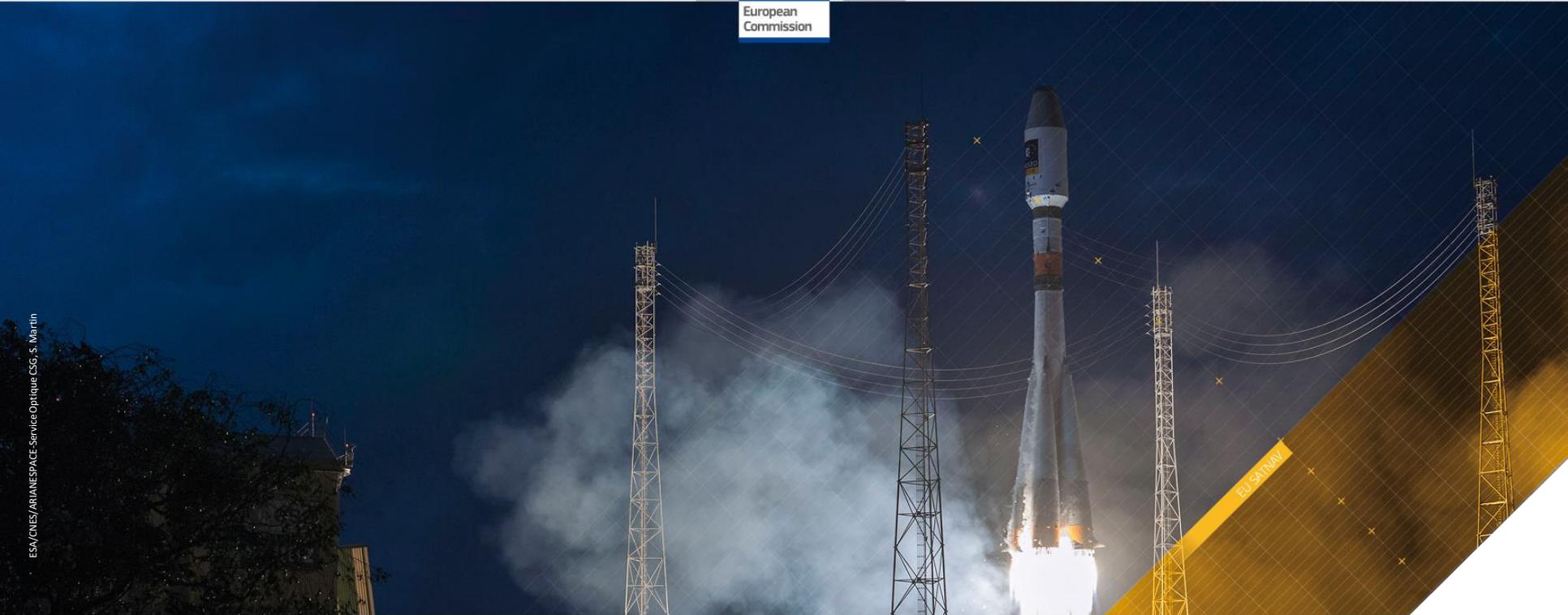




ESA/CNES/ARIANESPACE-ServiceOptique CSG, S. Martin



Galileo Programme Status Update

International Committee on GNSS

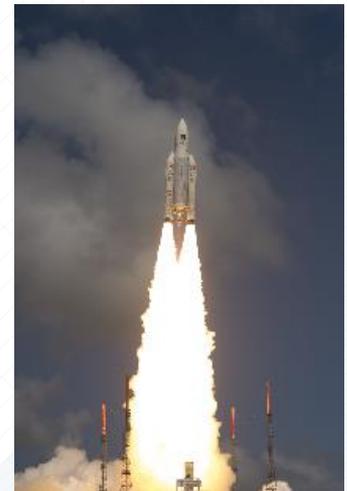
3 December 2017, Kyoto
European Commission



