Positioning roadmap for distributors - extended

April 2018
Product Strategy Positioning
Confidential (UBX-18017495)

GNSS portfolio

Product grades

	Standard Grade	Professional Grade	Automotive Grade
Environmental conditions	**Consumer environment**	**Industrial environment**	**Automotive environment**
Temperature	-20 … +65 °C	-40 … +85 °C	-40 … +85 °C (+105 °C on some products)
Product qualification	JESD47 (ICs) Subset of ISO 16750 (modules)	AEC-Q100 (ICs) ISO 16750 (modules)	AEC-Q100 (ICs) Extended ISO 16750 (modules)
Process levels for design, manufacturing and testing	• 100% outgoing test • product traceability • PCN process • Failure analysis	Standard grade, plus: • 100% automatic x-ray and optical inspection on modules	Professional grade, plus: • PPAP • ISO/TS 16949 manufacturing • automotive test flow • component traceability • 8D failure reporting • automotive PCN process • long product life cycles • 0-ppm program

Product portfolio overview

- **Standard precision**
  - Meter level accuracy
  - Cost-efficient product portfolio
  - Suitable for most applications
  - High tracking sensitivity
  - Low power consumption
- **High precision**
  - Sub-meter down to centimeter level accuracy
- **Dead Reckoning**
  - 100% positioning coverage e.g. parking garages & urban canyons
  - For road-vehicle applications
- **Timing & Frequency**
  - Reliable and high performance, plus skilled support




Product portfolio

	Modules		Chips
	LCC / LGA	**SiP**	
Highlights	• Form factor roadmap brings longest lifecycle (investment protection). • Minimal design efforts • Easy migration between SPG, HPG and DR receivers	• Optimized for minimal size, weight and power • Minimal design efforts	• Economy of scale for highest volume opportunities
Product Grade	Automotive, Professional and Standard	Professional and Standard	Automotive, Professional and Standard
MOQ	250 to 500 pieces	500 to 1'000 pieces	4'000 pieces
Dominant market	Automotive, Industrial	Industrial, Consumer	Automotive, Industrial, Consumer

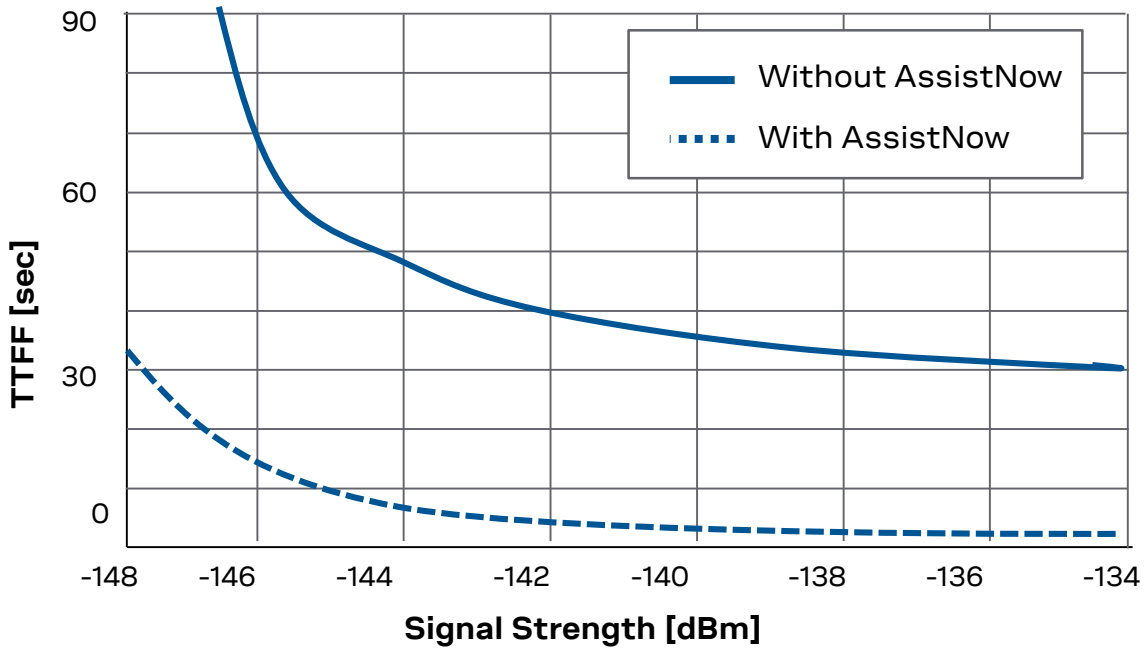
Why use modules?

- Little design-in effort
  - Plug and play – just connect antenna and power
  - No RF/HW qualification needed. No interface difficulties
  - No design risk
  - Fully qualified, tested, and certified
- Simple assembly & production testing
  - Only one standard SMD component
  - No test equipment investment – only go/no-go test
  - No FW programming on flash, no FW fusing
  - 100% yield
- Field support & RMA
  - High quality components for consistent performance in the field and lowest ppm (e.g. TCXO)
  - Extensive field experience comes along with the module
  - One-stop technical support
- Assured migration to next generation: pin-to-pin compatibility and largely SW compatible
- Reduced sourcing complexity
  - Only one supplier for complete functional block

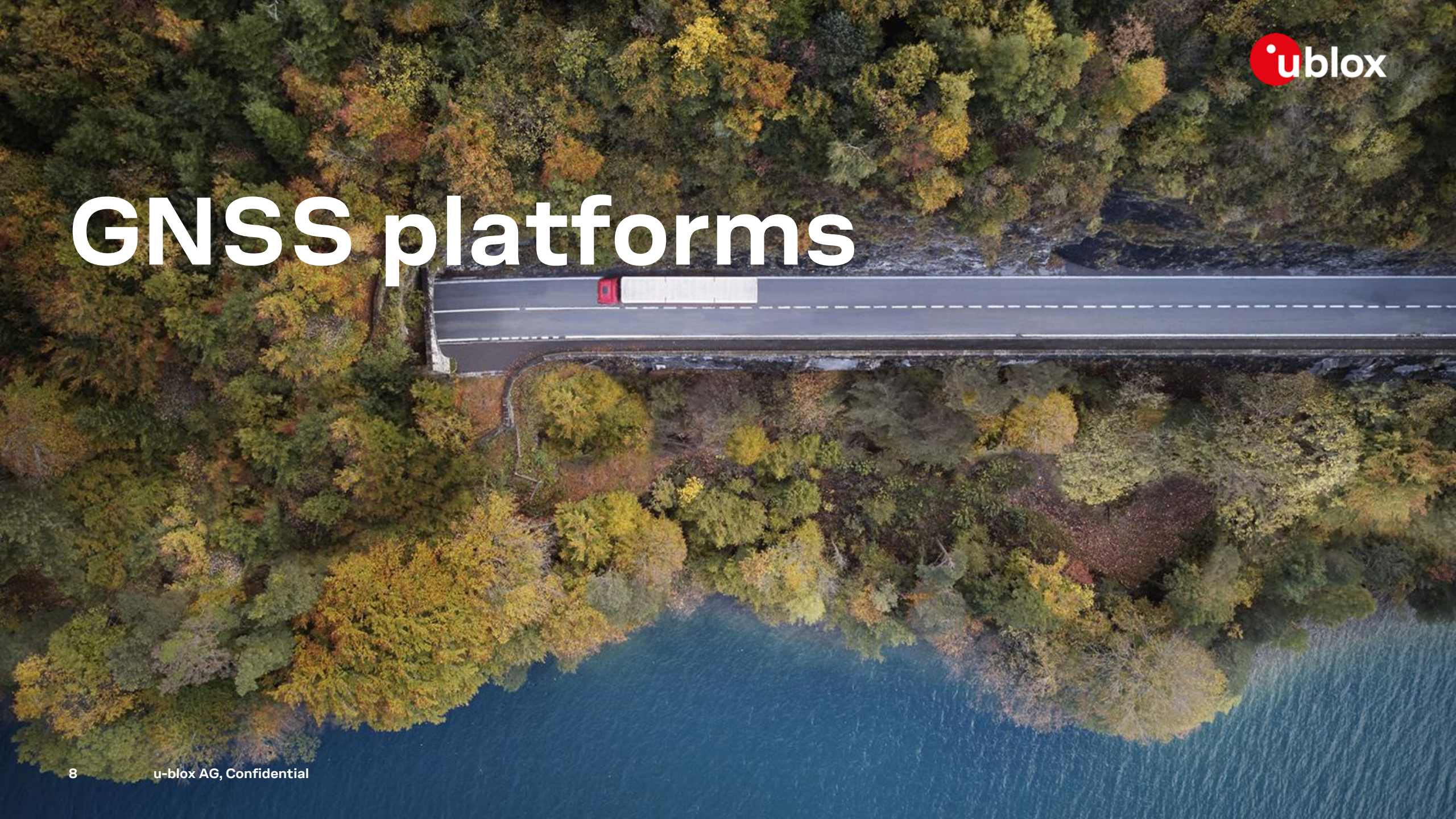
- Quick to market
- No technology risk
- Low engineering cost
- Now capital investment
- Future proof
- Reduced supplier base

