

Galileo - Strategic 21st Century Infrastructure for Europe and the World's Economy



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Septentrio Company Introduction

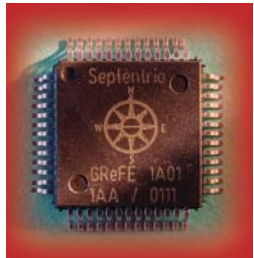


- ⊗ Spin-off of **I**nteruniversity Micro**E**lectronics **C**enter
- ⊗ International team of GNSS HW, SW and navigation experts covering the full GNSS receiver development cycle
- ⊗ Leading European developer of high-end GPS and Galileo receiver technology

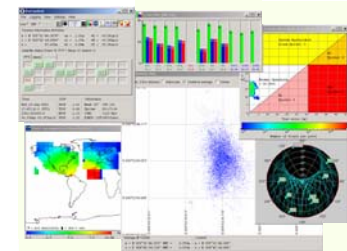
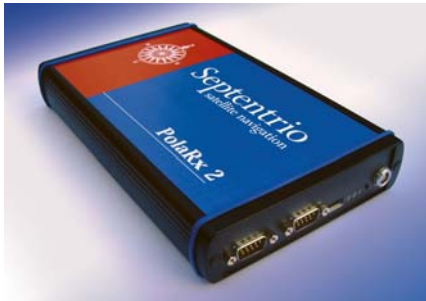


MISSION

**Design, develop & commercialize
High-end OEM satellite navigation products
Based on the Company's proprietary
satellite navigation technology**

