Vitrociset et Galileo

Nicky Carlomagno – Technical Manager

- **Vitrociset Belgium**
- **Le programme Galileo**
- **Stratégie Galileo en Belgique**
- **Les applications de Navigation satellitaire**

Vitrociset Group

VITROCISET GROUP

Headquarter & Operations
Via Tiburtina 1020
00156 ROME

Operations
Capo San Lorenzo
Cagliari -Sardegna

National Offices

Milano
Firenze
Genova
Napoli
Bari
Palermo
Torino
Venezia
Cagliari

National Subsidiaries

Vitrociset ICT
Salaria Real Estate

International Controlled Companies

Vitrociset Belgium (VTCB)
VTCB Permanent Establishment DE
VTCB Permanent Establishment NL
Vitrociset France
Vitrociset Kenya

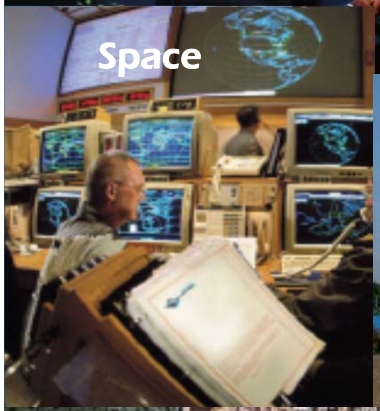
International Participations

Jadwalean Vitrociset Co Ltd. Riyadh (SA)

The activity domains

VITROCISET Belgium

- 30 countries where Vitrociset has assembled, installed and validated infrastructures for civil and defense use
- 130 systems installed worldwide
- 1000 Staff
- 250 MEuro turnover
- Certifications
  - ISO 9001: 2000 EA33, 28 et 19
  - AQAP -2110 / 160
  - AER-Q-2120 (AQAP-2120)
  - EASA PART 145
  - EASA PART 21
  - AECMA EASE pr EN9110



Vitrociset Group some figures

Notre organisation

12,5 M€ Turnover
Certified ISO 9001 – 2008

82 staff

Galaxia
European Space Applications Park
l'espace pour développer

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Fax: +49 (0)6151 95734-26

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2201 CZ Noordwijk - The Netherlands
Tel.: +31 (0)71 3649770
Fax: +31 (0)71 3648960

Vitrociset Spain
Av. Aragon 330
28023 Madrid Spain

The Belgian legacy

Third parties Management
ESA – Redu ESTRACK

Ciset — **1982**

Technical know-how & expertise consolidation

Ciset International — **1989**

Strong investments phase in Wallonia with permanent structures: ESC, Dinant Metrology Laboratories

Vitrociset EPB — **2002**

Permanent structures transferred to local administrations for institutional aims (Idelux, Forem);

Vitrociset focused on industrial objectives with significant investments at Redu;

Vitrociset Belgium — **2008**

Considerable Investments in know-how transfer:

- EGNOS vs Galileo infrastr.
- GNSS added value
- Ground Data Software

Vitrociset Belgium plays a considerable role in Galileo IOV & FOC1.

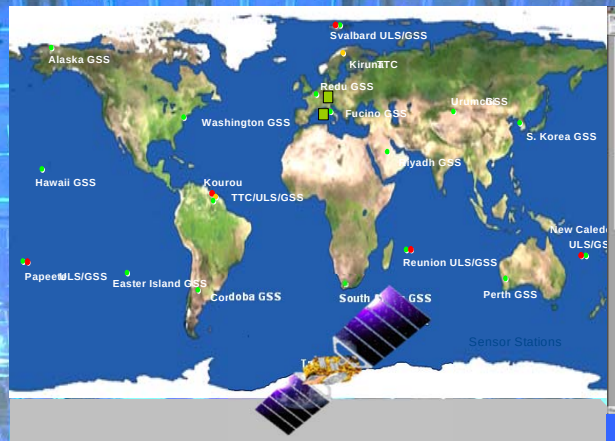
The expertise & activities 'domains

Technical and Operational Management of complex sites and technical infrastructures.
Conception, design & development of integrated technology applications.

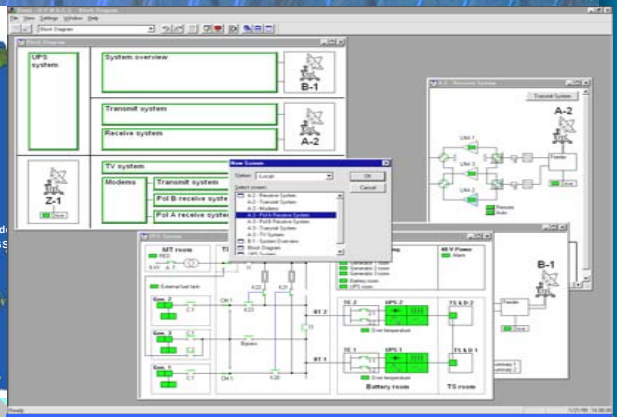
The conception and development of software suites for the control, the automation and the tests of the Satellite Ground Infrastructure: Mission Control System, Automation System, Electrical Ground Support Equipment

Operations and Engineering Services performed in the framework of the missions and activities of the European Space Agency, respectively in ESOC (DE) and ESTEC (NL)

Participation and contribution to the deployment of the Galileo Ground Infrastructure



