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

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Dr. Serge PLATTARD
Resident Fellow, ESPI,
Honorary Professor of UCL
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%)

<table>
<thead>
<tr>
<th>The Market</th>
<th>2013</th>
<th>2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Units in billions</td>
<td>2,2</td>
<td>6,1</td>
</tr>
<tr>
<td>Enabled Revenue (b€)</td>
<td>150</td>
<td>244</td>
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<tr>
<td>Core Revenue (b€)</td>
<td>50</td>
<td>110</td>
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• 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 \(\rightarrow\) 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 GNNSS 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!

serge.plattard@espi.or.at
@splattard1