



Galileo Programme Update

Pieter De Smet, European Commission
ICTP Conference, Prague, 10 November, 2014



**REGULATION (EU) No 1285/2013 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL
of 11 December 2013
on the implementation and exploitation of European satellite navigation systems and repealing
Council Regulation (EC) No 876/2002 and Regulation (EC) No 683/2008 of the European
Parliament and of the Council**

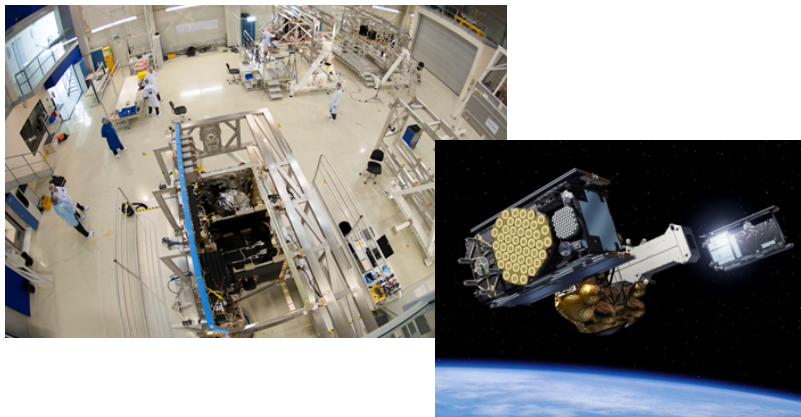
- ✓ A stable 7 years perspective
- ✓ A substantial budget
- ✓ A new governance scheme driven by exploitation

2014-2020

- 1,930 B€ for Galileo Deployment**
- 3 B€ for Galileo Exploitation**
- 1,580 B€ EGNOS Exploitation**



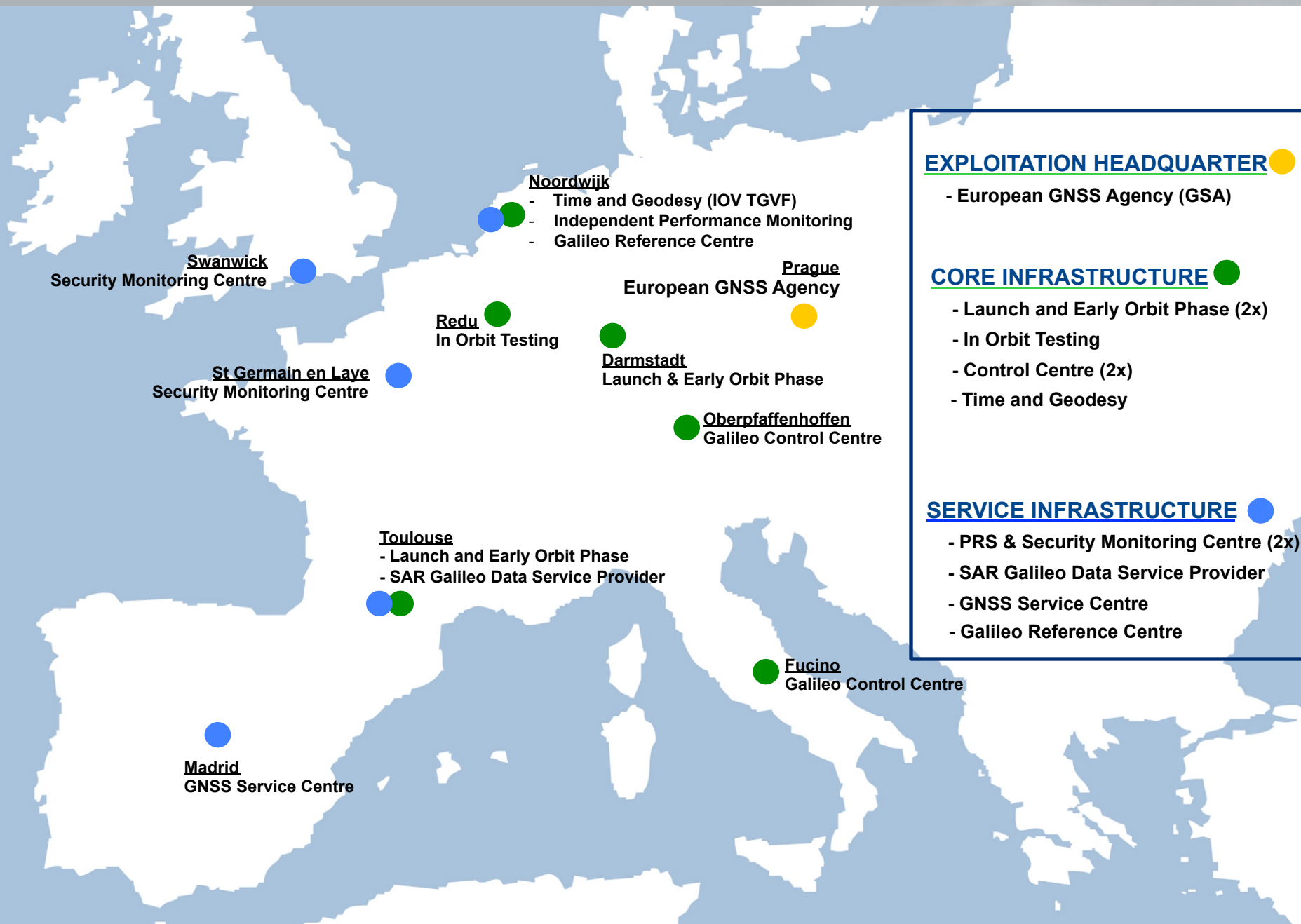
- ★ New governance for the programme put in place
- ★ Galileo In Orbit Phase successfully concluded
- ★ Ground infrastructure deployment finalised for initial operations



