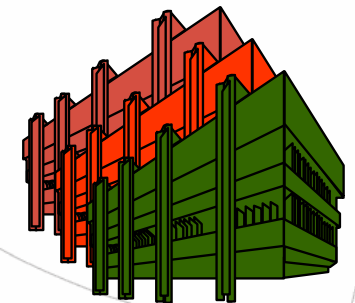
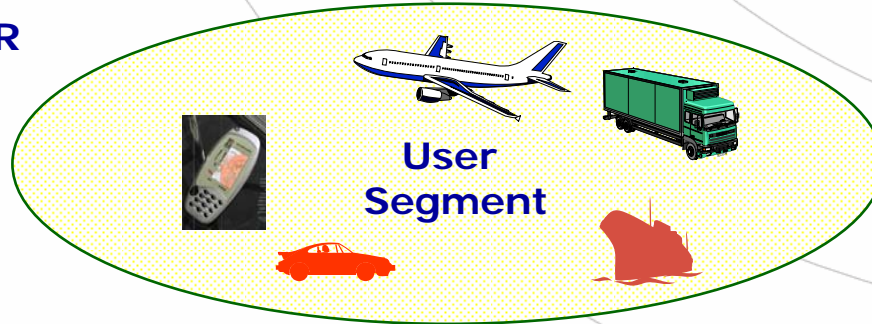
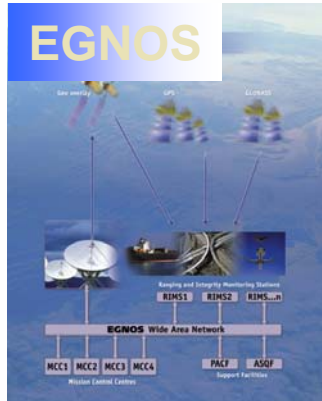
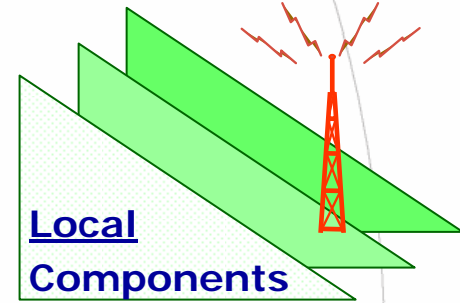
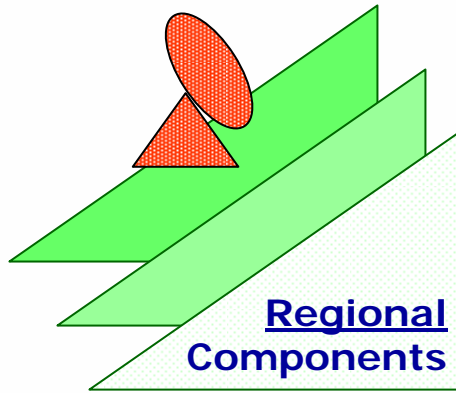


# Galileo - Status, 6<sup>th</sup> & 7<sup>th</sup> FP & GSA

Mr. Peter Marchlewski  
General Counsellor  
Galileo Joint Undertaking






DLR Seminar,  
Bonn University, 20<sup>th</sup> September 2006

# Galileo Architecture



# Galileo - Five Services

**EU Transport Council Decision- December 2004**

<b>Navigation</b>	<b>Open Access</b>	Free to air; Mass market; Simple positioning	
	<b>Commercial</b>	Encrypted; High accuracy; Guaranteed service	
	<b>Safety of Life</b>	Open Service + Integrity and Authentication of signal	
	<b>Public Regulated</b>	Encrypted; Integrity; Continuous availability	
<b>SAR</b>	<b>Search and Rescue</b>	Near real-time; Precise; Return link feasible	



# Unique Characteristics

**Galileo will offer the user:**

- High Accuracy**
- Authentication**
- Integrity**

**This entails a safer and more robust system.**

# Galileo Application Overview

## Safety of Life

- Aviation
- Rail
- Maritime
- Inland waterways
- Ambulance
- Police / Fire
- Search and Rescue
- Personal Protection
- Traffic surveillance
- Dangerous goods trans.
- ADAS

## Mass Market

- Personal communication and navigation
- Cars / motorcycles
- Trucks & buses
- Light Commercial Vehicles
- Personal outdoor recreation
- Others...

