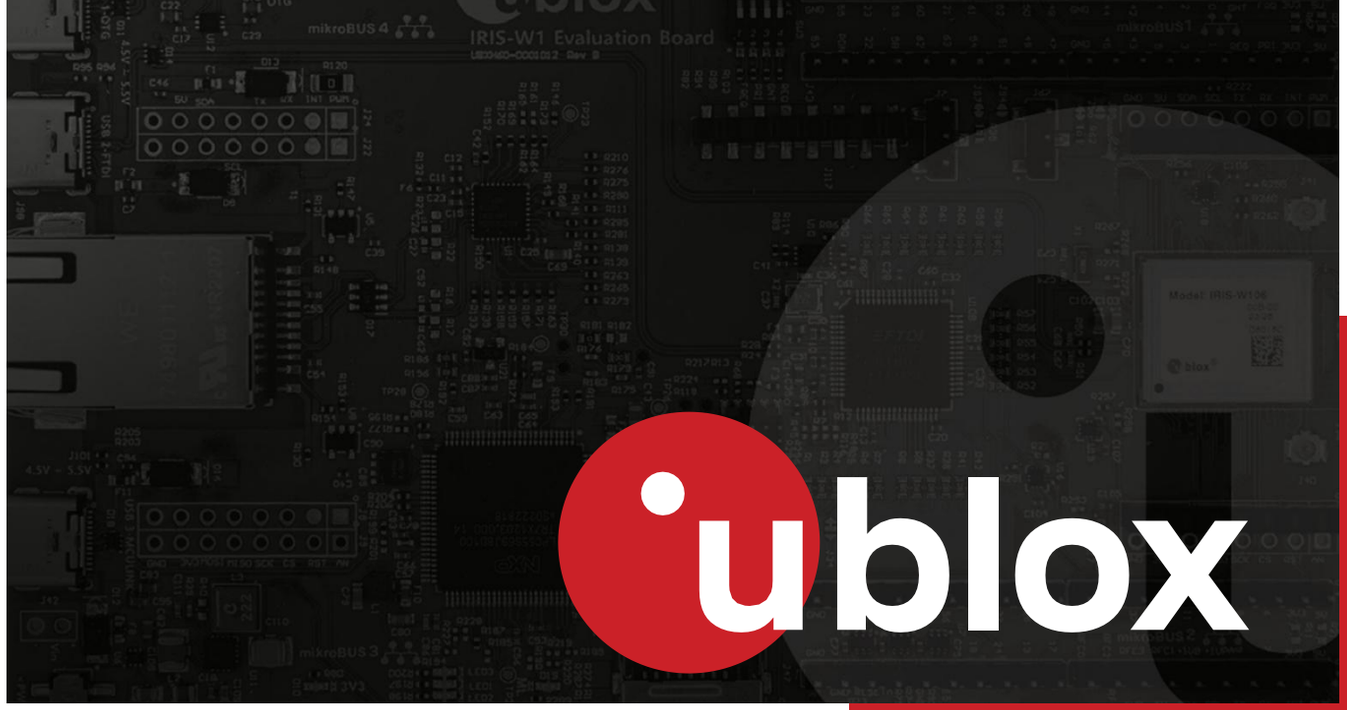
EGNOS Workshop 2025

Berlin, 1-2 October 2025

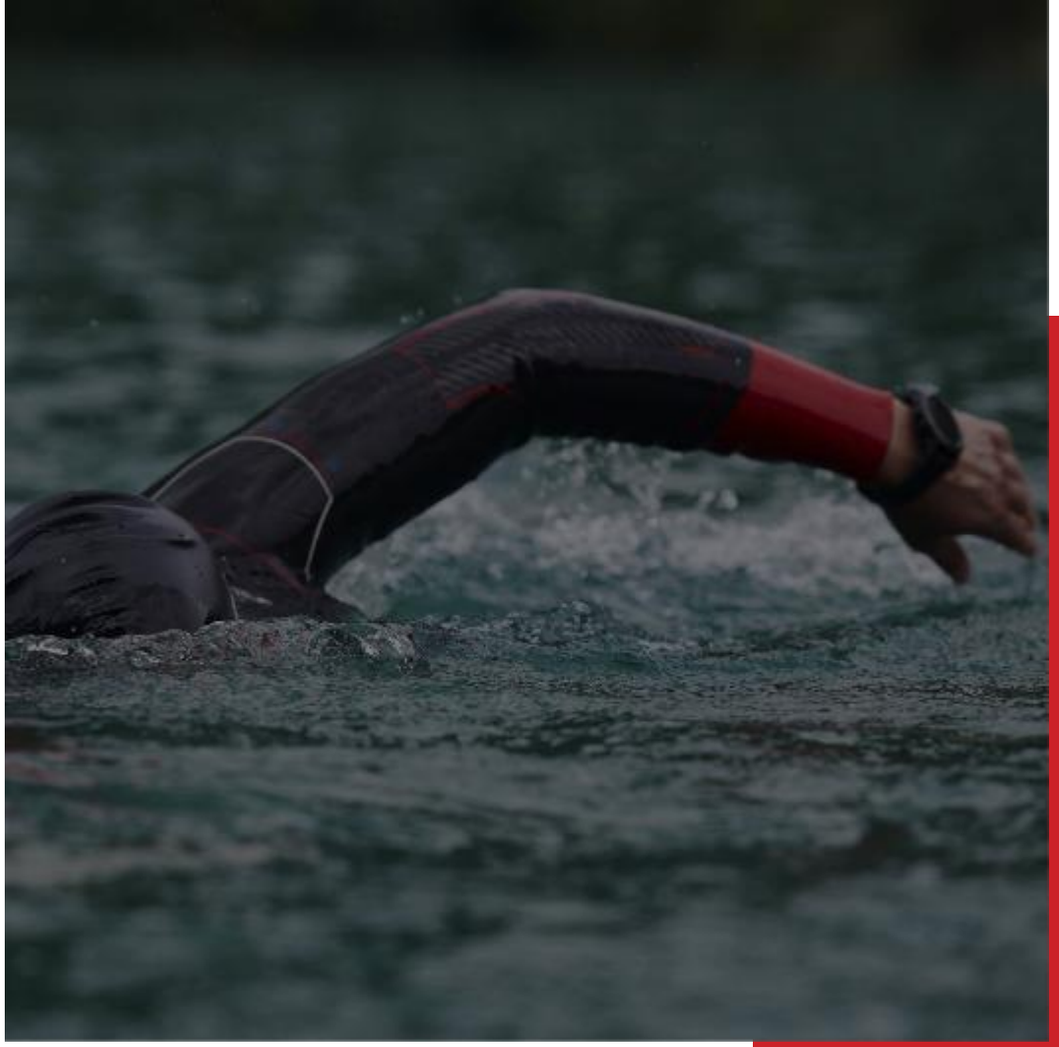


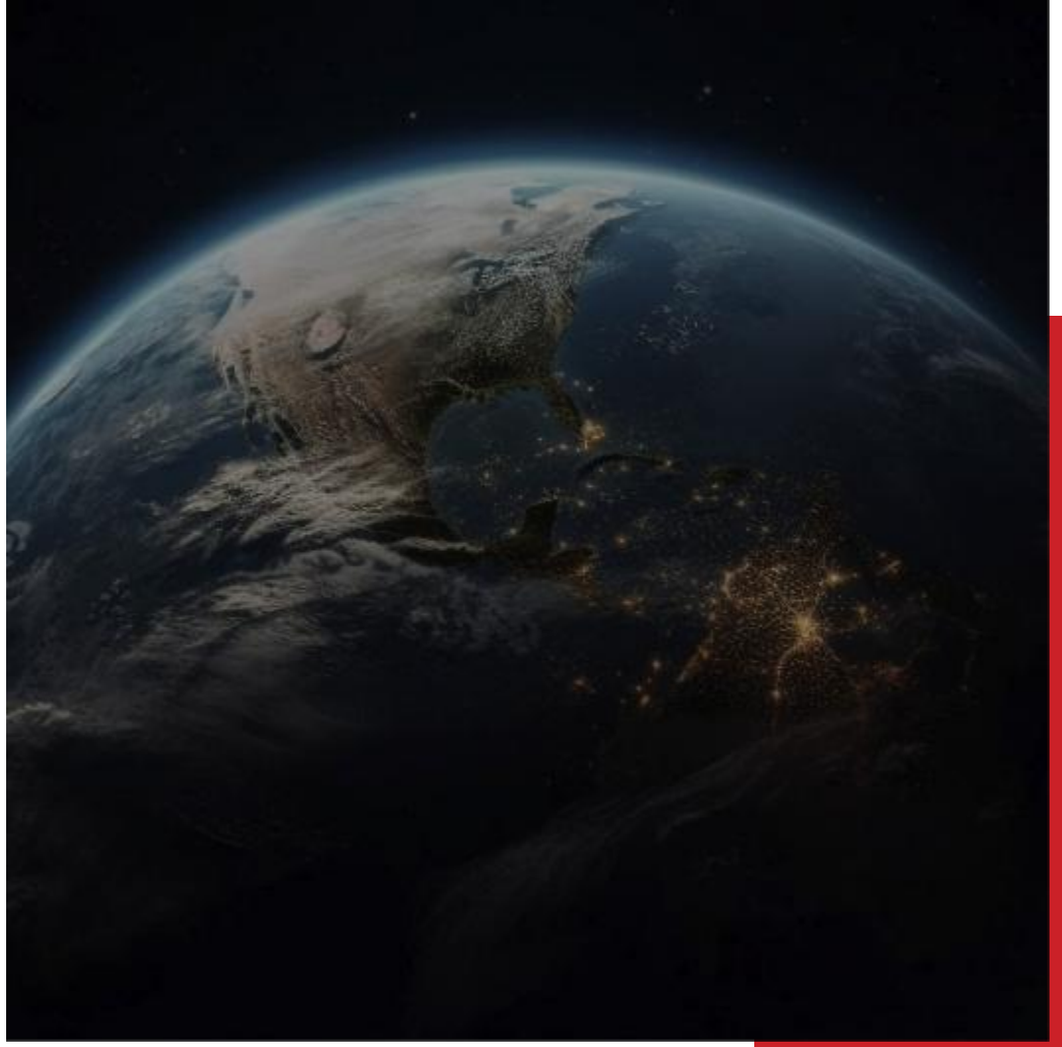
Armin Forouhar
Key account and Segment manager - HPG
u-blox

u-blox (SIX:UBXN) is a global leader in automotive, industrial, and consumer markets, driving innovation through our cutting-edge positioning and short-range communication technologies.

We are the pioneers behind high-precision technologies, providing smart and reliable solutions that enable people, vehicles, and machines to determine their precise position and communicate wirelessly.

With headquarters in Thalwil, Switzerland, and offices across Europe, Asia, and the USA, we are making a global impact.





