



Quantum Space Gravimetry at European Commission

DG DEFIS

DG DEFIS: who we are

- Directorate-General for Defence Industry and Space (DEFIS)
- A **new Directorate General** at European Commission (DOB JAN 2020)
- Managing European Commission's activities in the Defense Industry and Space sector
- Our space mission:
 - Managing the EU Space Programmes (among others Galileo, EGNOS, Copernicus...)
 - **Fostering a strong and innovative space industry**
 - ...

Unit B.2, home of the space quantum team

- Innovation, Start-ups and Economics
- Quantum Team:
 - New applications for space / quantum technologies:
 - Quantum space gravimetry a topic a major interest
 - Space Quantum communication (EuroQCI)
- Horizon Europe, Digital Industry and Space
 - Our tool to fund R&I for space

Quantum space gravimetry

- Long history of space gravimetry: GRACE, GOCE...
 - **But** current technology is reaching its limit (accelerometer performance)
 - Need for a new technology breakthrough
 - => Quantum sensors based on cold atom interferometry
 - Need for a pathfinder mission
 - => CAI, need to test / demonstrate / improve the technology for space mission
 - Need for a fully-fledged quantum gravimetry mission

Long term objectives

- Mature the QSG technology and improve TRL of QSG components
- Deploy an EU pathfinder mission within this decade decade to demonstrate the technology (BEC) in orbit and feasibility of mission concept
- Pave the way for an EU space quantum gravimetry mission within the next decade. This will:
 - Benefit our EU space programs, in particular the Copernicus programme
 - Benefit the overall EO community with enhanced gravimetry data
 - Possibly (technology) be used for other missions (Moon, Mars...)
 - Possibly combine with a ground network and ensure operational coverage
 - Foster the development of a QSG industrial (supply chain) & academic ecosystem

International cooperation on QSG

- European Commission is open to international cooperation:
 - Exploitation of gravimetry data for Earth science
 - Fundamental physics using QSG mission data
- Possibly implemented through Horizon Europe work programme
 - Need to set-up a political framework for cooperation (e.g. EU-JPN space dialogue)
 - Lab to lab cooperation
 - Mutual benefit and EU funding for EU labs

Thank you



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