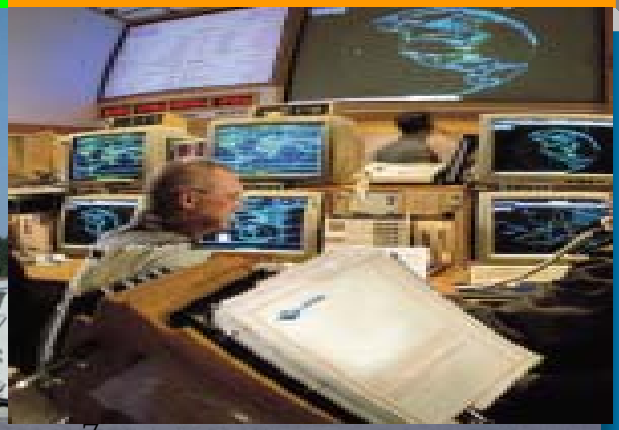
Galileo Infrastructure



Ground Data Systems

M&O Services
User's applications

Space Operations & System's Engineering



Espace en Belgique

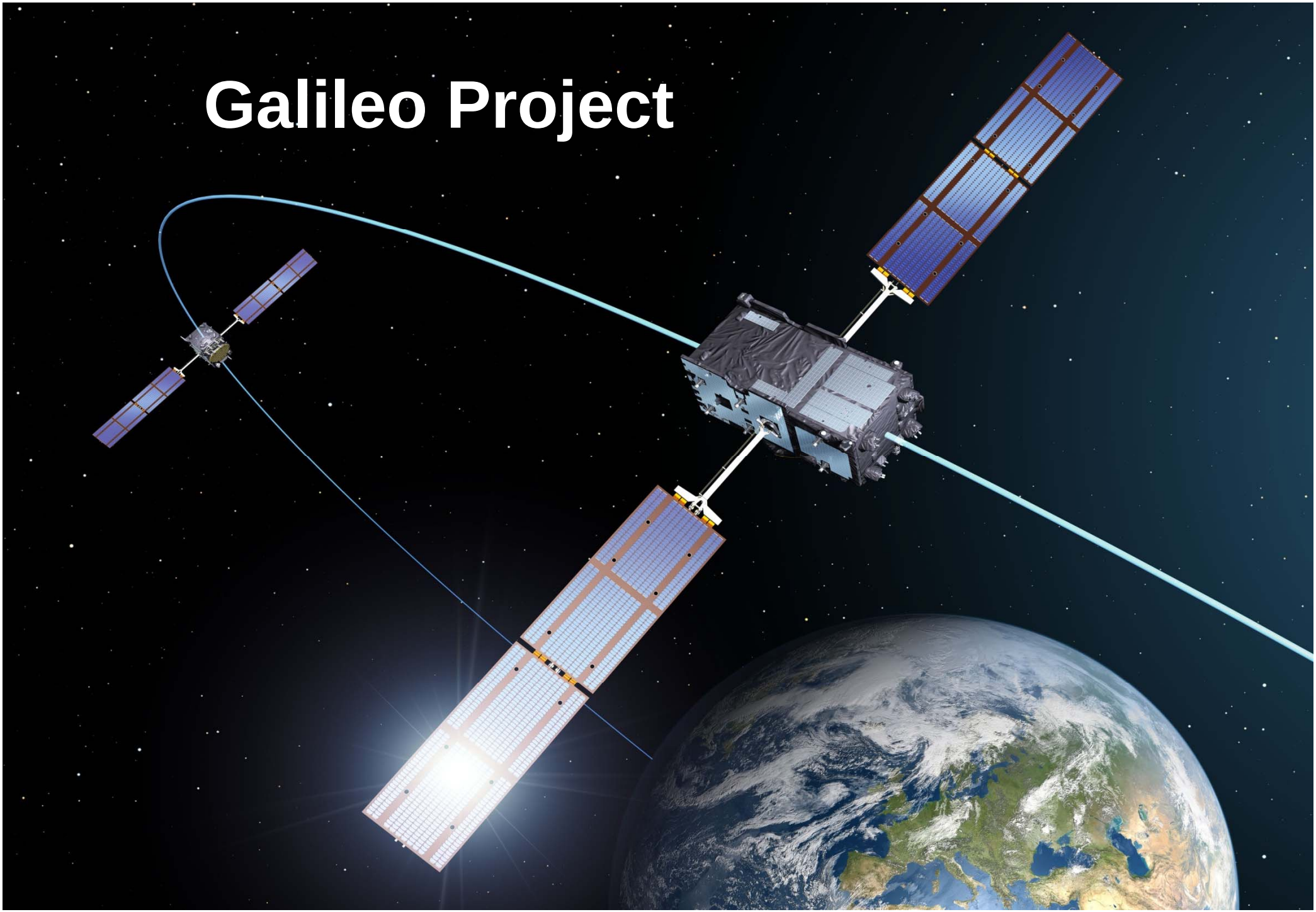
«the smallest among the bigger, the biggest among the smaller»

Jean-Marie Luton – Former ESA DG

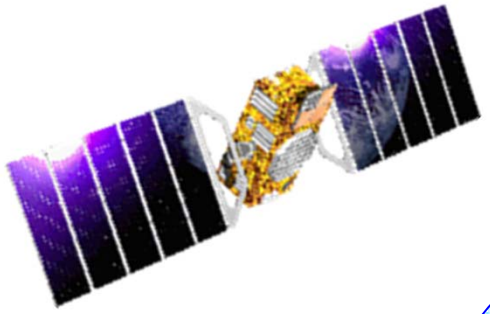
Belgium budget in ESA
947 M Euro (2009-2013)
Share 2009: 5,8 %

- La Belgique est l'un des pays fondateurs de la politique spatiale en Europe avec la création en 1962 de l'ESRO
- 70 équipes de recherche au sein d'universités, d'établissements scientifiques fédéraux, régionaux et de centres spécialisés;
- 50 entreprises: le chiffre d'affaires annuel (spatiales) 250 millions Euro;
- investissements en R&D dans le secteur spatial générant un effet multiplicateur pour l'ensemble de notre économie, celui-ci se situant dans une fourchette allant de 2 à 14 selon le domaine d'application considéré;
- environ 1.600 emplois directs hautement qualifiés.

Galileo Project

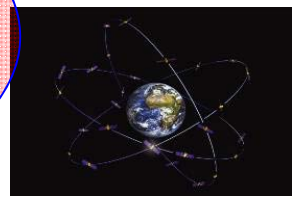


Galileo Implementation Plan



FOC Phase 2
All services
2018

FOC Phase 1
Open Service, Search & Rescue Public Regulated Service
total 18 satellites and G/S
2014 - 2015