10.1 MCHF

Free cash flow in 2024

1'000

Employees – 67% in R&D

263 MCHF

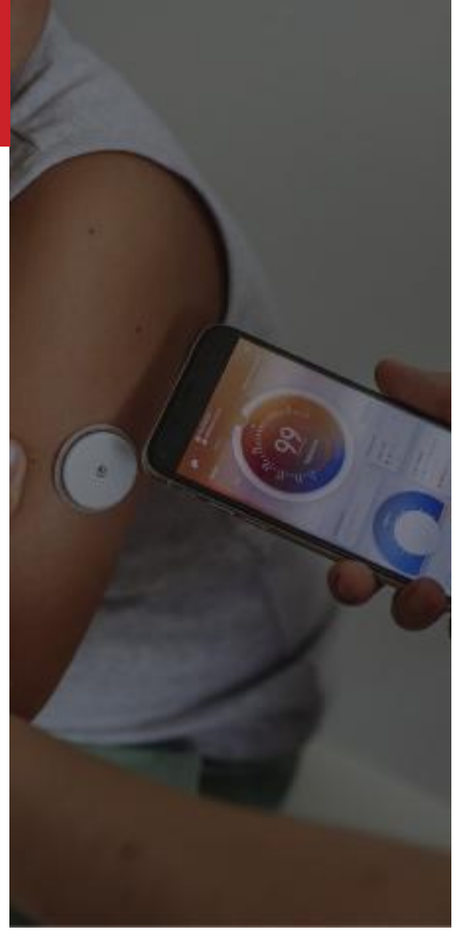
Revenues In 2024

7.0%

Growth (CAGR) 2007 … 2024

Positioning

GNSS chips and modules deliver unparalleled accuracy and reliability, ensuring critical applications in navigation and tracking operate flawlessly in any environment.

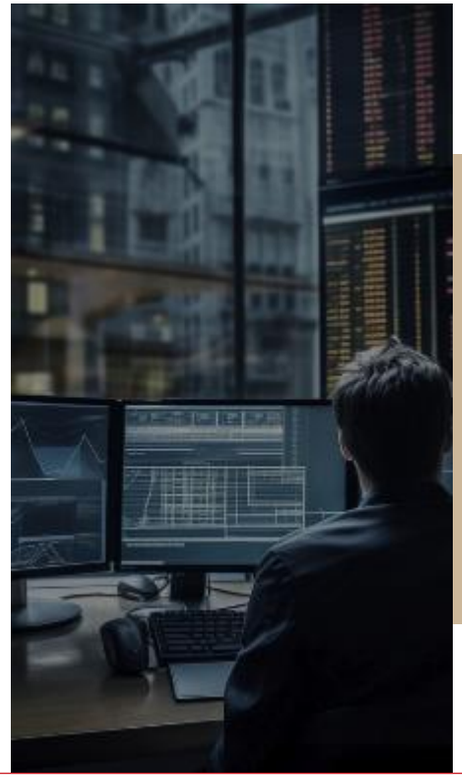


Wi-Fi, Bluetooth, Matter & Thread, provide robust, energy-efficient connectivity for devices within the emerging smart ecosystem.

