G2G and Beyond

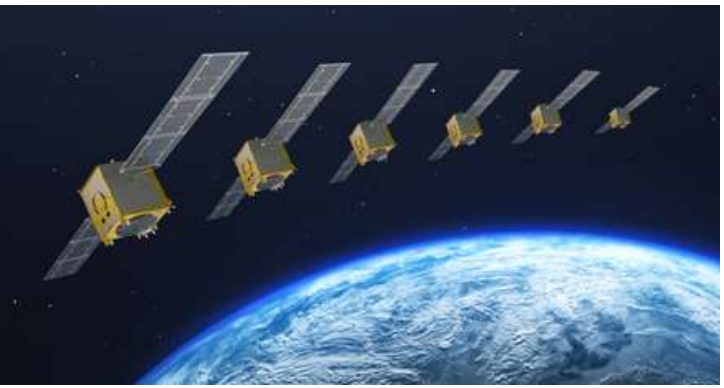
"The future starts today, not tomorrow" – Pope John Paul II

- Legal basis and requirements baseline in place
- Budget available
- Fast Track towards Galileo 2nd Generation
- R&D activity in parallel to maintain security of supply and study emerging concepts for GNSS (LEO-PNT)

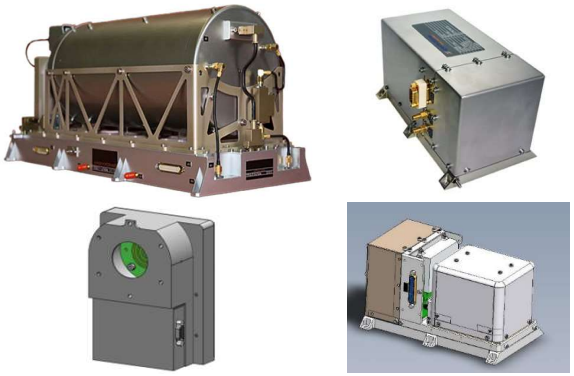
From R&D….

…to launch and exploitation !

Galileo Second Generation Procurements



G2G B1 – ADS-DE Satellite
Preliminary Design Review passed
First HW available



G2G Satellite Clocks
2 Operational, 2 Evolutions & 5 Experimental clocks ongoing

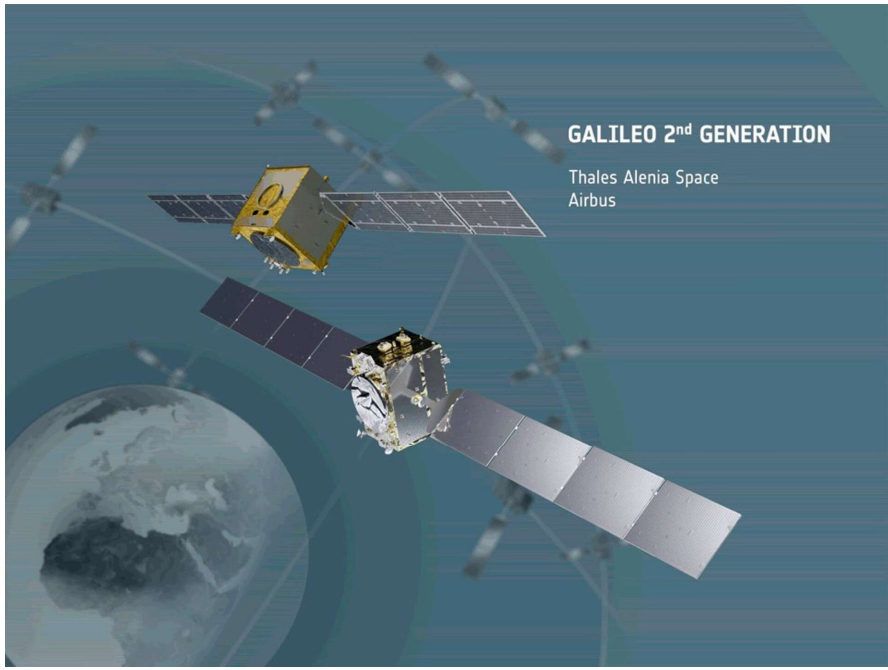
G2G B1 – TAS-IT Satellite
Preliminary Design Review passed
First HW available

G2G Ground Segment & System Test Beds
7 G2G In Orbit Validation Ground Segment & System Test Beds procurements ongoing.
G2G IOC GSEG reaching PDR.

G2G System Support & Tools
System Support activities engaged.
Tools and R&D ongoing (Rx, Sims, etc…).

