

A UK Government activity overview of emerging PNT Services & capabilities

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Lead for Satellite Navigation

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Innovate UK

InnovateUK – The UK's Innovation Agency



return to the economy

7,600



organisations supported



of GVA for every £1 invested



> 7 jobs created for every business invested in

Cross-Government PNT group

- Founded 2014 (InnovateUK/MoD)
- Almost all departments represented
 - Government & regulators only
 - Balanced
- Internal and industry briefings
- Information and knowledge exchange forum
- Not a *Working* group in the traditional sense
 - Not output based
 - No *formal* advice at this time



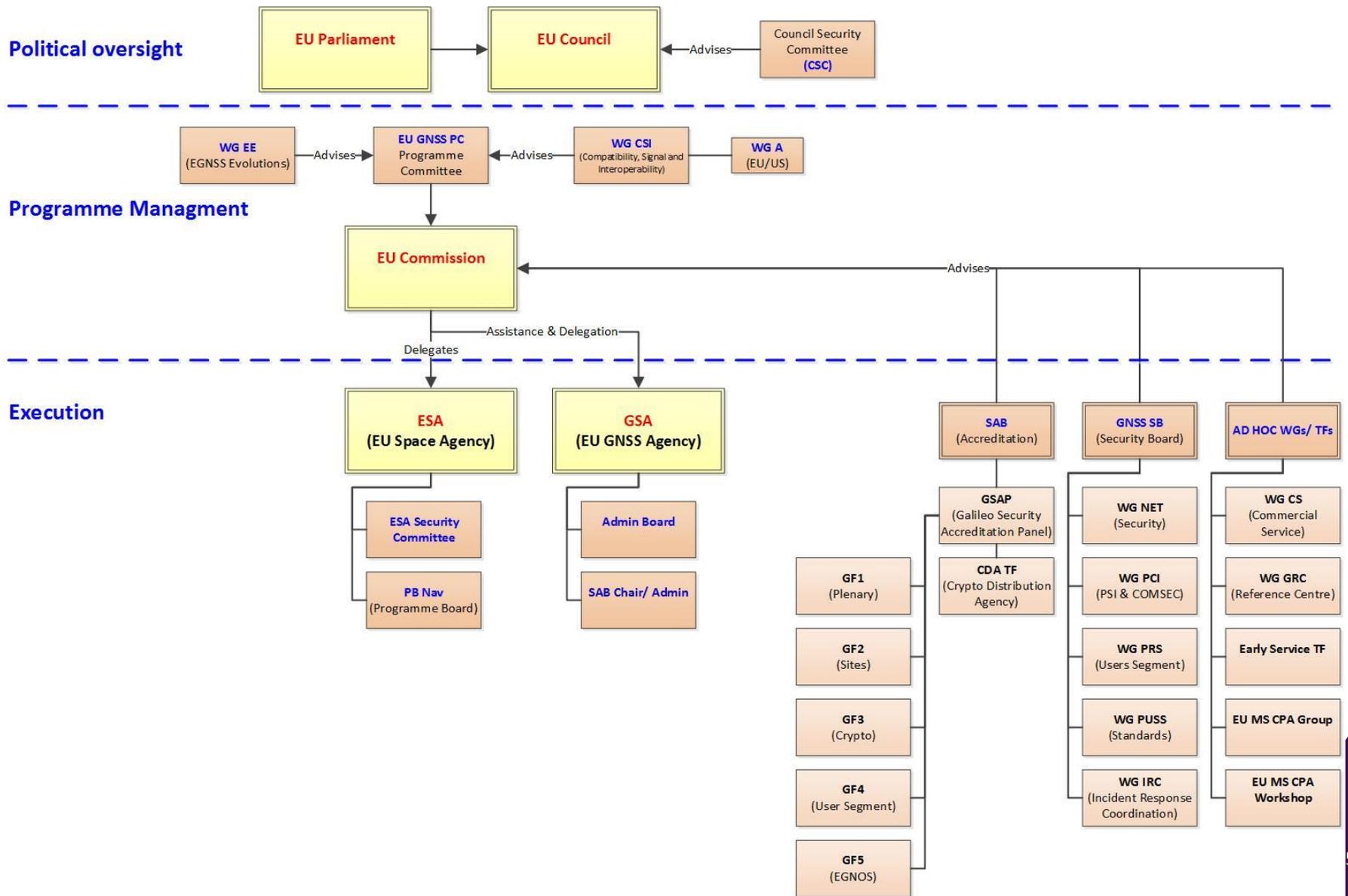
Galileo Status

- 12 Satellites launched
- 9 Satellites operational¹
- 2 satellites in anomalous orbit
- Initial Services 2016, FOC 2020 (plan)
- EGNOS operational
 - V3 Upgrade planned to include Galileo



1. At time of writing

Galileo programme management



PRS Pilot Projects – Realising PRS Benefits



Enabling PRS Infrastructure Capabilities — Secondary Channel Organised User Terminals — Providing a means to efficiently manage large Galileo PRS user communities

Solves the challenge associated with key delivery and management of autonomous receivers



EXploring Prs LOW-end REceiverS — Demonstrating ‘cloud’ based Galileo PRS service delivery into high volume, low cost markets.