- ★ New satellite design qualified
- ★ Soyuz Launch Anomaly



- ★ Preparation of service delivery and system exploitation



EXPLOITATION HEADQUARTER

- European GNSS Agency (GSA)

CORE INFRASTRUCTURE

- Launch and Early Orbit Phase (2x)
- In Orbit Testing
- Control Centre (2x)
- Time and Geodesy

SERVICE INFRASTRUCTURE

- PRS & Security Monitoring Centre (2x)
- SAR Galileo Data Service Provider
- GNSS Service Centre
- Galileo Reference Centre



The deployment plan for the Galileo constellation is secured

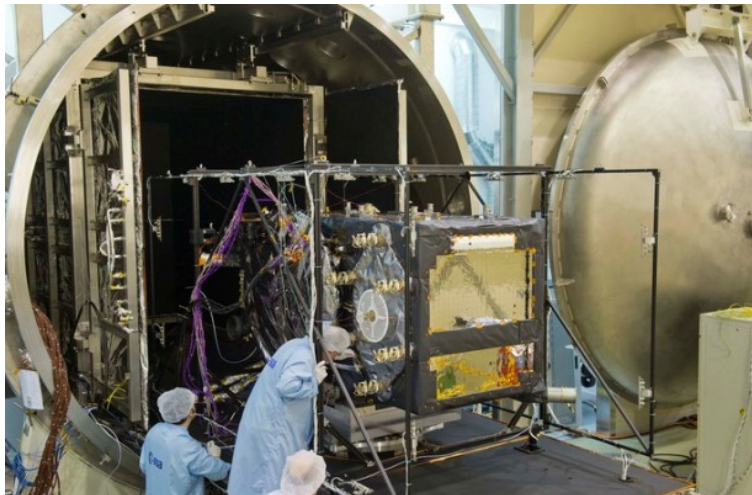
- ★ 26 satellites in total have been ordered:
 - ★ 4 IOV + 22 FOC
- ★ The launcher service contracts for the full constellation have been signed with Arianespace:
 - ★ Soyuz: 7 launches for 14 satellites (incl. the launches in 2011, 2012 and 2014)
 - ★ Ariane 5: 3 launches for 12 satellites



New satellite design on track



- ★ FOC Satellites built by OHB with navigation payload from Surrey Satellite Technology Ltd
- ★ Satellite production proceeds at a good pace



Not the first Gremlins in space...



- ★ 1st launch of Galileo FOC satellites on August 22nd
 - ★ Satellite injection anomaly detected shortly after the end of the launch phase
 - ★ Satellites under control but in elliptical orbit and different plane inclination
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- ★ Inquiry Board established by Arianespace investigated source of launch anomaly
 - ★ EC-ESA analysing best options to adapt the mission for those two satellites
 - ★ Follow-up launch sequence to be confirmed as soon as possible



- ★ Galileo Service Center operated by the GSA



www.gsc-europa.eu

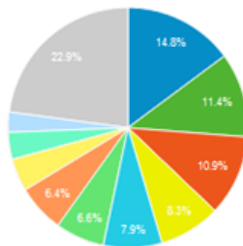
- ★ Regular publication of Notice Advisory to Galileo Users (NAGUs) and state of Galileo constellation



✓ Visiting countries

EU-28	Non EU Europa	Asia	America	Africa	Oceania
28	9	26	12	9	2

- Spain
- Belgium
- Germany
- Netherlands
- Czech Republic
- United Kingdom
- Italy
- France
- United States
- Poland
- Other



* USA: 93 visits; 3.89 % of total
 India: 42 visits; 1.76 % of total
 Japan: 34 visits; 1.42 % of total
 China: 23 visits; 0.93 % of total
 Russia: 18 visits; 0.75 % of total