## Professional

- Oil and Gas
- Mining
- Timing
- Environment
- Fleet Management
- Asset Management
- Geodesy
- Meteorological forecasting
- Land Survey / GIS
- Precision survey
- Precision Agriculture
- Fisheries / EEZ
- Vehicle control and robotics
- Construction / Civil Engineering
- Space

Integrity  
(**error-free**),  
Standards,  
Regulation,  
Continuity,  
Availability,  
Accuracy

**Low costs,**  
Low power cons.,  
Small size,  
Friendly use,  
Best perf.  
accordingly

**High precision,**  
High accuracy,  
High reliability



# Galileo Concession Time Table

**October 2003**

**April 2004 – March 2005**

**2005-2007**

Oct. 2003-  
Feb. 2004

Call for  
Interest

April 2004-January 2005-  
Competitive Negotiation Phase

December 2004-  
Transport Council Decision

1<sup>st</sup> March 2005- May 2005  
Parallel Negotiations

Mid-May 2005-  
The two consortia expressed their  
intention to join forces

20<sup>th</sup> June 2005- Delivery of the joint  
proposal to the Galileo Joint  
Undertaking

27<sup>th</sup> June 2005

Acceptance of  
the joint  
proposal from  
the two  
consortia

Contract  
Negotiations

Head of Terms  
Draft Contract  
– Dec. 2006

Financial Close  
And signature  
of the  
Concession  
Contract  
- 2007

# Tasks of the Concessionaire

- **Deployment of the operational satellites**
- **Deployment of the ground infrastructure**
- **Operate the system**
- **Generation of revenue**
- **Replenishment of the System**



# HoT Main Features

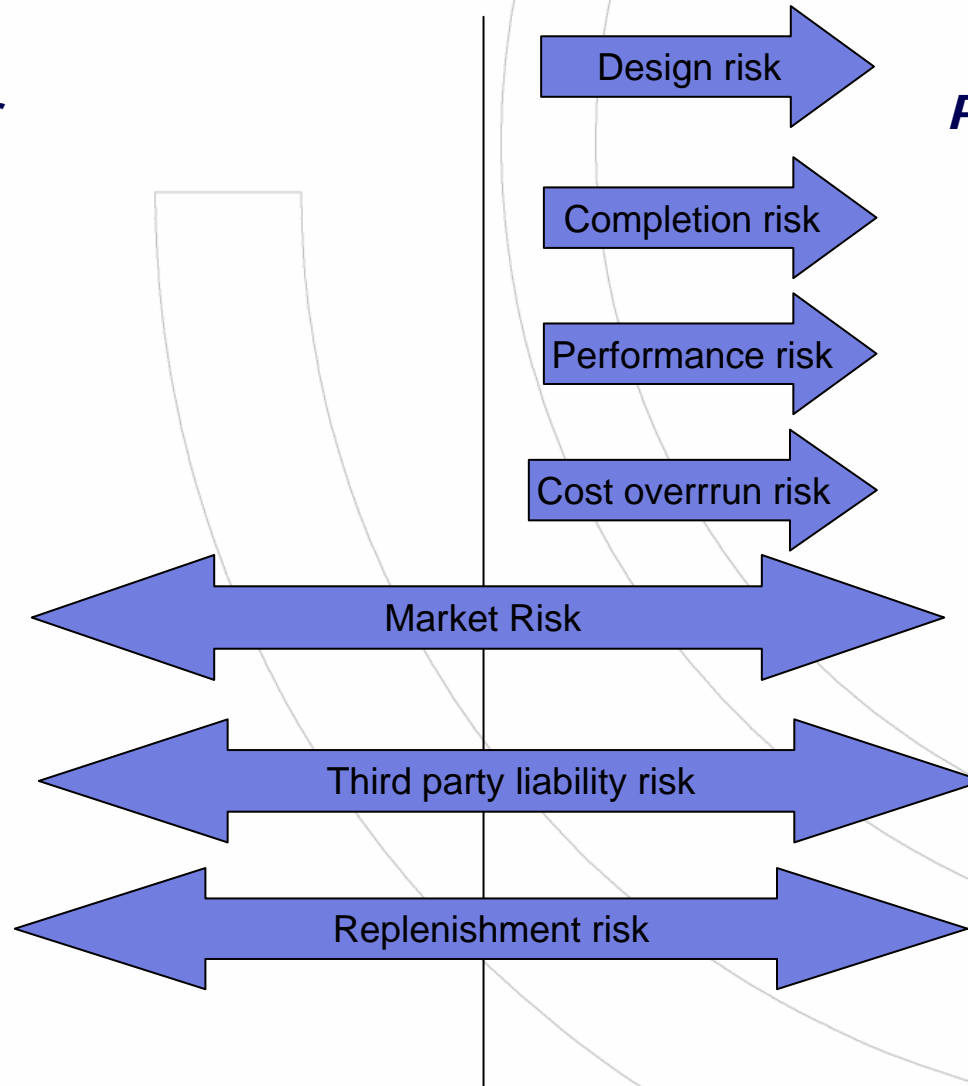
- **Performance risk**
- **Completion risk**
- **Cost overrun risk**
- **Design risk**
- **Market risk**
- **Third Party liability risk**
- **Replenishment risk**



