

GNSS OPEN SIGNALS: A *DE FACTO* GLOBAL PUBLIC GOOD WITH GOVERNANCE ISSUES

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GNSS Pervasiveness 1/3

- In 2020, four global space-based PNT constellations and two regional systems
- Several billions of receivers, everywhere, anytime, using free of charge radio signals
- GNSS utilization has become central for the functioning of our society
- In 2013, 40% of Apple & Android stores apps use location information

GNSS Pervasiveness 2/3

- Installed base of GNSS devices per region in 2020: EU27 (21%), NA (18%), RoW (62%)

The Market	2013	2020
Units in billions	2,2	6,1
Enabled Revenue (b€)	150	244
Core Revenue (b€)	50	110

- In 2022, two dominant market segments: LBS (47%), road (46%). Remaining 7% split into surveying (4.1%), agriculture (1.4%), aviation (1%), maritime (0.3%), rail (0,1%)

GNSS Pervasiveness 3/3

- Political, technological, economic and behavioral factors explain such figures
 - GPS open signal from the outset, removal of Selective Availability (SA) on May 1st, 2000
 - Continuous miniaturization of chipsets
 - Market scaling effect → continuous decreasing cost of receivers
 - Acceleration of lifestyle, urban and road mobility, increasing use of social networks

Public Good(s)

- A public good is: i) non rivalrous, ii) non-excludable, *de facto* responding to / substituting for a market failure
- i) Non rivalrous : consumption of the good by anyone does not reduce the quantity available to others
- ii) Non excludable : impossible to prevent anyone from consuming the good once it is produced
- Produced by a State
- Pure and impure public goods

Global Public Good(s) (GPG)

- **Global:**
 - covering all the countries,
 - addressing a broad spectrum of the population in its socio-economic dimension,
 - No jeopardy on the needs of future generations
- **Production of GPG → 2 issues to address:**
 - The place of GPG in the production chain (final GPG vs intermediate GPG)
 - Sustainability of GPG production

Do GNSS Signals qualify? 1/2

- PNT space-based systems set-up:
 - Only few state producers to generate radio signals from space, free of charge, any time, anywhere for billions of persons. A non-rivalrous usage
 - Difficult to prevent any receiver to pick up open signals once they are generated from space (non-excludability)
 - GNSS is a non-saturable information system, contrary to communication/broadcasting satellites systems

Do GNSS Signals qualify? 2/2

- IRNSS & QZSS signals can't qualify for a GPG
- Producers of open GNSS signals are committed to a continuous free of charge supply
- Multi-GNSS enabled receivers ensure continuous reception in case a satellite constellation would suffer signal production failure
- **GNSS primary open signals may deserve a GPG label, provided:**
 - i) they are considered more as an intermediate GPG,
 - ii) collective international action is firmed up

Yes, provided...

- GNSS signals considered as a “quasi GPG” since there is an entry cost for users via the price of receivers. This barrier will continuously be lowered in the coming years
- Two collective international actions:
 - Formal: WRC / ITU allocating frequencies and preserving the scarce electromagnetic spectrum resource;
 - Informal: International Committee on GNSS (ICG) established in 2005 as a result of a series of actions following UNISPACE III conference (1999)

Comments and questions

- Clearly, a closer international cooperation is desirable. ICG is one of the fora where this is elaborated
- Is a GNSS International Code of Conduct appropriate to be set up by 2020, laying down a set of practices / guidelines common to all providers?
- Is it appropriate to go beyond with a Providers Agency? A UN GNSS Agency?
- The GPG nature of open GNSS signals has been central to today's soaring market and for future developments
- What if these signals wouldn't be anymore free of charge? Market shrink? Or new resources for the PNT ecosystem benefiting even more to the entire society?

Thank you!

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