Multi GNSS AssistNow

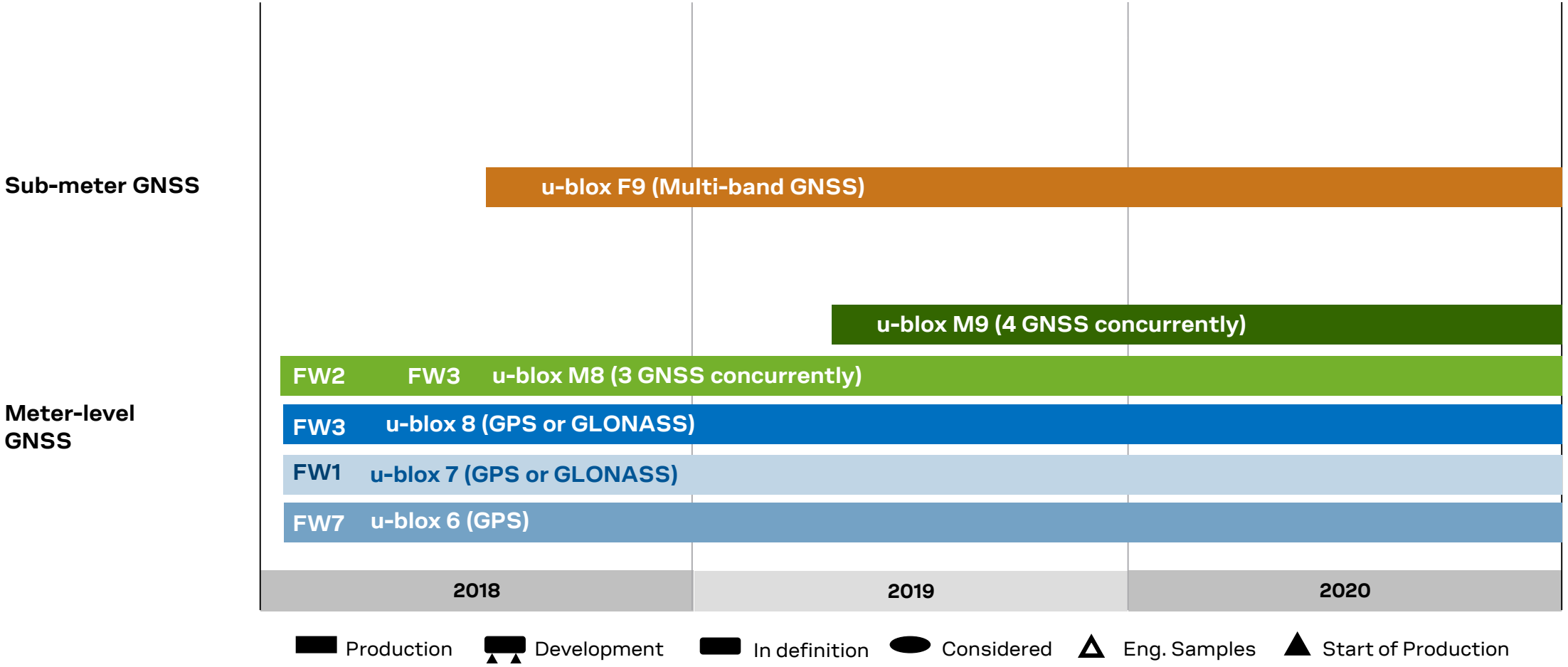
- Users expect instant position information, even in challenging environments
- Without aiding, it may take dozens of seconds to achieve the first position fix
  → **AssistNow**
- AssistNow brings four key advantages
  1. Faster Time-to-first fix
  2. Improved position availability
  3. Improved position accuracy
  4. Lower power consumption
- u-blox receivers supports free-of-charge AssistNow Online, Offline and Autonomous



GNSS platforms



Platform roadmap



u-blox GNSS platforms

	u-blox M9	u-blox F9
Target application	Wide range of Standard Precision in consumer, industrial and automotive	High Precision Navigation, V2X/automotive, augmented reality, UAV, UGV.
Accuracy	<2.0m (CEP68) <1.5m (CEP68) w/ SBAS	<1.5m (CEP68) <1.0m (CEP68) w/ SBAS <0.2m (CEP68) w/ SSR <0.03m (CEP68) w/ RTCM 3.x
Bands supported	Single-band (L1)	Multi-band (L1, L2, L5)
Corrections	SBAS, QZSS SLAS	SBAS, SSR, OSR
Variants	Timing, Dead Reckoning, Wearables	Timing, Dead Reckoning
Safety features	No	No
Security features	Yes	Yes

u-blox M9

High performance GNSS L1 platform

- Tracks all L1 signals from GPS, GLONASS, Galileo, BeiDou, QZSS and SBAS concurrently

- High position availability and accuracy in difficult urban conditions

- High flexibility with wide range of inter-changeable GNSS chips and modules

- High position update rate

- Dead Reckoning option for reliable performance in urban environments

- High security and trusted domain

u-blox F9

Takes GNSS precision to the next level

- Delivers accuracy down to the centimeter-level

- Paves the way for high precision navigation, augmented reality, and unmanned vehicles

- Fast time to first fix and robust performance with multi-band, multi-constellation reception

- Compatible with leading correction services for global coverage and versatility

- Dead Reckoning option for reliable performance in urban environments

- Advanced jamming and spoofing detection for highest security

u-blox F9

Multi-band, Multi-constellation capabilities

GPS

- L2: 19 satellites
- L5: 12 satellites

GLONASS

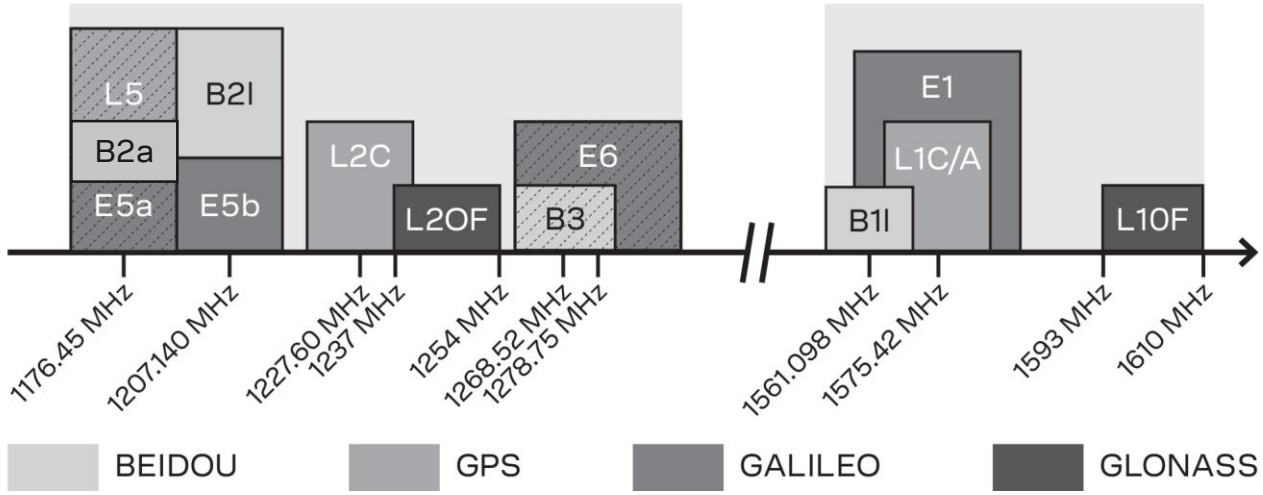
- Full constellation in L2
- No signal in L5

Galileo

- Same signals in E5a and E5b
- Correction service availability in EMEA and US okay, service availability in Asia tbd

BeiDou

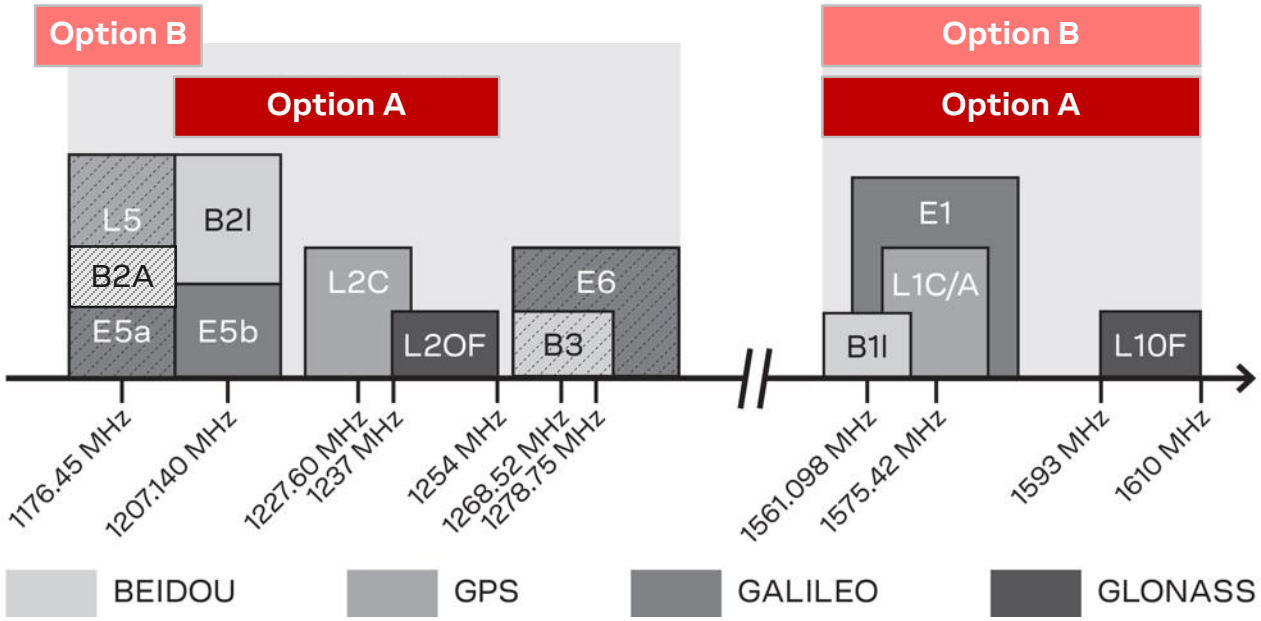
- B2I signal available today on ~10 sats
  - Will be discontinued after 2020-22 in steps
- B2a operational by 2020 (best case)
  - Correction service availability tbd