# Main risk allocation in the concession approach

*Public Sector*

*Private Sector*





# Galileo International

## Perspective:

- World wide markets
- Local-Regional Infrastructure
- Global Standards
- Product Certification
- Financing
- Information Centres

	<i>Signed</i>	<i>Draft</i>	<i>Negot.</i>	<i>Talks</i>
<i>U.S.A</i>	☑			
<i>China</i>	☑			
<i>Israel</i>	☑			
<i>Ukraine</i>	☑			
<i>India</i>		☑		
<i>Morocco</i>		☑		
<i>Norway</i>			☑	
<i>Switzerland</i>			☑	
<i>Argentina</i>			☑	
<i>Russia</i>			☑	
<i>S. Korea</i>	☑			
<i>Australia, Canada, Brazil, Chile, Mexico, Malaysia, Saudia Arabia.</i>				☑



# EC 6th Framework Programme and Galileo

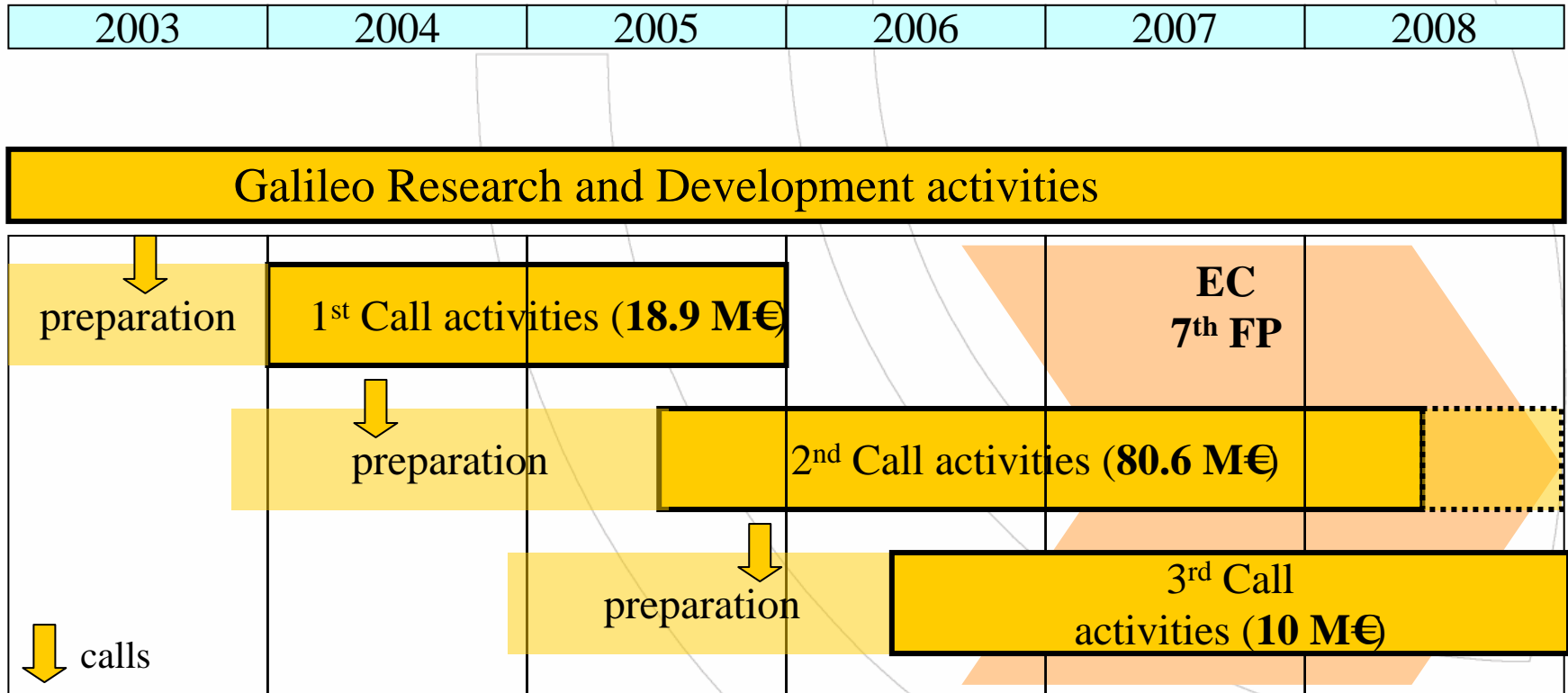
- **6th Framework Programme:**
  - **5-year period (2002-2006), overall budget €17.5 billion**
- **Galileo falls under Thematic Priority 1.4 "Aeronautics and Space" with an overall budget of about **110 million€****
- **The Galileo Work Programme:**
  - **Identifies priorities:**  
**Application, Receiver, Local Element, Standardisation and mission implementation**
- **Management of the Galileo 6th FP activities transferred by the Commission to the Galileo Joint Undertaking:**
  - **Launch the call, evaluate the proposal, negotiate the contract and follow the work performed**
  - **Coordination of R&D activities with EC, ESA, National Programme**



# Drivers of the R&D Work Programme

- **European GNSS implementation (EGNOS and Galileo)**
  - EGNOS
  - Galileo
  
- **Characteristics and differentiators with existing GNSS**
  
- **Development of the User Segment: complementary and in-line with the infrastructure development (space and ground segment)**
  
- **Evolution of GNSS:**
  - User needs (translated in the Mission Requirement Document)
  - Interoperability with other GNSS
  - Evolution of technology...
  
- **Setting up of the Concession**
  - Views of the concessionaire

# Overall Plan



# Conditions

- **Three Undertakings from three different countries**
  
- **For SME's**
  - **Two Undertakings from two different countries**
  - **(Level – €300,000)**



# 1<sup>st</sup> Call Activities

- **Task A: User Segment**  
Development of the receiver core technologies and initial prototyping.
- **Task B: Local Components**  
Development of Local Components 'Core Technologies'.
- **Task C: Galileo services prototyping using EGNOS**  
Demonstrate EGNOS and Galileo differentiators with 4 projects based on an innovative approach: all value-chain actors involved, addressing all service provision issues.
- **Task D: Application Market Development**  
Supports for the setting-up of the EGNOS/GALILEO service provision schemes and their international dimension.
- **Task E: Mission Implementation**  
Standardisation, certification, and frequency related activities; development of External interfaces; Mission Consolidation.