"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



CONSTELLATION DEPLOYMENT - LAUNCHES

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

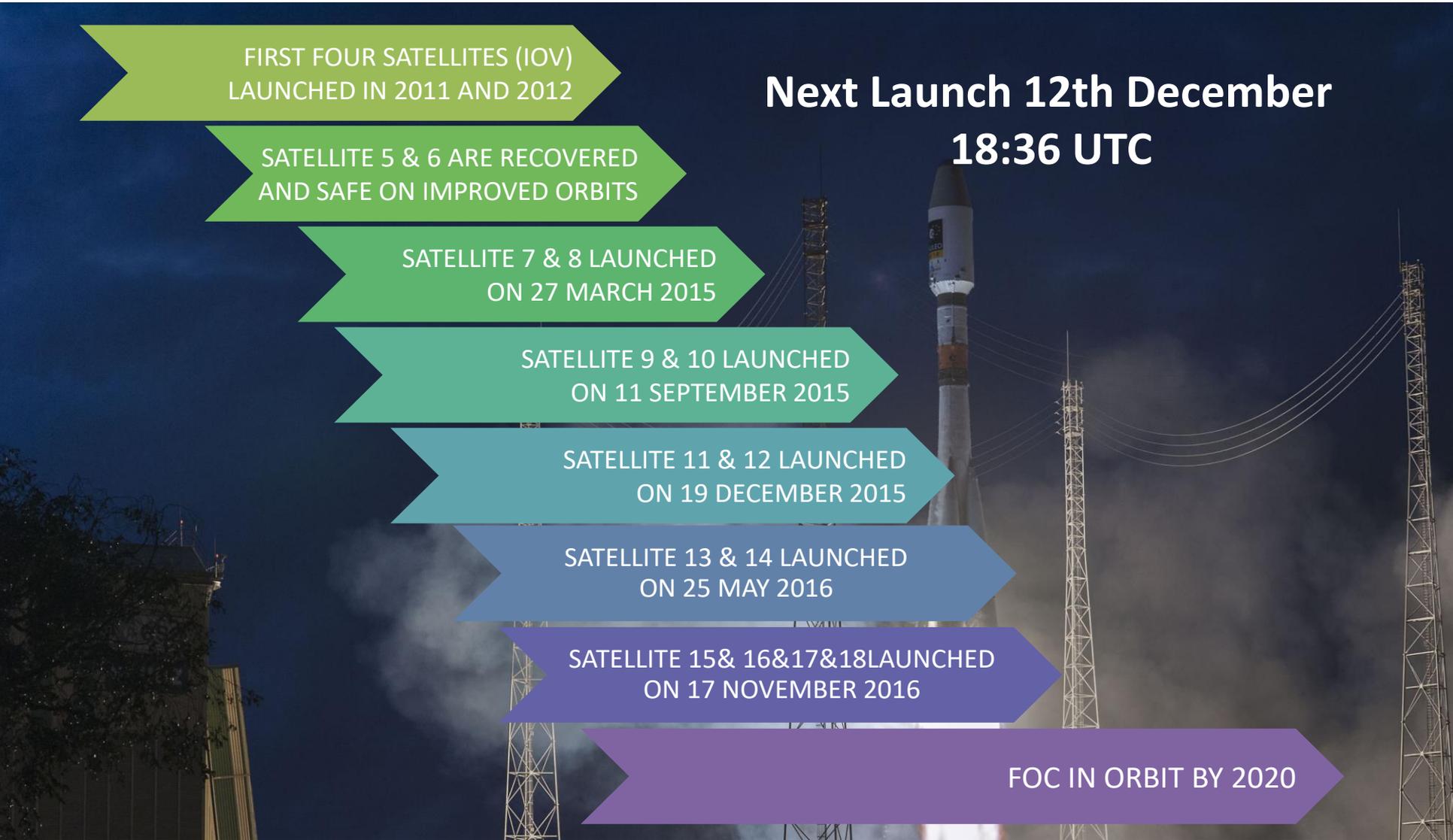
SATELLITE 11 & 12 LAUNCHED
ON 19 DECEMBER 2015