u-blox F9

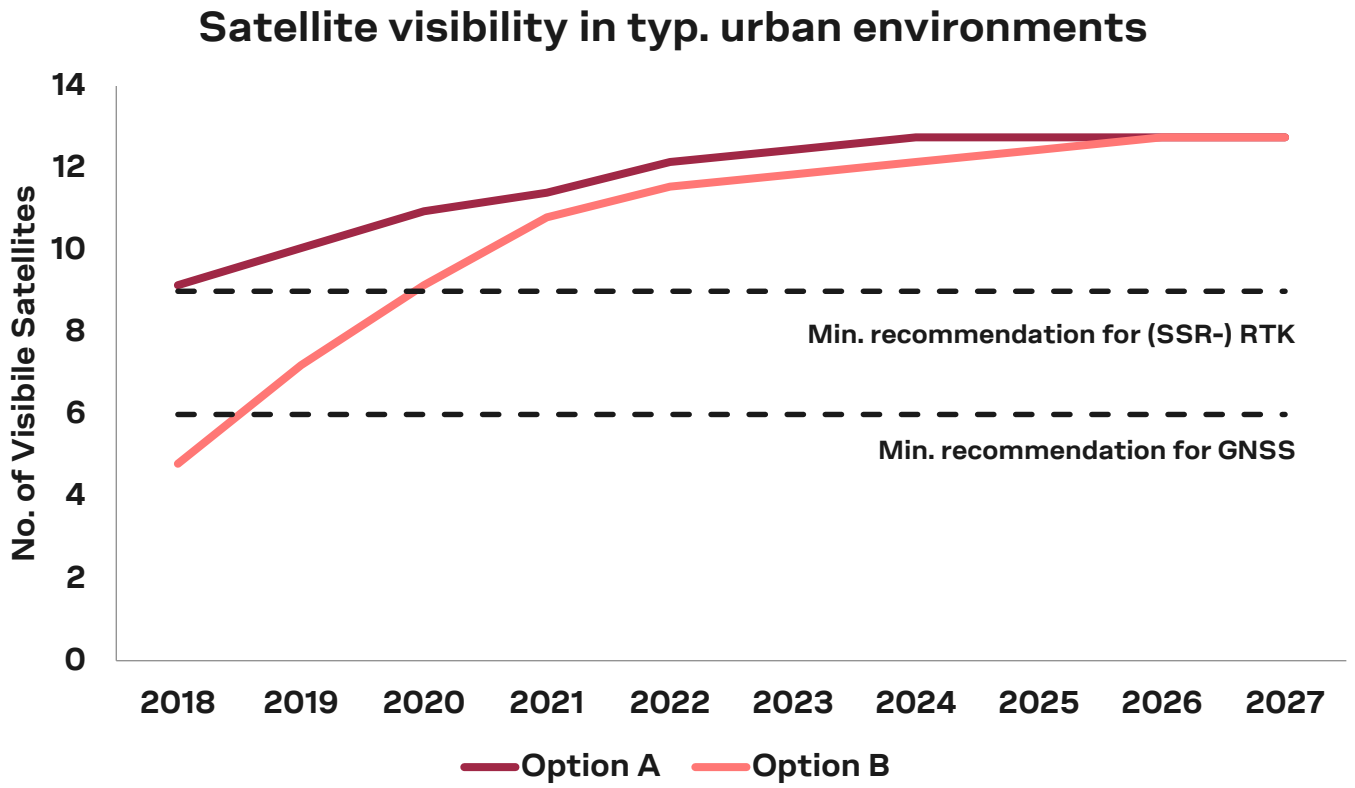
Multi-band, Multi-constellation capabilities

- u-blox F9 capable of tracking all civil GNSS signal bands
- Multi-band enables fast time to first fix and robust performance by mitigating ionosphere errors
- Multi-constellation enables receiver to track a high number of GNSS observations



u-blox F9 – multi-band, multi-constellation

Importance to maximize number of signals in urban areas



u-blox F9 platform capable to maximize satellite visibility in urban environments for both High Precision and Standard Precision GNSS use cases

u-blox F9 – multi-band, multi-constellation

Importance to maximize number of signals in urban areas

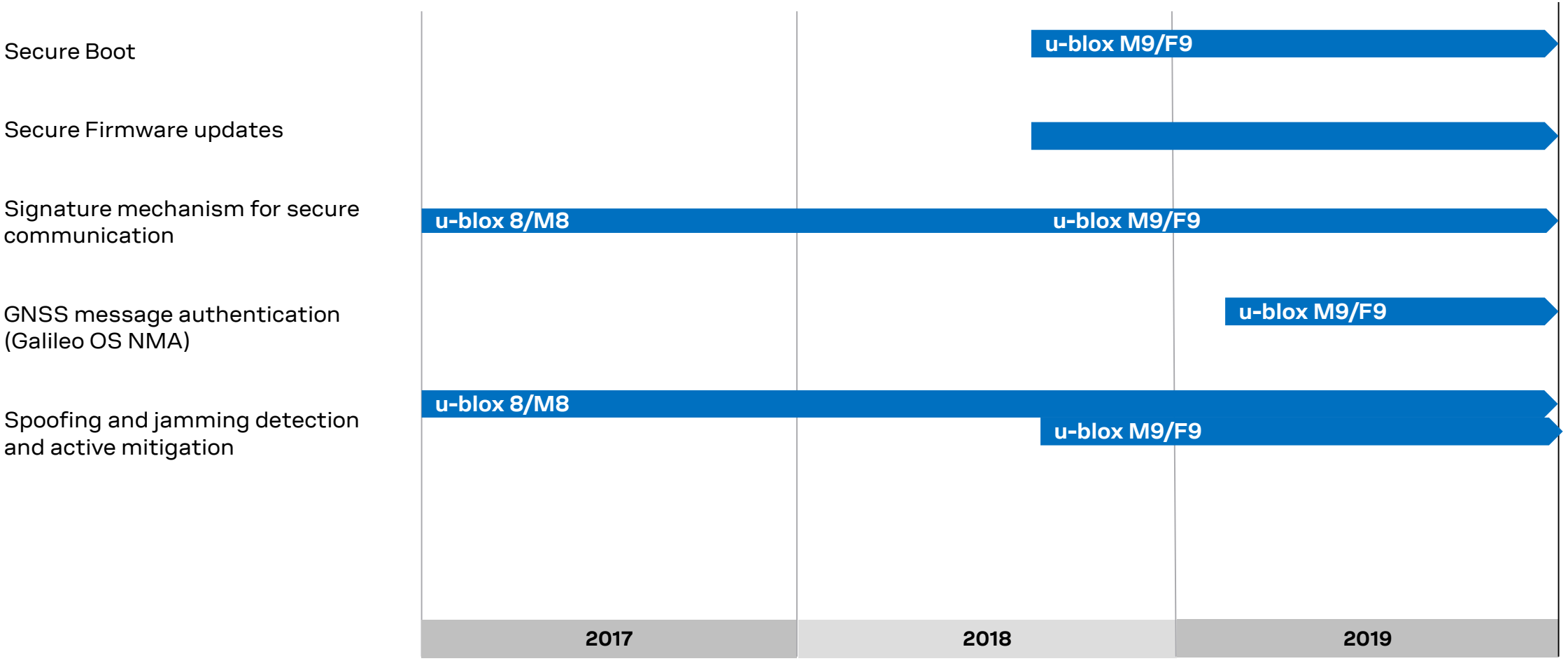
- Multi-constellation, multiband RTK / SSR-RTK is crucial for centimeter-level performance
- Option A (L1, L2 and L5) maximizes satellite visibility for RTK / SSR-RTK
  - GPS & GLONASS: readily available in L2C/L2OC
  - Galileo: full E5b constellation by ~2020
  - BeiDou: B2I available until migration to B2a
- Option B (L1 and L5) maximizes sub-meter performance for GNSS (without correction service)
  - Dependent on BeiDou migration to B2a
  - Does not become useful for RTK / SSR-RTK until 2021

u-blox security features

Threats	Principle	Benefit
Modifications to the way that u-blox and customers' products work	 **Secure Boot** **Secure Firmware Updates**	u-blox GNSS receivers are secured against security threats originating from attacking the receiver behavior.
	 **Secure interfaces; and APIs**	u-blox GNSS receivers are protected against man-in-the-middle and replay attacks.
Changing the data as it flows around the system	 **Secure Communications Transport Layer**	u-blox AssistNow service cannot be used to attack u-blox GNSS receivers
Taking control of u-blox products from unauthorised systems	 **Secure against spoofing and jamming; robust against software attack**	u-blox GNSS receivers are well protected against malicious attacks at the antenna side.

Available on all u-blox M9, F9 and A9 products. Partially supported with u-blox M8

u-blox security features



Standard Precision GNSS

Standard Precision platforms

	u-blox 7	u-blox 8	u-blox M8	u-blox M9
Receiver type	Single constellation: GPS or GLONASS	Single constellation: GPS or GLONASS	Multi constellation: 3 GNSS concurrently	Multi constellation: 4 GNSS concurrently
GNSS supported	GPS, QZSS, GLONASS, SBAS	GPS, QZSS, GLONASS, SBAS	GPS, QZSS, GLONASS, BeiDou, Galileo, SBAS	GPS, QZSS, GLONASS, BeiDou, Galileo, SBAS
Dead Reckoning	No	No	Yes	Yes
Track. Sensitivity	-162 dBm	-166 dBm	-167 dBm	-167 dBm
Update rate (ROM / Flash)	10 Hz / 5 Hz	18 Hz	10 Hz / 5 Hz	20 Hz / 20 Hz
Trusted domain	No	Basic	Basic	Extended
Current consumption (@3V, 1 Hz) Continuous Mode Power Save Mode Super-E Mode	 16 mA 4 mA N/A	 16 mA 3.7 mA N/A	 21 mA 5.3 mA (SPG3.01) 2.7 mA (SPG3.51)	 18 mA (Single GNSS) 35 mA (4 GNSS)
Supply Voltage	1.4 ... 3.6 V	1.4 ... 3.6 V	1.4 ... 3.6 V	1.65 ... 3.6 V
Program memory	ROM or Flash	ROM	ROM or Flash	ROM or Flash or download from host

u-blox M8 FW comparison

Super Efficient Low Power

	SPG3.51	SPG3.01
Highlight	Low power receiver	Multi-purpose receiver
Products	IC, ZOE	IC, ZOE, EVA & Modules
USB, Time Pulse	N/A	✓
Data logging, Geofencing, odometer	✓	✓
Continuous Mode Tracking sensitivity Cold start Max. update rate (2 concurrent GNSS) Tracking current	✓ -167 dBm -148 dBm Up to 10 Hz 21 mA@3.0V, 1 Hz	✓ (Default) -167 dBm -148 dBm Up to 10 Hz 21 mA@3.0V, 1 Hz
Super-E mode Tracking sensitivity Cold start Max. update rate (2 concurrent GNSS) Tracking current	✓ (Default) -160 dBm -148 dBm Up to 4 Hz 2.7 mA@3.0V, 1 Hz	N/A
Data batching	✓	N/A
LNA power saving (tracking)	✓	N/A

u-blox M8 SiP module portfolio selector

	EVA-8M	EVA-M8M/Q	ZOE-M8G/Q	ZOE-M8B
Application requirements	Most economical choice	High performance	Smallest size & high performance	Smallest size and lowest power
FW version	SPG3.01	SPG3.01	SPG3.01	SPG3.51
Application examples	Industrial vehicle & asset tracking	Fleet management, high end vehicle tracking	OBD dongles, UAVs, industrial trackers	Tag trackers, sport & fitness, personal trackers, battery powered trackers
Key highlights	• u-blox 8 economical • Xtal	• u-blox M8 performance • Xtal or TCXO	• 1.8V or 3V supply • SAW/LNA • TCXO	• 1.8V supply • Super-E mode • Batching mode • SAW/LNA •TCXO