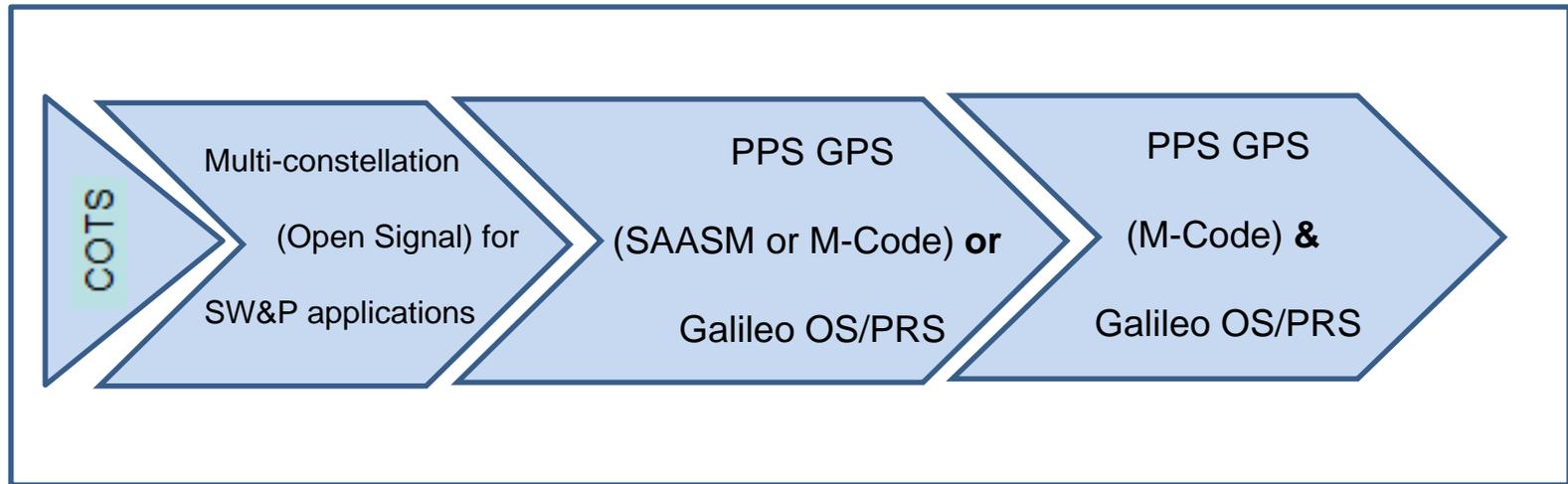
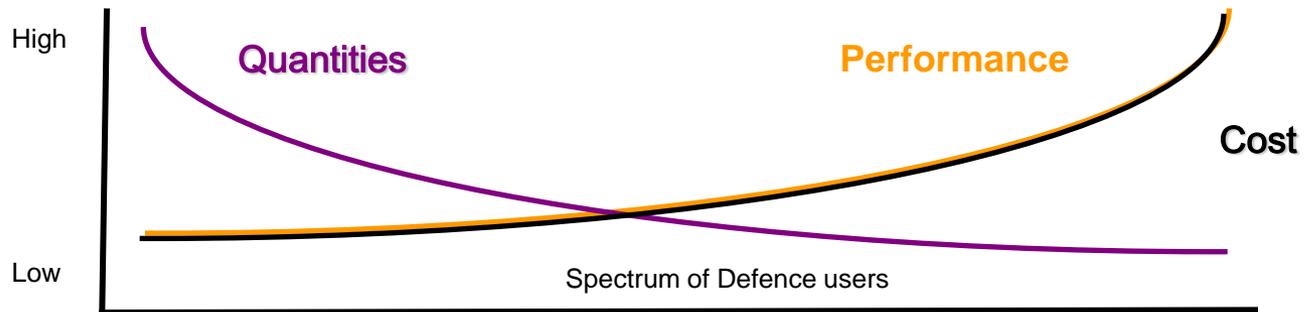
First ever demonstration of two novel concepts for cloud based PRS receivers



PRS Export Receivers for the Military — Infrastructure to Tactical — Development of a dual-mode receiver exploiting encrypted Galileo PRS and GPS-PPS (military GPS).