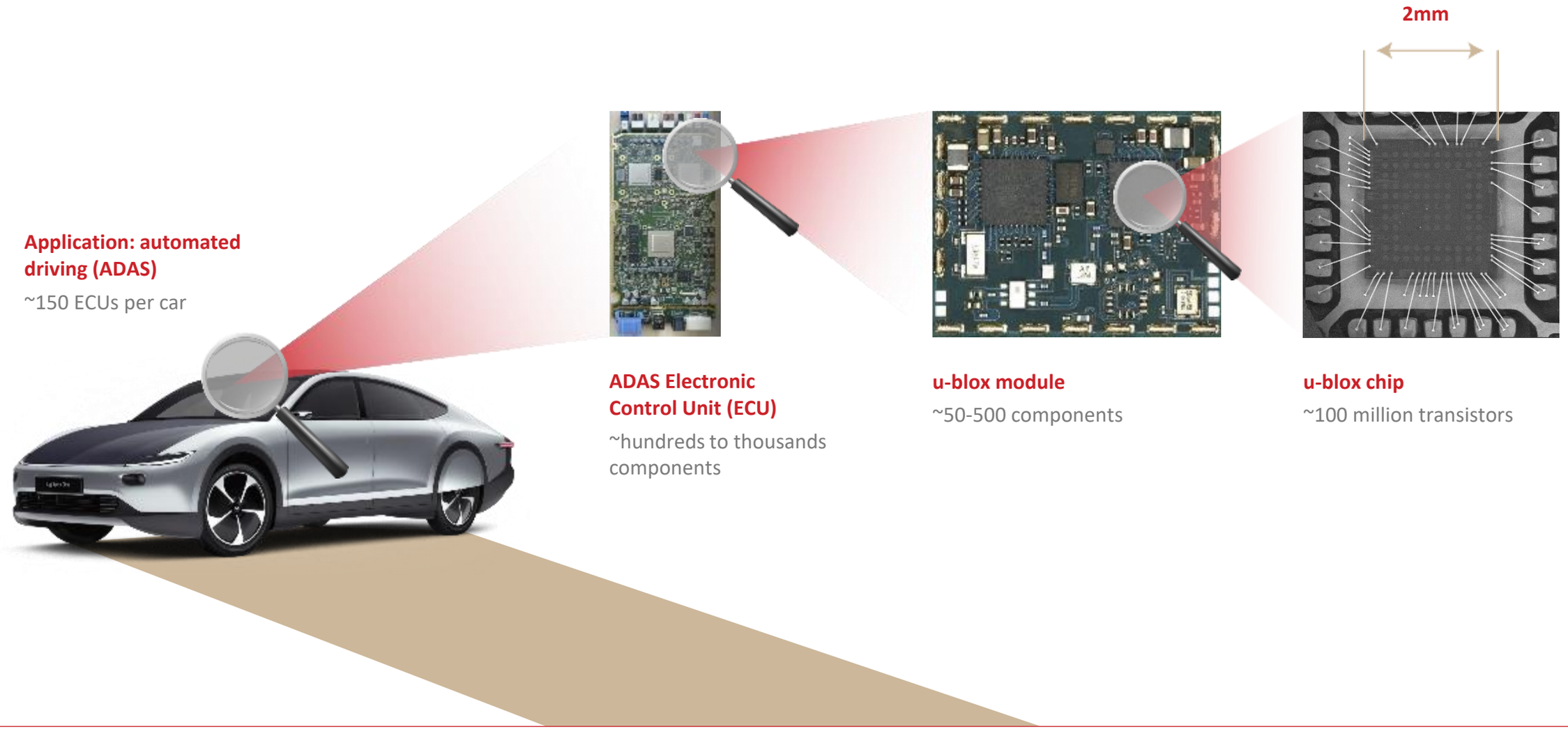
Short-Range

Services

Value adding services deliver high-precision positioning and wireless communication solutions that enhance the accuracy and reliability of u-blox products.



u-blox contributes with chips and modules to enable key applications like automated driving



u-blox GNSS security features for supported platforms

Feature		u-blox M8	u-blox M9	u-blox F9	u-blox F20	u-blox X20	u-blox A9
Signal integrity	SBAS	●	●	●	●	●	●
	Spoofing and jamming detection with active mitigation	●	●	●	●	●	●
	Galileo OSNMA		○	●	●	●	○
Device integrity	Secure boot		●	●	●	●	●
	Secure firmware update		●	●	●	●	●
	Configuration lock		●	●	●	●	●
	Hardware root-of-trust			●	●	●	●
Secure interface	Receiver message authentication	●	●	●	●	●	●
	Encrypted communication				○	○	
Functional safety	Compliant to ISO 26262 - ASIL B						●

● Supported with 1st product release ○ Supported with later product release

u-blox – supported correction services

	Observation State Representation (OSR)	State Space Representation (SSR)		
Techniques	Single Baseline RTK Network RTK (VRS)	SBAS	Global PPP	PPP-RTK
Available services	Local base station setups, various commercial alternatives	EGNOS, WAAS, MSAS, GAGAN, BDSBAS, ...	PointPerfect Global Galileo HAS	PointPerfect Flex CLAS
Delivery channels	Internet	Satellite / Internet*	Internet and/or satellite	
Format	RTCM	SBAS	SPARTN, various CSSR formats (e.g., HAS CSSR and CLAS CSSR)	
Coverage	Regional	Continental	Global	Continental
Expected performance	0.01 m in sec	<1 m in sec	<dm in <5min(1)	<dm in <1min(1)
Supported products	All HPG products	All products	All X20 products	All F9, F20 and X20 HPG products