Product Roadmap

GNSS SiP modules

EVA

7.0 x 7.0 mm

ZOE

4.5 x 4.5 x 1.1 mm

		2018	2019	2020
EVA	ROM V3 / EVA-M8M	• u-blox M8 platform • Crystal • Flash or ROM		
	EVA-M8Q	• u-blox M8 platform • TCXO • Flash or ROM		
	ROM V3 / EVA-8M	• u-blox 8 platform • Crystal • ROM		
ZOE	ROM V3 / ZOE-M8G	• u-blox M8 platform • TCXO,1.8V • SAW/LNA integrated		
	ZOE-M8Q	• u-blox M8 platform • TCXO,3V • SAW/LNA integrated		
	ROM V3 / ZOE-M8B	• u-blox M8 platform • **Super-E low power mode** • TCXO,1.8V, SAW, LNA		

Production | Development | In definition | Considered | Eng. Samples | Start of Production

Product Roadmap

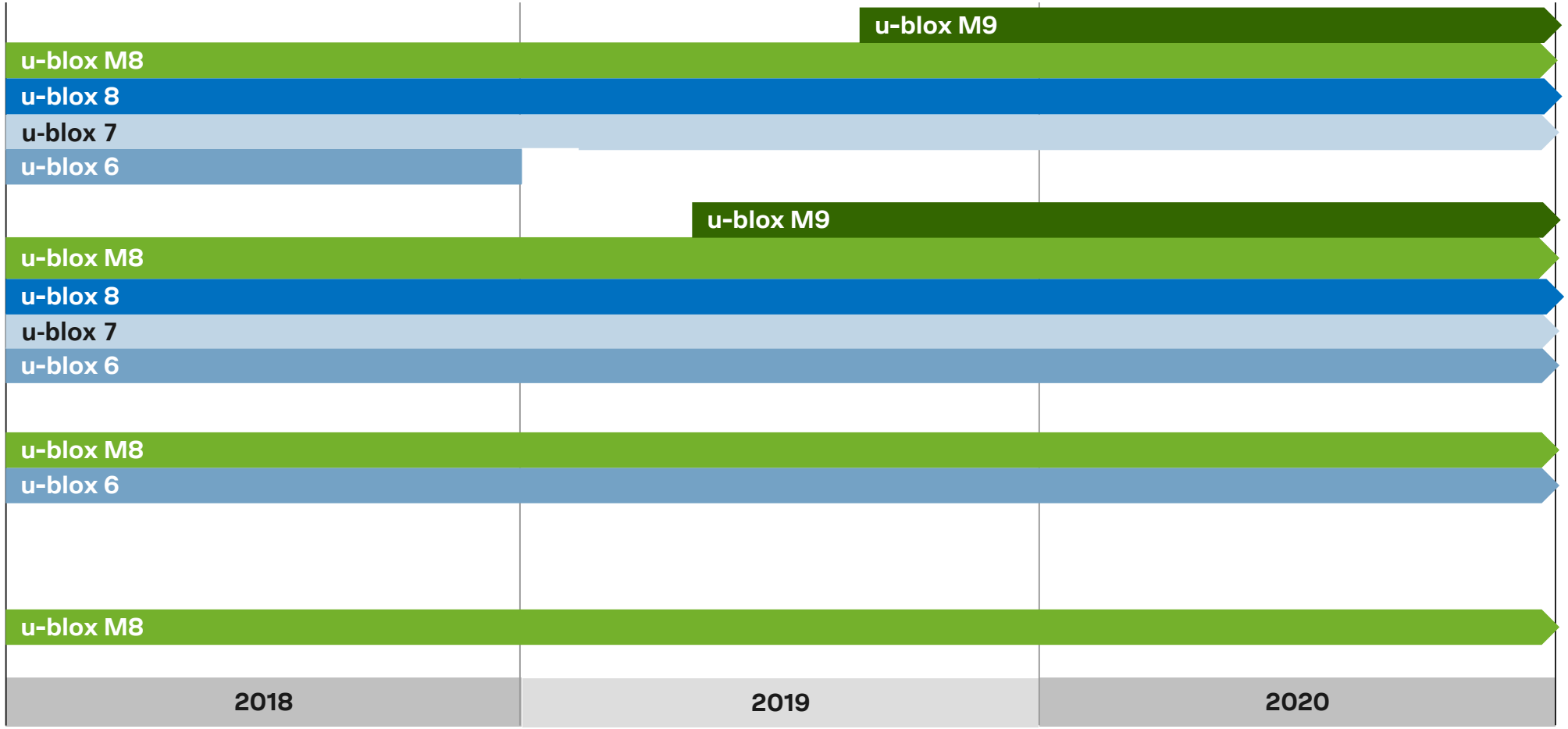
GNSS LCC modules

MAX (9.7 x 10.1 mm)

NEO (12 x 16 mm)

LEA (17 x 22 mm)

(15.5 x 15.5 mm)



Production | Development | In definition | Considered | Eng. Samples | Start of Production

Product Roadmap

GNSS LCC modules – professional grade

MAX

9.7 x 10.1 mm

ROM V3 / **MAX-M8C**
- u-blox M8 platform
- 3 V, Crystal
- ROM only

ROM V3 / **MAX-8C**
- u-blox 8 platform
- 3 V, Crystal
- ROM only

ROM V3 / **MAX-M8Q**
- u-blox M8 platform
- 3 V, TCXO
- ROM only

MAX-M9Q (Q3/19 △, Q4/19 ▲)
- u-blox M9 platform
- 3 V, TCXO
- ROM only

ROM V3 / **MAX-8Q**
- u-blox 8 platform
- 3 V, TCXO
- ROM only

ROM V3 / **MAX-M8W**
- u-blox M8 platform
- 3 V, TCXO
- Onboard short circuit detect/protection
- ROM only

MAX-M9S
- u-blox M9 platform
- 3 V, TCXO, SAW, LNA
- ROM only

2018 | 2019 | 2020

Production | Development | In definition | Considered | △ Eng. Samples | ▲ Start of Production

Product Roadmap

GNSS LCC modules – professional grade

NEO

12 x 16 mm

ROM V3
NEO-M8M
- u-blox M8 platform
- 1.8V or 3V, Crystal
- ROM only

ROM V3
NEO-M8Q
- u-blox M8 platform
- 3 V, TCXO
- SAW, LNA
- ROM only

ROM V3
NEO-8Q
- u-blox 8 platform
- 3 V, TCXO
- SAW, LNA
- ROM only

For upgradability

FW V3
NEO-M8N
- u-blox M8 platform
- 3 V, TCXO
- SAW, LNA
- Flash

NEO-M9N
Q2/19 (Eng. Samples)
Q3/19 (Start of Production)
- u-blox M9 platform
- 3 V, TCXO
- SAW, LNA
- Flash or host download

2018 | 2019 | 2020

Production | Development | In definition | Considered | Eng. Samples | Start of Production

Product Roadmap

GNSS LCC modules – professional grade

LEA

17 x 22 mm

ROM V3

LEA-M8S

- u-blox M8 platform
- 3V, TCXO
- ROM only

2018 | **2019** | **2020**

Production | Development | In definition | Considered | Eng. Samples | Start of Production

Product Roadmap

GNSS Antenna modules – professional grade

CAM

9.6 x 14mm

SAM

15.5 x 15.5 mm

ROM V3

CAM-M8C

- u-blox M8 platform
- 3V, Crystal
- ROM only

ROM V3

CAM-M8Q

- u-blox M8 platform
- 3V, TCXO
- ROM only

ROM V3

SAM-M8Q

- u-blox M8 platform
- SMD Antenna variant
- TCXO, SAW, LNA
- ROM only

2018 | **2019** | **2020**

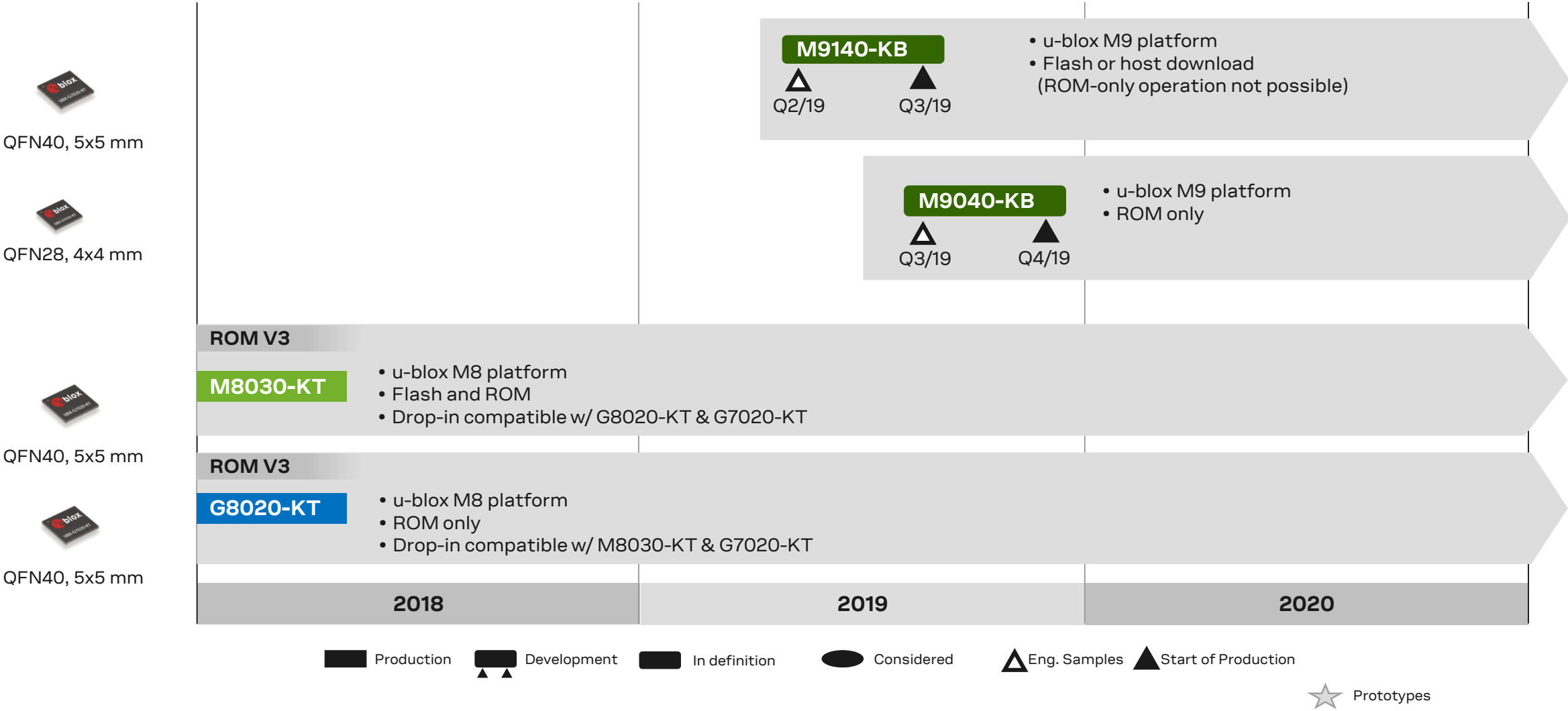
Production | Development | In definition | Considered | Eng. Samples | Start of Production