# 2<sup>nd</sup> Call Activities

<b>Area 1</b>		<b>Area 2</b>	<b>Area 3</b>
<b>1A User community</b>	<b>1B Technological</b>		
<i>GNSS introduction in the LBS sector 3.2M€</i>	<i>Galileo Mass-market receiver development 2.5M€ x 3</i>	<i>Galileo reference mission activities 3.8M€</i>	<i>Co-ordination of Galileo Research and Development Activities</i>  <i>- International</i> <i>- Expert group</i>  <i>4.9M€</i>
<i>GNSS introduction in the Road sector 3.2M€</i>		<i>Galileo Advanced Concept 2.8M€</i>	
<i>GNSS introduction in the Rail sector 3.2M€</i>	<i>Galileo Professional receiver development 2.6M€ x 2</i>	<i>Implementation of Galileo Time Service Provider Prototype 2.8M€</i>	
<i>GNSS introduction in the Maritime sector 3.2M€</i>	<i>Galileo Safety of Life receiver development 3.5M€</i>	<i>Implementation of Galileo Geodetic Service Provider Prototype 1.8M€</i>	
<i>GNSS introduction in the Aviation sector 2.2M€</i>	<i>Interference Detection, Mitigation and Isolation 1.8M€</i>	<i>SAR Local User Terminal Development 4.3M€</i>	
<i>GNSS for special user community 1.25M€ x 7</i>			

*Innovation by Small and Medium Enterprises  
300k€ x 32*

50%

70%



# **Outcome of the 1<sup>st</sup> and 2<sup>nd</sup> Calls**



# 1<sup>st</sup> and 2<sup>nd</sup> Call Activities (I)

## ○ Applications

- Applications and Services development based on EGNOS integrity in the 1<sup>st</sup> call
- 2<sup>nd</sup> Call: Development of GNSS (EGNOS+Galileo) services and applications in several major user communities:
  - All major transport domains
  - LBS
  - Scientific and Professional domains
  - Agriculture...

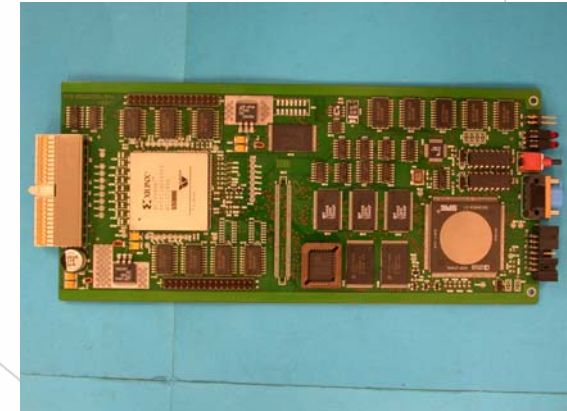
## ○ Mission

- Standardisation
- Activities complementing GalileoSat:
  - Time and Geodesy Service Provision
  - SAR MEOLUT development
- Activities related to frequency
- Definition and evolution of the mission

# 1<sup>st</sup> and 2<sup>nd</sup> Call Activities (II)

## ○ Receivers

- Development of tools and first receiver prototypes in the 1<sup>st</sup> call
- Development of commercially oriented receivers in the second call through parallel contracts
  - Mass market receiver
  - Professional receiver
  - Safety of Life receiver