*Referring to EDAS

Demanding Industrial markets - HPG

Precision Ag

Ground Robotic

UAV

Heavy machinery & construction

Railway

Maritime

Infrastructure

Surveying

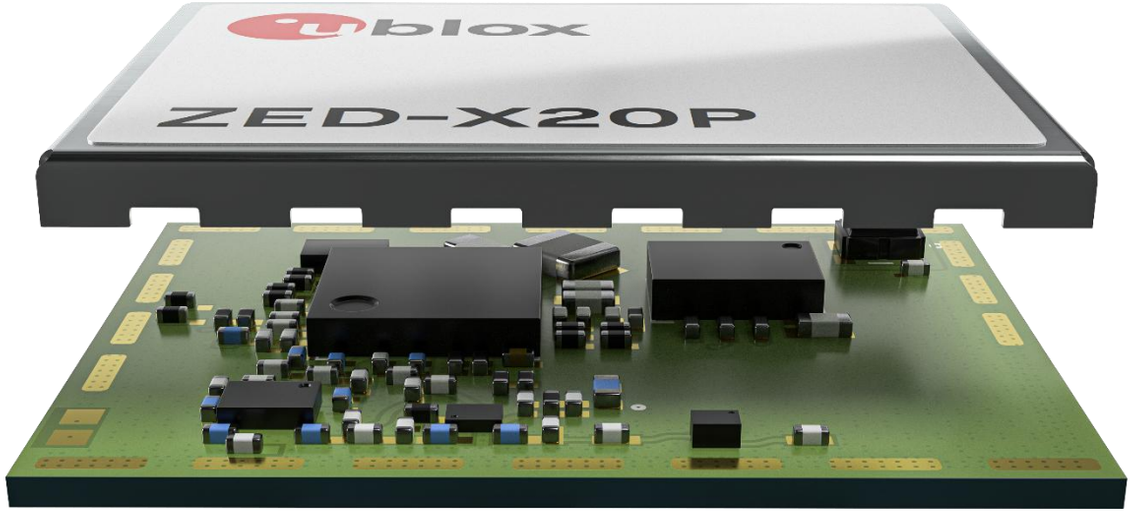
Drone application and SBAS

	Single-band GNSS	Dual-band GNSS	All-band GNSS
Model	M8 / M9 /M10	F9	X20
Feature	Standard PVT	RTK / PPP-RTK	RTK / PPP-RTK / PPP-AR / HAS
Integrity and authentication	SBAS integrity	OSNMA SBAS integrity	OSNMA SBAS integrity