u-blox 8/M8 chip portfolio selector

	M8030-KT / G8020-KT	M8030-CT	M8230-CT
Highlights	• Perfect for industrial applications • - 40°C / +85°C	• Small form factor for tight integration • - 40°C / +85°C	• Lowest power (Super-E mode) • Small form factor for tight integration • - 40°C / +85°C
FW version	FW3.01	FW3.01	FW3.51
Size (pitch)	5x5mm (0.4mm)	3x3.21mm (0.4mm)	3x3.21mm (0.4mm)
Variants	XTAL / TCXO	XTAL / TCXO	TCXO
u-blox Grade	Professional	Standard	Standard
Dominant market	Industrial	Consumer	Low power consumer

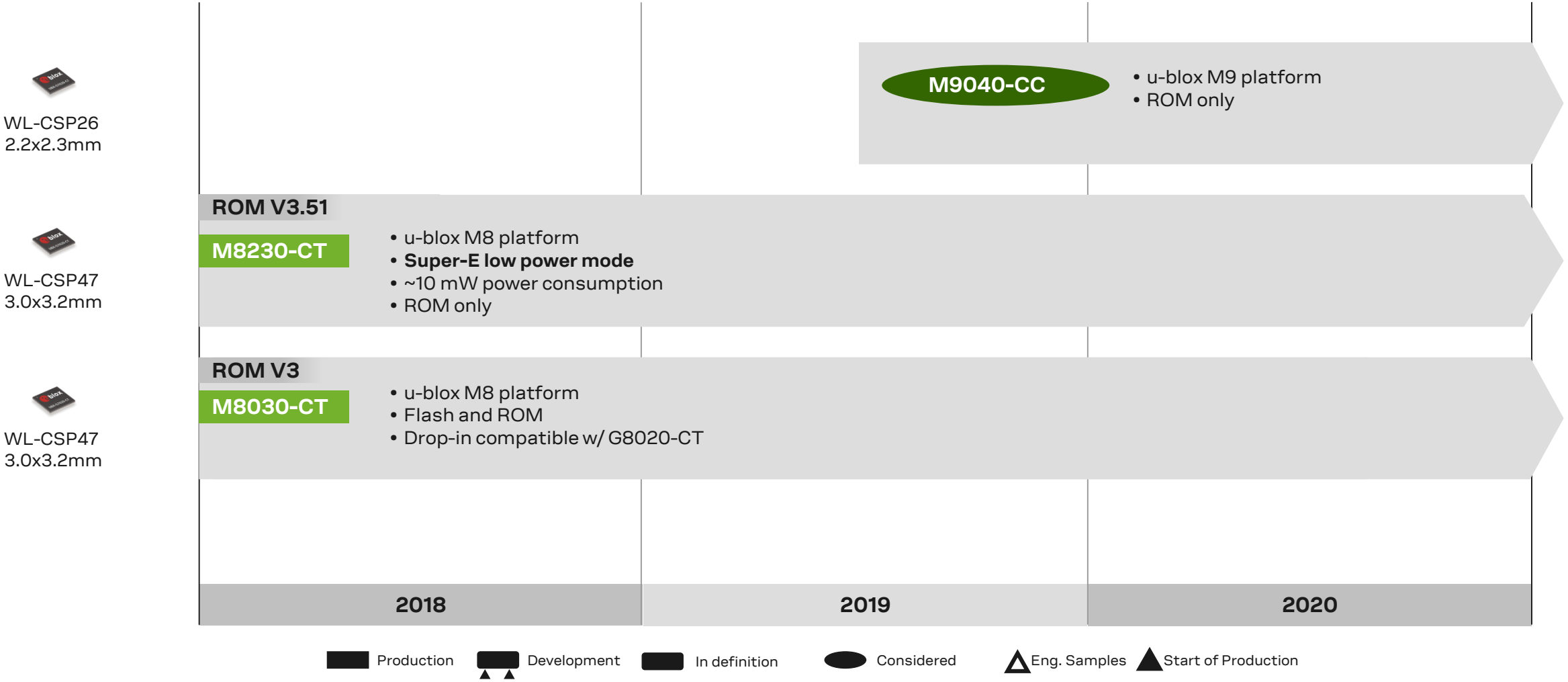
Product Roadmap

GNSS chips – professional grade



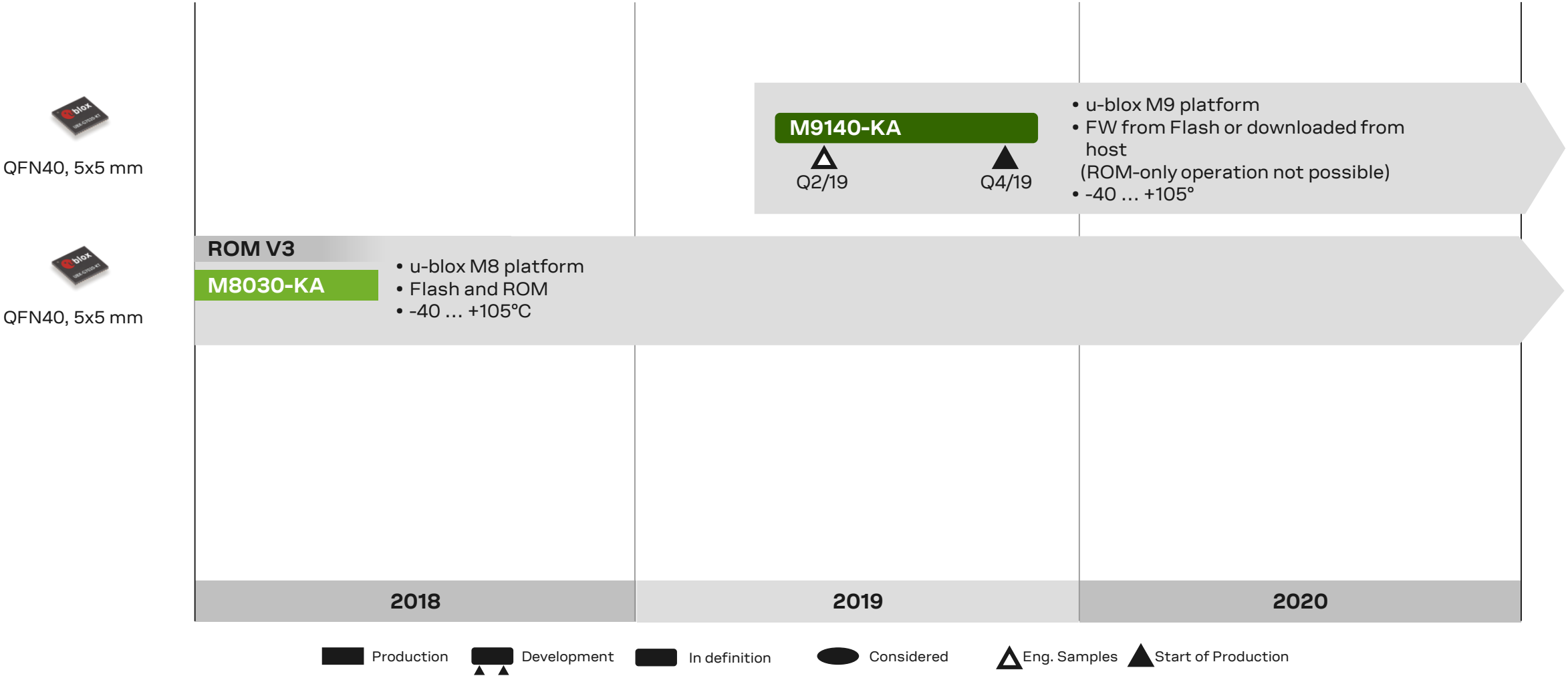
Product Roadmap

GNSS chips – standard grade



Product Roadmap

GNSS chips – automotive grade




High Precision
GNSS

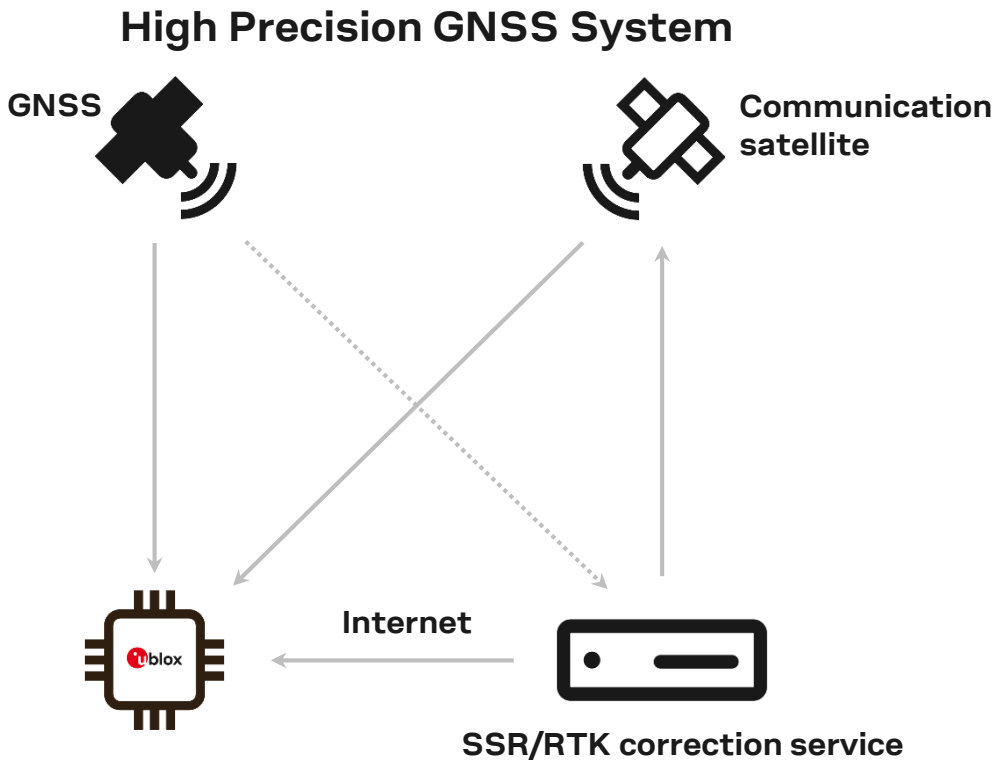
High Precision GNSS system overview

Standard Precision GNSS system consists of:

- Multi-band, multi-constellation GNSS receiver
- Enables meter-level performance with SBAS

High Precision GNSS system consists of:

- Multi-band, multi-constellation GNSS receiver
- GNSS correction service
- Internet connection / L-band receiver
- Enables centimeter-level performance



u-blox High Precision GNSS platforms

	u-blox M8	u-blox F9
Target application	High Precision Navigation, Attitude Alignment	High Precision Navigation, UAV, UGV, Heavy Machinery Navigation.
Receiver Type	Multi constellation: 2 GNSS concurrently	Multi constellation: 4 GNSS concurrently
GNSS supported	GPS, GLONASS, BeiDou	GPS, QZSS, GLONASS, BeiDou, Galileo, SBAS
Bands supported	Single-band (L1)	Multi-band (L1, L2, L5)
Accuracy	<2.0m (CEP68) <0.03m (CEP68) w/ RTCM 3.x	<1.5m (CEP68) <1.0m (CEP68) w/ SBAS <0.2m (CEP68) w/ SSR <0.03m (CEP68) w/ RTCM 3.x
Corrections	OSR	SBAS, SSR, OSR
Update rate	Up to 8 Hz	Up to 20 Hz
Safety features	No	No
Security features	Yes	Yes

Product Roadmap

Professional grade high precision modules

NEO