First ever demonstration of combined positioning from Military GPS and Galileo PRS

The MoD's RGNS Project



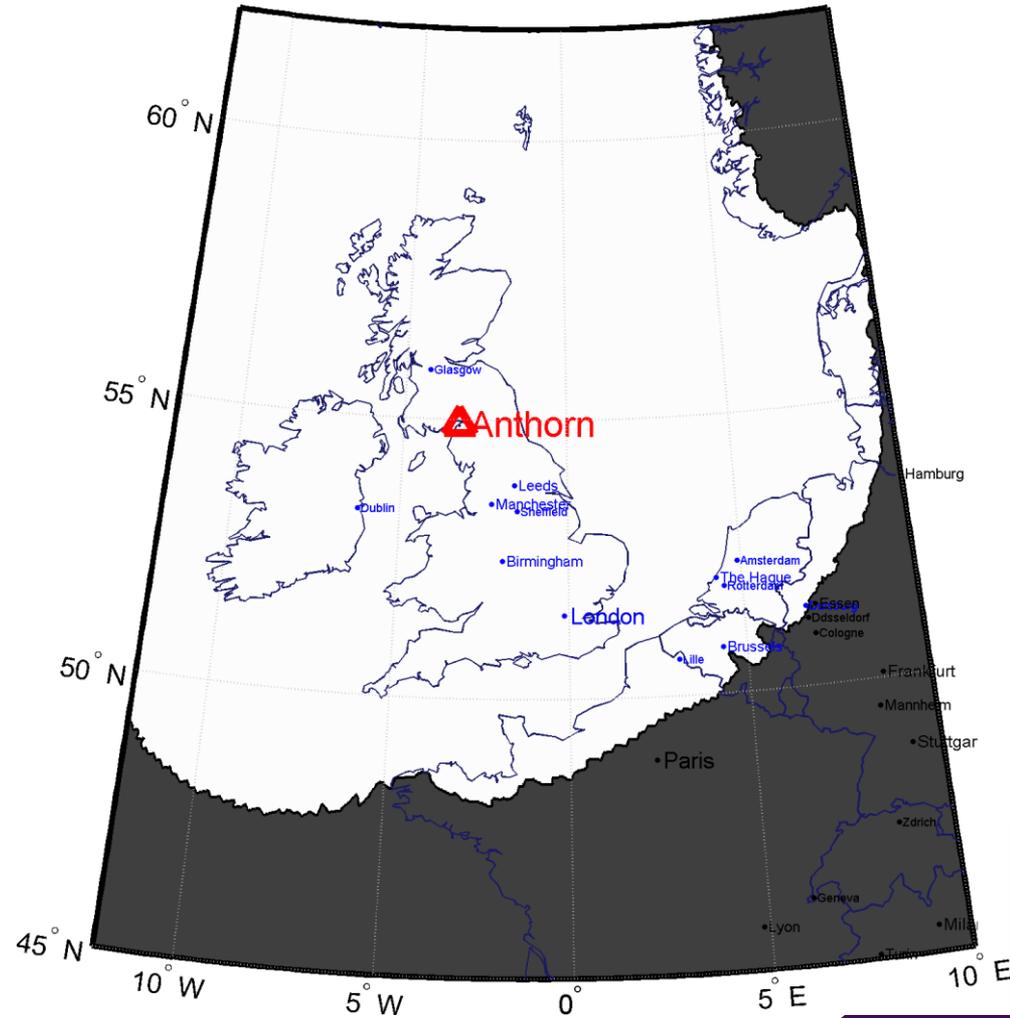
European Loran Infrastructure @ 31 Dec 2015

- France 2 TX **CLOSED**
 - Lessay, Soustons **CGB CLOSED**
- UK 1 TX
 - Anthorn **Providing timing for the whole of the UK and Ireland**
- Denmark 1 TX
 - Ejde **TO CLOSE**
- Germany 1 TX
 - Sylt **TO CLOSE**
- Norway 4 **CLOSED**
 - Vaerlandet, Boe, Jan Mayen, Berlevåg



UK-only Timing & Data Capability

- UTC Timing from a single UK Transmitter
- 500ns (indoors)
- Robust Data Capability
- Some sectors have a **CRITICAL** dependence upon timing



The UK quantum technologies programme

- A 5 year programme with a 10 year vision.
 - Now over £350m spend
- Delivering new devices and new businesses from world leading UK research
- Industry, academia and public bodies working together to create opportunities for UK wealth creation.