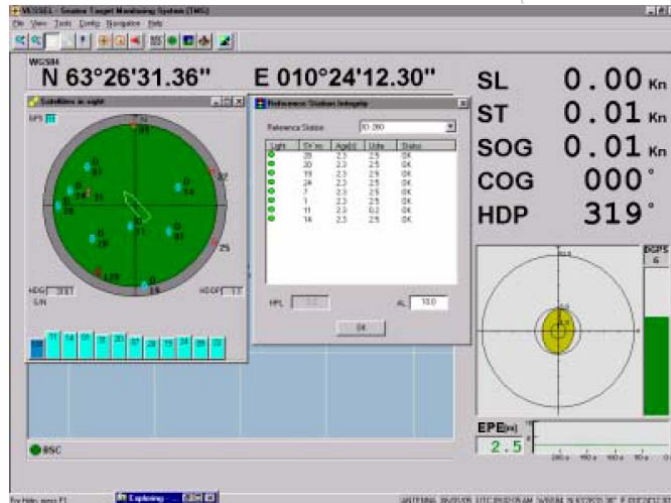


## ○ Local Elements

- Development of the LE Building Blocks
- Development of “application and service oriented” local elements in the 2<sup>nd</sup> call (in line with the different user communities requirements)

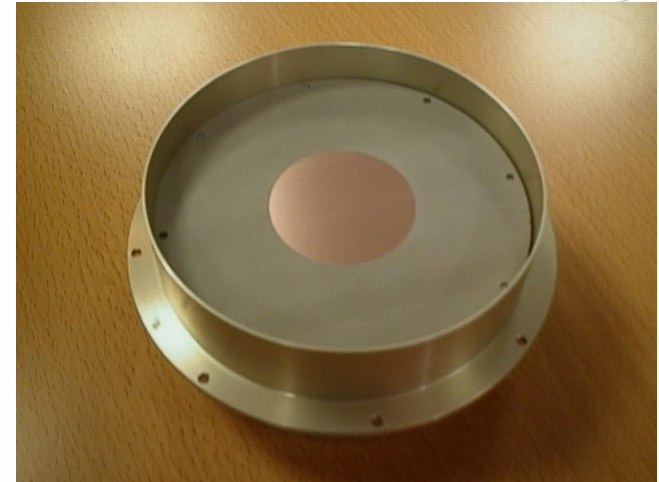
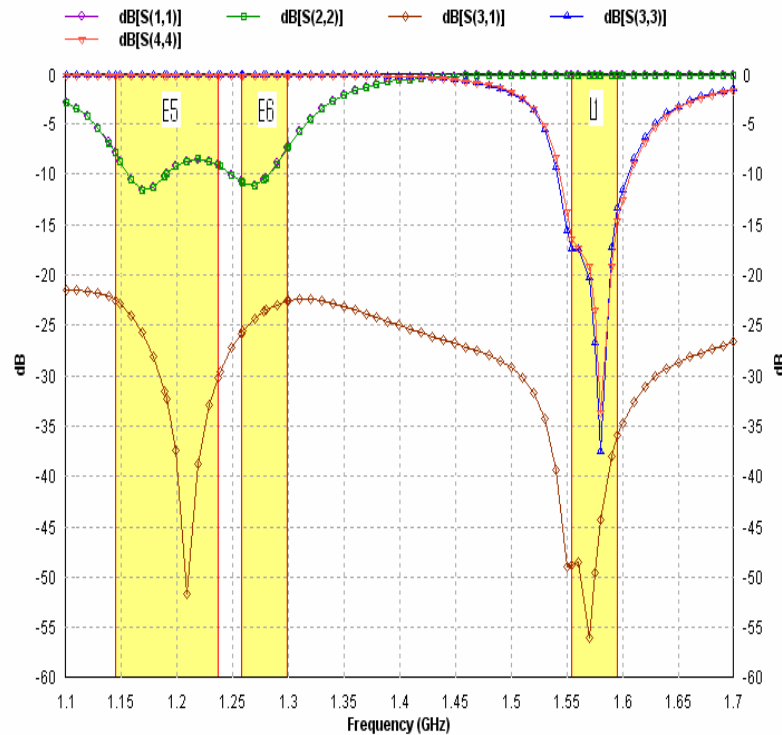
# Results: applications

- *Navigation services based on the EGNOS corrections demonstrated for:*
  - *Port approach*
  - *Inland waterways*



# Results: antennas

- Development of a 3-frequencies compact antenna for professional applications
- Innovative solutions