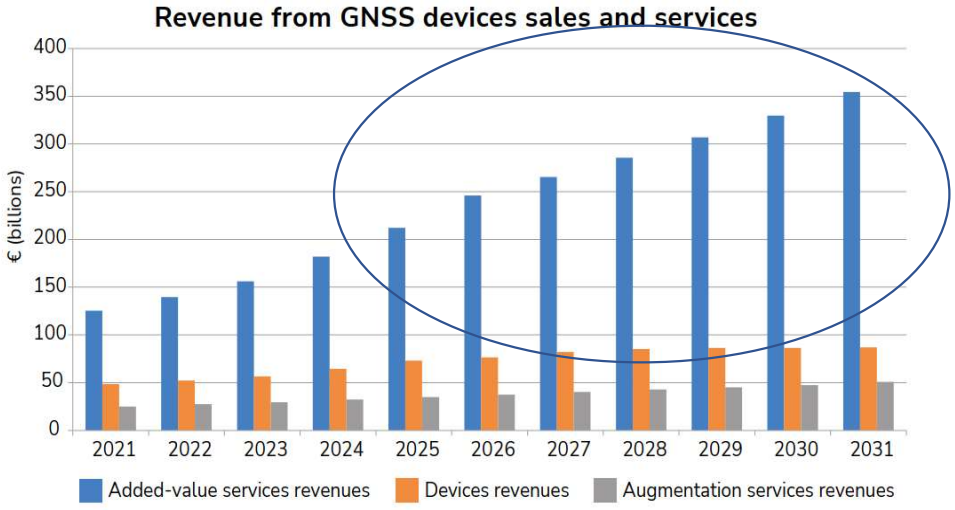
G2G Satellites: Designed for future generations

- New signal generation capabilities: increased number of signal components and configurability.
- Improved EIRP.
- Inter Satellite Links.
- On Board Authentication.
- Minimised in-orbit maintenance activities.
- Increased data rate in the Ground to Space communication.
- Improved Time Reference (number of atomic clocks and their relevant monitoring functions).
- Orbit Raising Capability – Dual Launch.
- 15 years lifetime.

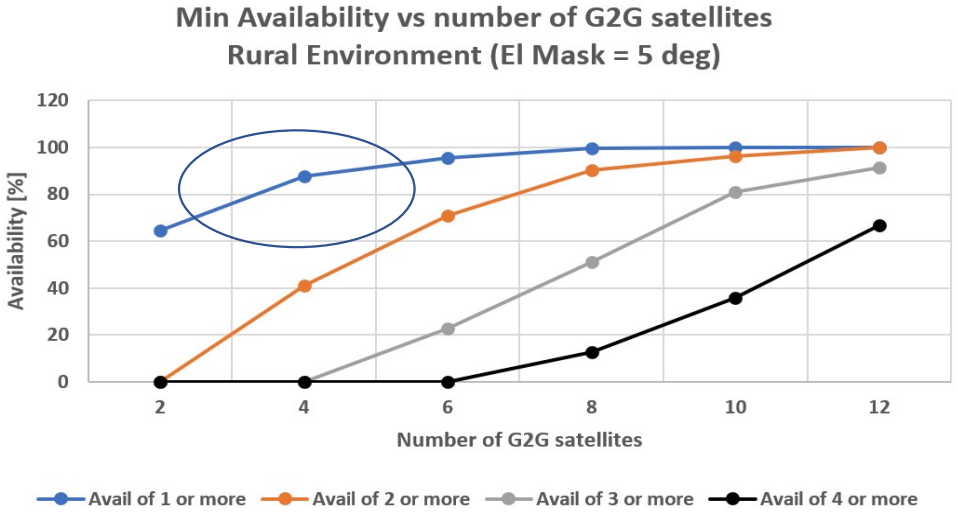


G2G System Flexibility and Added Value Services focused

- G2G design at all levels is embedded with internal flexibility to ensure new service implementation without constellation re-deployment (from 15 years to 1 year Time To Market).
- G2 development and satellite validation approach is compatible with progressive improvement and deployment of services already working with one line-of-sight:
  - E.g. Fast Acquisition, OS Signal Authentication, OS TTFF, HAS, EWS, ARAIM, etc…
  - This is the fastest growing market sector.