In-Orbit Validation
4 IOV satellites and ground segment
2011 - 2012

Galileo System Testbed
GIOVE A , GIOVE B , GIOVE M
2005 - 2008

GALILEO
GIOVE

System Architecture

VITROCISET Belgium

9 Mission Uplink Stations

5 TT&C Stations

Constellation of 30 MEO Satellites

Users & Service Providers






IOT Centre

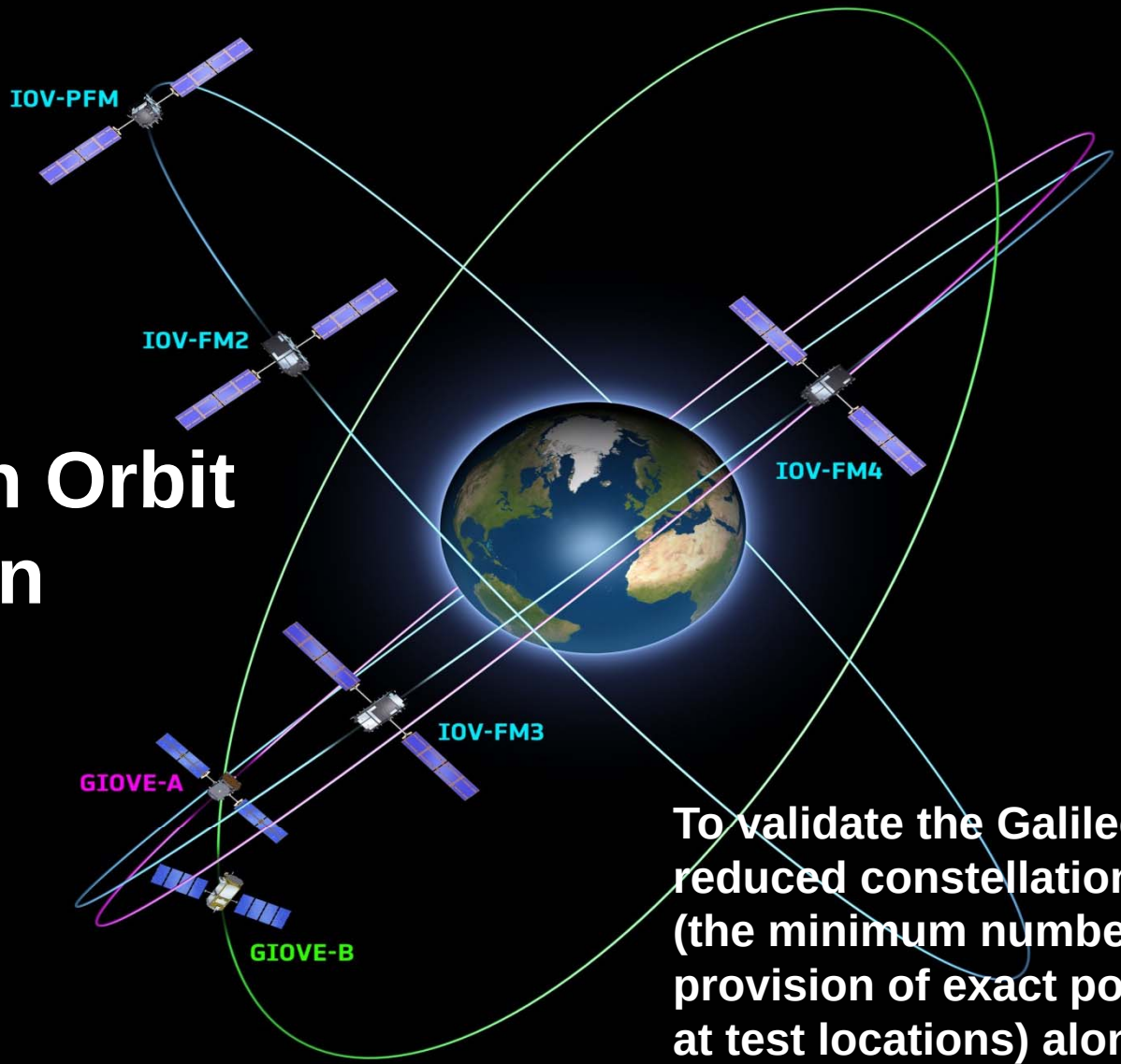
2 Control Centres


2 LEOP Centres


30 Galileo Sensor Stations

VITROCISET
Belgium

Galileo In Orbit Validation



To validate the Galileo concept with a reduced constellation of four satellites (the minimum number to guarantee the provision of exact positioning and timing at test locations) along with a reduced ground segment

Galileo IOV on the Ground

2 Complementary Control Centres:

- **Ground Mission Segment (GMS) in Fucino has the responsibility for the mission aspects ,**
- **Ground Control Segment (GCS) in Oberpfaffenhofen, to control and monitor the constellation.**

Both centers will be completed to become fully redundant.

Galileo IOV on the Ground - 2

Receiving from or sending information to:

- 5 Uplink Stations (ULS)
- 2 Telemetry Tracking and Control Facility (TTC)
- 12 Galileo Sensor Stations (GSS) distributed worlwide,

Galileo Data Dissemination Network (GDDN), ensures the data transmission between the different sites, for both navigation or operation purposes.

TTC Antenna in Kiruna

TTC Kourou

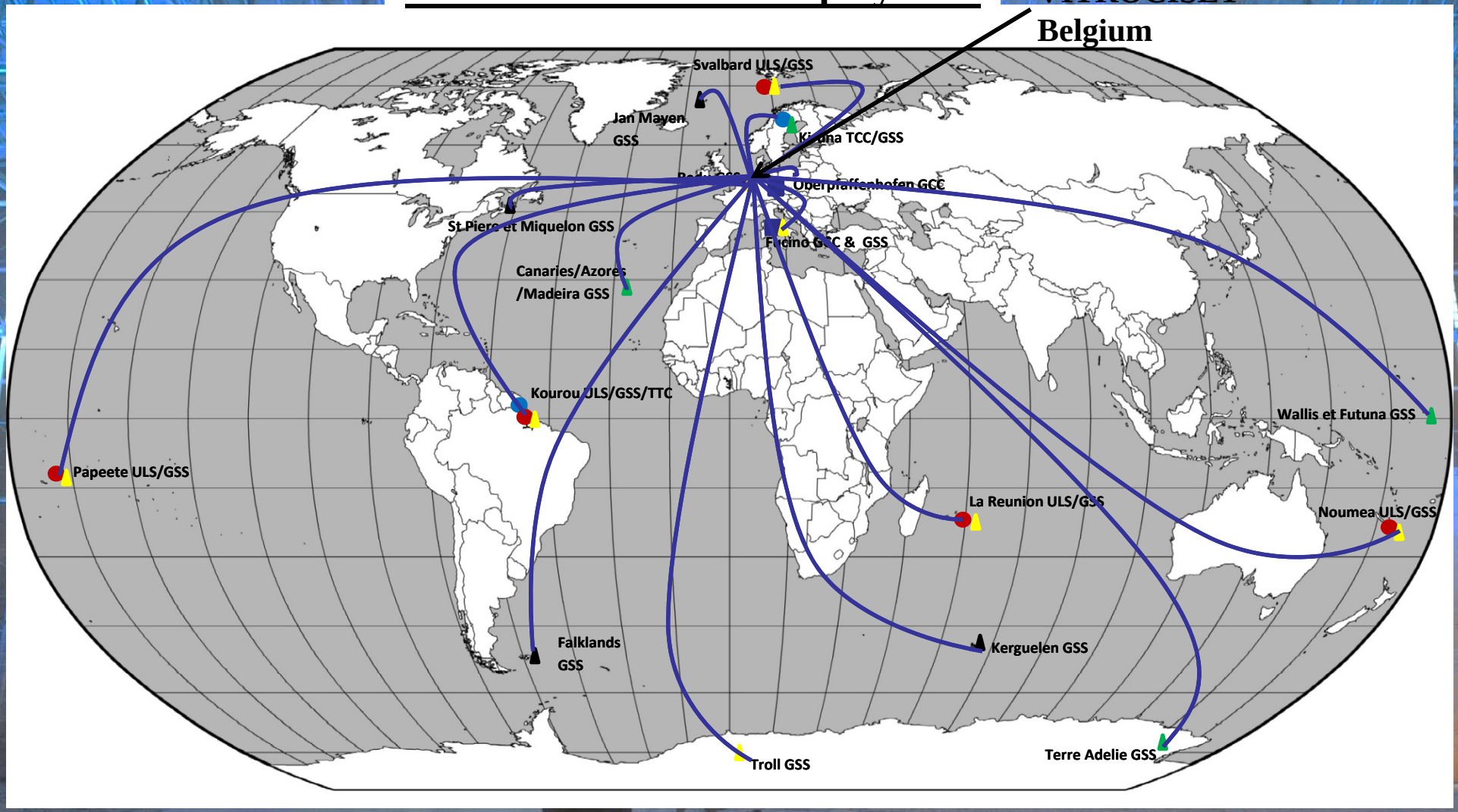
GSS Troll

Where & how many?