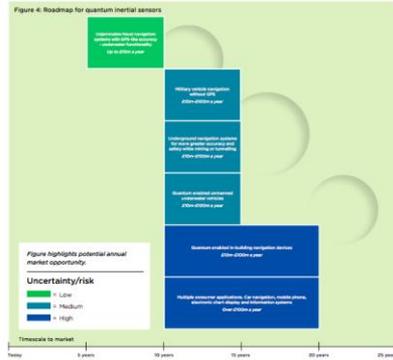


Autumn statement 2013

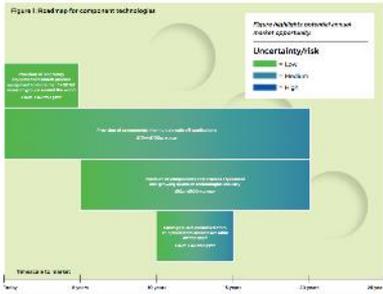
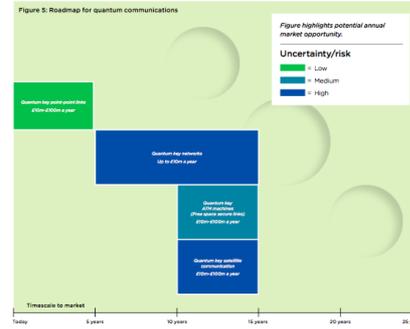
£270M

UK Government investment in quantum technologies research

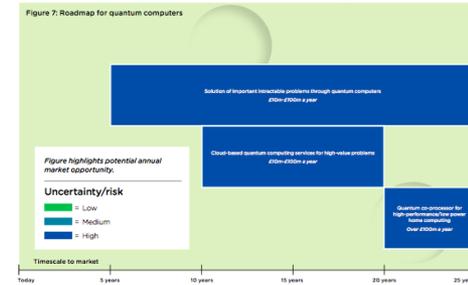
Inertial sensors



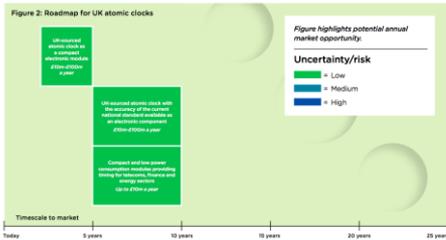
Communications



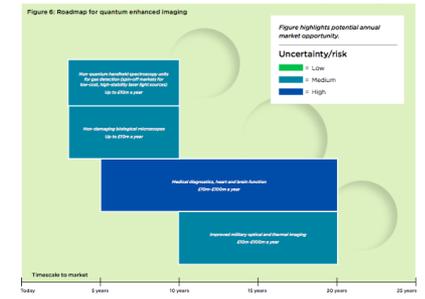
Computing



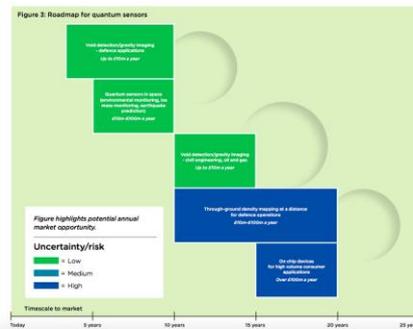
Components



Enhanced imaging



Clocks



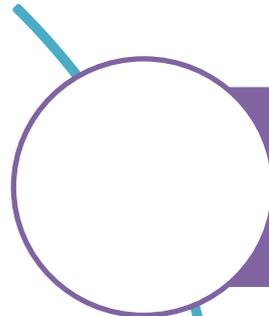
Sensors

Summary

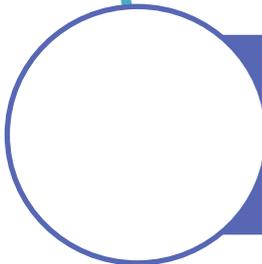
- InnovateUK at the heart of technology innovation in the UK
- Cross-government group to understand common issues and share
- UK involvement in Galileo
- eLoran is an activity work item
- Large Quantum programme to compliment



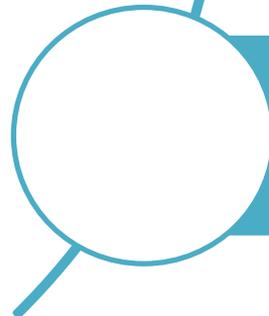
Final thought



Can my organisation and/or it's sub-contractors demonstrate performance to delivery and service levels, without using space-based location and timing data for [say] 3 days?



What is the risk and likelihood of losing space-based PNT data ?
Where can I get the information?
Is it valid to back up a space based capability with a similar space based capability?



How can we measure the technical and financial impact of the loss of space-based PNT in my organisation and our supply chain?

Thank You

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