Pageviews	%
1,589	
1,095	
999	
254	
238	
156	
121	
114	
106	
105	

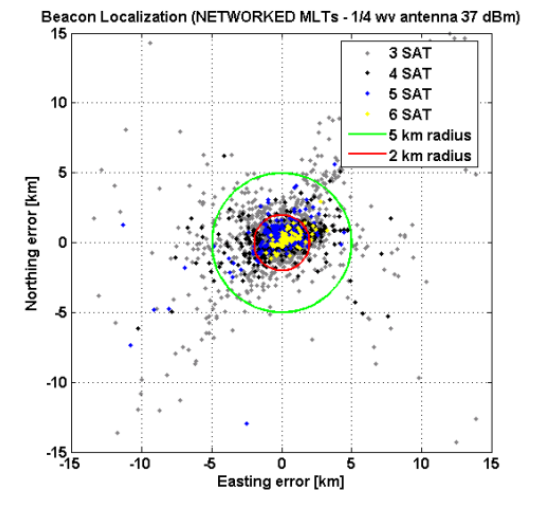
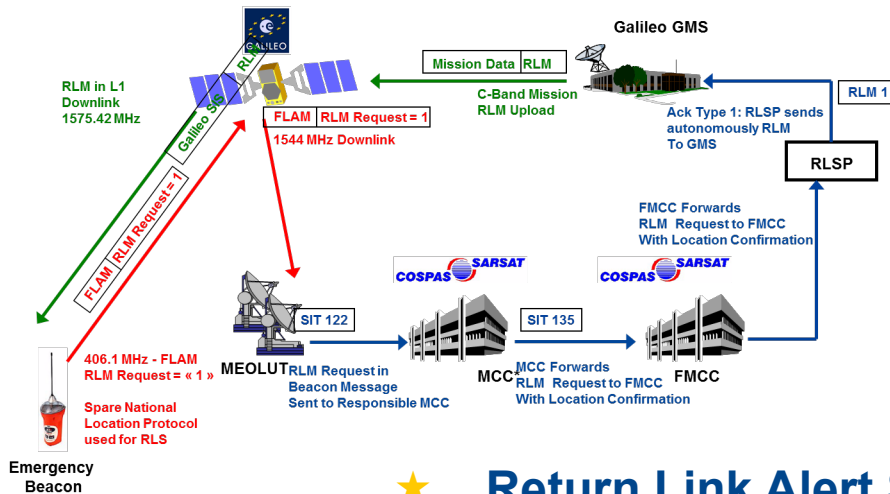
Evolution of number of visits / unique visitors



- ★ Growing number of visits and user queries
- ★ New functionality being developed for early services
 - Subscription services soon available
 - Monthly service reporting

★ The Forward Link Alert Service: contribution to the Cospas-Sarsat MEOSAR Programme

- ★ Successfully tested networked ground segment, April 2014
- ★ Positioning accuracy exceeds expectations



★ Return Link Alert Service: provides users in distress an acknowledgment message informing them that the alert has been detected and located

- ★ End-to-end link tested successfully, Oct 2013 and March 2014

★ Main objective of the Commercial Demonstrator

- ★ Test and characterise the high accuracy and authentication performance obtainable with Galileo CS.

★ First results are extremely promising:

- ★ High accuracy PPP enhancement for both Galileo and GPS was already demonstrated through information transmitted via the E6B signal
- ★ Authentication schemes are currently under test, including data authentication and spreading code encryption.
- ★ Access control and signal encryption and key management also under test.



(PPP: Precise Point Positioning)



★ Receiver Test campaign

- ★ Support manufacturers to ensure that Galileo is well implemented in chipsets and receivers
- ★ Develop dialogue with the user receiver segment.
- ★ Understand the market situation and follow-up adoption of Galileo

★ Campaign organised by GSA with technical testing by EU's Joint Research Center (JRC) and European Space Agency (ESA)

★ Test Campaign Organisation (2014-2015)

- ★ Consumer (mass market) chipset: 7 companies involved (90+% market share in total)
- ★ Professional receiver: 8 companies involved.
- ★ E-call specific testing: 8 companies involved.





- ★ **Galileo will deliver reliable, high quality services to the world and continue to evolve and introduce innovative features**
- ★ **In the near future, the trend for most user communities is towards service levels based on a multi-constellation approach, it is therefore crucial to:**

- ★ Continue improving signal compatibility and service interoperability with other providers
- ★ Cooperate on multi-constellation service provision



In 2015, Galileo will be facing the challenges of the early phase of service delivery...

- ★ Gradual service introduction approach
- ★ Strong interaction with users
- ★ Need to run early services with continued infrastructure deployment

...and

- ★ Conduct a service validation campaign
- ★ Finalise Commercial Service definition
- ★ Develop a long term evolution plan for Galileo



Questions?



Navigation solutions powered by the European Union

<http://ec.europa.eu/galileo>