SATELLITE 13 & 14 LAUNCHED
ON 25 MAY 2016

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

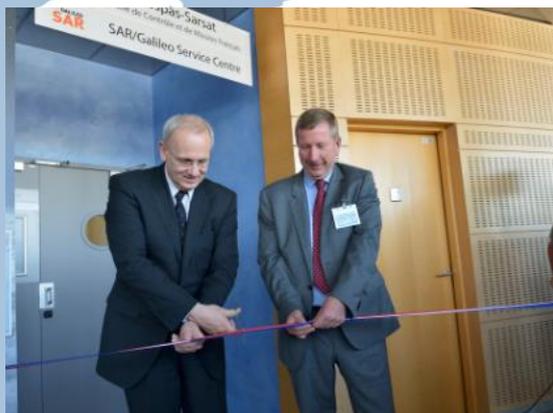
FOC IN ORBIT BY 2020

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)**

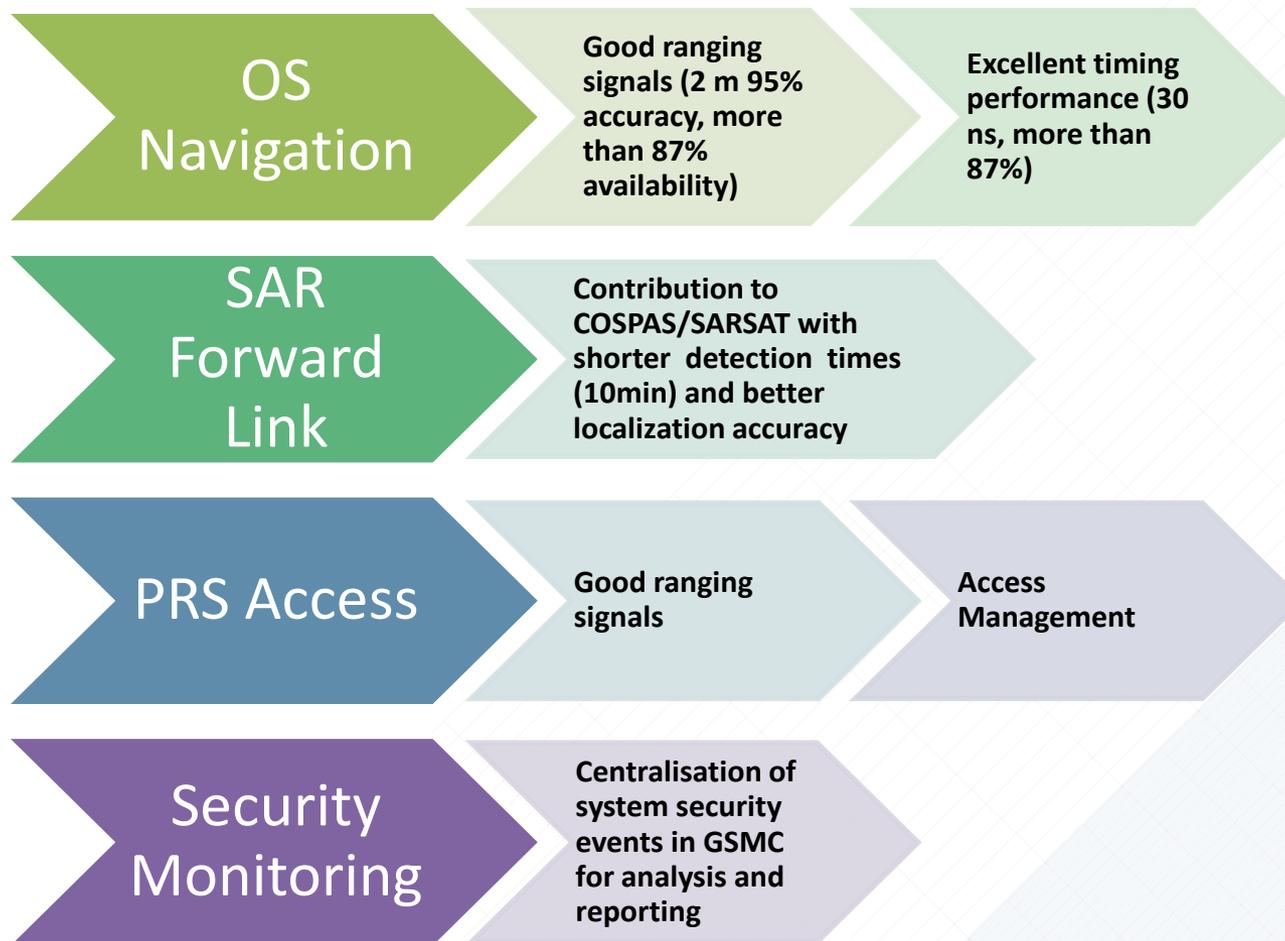


**Galileo Service Center
Madrid (Spain)**

15th DECEMBER 2016... THIS IS IT !



WHAT SERVICES ARE OFFERED ?



WHERE IS IT DESCRIBED ?

Galileo OS Service Definition Document

Version 1.0, December 2016

Galileo Search and Rescue Service Definition Document

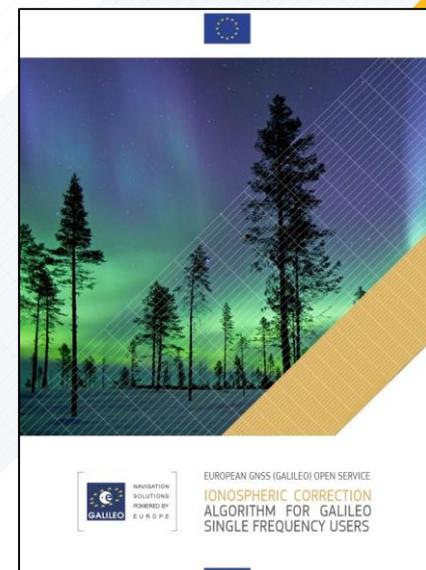
Version 1.0, December 2016

Galileo Open Service Signal In Space Interface Control Document (OS SIS ICD)

Version 1.3, December 2016

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



GALILEO SERVICE PROVISION

- 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

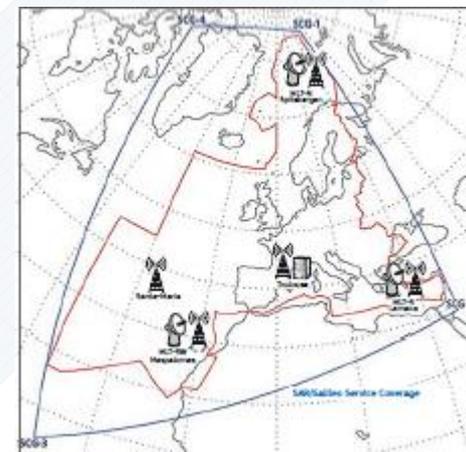


- Early Operational Capability (EOC) for MEOSAR declared by COSPAS SARSAT in December 2016

- » Faster Detection of Beacons
- » Better position accuracy



- Collaborative approach with SAR Transponders onboard **GALILEO – GPS – GLONASS**
- EU Coverage 3 **MEOLUTs**