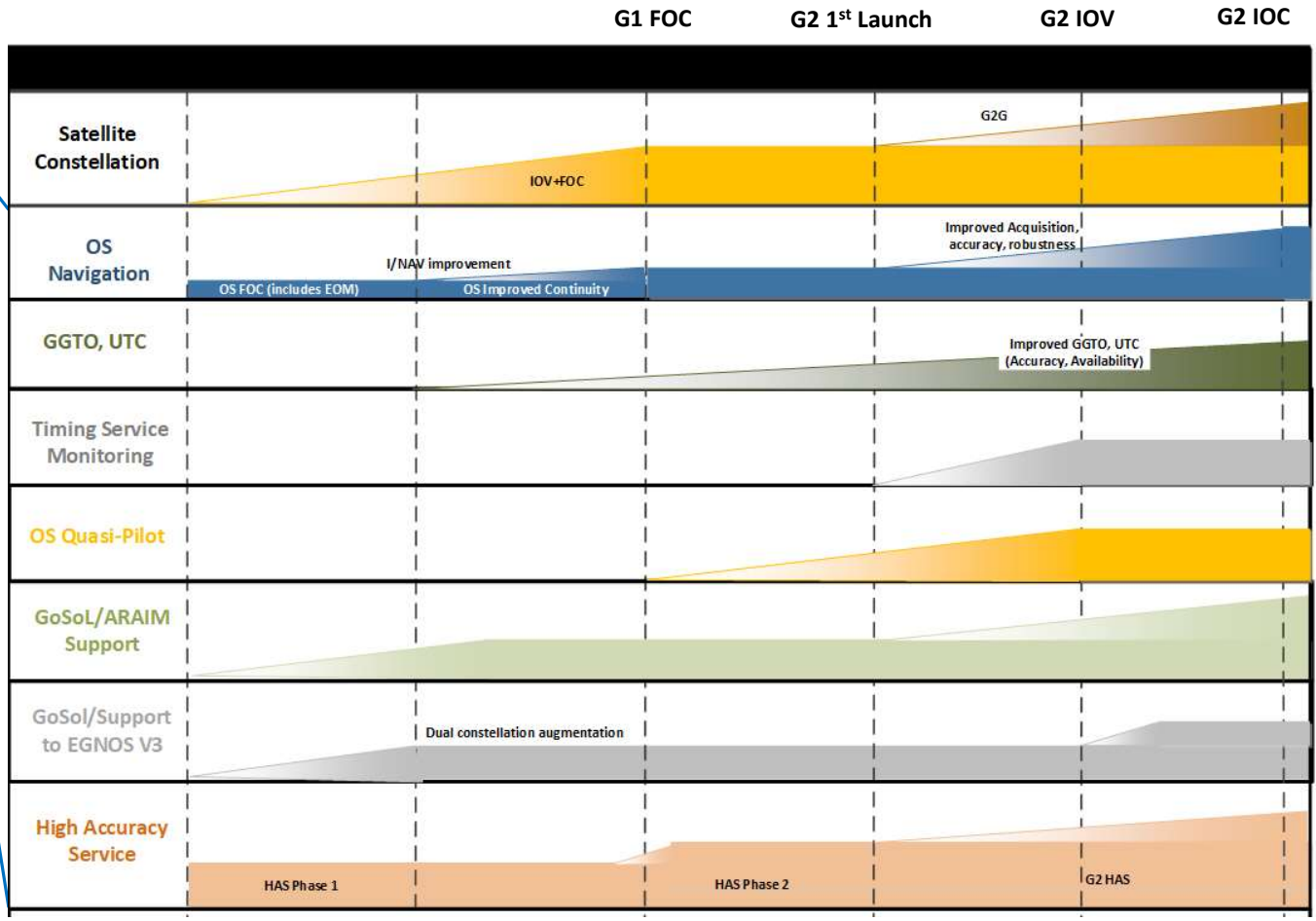


Courtesy EUSPA EO & GNSS Market Report:
https://www.euspa.europa.eu/sites/default/files/uploads/euspa_market_report_2022.pdf



Galileo Service Enhancements & New Services incremental build up (I)

Service	Service Component
Open Service (OS)	OS (Navigation Performance)
	Timing Service
	Quasi Pilot
	GOSOL (incl ARAIM)
High Accuracy Service (HAS)	Service Level 1 (global)
	Service Level 2 (regional)
OS Authentication (OS-A)	OS Nav Msg Authentication
	OS Ranging Authentication
Commercial/Signal Authentication (CAS/SAS)	Commercial/Signal Auth Service
Search & Rescue (SAR)	Forward Link
	Return link
	Remote Beacon Activation
	Two Way Communication
	Distress Position Sharing
Emergency Warning Service (EWS)	EWS-Return Link Message
	EWS-INAV
Public Regulated Service (PRS)	Public Regulated Service
	A-PRS
Ionospheric Prediction (CIP)	Ionosphere Prediction



Galileo Service Enhancements & New Services incremental build up (II)

