Strategic interest in service provision for accurate geolocation

ROKUBUN
Innovative Navigation Solutions

ICGC
Institut Cartogràfic i Geològic de Catalunya

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Context, who needs accurate geolocation?

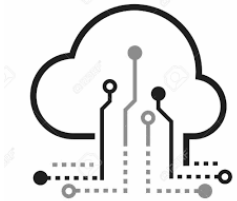
4th Industrial Revolution is about to add thousands of millions of automated moving devices to market that will require accurate and affordable navigation. Those devices are in need of precise and robust yet very affordable and scalable location solution, and therefore cannot rely on expensive high-end GNSS equipment

Autonomous / Unmanned Vehicle

LBS / Smartphones

Drones / Robotics

Precision Farming



IoT / Smart cities automation

source: EUSPA 2022 Market report, https://www.euspa.europa.eu/sites/default/files/uploads/euspa_market_report_2022.pdf

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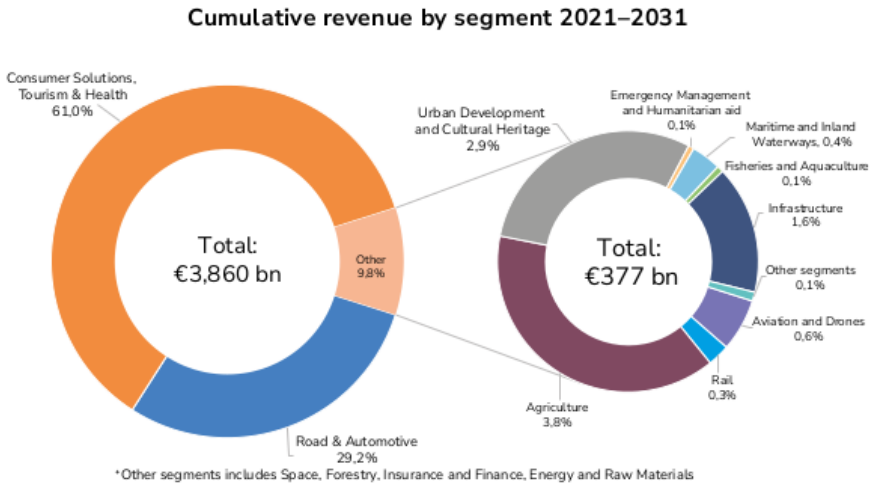

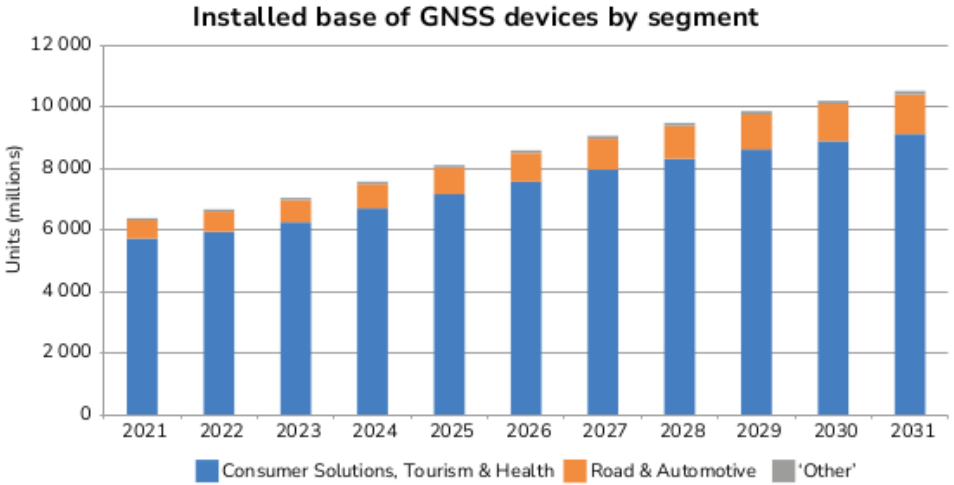

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How does UNION fit in this context

UNION attempts to answer the market demand through two cornerstones

- **SPEAR**: Provision of a location stack that can be licensed by chip manufacturers or system integrators (i.e. positioning engine based on UUPE)

- **P-VRS**: Scalable correction service based on Observation State Representation (OSR) corrections