12 x 16 mm

FW V3.01 HPG1.40

NEO-M8P-0

- u-blox M8 platform
- RTK L1 rover
- Sub-decimeter level accuracy
- RTCM v3 correction data input

FW V3.01 HPG1.40

NEO-M8P-2

- u-blox M8 platform
- Features as NEO-M8P-0, with base station capabilities
- RTCM v3 correction data output
- Survey-in functionality

2019	2019	2020

Production | Development | In definition | Considered | Eng. Samples | Start of Production

Product Roadmap

Professional grade high precision modules

ZED

17 x 22 mm

Ver. 00 | **Ver. 01** | **Ver. 10**

ZED-F9P

7/18 — 11/18

- u-blox F9 platform
- Multi-band RTK
- GPS, Galileo, GLONASS, BeiDou

ZED-F9N

- u-blox F9 platform
- L1+L5/IRNSS GNSS
- SBAS, Sapcorda Basic

2018 | **2019** | **2020**

Production | Development | In definition | Considered | Eng. Samples | Start of Production

ZED-F9P firmware overview

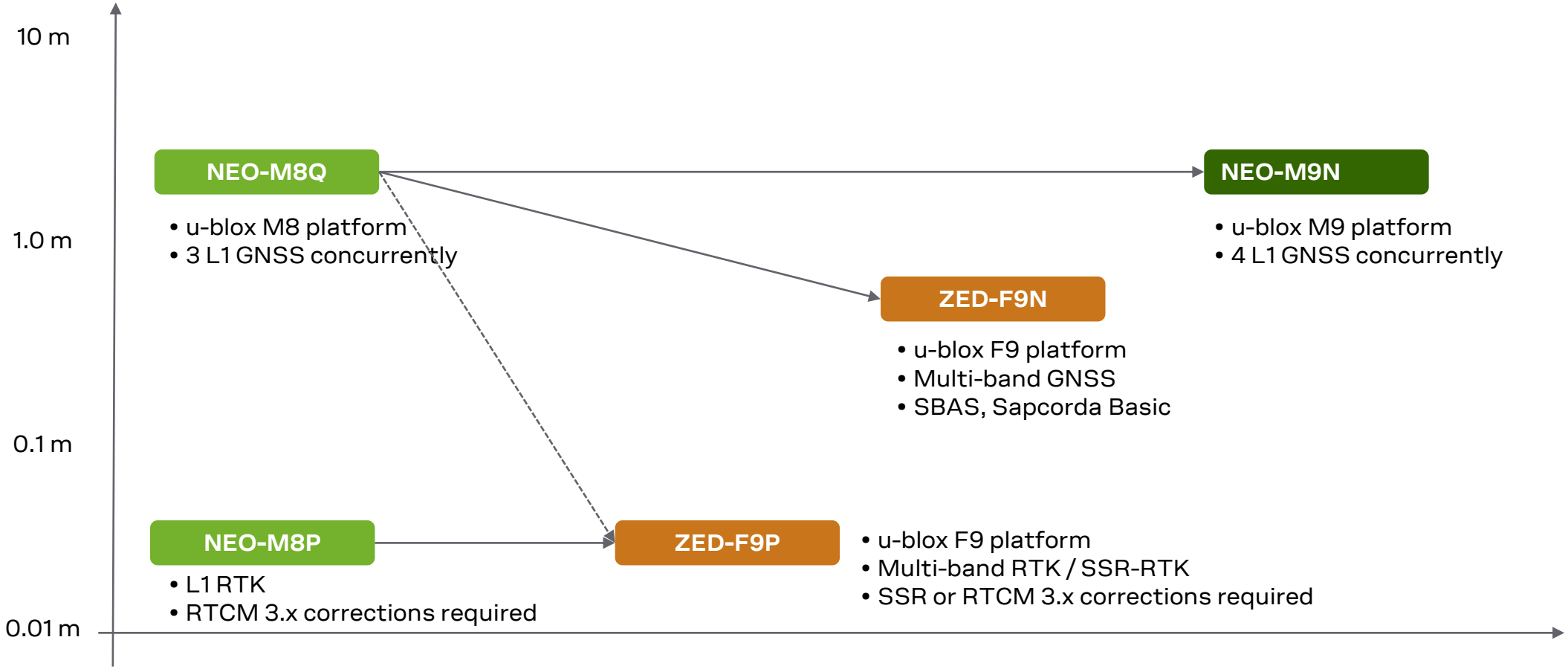
Version	Schedule	Planned new features

00	ES1: 07/2018 *
	ES2: 09/2018
	IP: 11/2018
		• Multi-band RTK
		• Band option A: GPS, Galileo, GLONASS, BeiDou
		• Correction service support:
		  • RTCM 3.x
		  • Base / rover setup
		• RAW multi-band, multi-constellation GNSS output

01	Q1/2019	• Firmware upgrade adding SSR support
10	Q2/2020	• New version for band option B: GPS, Galileo, GLONASS, BeiDou, NAVIC (not replacing version 01)

* Preliminary HW FW feature complete.

Module migration path to high precision GNSS



DR: Dead Reckoning

u-blox Dead Reckoning

100% positioning coverage in tunnel and urban canyons

DR brings GNSS ‘clear-sky’ accuracy to the city thanks to

- u-blox multi-GNSS technology fused with
- gyro, accelerometer and wheel-tick measurements

u-blox Dead Reckoning comes in two flavors:

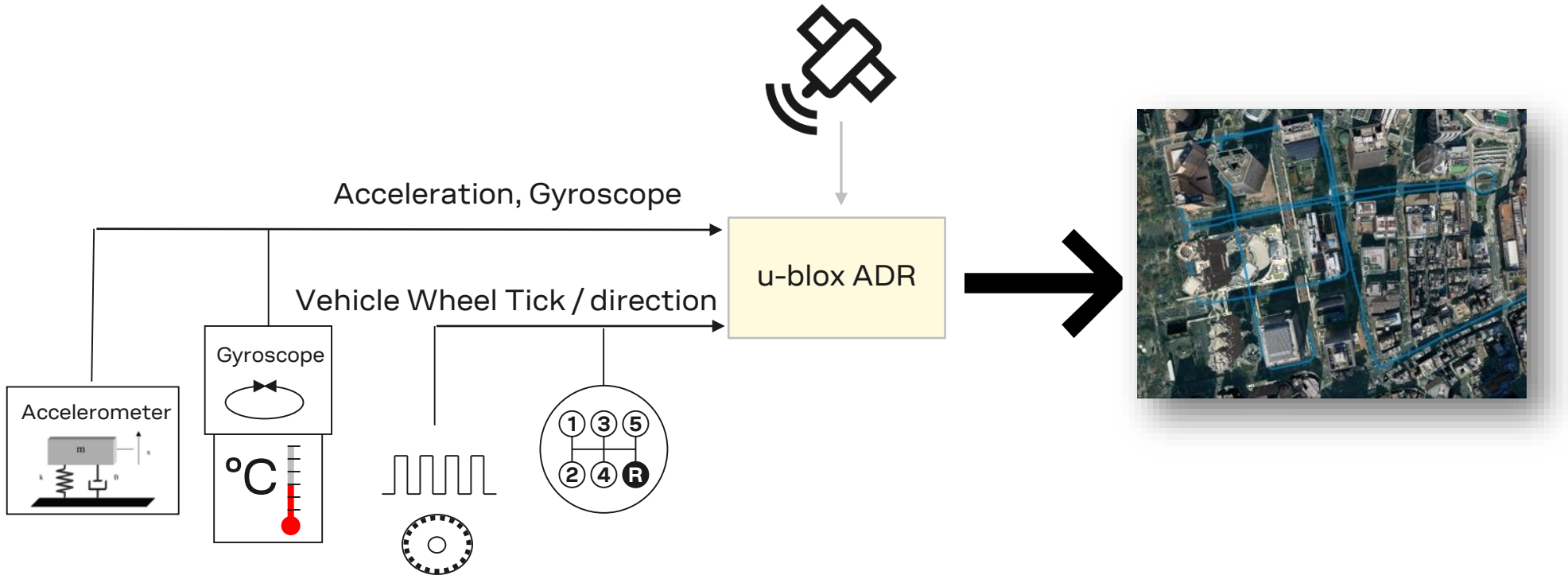
1. ADR: navigation for application with access to vehicle data
   ☞ Ideal for first mount
2. UDR: navigation for application without access to vehicle data
   ☞ Ideal for aftermarket

