



28th Meeting
May 3 - 4, 2023
Crowne Plaza Annapolis
Annapolis, MD

Time to consider the information perspective of GPS:

Scalability to GPS-based application and self-adaptiveness to GPS positioning environment enhance modern GPS adoption

Renato FILJAR^{1,2}

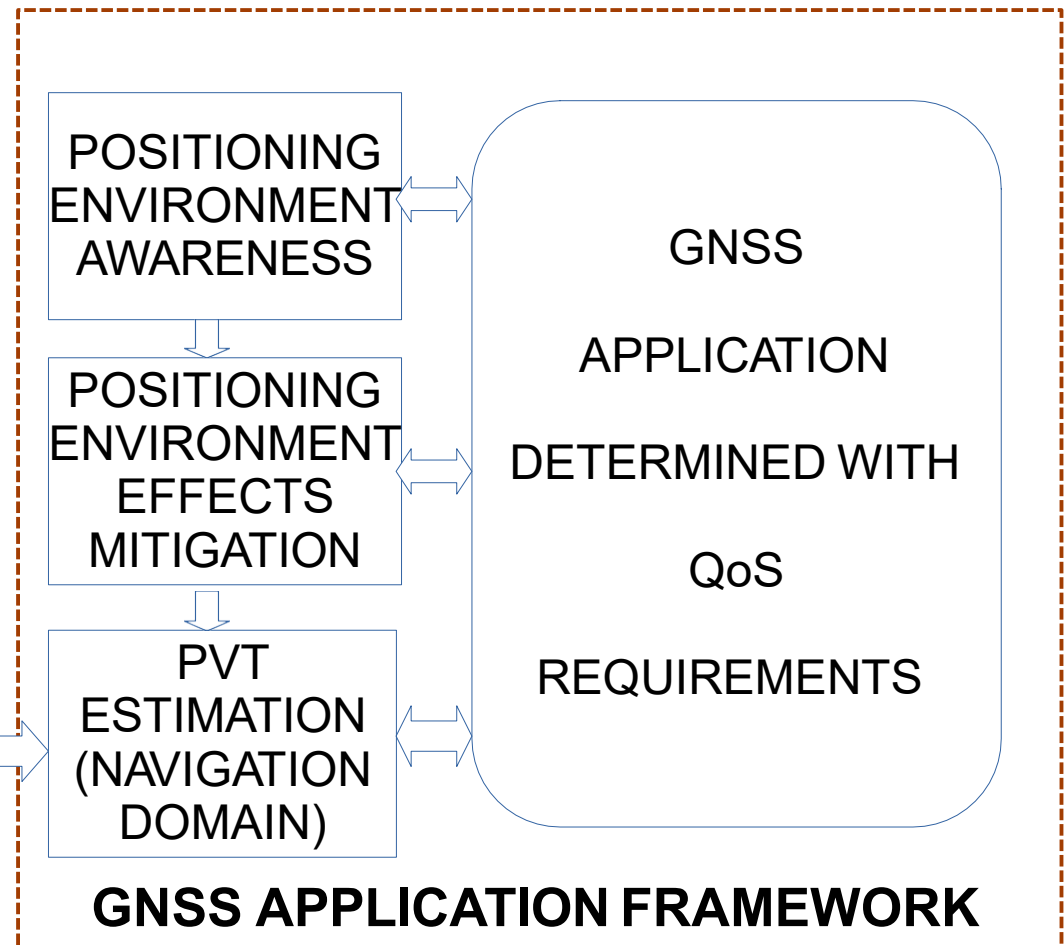
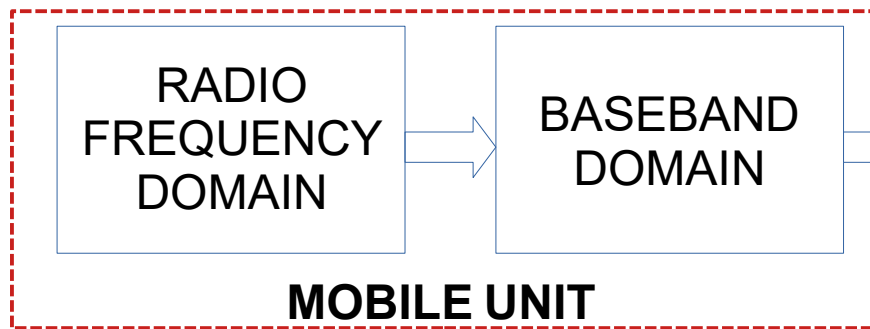
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Positioning-as-a-Service

- Software-Defined Radio
- Self-adaptiveness
- Environment awareness
- GPS application alignment
- ML/AI utilisation