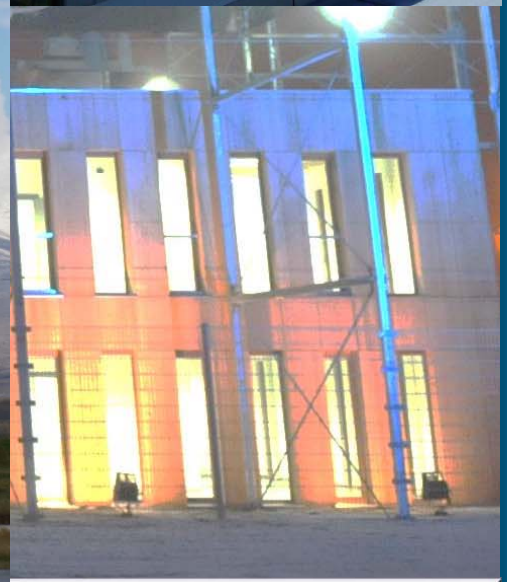
VITROCISET Belgium

IOV/FOC1 Phase

Galileo Remote Sites Deployment



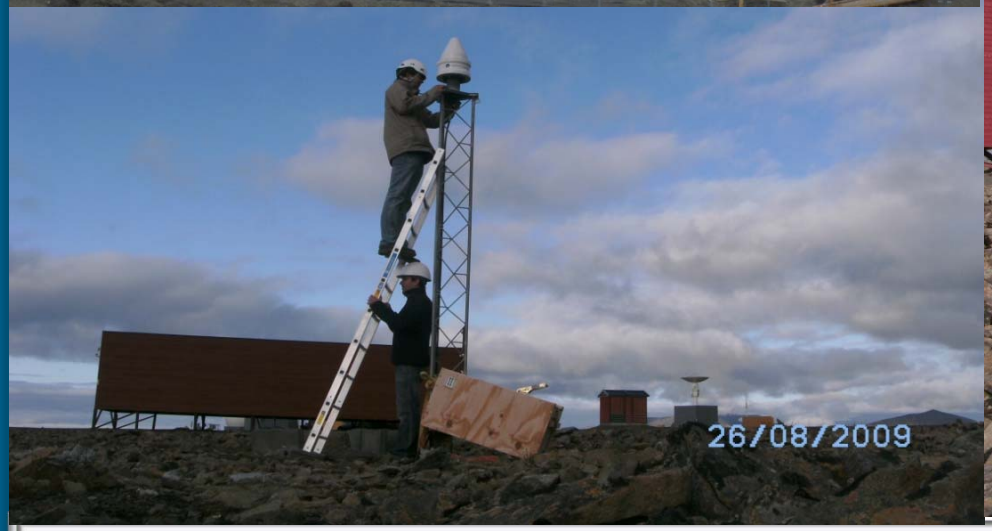
Fucino GCC & GSS



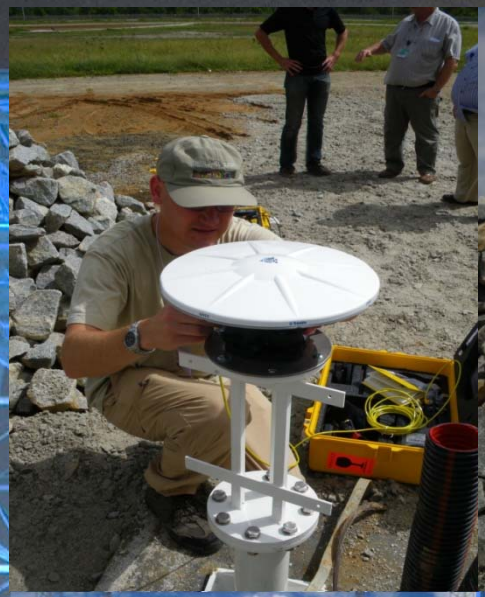
Oberpfaffenhofen GCC

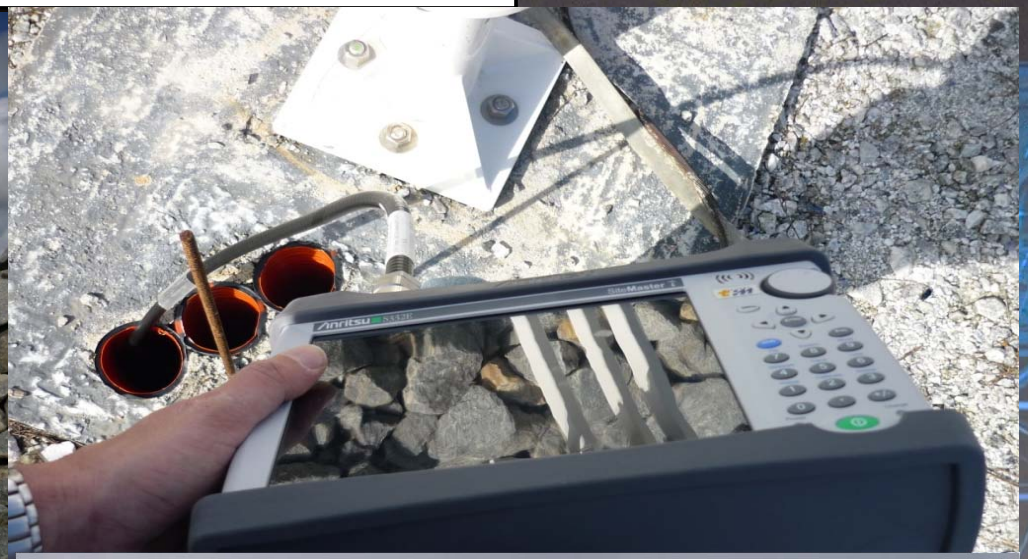
Troll GSS

Svalbard ULS & GSS



Kourou ULS, GSS & TTC





Papeete ULS & GSS

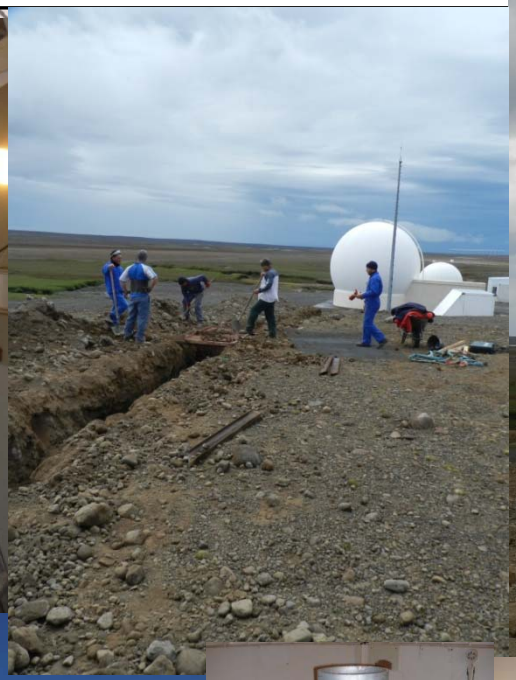
La Réunion ULS & GSS