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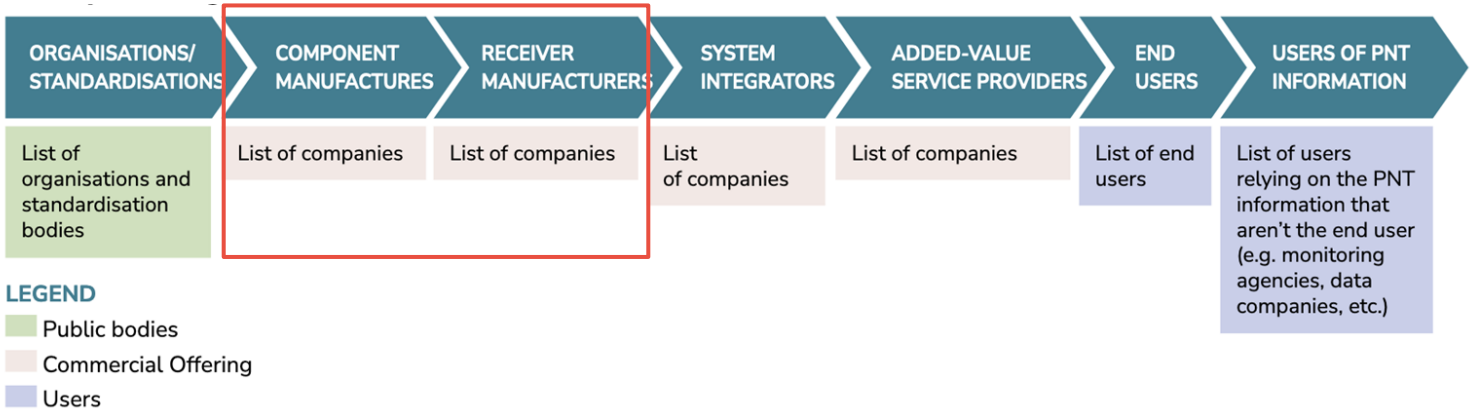
Location Stack?

Location Stack is a low level software library for precise navigation

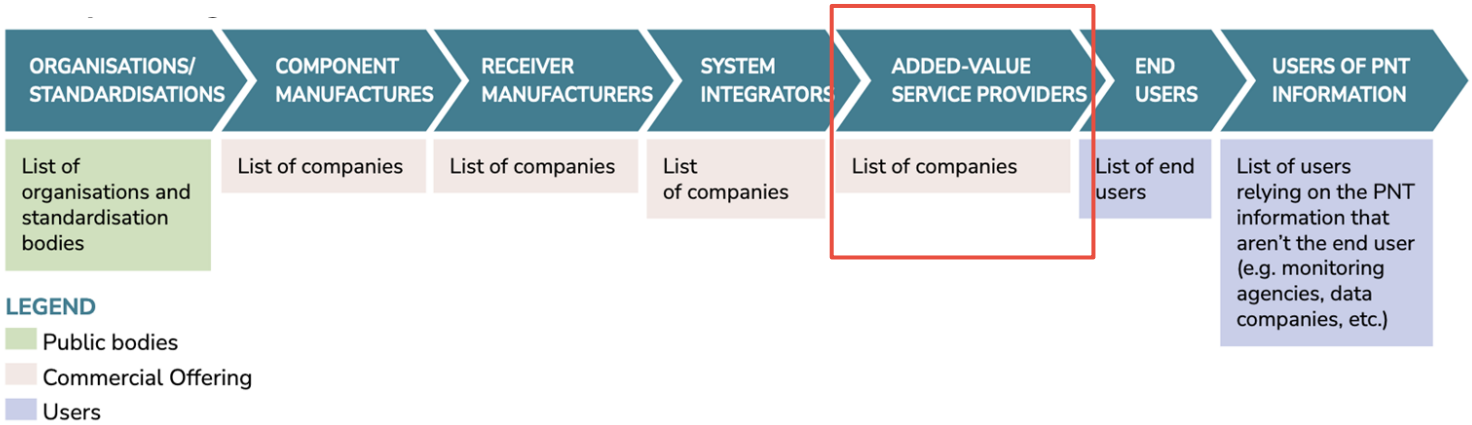
SPEAR is a Software Development Kit (SDK) that can be compiled for any user platform (i.e. embedded application processors, laptops, or Android devices).



Correction service?

Correction service provision means corrections for accurate location

A correction service is considered an **added value service** → Service aimed at improving the position solution of a receiver, not only in terms of accuracy but also in robustness (convergence time, integrity, …)



