Galileo Programme Status Update
International Committee on GNSS

3 December 2017, Kyoto
European Commission
"In a changing environment and fast-evolving market, these systems must continue to develop to ensure that they deliver state-of-the-art services with greater efficiency and robustness"
Since Last Year... HIGHLIGHTS

• **FIRST QUAD LAUNCH** in November 2016 with ARIANE V launcher

• **18** Satellites flying-**15** Operational

• Initial **SERVICES** declared

• Signed Contract for third batch of **GALILEO** satellites

• Handover of Service Provision to **GSA**

• **USER ADOPTION** materializing
FIRST FOUR SATELLITES (IOV) LAUNCHED IN 2011 AND 2012

SATELLITE 5 & 6 ARE RECOVERED AND SAFE ON IMPROVED ORBITS

SATELLITE 7 & 8 LAUNCHED ON 27 MARCH 2015

SATELLITE 9 & 10 LAUNCHED ON 11 SEPTEMBER 2015

SATELLITE 11 & 12 LAUNCHED ON 19 DECEMBER 2015

SATELLITE 13 & 14 LAUNCHED ON 25 MAY 2016

SATELLITE 15 & 16 & 17 & 18 LAUNCHED ON 17 NOVEMBER 2016

FOC IN ORBIT BY 2020

Next Launch 12th December
18:36 UTC
GALILEO – NEW SERVICES INFRASTRUCTURES

Galileo Reference Center
Noordwijk (The Netherlands)

Galileo SAR Center
Toulouse (France)

Galileo Integrated Logistics Center
Transinnes (Belgium)

Galileo Service Center
Madrid (Spain)
15th DECEMBER 2016... THIS IS IT!
WHAT SERVICES ARE OFFERED?

**OS Navigation**
- Good ranging signals (2 m 95% accuracy, more than 87% availability)
- Excellent timing performance (30 ns, more than 87%)

**SAR Forward Link**
- Contribution to COSPAS/SARSAT with shorter detection times (10 min) and better localization accuracy

**PRS Access**
- Good ranging signals
- Access Management

**Security Monitoring**
- Centralisation of system security events in GSMC for analysis and reporting
WHERE IS IT DESCRIBED?

Galileo OS Service Definition Document
Version 1.0, December 2016

Galileo Open Service Signal In Space Interface Control Document (OS SIS ICD)
Version 1.3, December 2016

Galileo Search and Rescue Service Definition Document
Version 1.0, December 2016

Ionospheric Correction Algorithm for Galileo Single Frequency Users
Version 1.2, September 2016
AND IT WORKS!

- **Excellent performance** delivered since Initial Services Declaration
  - For Navigation: Typical constellation average pseudorange accuracy (0.4-0.6 meters 95%)
  - For Search and Rescue: Well within detection and localisation targets set by COSPAS SASAT (70% within 5 km > Galileo = 96%)

- **Full transparency**
  - Quarterly Performance Reports published through the Galileo Service Center website
The key focus is now on **Service Provision**

Service Delivery handed over to the **European GNSS Agency (GSA)**

**New operations contract** signed in Dec 2016
- SpaceOpal
- 10-year service contract
COMMERCIAL SERVICE – EN ROUTE!

★ Programme decision taken: High Accuracy and Authentication.

★ Authentication will be based on a

★ **Navigation Message Authentication:**
  ★ Integrated in the E1 OS. Aimed at consumer users and offered for free. Already prototyped and under testing

★ **Commercial Service Authentication:** based on the E6 Spreading Code Encryption.

★ **High Accuracy** will be based on PPP transmission in E6B.

★ Gradual implementation between **2018 and 2020**
SEARCH AND RESCUE – COSPAS SARSAT MEOSAR IS DECLARED

• Early Operational Capability (EOC) for MEOSAR declared by COSPAS SARSAT in December 2016
  » Faster Detection of Beacons
  » Better position accuracy

• Collaborative approach with SAR Transponders onboard GALILEO – GPS – GLONASS
• EU Coverage 3 MEOLUTs
NEXT STEP...

Encore !!!

Enhanced Services
EVOLUTIONS - ROADMAP

Consult
- Users
- Industrial Stakeholders
- Member States and Institutional actors

Consolidate
- Mission Needs established by EC
- System scenarios established by ESA
- Cost Benefit Analyses conducted by GSA

Decide
- Down selection to one scenario
- Budgetary Elements

Implement
- G2G Design and Development
"The potential areas of application are huge and they are not yet fully exploited"
HOW: A SET OF COHERENT ACTIONS

- Awareness Raising Activities
- Standards
- Measures ensuring Galileo/EGNOS compatibility
- Testing campaign with receiver manufacturers
- R&D H2020 and Fundamental Elements
- Etc.
From 3 manufacturers adopting Galileo in 2010 to 17 in 2017, representing more than the 95% of global supply.
**GALILEO-ENABLED PIONEERS**

- **Bq Aquaris X5**
  - July 2016

- **Sony Xperia XZ**
  - March 2017

- **Huawei P10**
  - March 2017

- **Samsung S8**
  - April 2017

- **Apple Iphone 8, 8s and X**
  - Sept 2017
"The Commission will strengthen its bilateral and multilateral space policy dialogues pursued closely with Member States"
INTERNATIONAL

• Extensive bi-lateral cooperations to deliver best multiconstellation services

• Adopt compatible solutions for innovative services:
  – Example: Emergency Warning Services

• Defend jointly the use of GNSS Spectrum

• Continuous involvement in multilateral discussions in UN-ICG

• Cooperation in international standardisation
INTERNATIONAL

• Means of cooperation:

  – GNSS Cooperation Agreements
  – GNSS Cooperation Arrangements
  – Space Dialogues with major GNSS providers
THANK YOU

http://ec.europa.eu/growth/sectors/space/galileo/