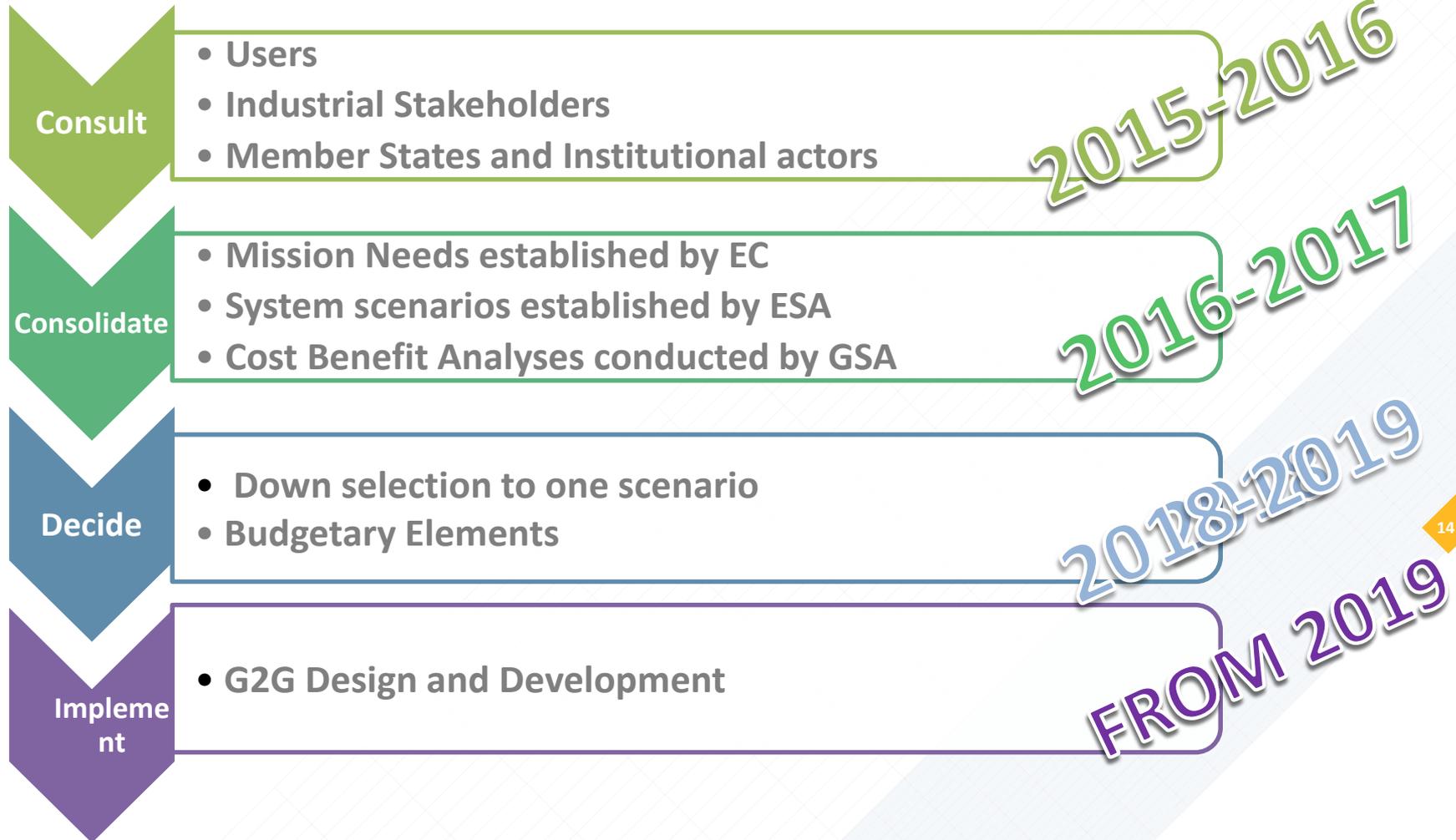
NEXT STEP...

Encore !!!