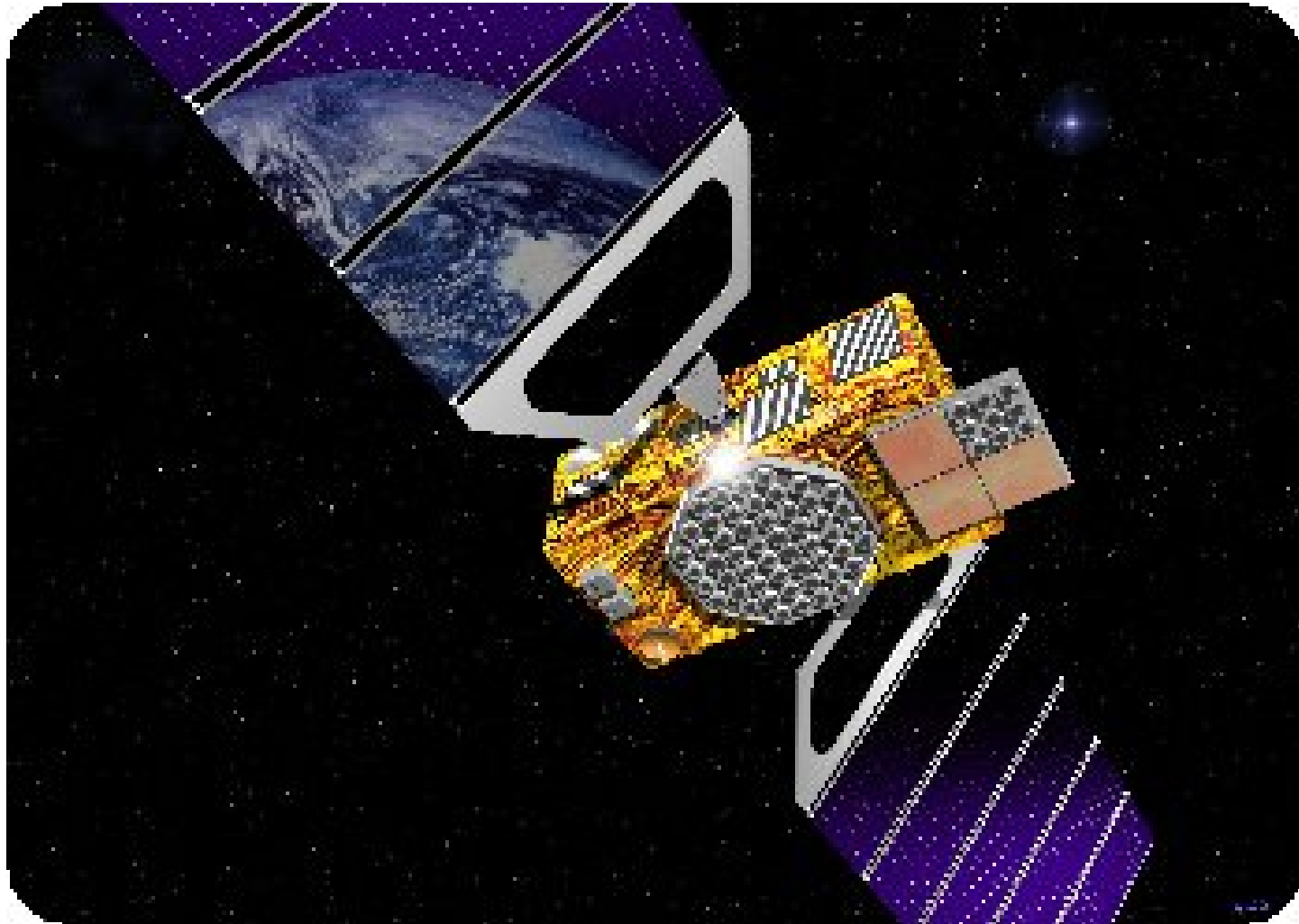


- ⊗ Advanced Septentrio GNSS chipset (RF, digital)
- ⊗ AsteRx and PolaRx2 platforms : flexible and open architecture
 - ⊗ Single/Dual frequency, SBAS
 - ⊗ Single or multi-antenna
 - ⊗ Powerful processor on board
 - ⊗ Easy to integrate (interfaces, commands, ...)
- ⊗ Firmware for high performance and flexibility
 - ⊗ Tracking of GPS, Galileo, GLONASS and SBAS
 - ⊗ Patented tracking algorithms for superior sensitivity
 - ⊗ High precision positioning, incl. RTK
 - ⊗ RAIM
 - ⊗ Attitude calculation based on GNSS
 - ⊗ Patent pending A Posteriori Multipath Estimator (APME)
 - ⊗ Flexible user interface and intuitive GUI, incl. field controller
- ⊗ Galileo receiver technology
- ⊗ INS integration developments



- ⊗ Galileo Introduction
- ⊗ Septentrio's Role in Galileo
- ⊗ Applications – Economic Value

Galileo Introduction



- **Navigation and Timing Services within Global Earth Coverage and Space Coverage**
- **Independent from GPS but complementary to it and inter-operable**
- **Performances similar to future GPS**
- **Core constellation of 30 MEO satellites**
- **World-wide dissemination services for:**
 - Search and Rescue return link data
 - Navigation-Related data (weather data, alerts traffic information and accident warnings, etc.)