## 3<sup>rd</sup> Call

- **Tracking and Tracing Technologies for EU Regulated Services**
- **Galileo Applications in Emergency Management**
- **Galileo Time and Synchronisation Applications**
- **Public Regulated User Segment**
- **Education, Research and Innovation in the field of GNSS**

# Results and Outcomes

- GJU has launched **70 projects** (including SMEs) dedicated to the development of the User Segment for an overall budget of **170 M€** (110M€ financed by GJU)
- More than **360 companies** (including a large number of **SME's**) are now involved in the Galileo R&D activities financed by the GJU
- Tendering Rate 33%



# Specific support for SME's

- A specific call for SME (and Research Institutes) allowed financing 32 projects: 9M€
- Clear requirement asking for a minimal participation of SME's in each project:
  - No requirement in the first call
  - 7% for the 2<sup>nd</sup> call (i.e. 5 M€)
  - 10% for the 3<sup>rd</sup> call (i.e. 1M€ secured for SMEs)
- Out of the 110M€, 15M€ has been 'secured' for SME's.
- The result achieved is much higher *33% of the Galileo R&D budget has been allocated to SME's*





# Inputs: 7<sup>th</sup> FP Galileo

**For Galileo, 4 activity streams have been identified by the EC and the EU Presidency:**

- **Exploiting the full potential**
- **Preparing the tools and creating the appropriate environment**
- **Adapting receivers to requirements and upgrading core technologies**
- **Supporting infrastructure evolution**
  
- **“Theme 7 – Transport” Work Program is currently under draft. It will be presented to Members States in Autumn 2006 and published later.**

# 1. Exploiting the full potential

**Promoting growth in the use of the services:**

**○ Research areas**

- 7.3.1.1 Mass market applications**
- 7.3.1.2 Professional applications**
- 7.3.1.3 Scientific applications**
- 7.3.1.4 Safety-of-life applications**
- 7.3.1.5 Timing and Synchronisation applications**
- 7.3.1.6 Governmental applications**
- 7.3.1.7 New and innovative applications and services**
- 7.3.1.8 Search and Rescue applications**
- 7.3.1.9. Regulated applications**



## 2 - Providing the tools and creating the appropriate environment

- Ensuring safe and secure use of services:
- Research areas
  - 7.3.2.1 Tools
  - 7.3.2.2 Certification and Standardization

## **3 - Adapting receivers to requirements and upgrading core technologies**

- Improving receiver performances:**

- Research Areas**

- 7.3.3.1 Receivers**

- 7.3.3.2 Customised user terminal**

- 7.3.3.3 Local elements**

## **4 - Supporting infrastructure evolution**

- Preparing second generation systems:**
- Research areas**
  - 7.3.4.1 User need and mission evolution**
  - 7.3.4.2 Space and ground segment evolution**
  - 7.3.4.3 International and awareness**



# Contribution to the 7<sup>th</sup> FP

- **A Call for Ideas** has been published on the Galileo Joint Undertaking website
- The GJU in cooperation with the EC, the GSA and the ESA is currently preparing the detailed Work Programme and a strategic Roadmap
- The 7<sup>th</sup> FP will be carried out by the GNSS Supervisory Authority



# Galileo Joint Undertaking

**The Galileo Joint Undertaking was established on 21<sup>st</sup> May 2002, under Council Regulation (EC) No. 876/2002**

## **Main Tasks:**

**To manage the Development Phase of the Galileo Program**

**To integrate EGNOS into Galileo**

**6<sup>th</sup> Framework Programme Activities**

**International Activities**

**Concession**

**The GJU will cease on the 31<sup>st</sup> December 2006**



**GJU** GALILEO JOINT UNDERTAKING



**Many thanks for  
your attention**

**Bonn, 20<sup>th</sup> September 2006**

**Mr. Peter Marchlewski  
Galileo Joint Undertaking**

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**[Hans.marchlewski@galileoju.com](mailto:Hans.marchlewski@galileoju.com)**