u-blox GNSS platforms with Dead Reckoning

	u-blox M8/M9	u-blox F9
Target application	Navigation, Telematics, Aftermarket	High Precision Navigation, Augmented Reality, V2X, ADAS, etc.
Accuracy	<2.0m (CEP68) <1.5m (CEP68) w/ SBAS	<1.5m (CEP68) <1.0m (CEP68) w/ SBAS <0.2m (CEP68) w/ SSR <0.03m (CEP68) w/ RTCM 3.x
Bands supported	Single-band (L1)	Multi-band (L1, L2, L5)
Corrections	SBAS, QZSS, SLAS	SBAS, SSR, OSR
Variants	ADR, UDR	ADR
Safety features	No	No
Security features	Yes	Yes

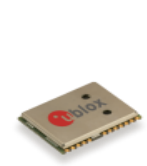
u-blox Automotive Dead Reckoning

- Dead reckoning calculates position with sensor inputs and GNSS, even if GNSS signal is lost or degraded
- Combined with high precision GNSS we get down to centimeter-level accuracies, also in urban environments



Product Roadmap

Professional grade Dead Reckoning



12 x 16 mm

ADR 4.20

NEO-M8L

- ADR with UDR fallback
- Onboard sensors
- HNR 30Hz real time navigation

ADR 5.10

NEO-M9L

- ADR with UDR fallback
- Onboard sensors
- 4 GNSS concurrently
- HNR 50Hz real time navigation

12 x 16 mm

UDR 1.20

NEO-M8U

- UDR
- Onboard sensors
- HNR 30Hz real time navigation

UDR 2.10

NEO-M9U

- UDR
- Onboard sensors
- 4 GNSS concurrently
- HNR 50Hz real time navigation

7 x 7 mm

UDR 1.20

EVA-M8E

- UDR
- HNR 30Hz real time navigation

2018 | **2019** | **2020**

Production | Development | In definition | Considered | Eng. Samples | Start of Production

Product Roadmap

Automotive grade Dead Reckoning modules

NEO

12 x 16 mm

ZED

LGA, 17 x 22mm

ADR 4.20

NEO-M8L

- u-blox M8 platform
- **L1 ADR with UDR fallback (<1.5m 1-sigma)**
- Onboard sensors
- HNR 30Hz real time navigation

ADR 5.10

NEO-M9L

- u-blox M9 platform with 4 GNSS concurrently
- **L1 ADR with UDR fallback (<1.5m 1-sigma)**
- Onboard sensors
- HNR 50Hz real time navigation
- 85°C, optionally 105°C

ADR 4.20

ZED-M8L

Q2/18

- u-blox M8 platform
- **L1 ADR with UDR fallback (<1.5m 1-sigma)**
- Onboard sensors
- HNR 30Hz real time navigation

ADR 5.00

ZED-F9L

- u-blox F9 platform
- **Multi-band GNSS with ADR (<1m 1-sigma)**
- No correction service required
- Multi-band GPS, Galileo, GLONASS, BeiDou, IRNSS (option B)
- Onboard sensors
- HNR 30Hz real time navigation
- 85°C, optionally 105°C

Ver 00

ZED-F9K

Q2/19 Q3/19

Ver 10

- u-blox F9 platform
- **RTK/SSR-RTK with ADR (<0.2m 1-sigma)**
- Multi-band GPS, Galileo, GLONASS, BeiDou (
- On-board sensors
- HNR 30Hz real time navigation
- 85°C, optionally 105°C

2018 **2019** **2020**

Production Development In definition Considered Eng. Samples Start of Production

ADR/UDR version overview

Dead Reckoning FW Roadmap

ADR Release	Products	Schedule	Planned new features
ADR 4.20	NEO-M8L	Q2/2018	• ADR with UDR fallback: resilient to loss of wheel tick data • User configurable reference point for different V2X standards • Vehicle pitch rate update at 10Hz with better accuracy • Support for SLAS correction data of QZSS system (Japan)
ADR 5.00	ZED-F9L	Q2/2019	• ADR with UDR fallback: resilient to loss of wheel tick data • Band option A: GPS, Galileo, GLONASS, BeiDou • No correction service required
ADR 5.10	NEO-M9L	Q4/2019	• L1 all-in-view GNSS • ADR with UDR fallback: resilient to loss of wheel tick data

UDR Release	Products	Schedule	Planned new features
UDR 1.20	NEO-M8U EVA-M8E	Q2/2018	• Improved accuracy in urban canyons • Motor bike support
UDR 2.10	NEO-M9U	Q4/2019	• L1 all-in-view GNSS

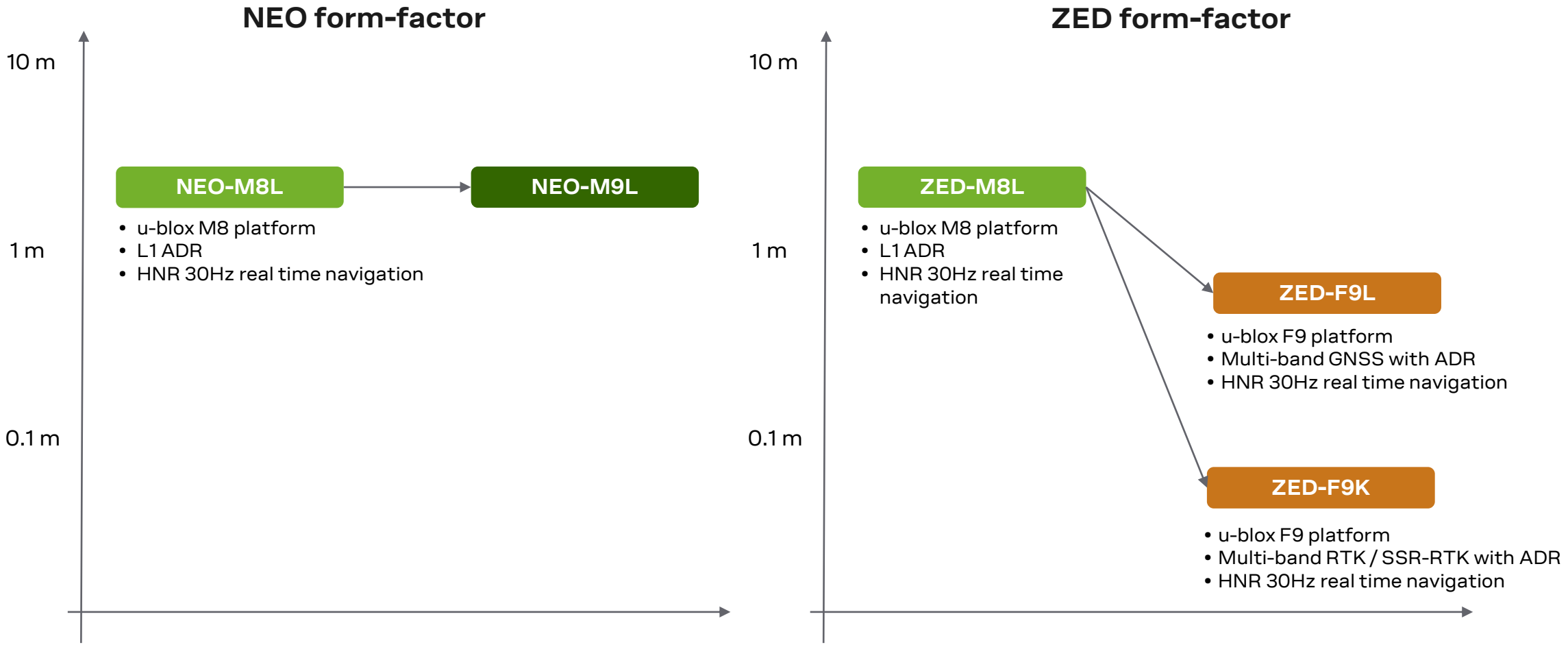
ZED-F9K version overview

Version	Schedule	Planned new features

00	Q2/2019	• Multi-band RTK / SSR-RTK with ADR
		• Band option A: GPS, Galileo, GLONASS, BeiDou
		• Correction service support:
		  • RTCM 3.x
		  • SSR

10	Q2/2020	• New version for band option B: GPS, Galileo, GLONASS, BeiDou, NAVIC (not replacing version 00)

Dead Reckoning module migration path



Timing

Product Roadmap Timing modules

NEO

12 x 16 mm

LEA

17 x 22 mm

ZED

LGA, 17 x 22mm

LEA

17 x 22 mm

TIM 1.10

NEO-M8T

- Multi-GNSS Timing
- <20ns accuracy

TIM 1.10

LEA-M8T

- Multi-GNSS Timing

Ver 00 **Ver 10**

ZED-F9T

Q1/19 Q2/19

- Multi-band timing
- <5ns accuracy

FTS 1.02

LEA-M8F

- Time and frequency synchronization

2018 **2019** **2020**

Production Development In definition Considered Eng. Samples Start of Production

Timing modules version overview

Version	Products	Schedule	Planned new features
TIM 1.10	NEO-M8T LEA-M8T	Current	• Multi-GNSS timing
00	ZED-F9T	Q1/2019	• Multi-band, high-integrity timing • Highest accuracy timing • Band option A: GPS, Galileo, GLONASS, BeiDou
10	ZED-F9T	Q2/2020	• New version for band option B: GPS, Galileo, GLONASS, BeiDou, NAVIC (not replacing TIM2.00)