Noumea ULS & GSS

Redu GSS

Kerguelen GSS (Fast Track) -1

Kerguelen GSS (Fast Track) -2



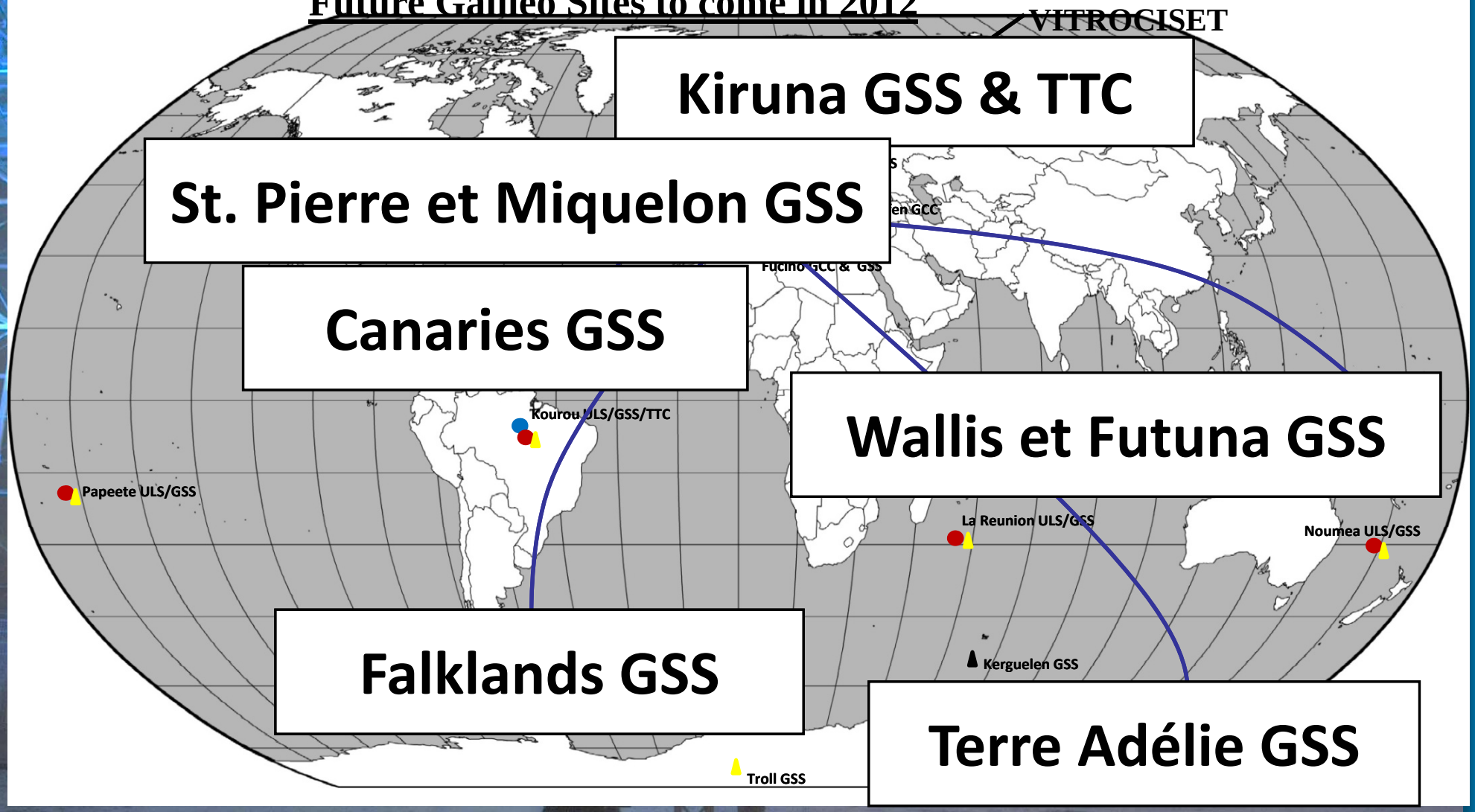
Kerguelen GSS (Fast Track) -2

Jan Mayen GSS (Fast Track))1

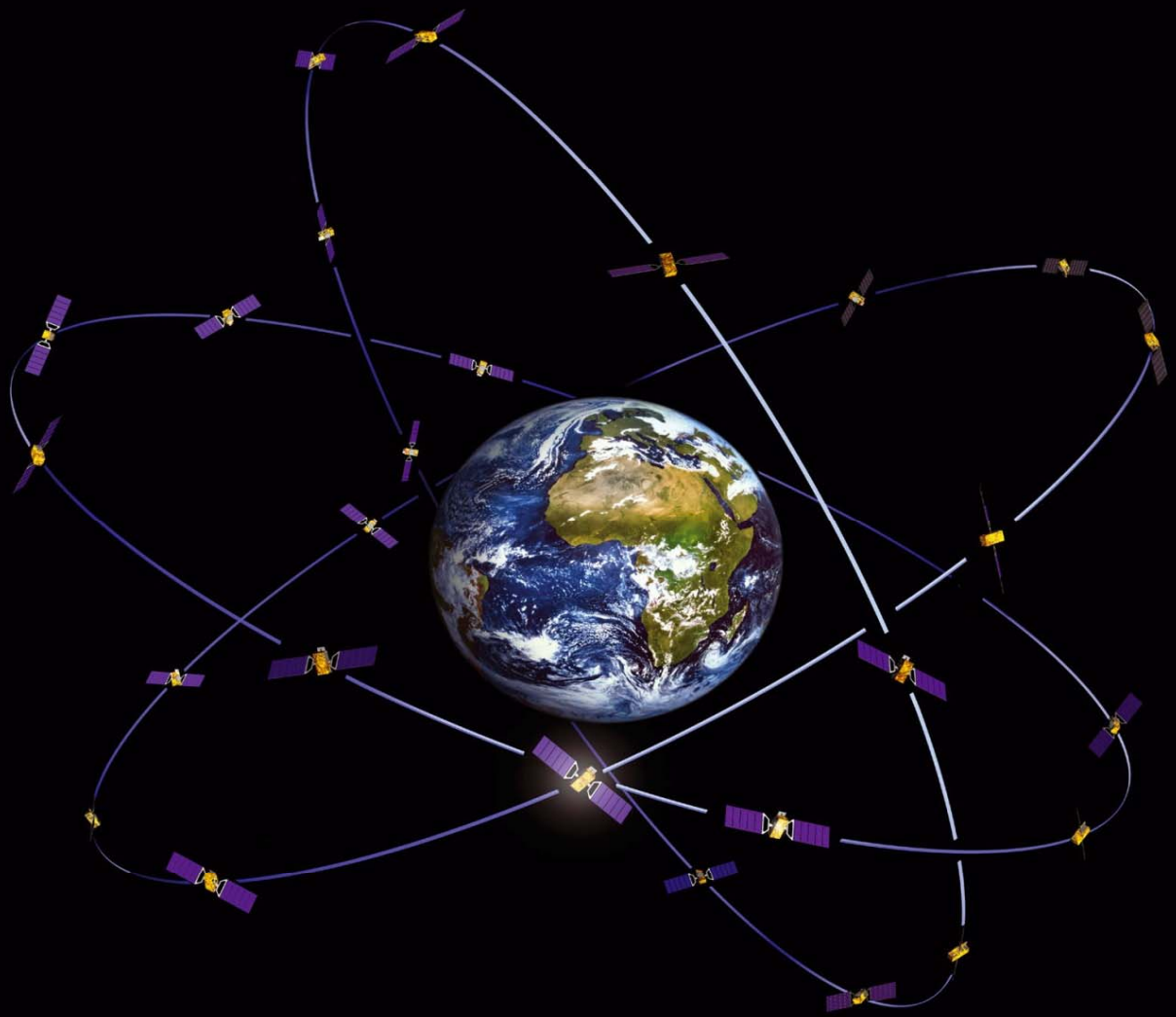
Jan Mayen GSS (Fast Track) -2

VITROCISET Belgium

Future Galileo Sites to come in 2012



FOC development is on-going toward a full 30 satellites configuration and its associated ground segment.