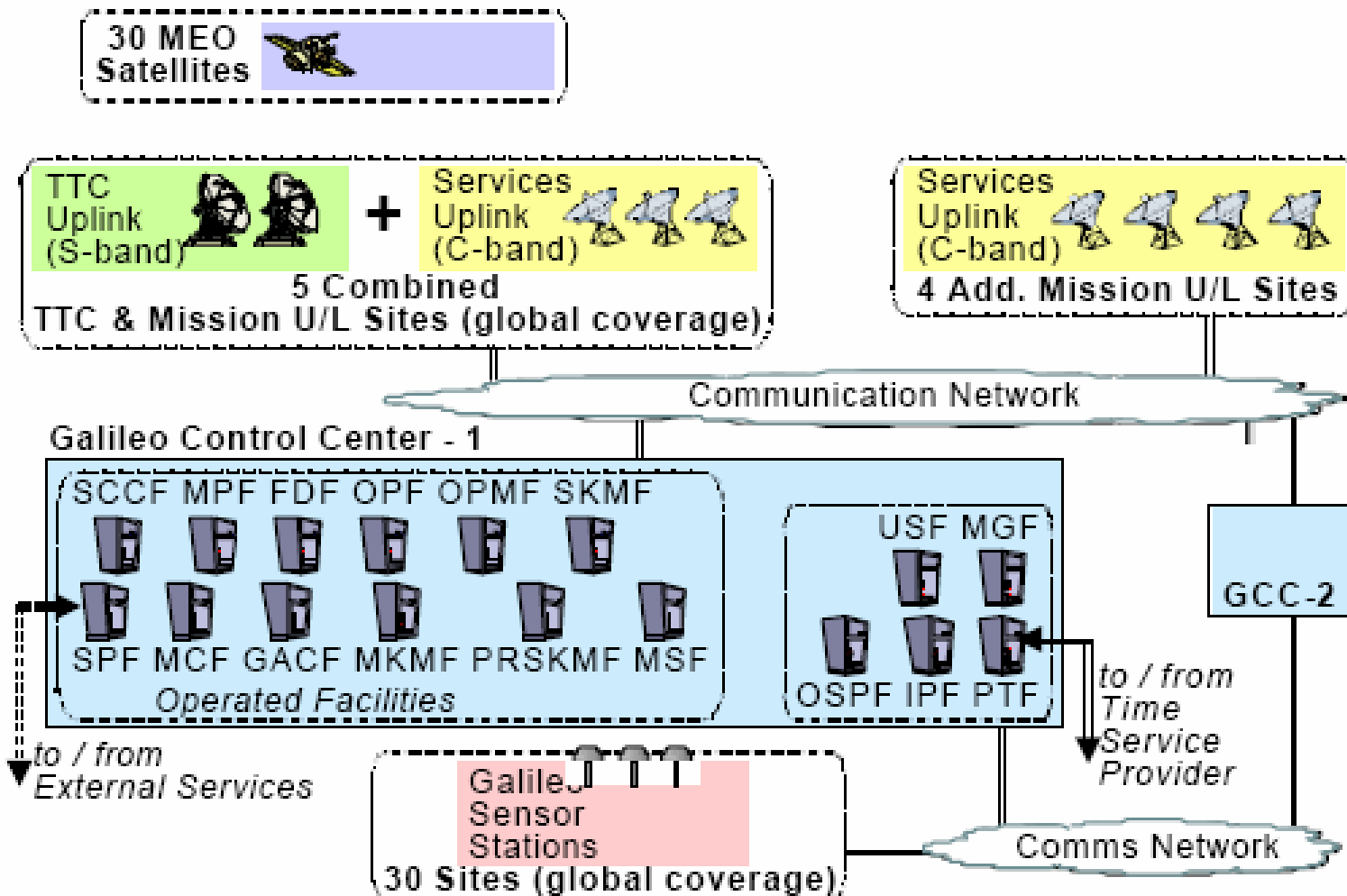
- **Provision of Integrity Services:**
 - Integrity Determination and Dissemination Service providing continuous health monitoring of the Galileo satellites.
 - Dissemination, by the Galileo satellites, of Integrity data generated by External Regions Integrity Systems.

- **Independence of Integrity Functions w.r.t. Navigation Functions.**

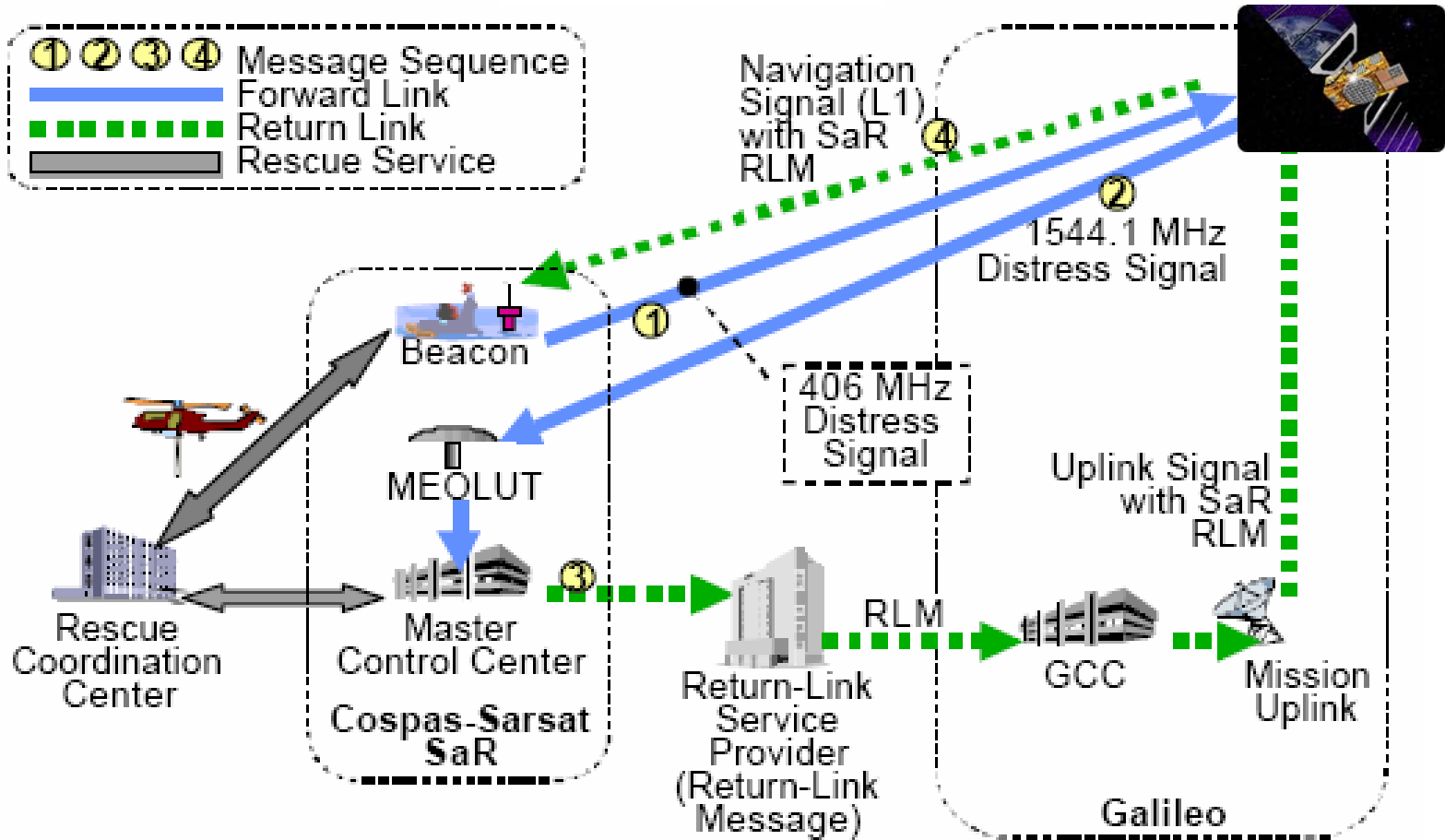
3 Navigation Services:

- Services of general interest (**Open Services**)
 - for mass market users (free of charge) provides position velocity and time services
- Commercial Services (**CS**):
 - for professional users (high accuracy and integrity service)
- Service of Public Interest (**PRS, SoL**):
 - for Governmental and Safety of Life applications

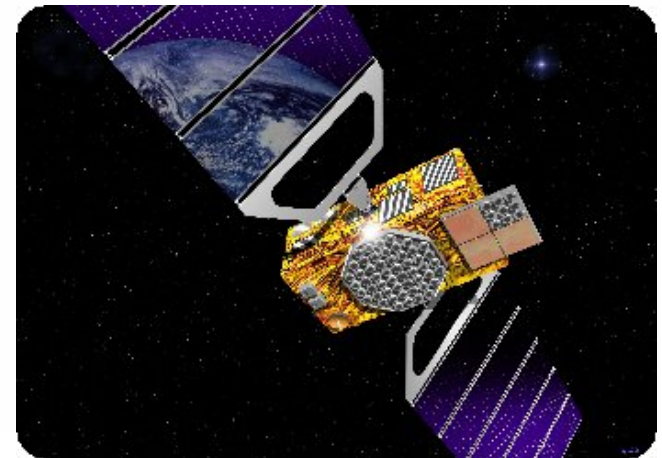
Galileo Architecture



Galileo Search & Rescue Architecture



- Constellation of 27+(3 spare) MEO Satellites organised to give a Walker Constellation 27/3/1
- 3 orbital planes
- Inclination of 56° degrees
- Altitude of ~23600 km
- Design lifetime of 20 years
- Two payloads embarked:
 - Navigation
 - Search and Rescue



⊗ Galileo Introduction

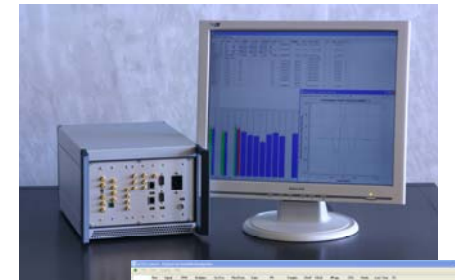
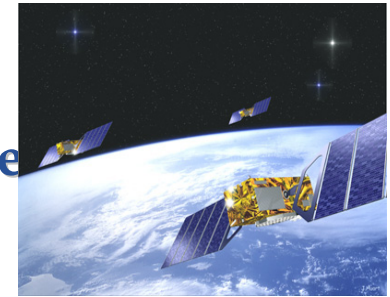
⊗ **Septentrio's Role in Galileo**