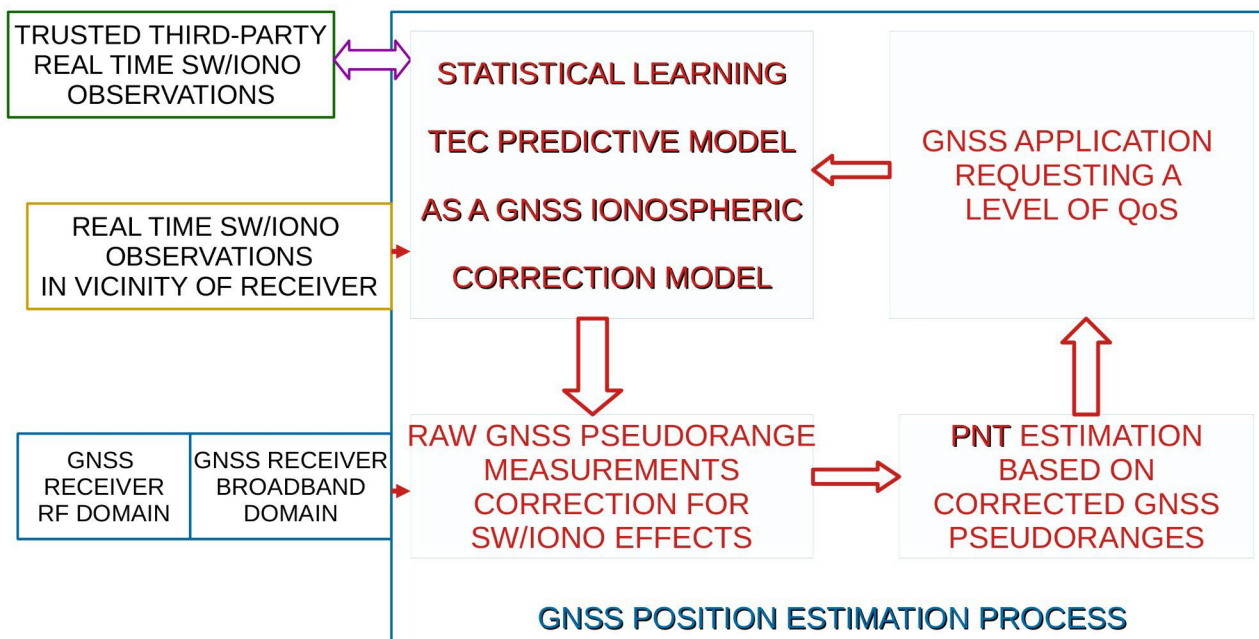
Opportunities: detection of and resilience against natural and artificial adverse effects (space weather, spoofing, jamming), **scalable GPS PNT QoS** (market enhancement and development)

Challenges: information perspective of GPS, means and content of information provision, regulations, legal liabilities, standardisation, international co-operation, academic and professional education

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Case study of self-adaptive and positioning environment-aware GNSS ionospheric delay correction model

- Self-adaptivness → Machine Learning (ML)-based correction model
- Environment awareness → mobile unit's observations & third-party data
- The need for contextual awareness support (third-party data provision), HAS potential?



Reference:

Filjar, R. (2022). Statistical learning TEC predictive model for GNSS ionospheric delay mitigation in self-adaptive environment - aware SDR GNSS position estimation algorithm. *The United Nations/Azerbaijan Workshop on the International Space Weather Initiative: The Sun, Space Weather and Geosphere*. Baku, Azerbaijan.

Available

at:

https://www.unoosa.org/documents/pdf/psa/activities/2022/ISWI2022/s6_01.pdf

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Developments in Europe and world-wide

- A report released: *JRC. (2023). Assessing Alternative Positioning, Navigation, and Timing Technologies for Potential Deployment in the EU (JRC Science for Policy Report). EC JRC. Ispra, Italy. Available at: <https://publications.jrc.ec.europa.eu/repository/handle/JRC132737>*
- Another case-study of ML implementation for GPS PNT performance improvement, with HAS potential: *Natras, R et al. (2023). Regional Ionosphere Delay Models Based on CORS Data and Machine Learning. NAVIGATION: Journal of the IoN, 70 (3) navi.577; doi: <https://doi.org/10.33012/navi.577>*
- Initiative for alignment of university study programmes across disciplines to ensure the common GPS/GNSS competence levels obtained – bilateral agreements, so far
- (Hybrid Format) United Nations Workshop on the International Space Weather Initiative: The Way Forward, Vienna, Austria, June 26 – 30, 2023 (UN OOSA & UN ICG), <https://www.unoosa.org/oosa/en/ourwork/psa/schedule/2023/2023-iswi-workshop.html>

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Developments in Europe

- Baška SIF (Spatial Information Fusion) Forum
- Baška, Krk Island, Croatia, June 11 – 15, 2023
- Topics: mathematics, statistics, statistical and machine learning, predictive modeling, computer science, Global Navigation Satellite Systems (GNSS), navigation methods and algorithms, remote sensing, signal processing, electrical engineering, mechanical engineering, finance, econometrics, energy, medicine, epidemiology and public health, telecommunications and location-based services, Internet of Things (IoT), aviation, air & maritime & road & railways transport & traffic & logistics, space weather, biology, ecology, agriculture, forestry, sports, forensics, meteorology, archaeology, civil engineering, smart cities, geodesy, tourism, and the other disciplines, which concern and exploit spatial data/information for spatial phenomena, patterns, and processes description, identification, modeling, and prediction.



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In appreciation of your attention, and
with invitation to

Baška SIF (Spatial Information Fusion) Forum

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