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SPACEOPAL

Spaceopal is a Galileo Project Management Company established jointly by DLR GfR mbH and Telespazio S.p.A. DLR GfR mbH and Telespazio S.p.A each hold 50% of the shares of the company. Spaceopal is fully dedicated to manage the Galileo Operations, separated from other projects, activities and business lines, and with its own specialized staff.
The company is duly established and registered under German law (GmbH) and is having its seat in Munich. It is based on a Joint Venture Agreement, Articles of Associations, Management Regulations and Rules of Procedures.

SPACEOPAL Core Team Members

To perform the Galileo operations, Spaceopal has formed a Core Team of companies. By this set-up, Spaceopal takes utmost advantage of previous public sector investments, industrial experiences and skills acquired in the definition and developments phases of the European GNSS programmes, especially in the IOV phase.

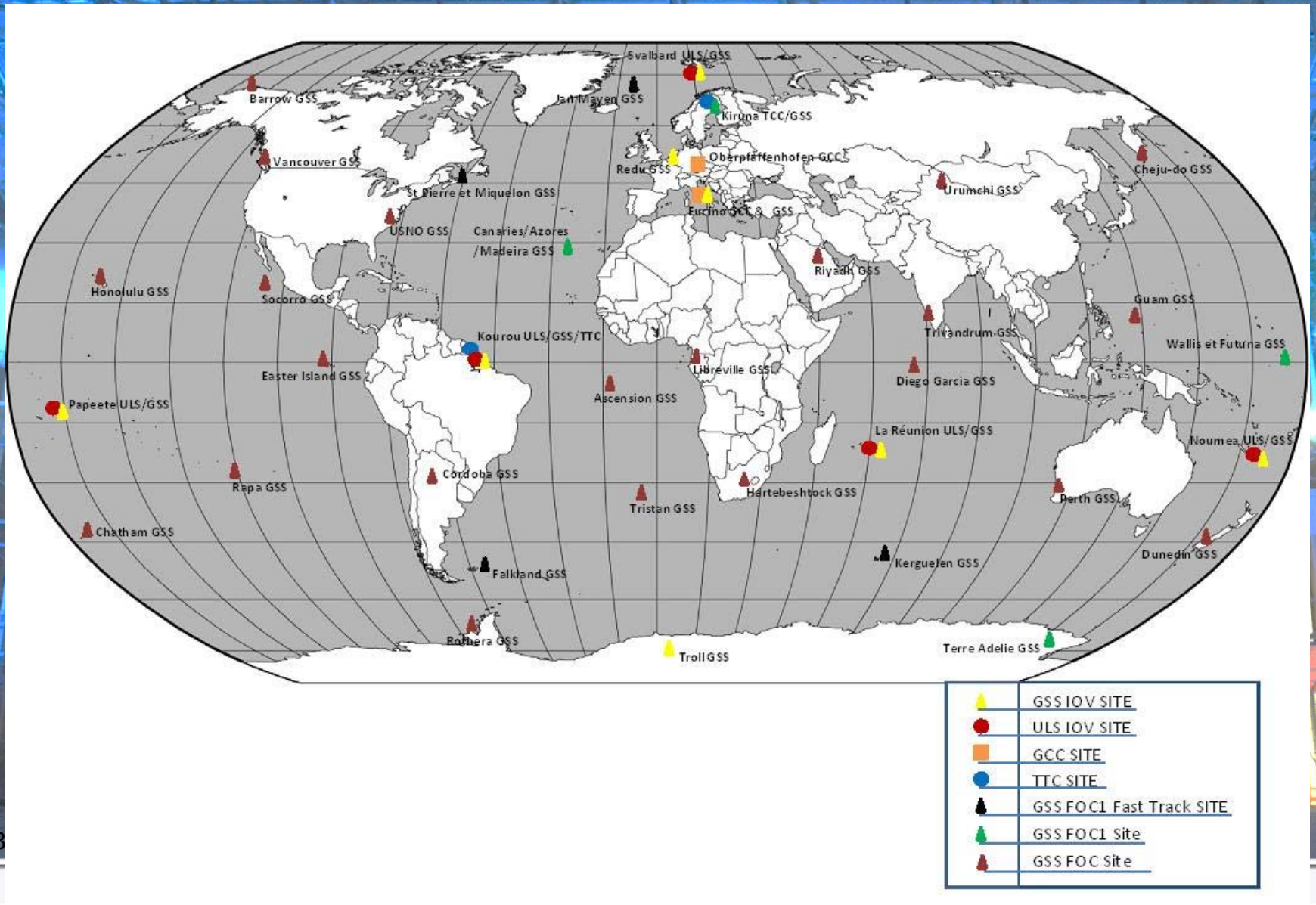
The Spaceopal CTM companies are:

DLR GfR mbH (Germany)
Telespazio S.p.A. (Italy)
Astrium Services GmbH (Germany),
SES ASTRA TechCom S.A. (Luxembourg)/ Redu Space Services S.A. (Belgium),
T-Systems Enterprise Services GmbH (Germany)
Vitrociset Belgium Sprl. (Belgium)
ESOC (Germany)/CNES (France).

Where & how many?

VITROCISET Belgium

FOC Phase



Pourquoi Galileo ?