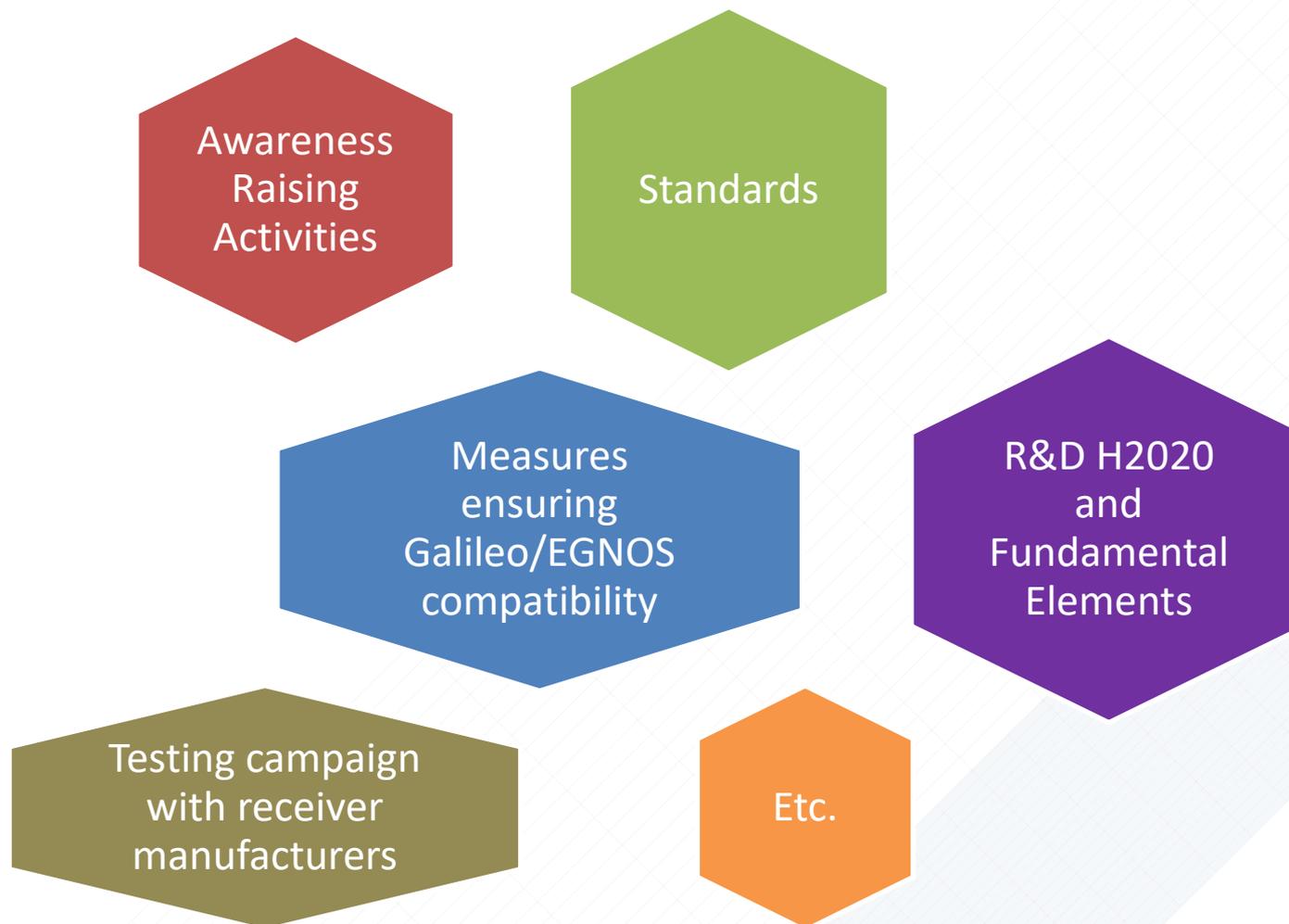
Enhanced Services

EVOLUTIONS - ROADMAP



"The potential areas of application are huge and they are not yet fully exploited"

HOW: A SET OF COHERENT ACTIONS



COMPATIBLE RECEIVERS



2017

TIMING *Synchronizing Critical Operations*

SMARTPHONES/MASS MARKET

AUTOMOTIVE

UAVs

HIGH PRECISION



From 3 manufacturers adopting Galileo in 2010 to 17 in 2017, representing more than the 95% of global supply

USE GALILEO.EU

FIND A GALILEO-ENABLED DEVICE TO USE TODAY

Galileo is Europe's Global Satellite Navigation System (GNSS), providing users with improved positioning and timing information.