ZED-X20P: u-blox X20 high precision GNSS module

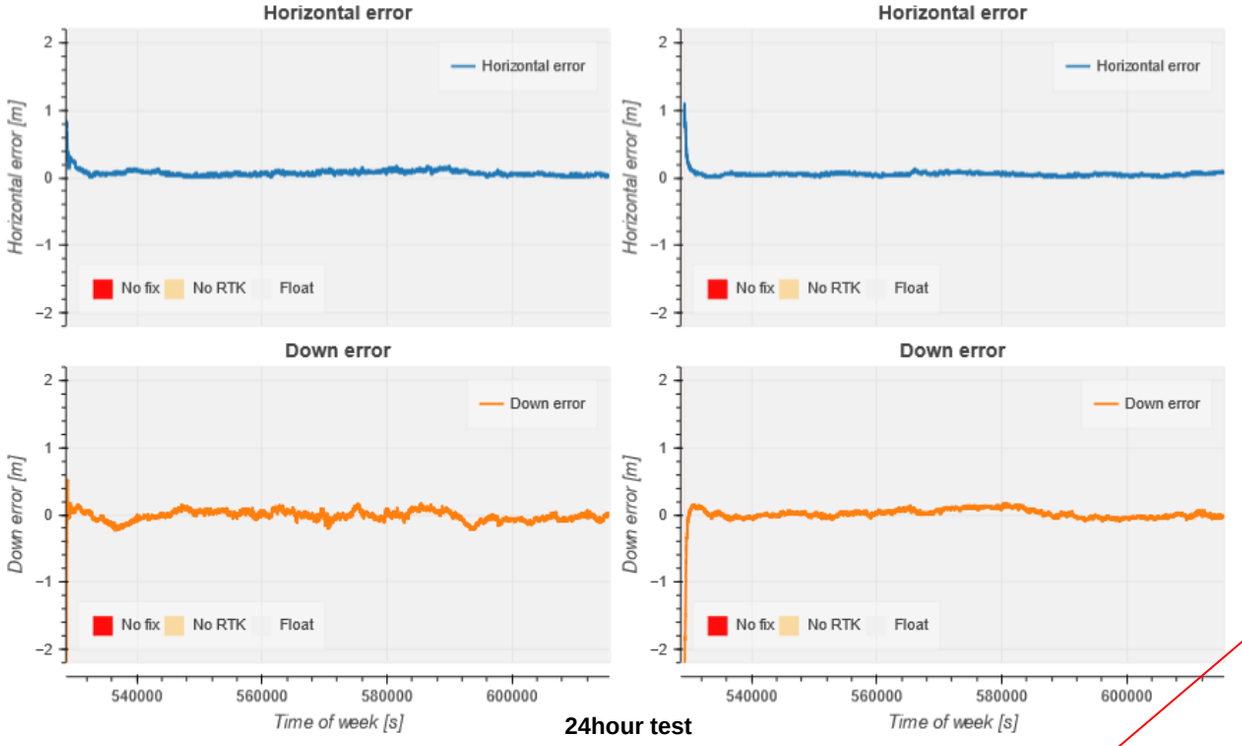
Raising performance worldwide

- All-band GNSS and cm-technology integrated in a small module (L1/L2/L5/L6 + L-band)
- World leading RTK, PPP-RTK and PPP support including Galileo High Accuracy Services (HAS)
- u-blox End-to-end Security providing Confidentiality, Integrity and Authentication from satellites to the host



HAS Preliminary Performance with ZED-X20P

ZED-X20P with Galileo HAS (Initial Service)



ZED-X20P with PointPerfect Global (PPP)

24hour test

- We see promising results in first PointPerfect Global and Galileo HAS performance data
- The biggest difference between PointPerfect Global and Gal HAS we expect to see in availability of the best solution in practical applications, e.g. convergence times.

FIGURE OF MERIT	TYPICAL PERFORMANCE	CONDITIONS AND CONSTRAINTS
HAS horizontal positioning accuracy	≤ 15 cm for Galileo + GPS	• 68th percentile • Over any 24 hours period • For the signal combinations supported by the HAS (specified in section 2.4.1) • Using the performance characterisation user algorithm - or HAS-UA -outlined in Appendix D • At least 8 satellites in view above 5 degrees elevation for Galileo + GPS users under open sky conditions • Static user • Applying orbit and clock corrections and code biases for the involved signals • At the AUL[14] of the service area (specified in 3.1) • Usage assumptions as per section 2.4
HAS vertical positioning accuracy	≤ 20 cm for Galileo + GPS	