Le concurrents:

GPS – USA: 30 satellites (couverture mondial)
GLONASS – Russia: 24 satellites (couverture mondial)
Beidou – China: 5 Geo + 30 Meo (couverture regional)
GAGAN – Inde: en développement (couverture regional)

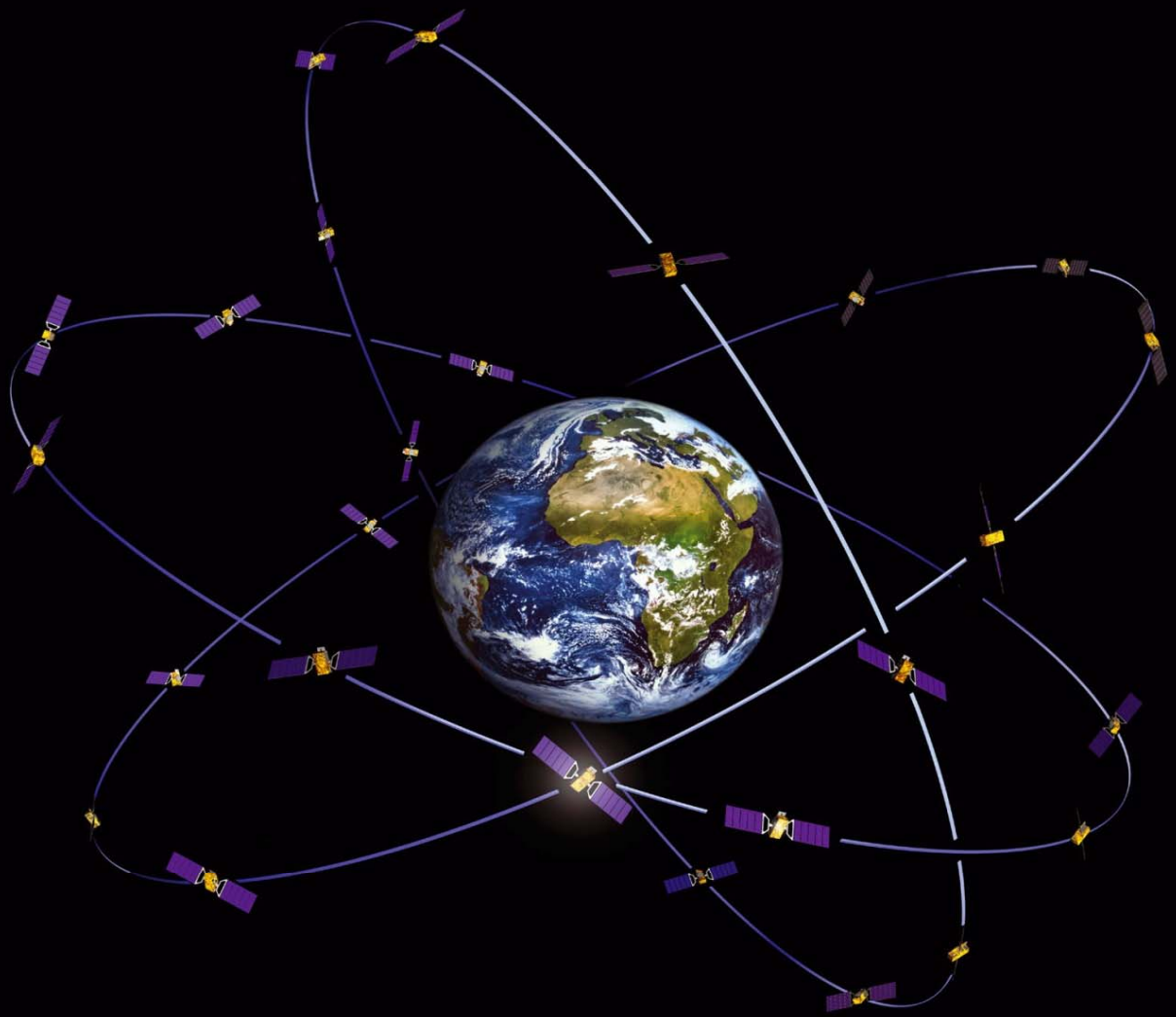
Services Galileo

Pourquoi Galileo ?

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

GALILEO EGNOS

Galileo: une stratégie pour la Belgique



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VITROCISET
Belgium

Un rôle pour la Belgique....

...ancré à Galaxia

Galaxia
European Space Applications Park

Our Galileo objective

The Galileo Maintenance Centre

Permanent overhaul centre for the centralisation and coordination of the Galileo remote sites :

GCC DE

GCC I

System Sites and Hosting coordination

Galileo Maintenance Centre

HE Service SLA

Remote Site HE Service n

Galileo, Belgium and Vitrociset in the IOV phase : a solid commitment...

...Towards the growth of a Central Galileo Logistic Centre in Belgium !

The Integrated Logistic Engineering analysis and procedures for the Galileo Mission Segment.	Vitrociset is doing it !
The provision of an Integrated Logistic Software tool for the Galileo Programme.	Vitrociset is doing it !
The Deployment, Assembly and Integration of the Galileo Mission Segment worldwide !	Vitrociset is doing it !
The Deployment, Assembly and Integration of the Mission Data Dissemination Network worldwide !	Vitrociset is doing it !

Having in mind the Galileo Logistic Center objective, we are ready to take the challenge of the FOC Phase !

CONFIDENTIAL

VITROCISET
Belgium

Galaxia: une opportunité pour le support opérationnel à Galileo et un pole technologique avec de la croissance économique…