⊗ Economic Value

Galileo and Septentrio : Involved from the start



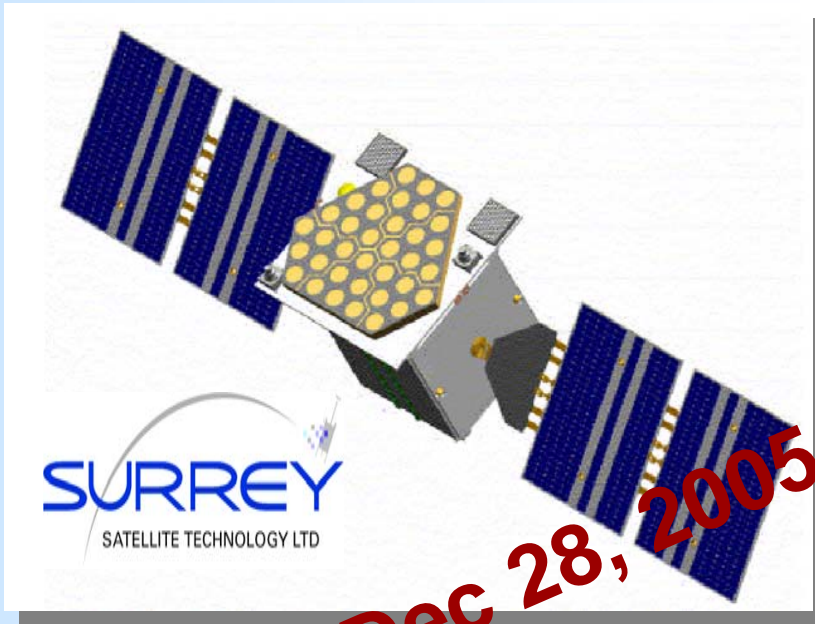
- ⊗ Founding Member of Galileo Services
- ⊗ Participating in Galileo Receiver Design Program since beginning :
 - ⊗ Receiver Requirements
 - ⊗ Reference Receiver Design
 - ⊗ Delivered first Galileo receiver model to ESA (Summer 2004)
 - ⊗ Delivered GSTBv2 receivers
 - ⊗ Used to receive first Galileo Signal from Space
 - ⊗ Leading Consortium for Test User Segment
 - ⊗ Projects for receiver development
- ⊗ Participating in European GNSS application projects with receiver technology



Receiving the World's First Galileo Signals from Space

InReach

GIOVE-A



Launched Dec 28, 2005

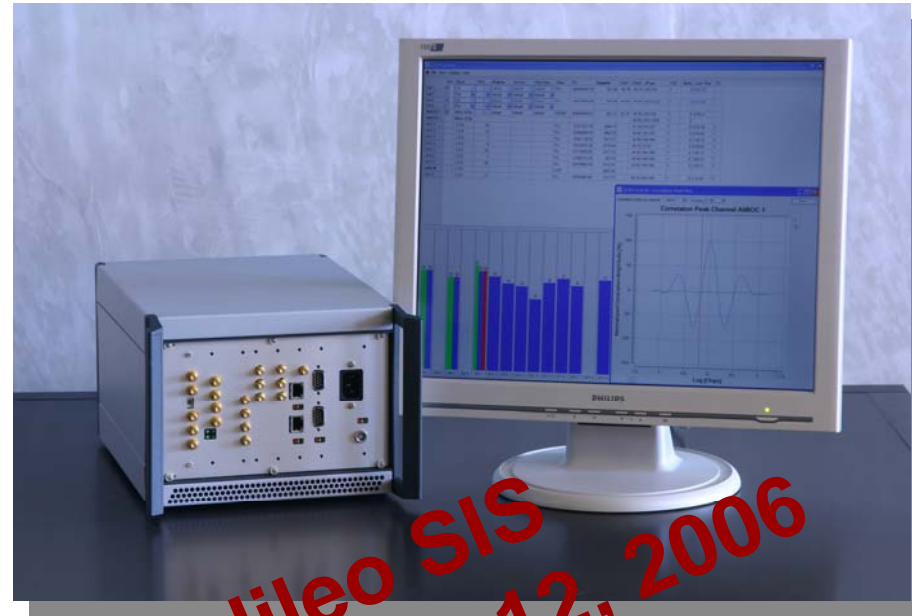
Line mass 600 kg

Power demand 700 W

Stowed Dimensions:

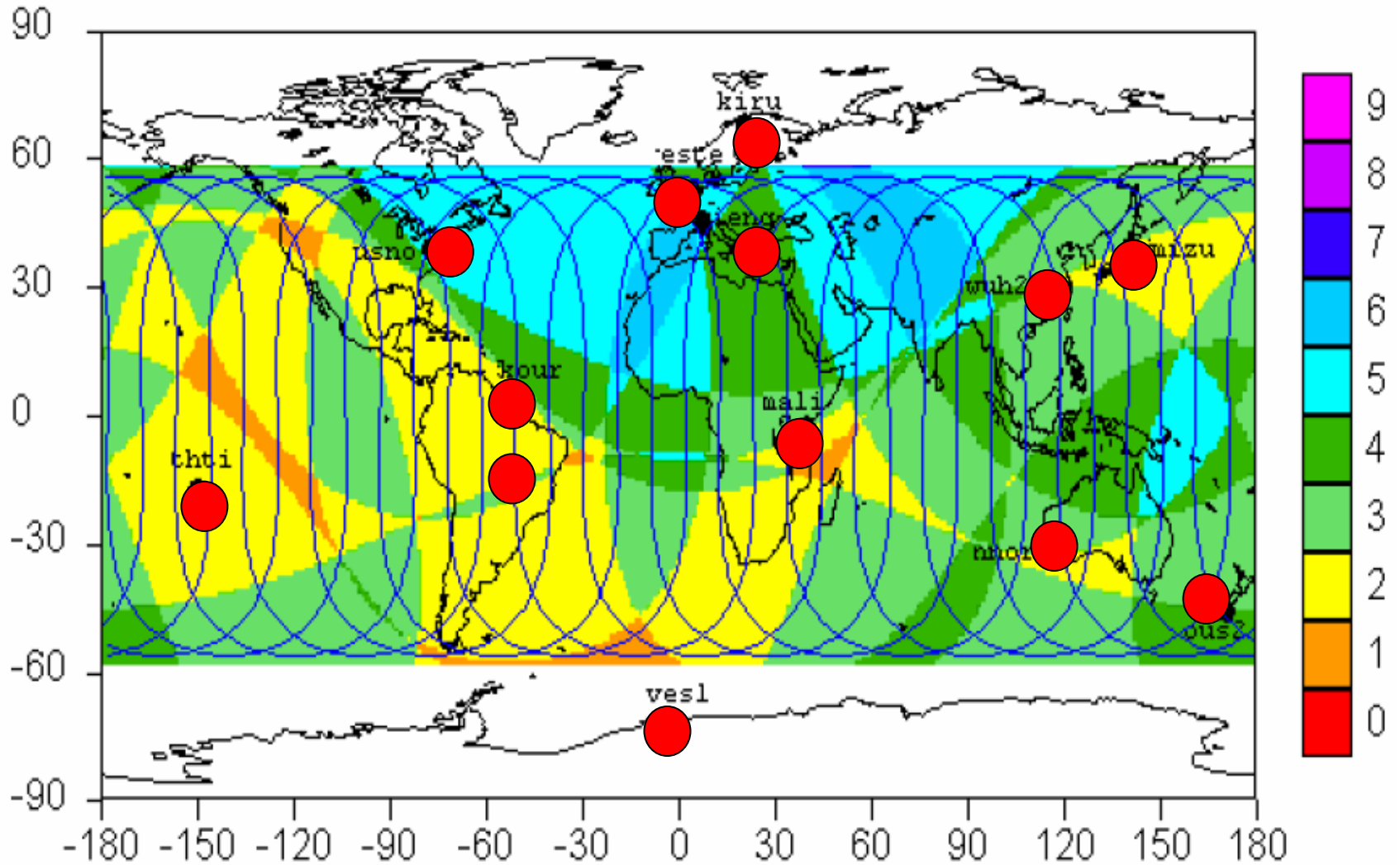
1.3 m x 1.8 m x 1.65 m

Septentrio GETR

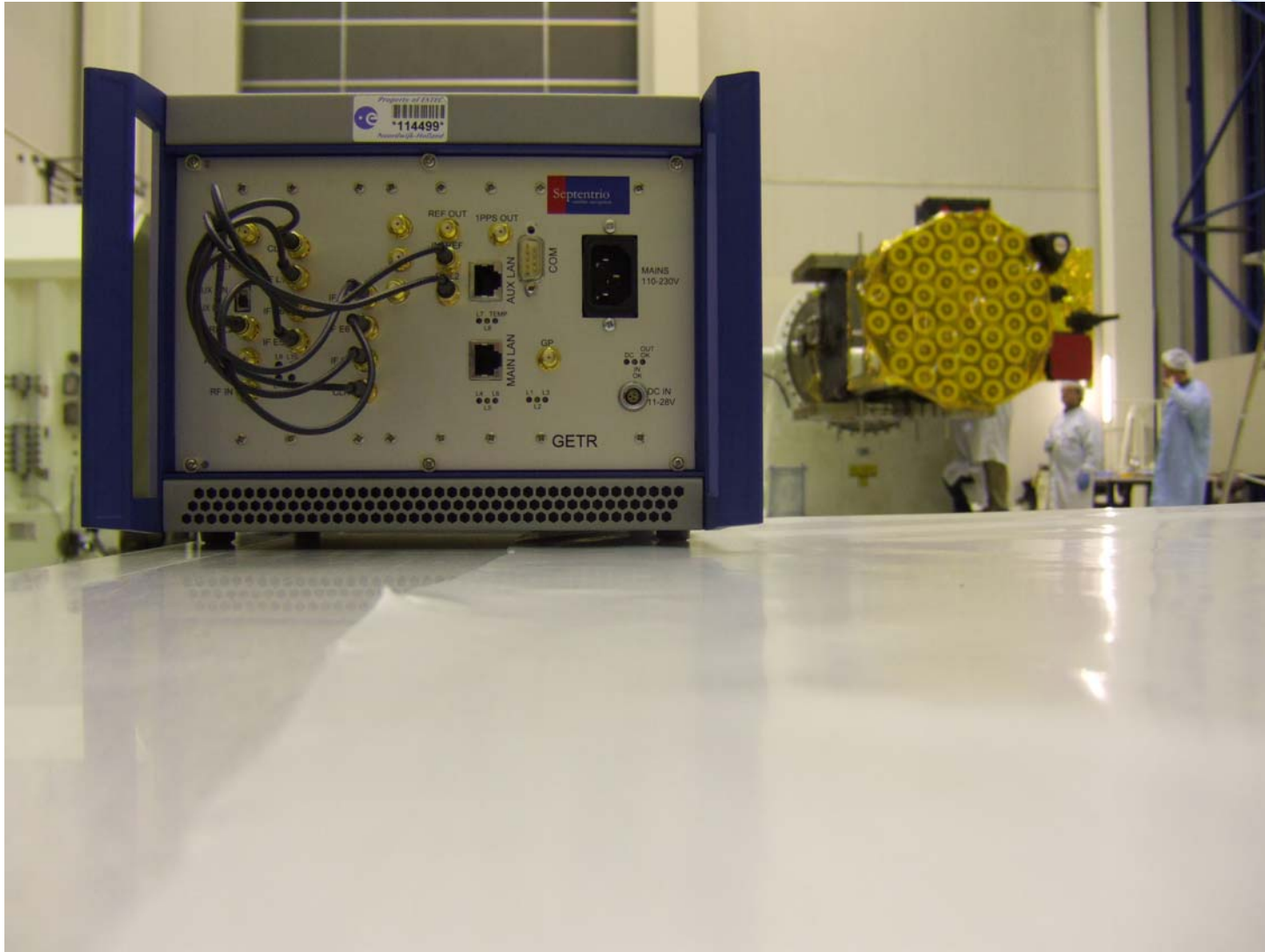


First Galileo SIS received Jan 12, 2006

GSTBV-M Sensor Station Network



End-to-End Test on GIOVE-B



Galileo Segment Contractors



- ⊗ Galileo System (GaIn = Galileo Industries):
 - S/S = Space Segment (Astrium-D)
 - GCS = Ground Control Segment (Astrium-UK)
 - GMS = Ground Mission Segment (Alcatel Alenia Space-F)
 - TUS = Test User Segment (Thales Avionique, F)

- ⊗ CDE1 TUS (2nd source):

- ⊗ Septentrio as prime contractor to ESA, consortium of 7 European companies



- ⊗ Galileo Phase C0 TUS: Nov.2003 - Aug.2004 (8 months)
 - ⊗ Galileo Phase CDE1 TUS: Jan.2005 - Jan.2009 (42 months)

- ⊗ GETR (GSTB-V2 Experimental Test Receiver):