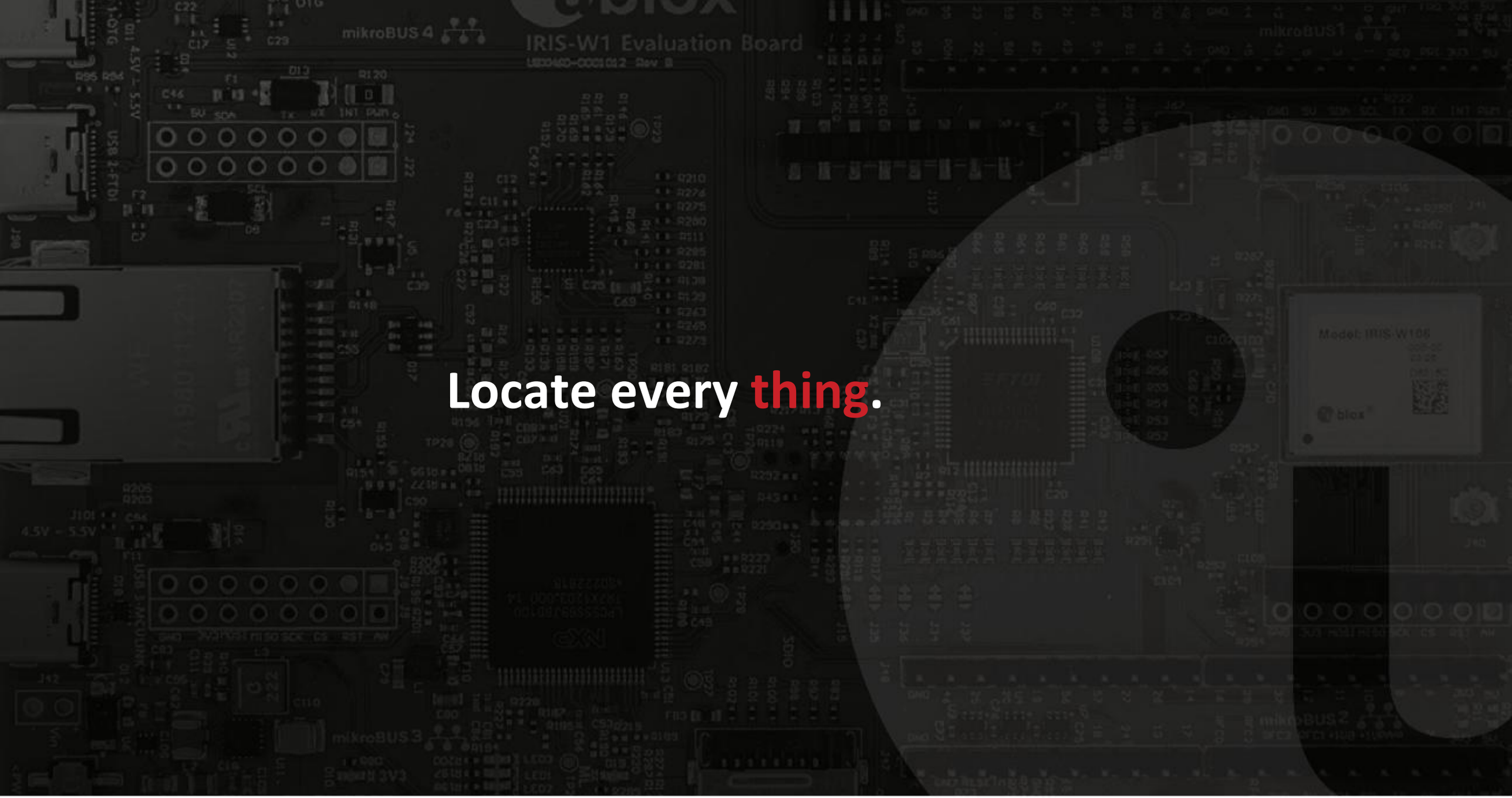
	2D p50	2D p68	2D p95	3D p50	3D p68	3D p95
PointPerfect Global	5cm	6cm	9cm	7cm	8cm	14cm
Galileo HAS	6cm	8cm	13cm	9cm	11cm	19cm

EGNOS V3

- Everyday life increasingly depends on **trustworthy, accurate positioning** – from mobility and smart cities to healthcare, logistics, and agriculture.

- **Mass-market demand** is rapidly growing across multiple sectors for reliable, safety-critical localization.

- **EGNOS V3** with dual-frequency, multi-constellation augmentation could facilitate on these needs, improving accuracy, robustness, and resilience.
- Integrating EGNOS V3 will enable:
  - Scalable solutions for automotive, UAVs, and IoT.
  - Seamless support for industry adoption and regulatory requirements.
  - Innovation pathways to next-generation safety and efficiency.



Locate every thing.