Service	Service Component
Open Service (OS)	OS (Navigation Performance)
	Timing Service
	Quasi Pilot
	GOSOL (incl ARAIM)
High Accuracy Service (HAS)	Service Level 1 (global)
	Service Level 2 (regional)
OS Authentication (OS-A)	OS Nav Msg Authentication
	OS Ranging Authentication
Commercial/Signal Authentication (CAS/SAS)	Commercial/Signal Auth Service
Search & Rescue (SAR)	Forward Link
	Return link
	Remote Beacon Activation
	Two Way Communication
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Emergency Warning Service (EWS)	EWS-Return Link Message
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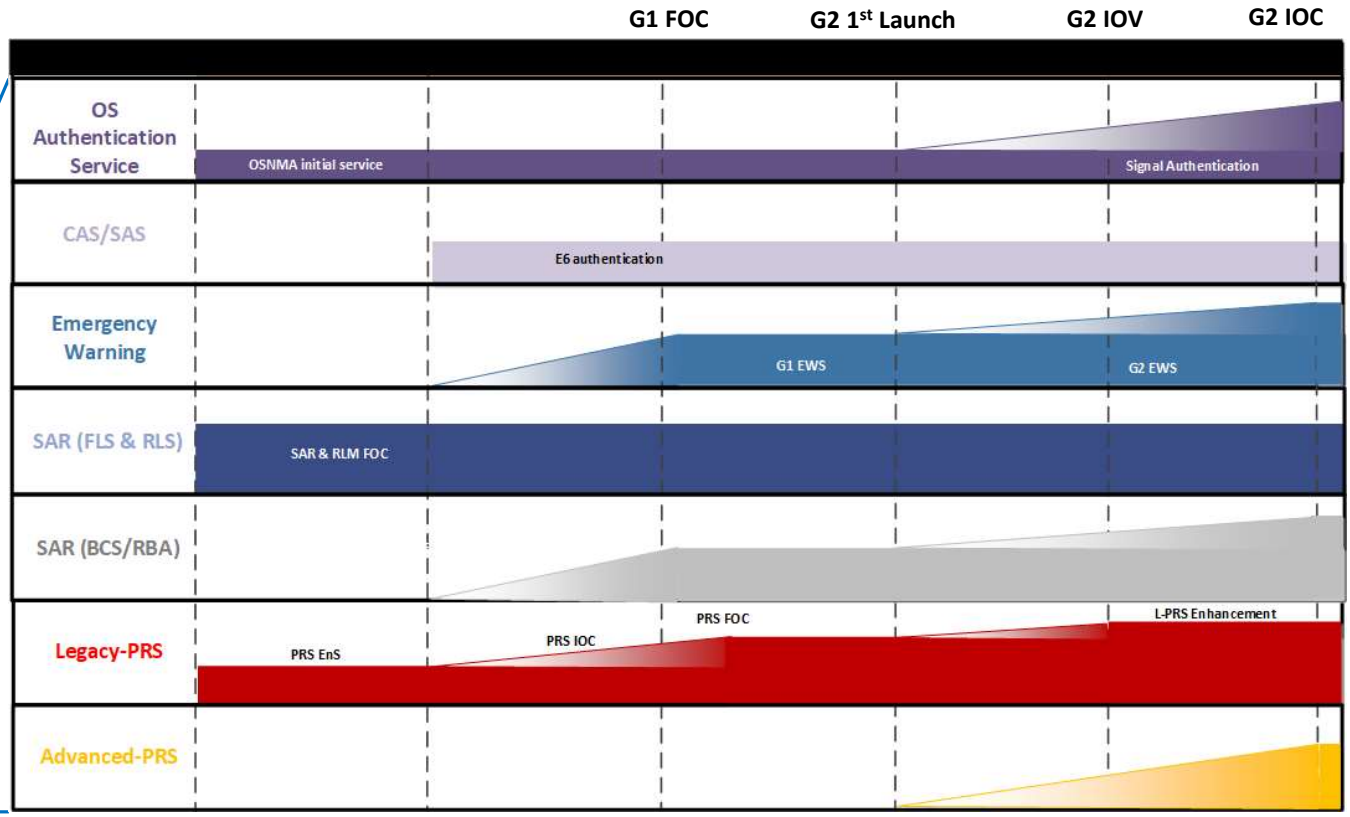

Galileo System Development Summary

- ✓ Galileo performances are outstanding.
- ✓ L11 successful (satellites in service).
- ✓ Galileo INAV qualification performed.
- ✓ High Accuracy Service capabilities under qualification.
- ✓ G2G In Orbit Validation activities ongoing (Satellite, GSEG, Test Beds, Tools):
  - ✓ They will ensure Galileo Legacy services enhancement and early G2 Capabilities and Services.
- ✓ G2G Initial and Final Operational Capability activities developing as planned, for the sake of final G2G Service Provision.