- ⊗ Septentrio as subcontractor to SSTL & INDRA (GaIn)
 - ⊗ Feb.2005 - Jul.2006 (18 months)

Galileo CDE1 TUS Consortium



⊗ WP1000: TUSREQ
Consolidation



⊗ WP2000: TUR
(Test User Receiver)



⊗ WP3000: PRS-TUR



⊗ WP4000: SAR Test Beacon
(Search & Rescue)



⊗ WP5000: Test Support Tools

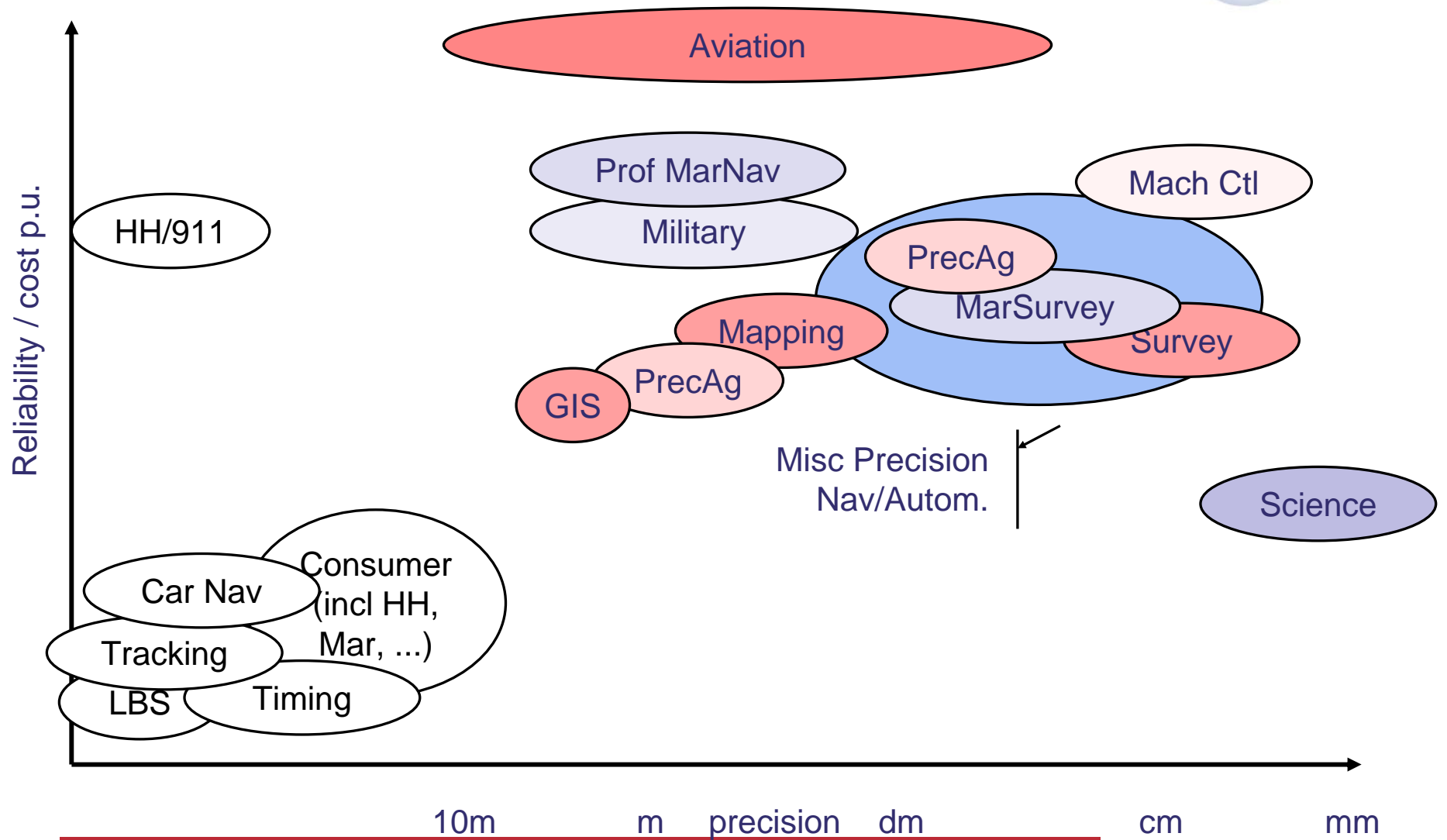


⊗ WP6000: Product Assurance



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Precision and Reliability



High-End Applications