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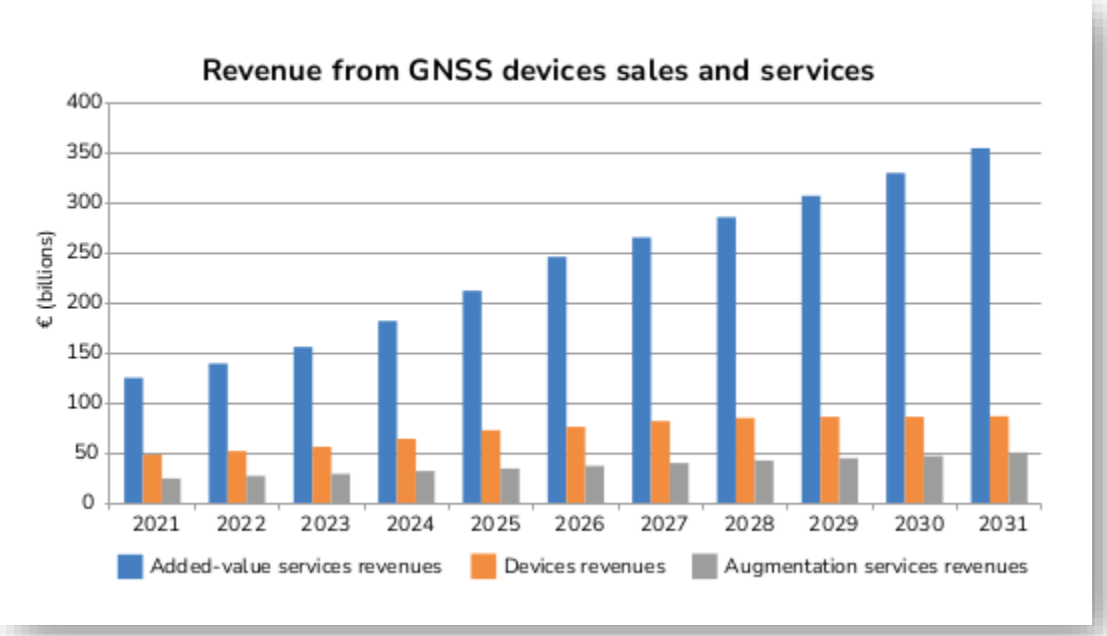
Added-value services for GNSS expected to grow more than 72% by 2031



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STARLING®
Precise Positioning Engine

Topnet Live

TERRASTAR

source: EUSPA 2022 Market report, https://www.euspa.europa.eu/sites/default/files/uploads/euspa_market_report_2022.pdf

OSR vs SSR

Added-value services based on correction provision divided in two categories

- Observation State Representation: Base station transmit its measurements to nearby receivers (RTK networks)

- Space State Representation: Servers transmit accurate satellite orbits, clocks, signal biases, …. (e.g. Galileo HAS)

OSR vs SSR

There is not the ideal solution, each approach has its **pros** and **cons**

OSR	SSR
Centimetric accuracy	Centimetric accuracy
Fast convergence time	Slow convergence time (> 1 min)
Local coverage	Global coverage
Bi-directional communication (workaround through P-VRS)	Broadcast solution (unidirectional communication)
High bandwidth required (full measurements need to be sent)	Low bandwidth
	Hardware may not be 100% compatible (need support of certain messages)

Examples of OSR providers

onocoy

GEODNET

teria

Regional services (premium or free) such as ICGC

Examples of SSR providers

swift NAVIGATION

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SAPCORDA

Trimble

HEXAGON

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What about the positioning engine?

Industry needs a positioning engine. Chip manufacturers and integrators are looking for it

point one

Product Industries Company Developers Get Started

NEWS

Point One Navigation Launches ASIL Positioning Engine to Enable Safe and Precise Autonomous Vehicles

20.12.2022

Point One's FusionEngine paired with STMicroelectronics TeseoAPP Chipset is a competitively priced, production-ready positioning solution for automotive OEMs developing navigation and advanced driver assistance systems (ADAS)

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Media Release: Quectel Demonstrates ASIL Solution for Advanced Automotive Applications at CES 2023

Quectel Wireless Solutions, a leading global IoT solutions provider, today demonstrates an advanced automotive safety integrity levels (ASIL) solution for the automotive market.

The industry-leading positioning solution will provide optimal precision, availability, and reliability for maintaining absolute in-lane positioning, satisfying level ASIL B and appropriate for advanced driver assistance systems (ADAS) and autonomous driving (AD) systems.

The design utilizes Quectel's LG69T-AB automotive module and will be compatible with the Trimble software positioning engine, Trimble RTX correction service, the ST Micro ASIL-rated TeseoAPP GNSS chipset, and the Murata SCHA600 ASIL inertial measurement unit (IMU).

Next steps

UNION has been the first step at establishing the main guidelines for the upcoming strategy of Rokubun in the positioning market

- With the licensing of SPEAR

- With the provision of added-value services for navigation

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Thank you!

Any questions?

More info at:

https://union-navigation.eu

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Funded by the European GNSS Agency research and innovation programme under grant agreement No GSA/GRANT/06/2019-UNION