Les applications de navigation Satellitaire

AREVA

World leader in the energy business

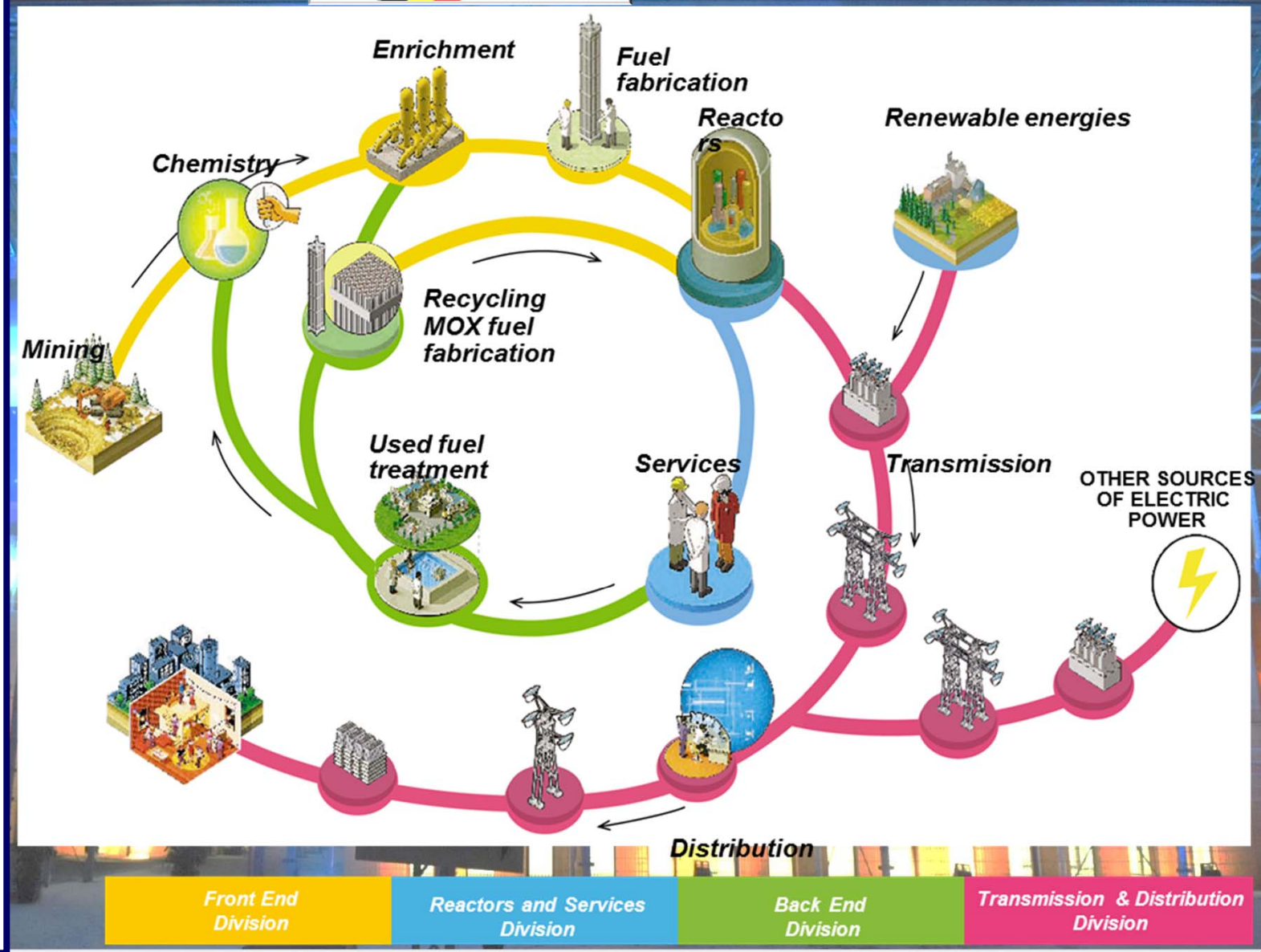
N° 1 in the entire nuclear cycle

N° 3 in electricity transmission and distribution

VITROCISET Belgium

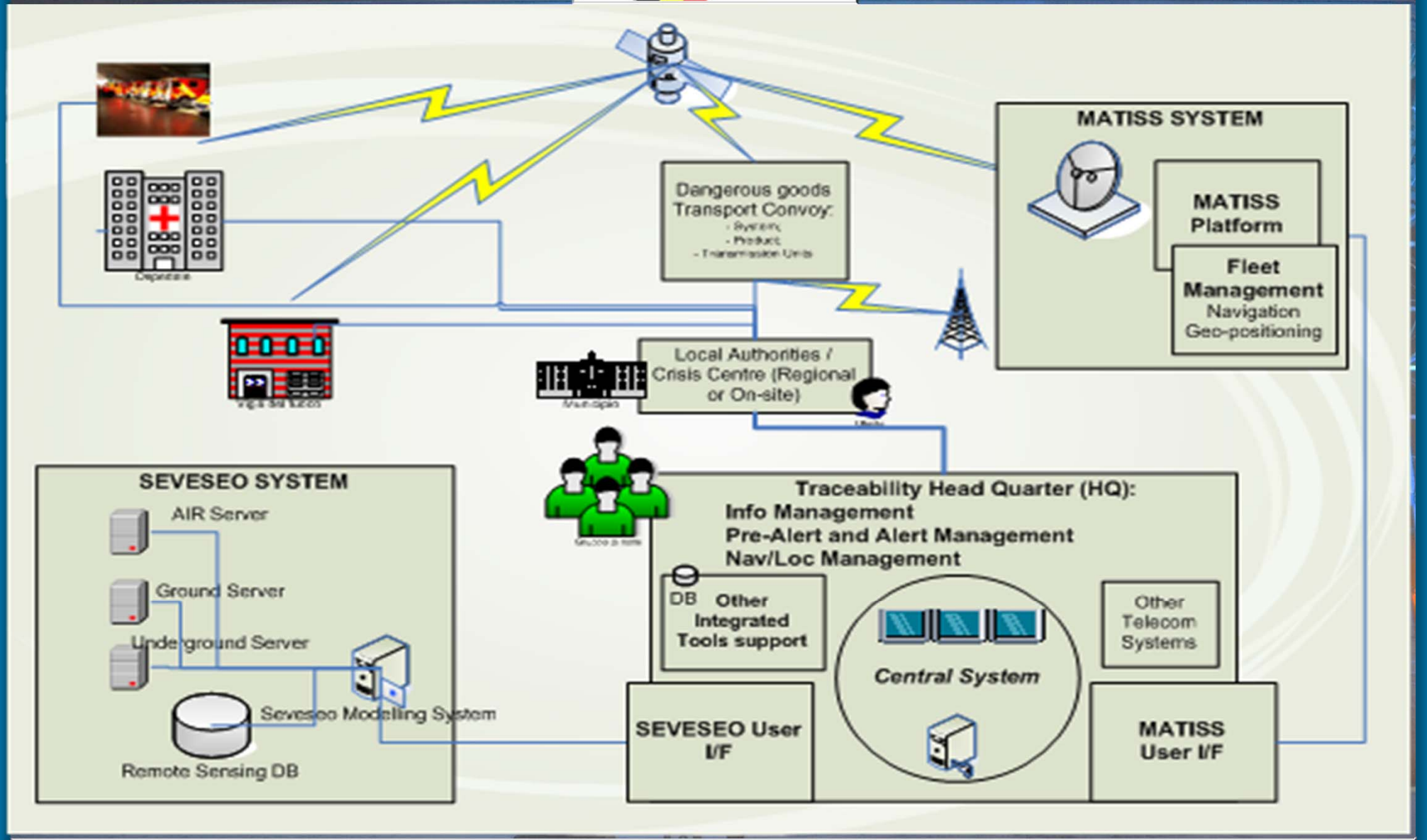
SSMART – 1

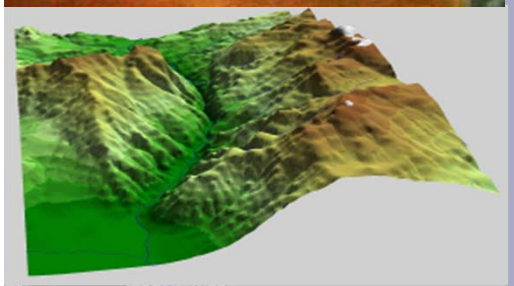
System for Safety in Multimodal Assisted Remotely Transports

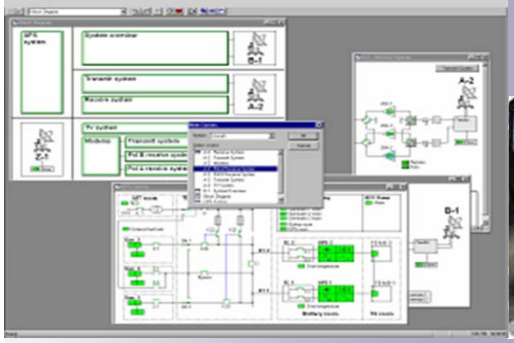


SSMART – 2

System for Safety in Multimodal Assisted Remotely Transports

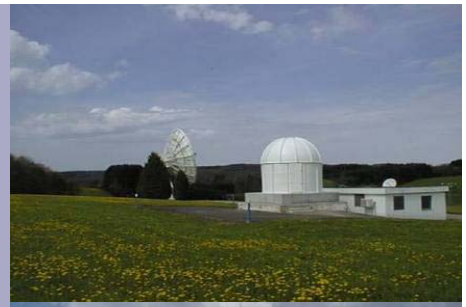






Questions ?

Merci pour votre attention



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