Click on the icons to find Galileo-enabled devices.



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

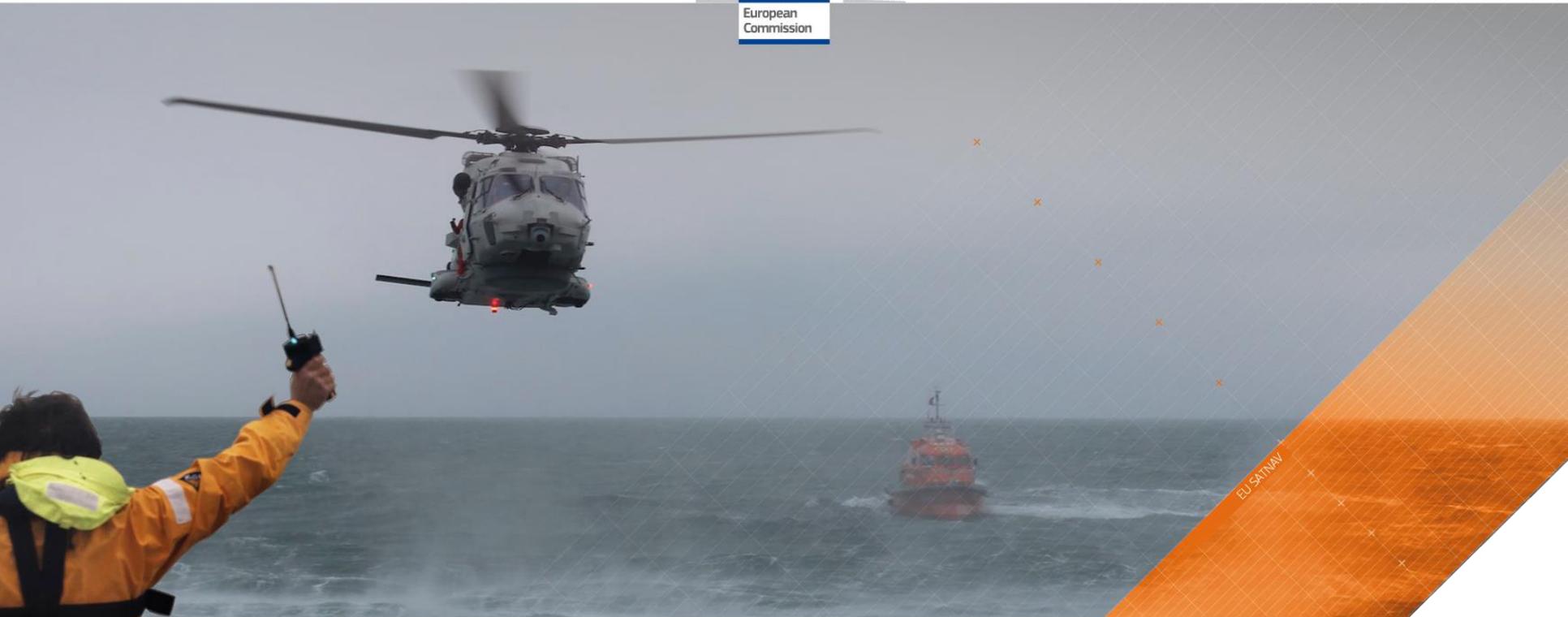
- Continuous involvement in multilateral discussions in UN-ICG

- Cooperation in international standardisation



INTERNATIONAL

- Means of cooperation:
 - GNSS Cooperation Agreements
 - GNSS Cooperation Arrangements
 - Space Dialogues with major GNSS providers



EU SATNAV



THANK YOU

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