Long-term availability

NEO (12 x 16 mm)

LEA (17 x 22 mm)

ZED (17 X 22 mm)

LEA (17 x 22 mm)

PPS Timing

NEO-M8T Multi-GNSS, Galileo

NEO-6T GPS

LEA-M8T Multi-GNSS, Galileo

LEA-6T GPS

Advanced Timing

ZED-F9T

Frequency & Time Synchronization

LEA-M8F Multi-GNSS

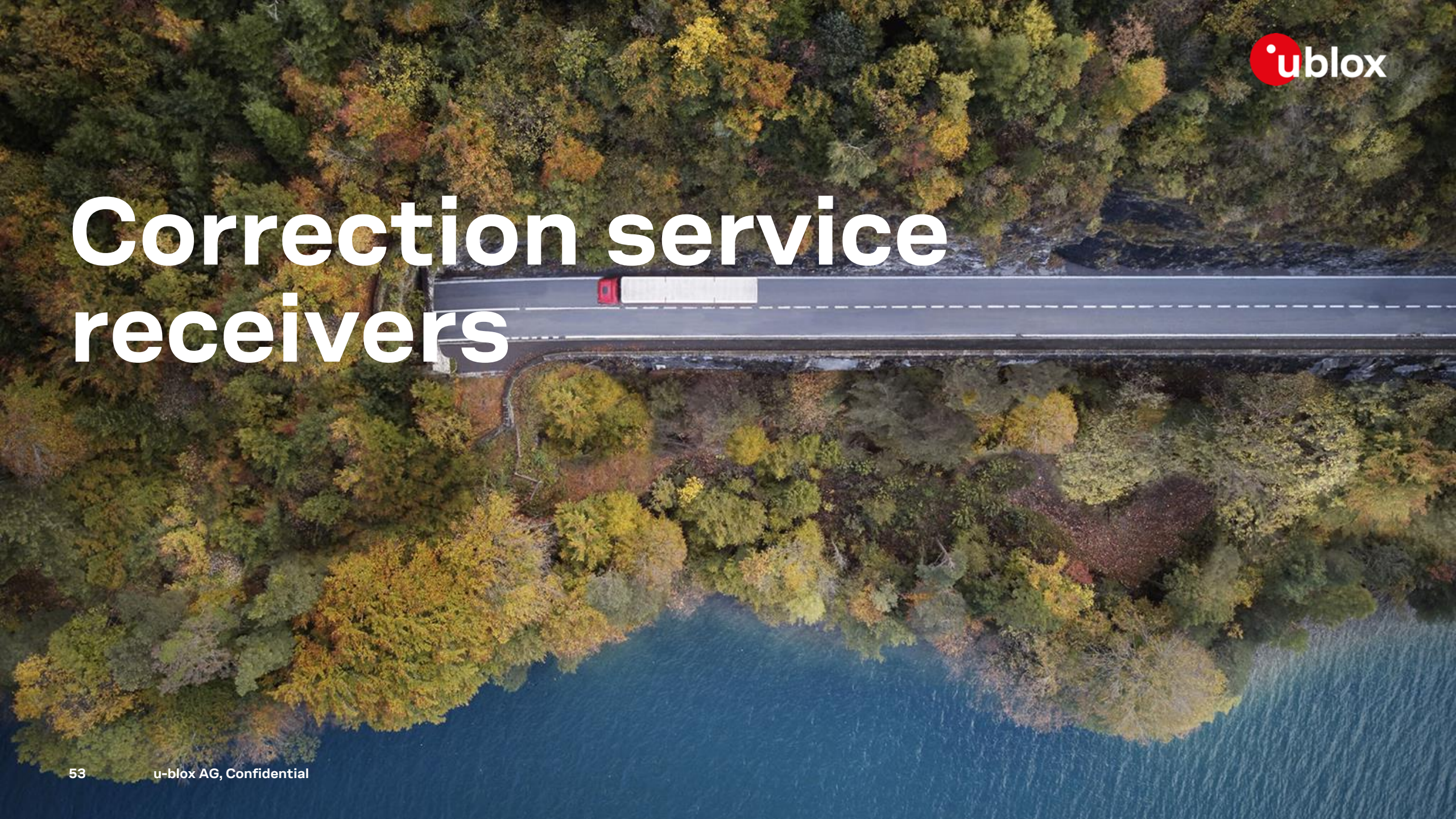
2019 | 2020 | 2021 | 2022 | 2023 | 2024

△ EOL Notification (Earliest date)

▲ Last time buy (Earliest date)

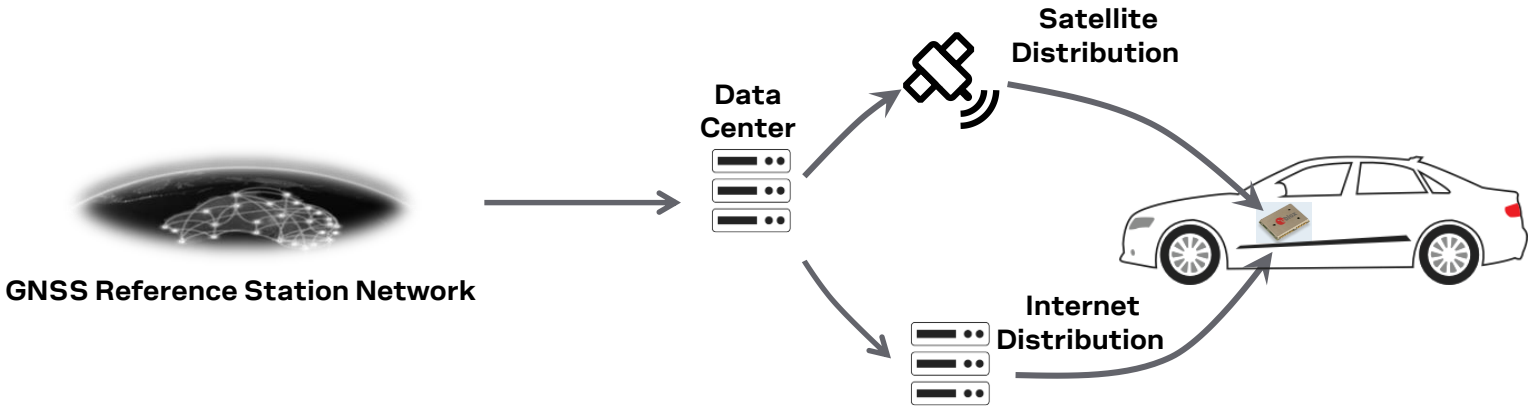
▲ Last Shipment Date (Earliest date)

Correction service receivers



Correction services

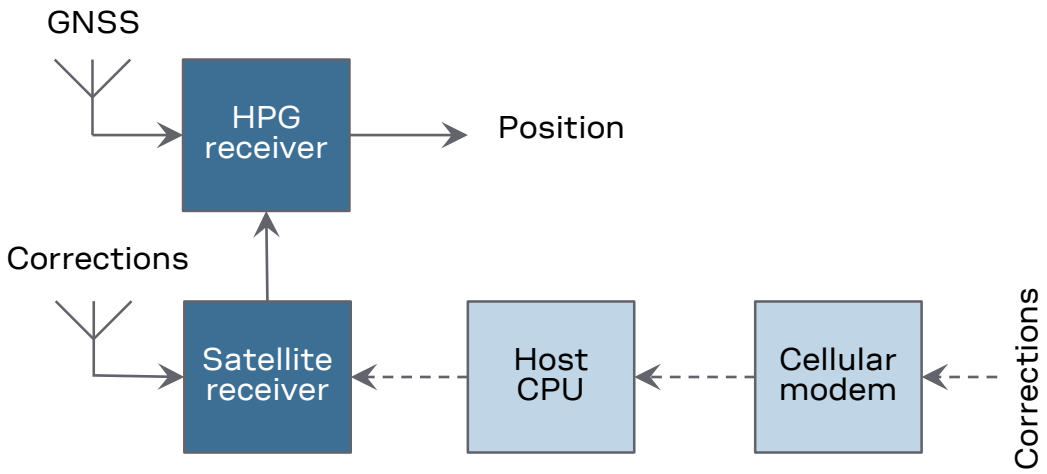
- A correction service is required to achieve dm-level accuracy or better
- Corrections needs to be continuously available with minimal outages



- For navigation applications, this is typically ensured by two complementary distribution channels:
  - Satellite distribution
  - Internet distribution
- Dedicated hardware is required for satellite distribution

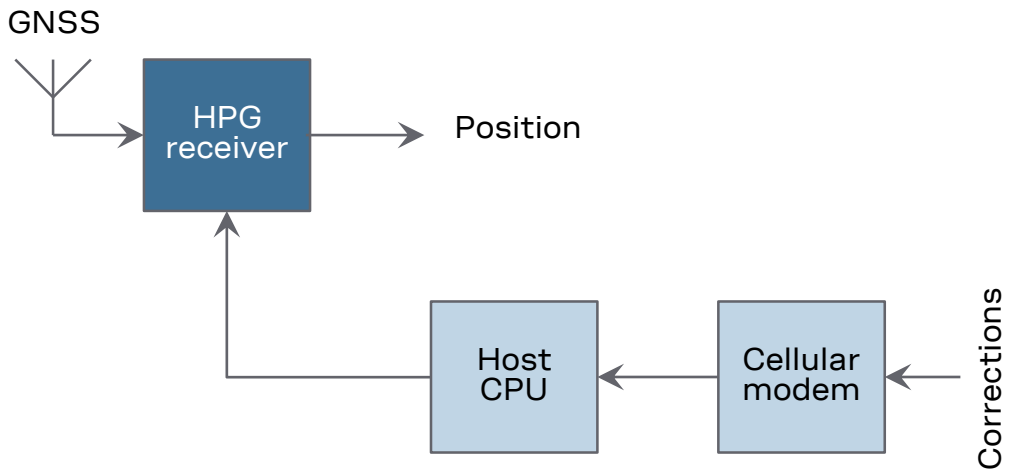
Correction service receivers

With satellite distribution



- Correction data delivered via satellite and optionally via internet
  - Correction streams merged in satellite receiver
- Service license is managed satellite receiver
- HPG receiver process GNSS signal and corrections

Internet distribution only



- Correction data are delivered via internet only
- Service license is managed on host CPU
- HPG receiver process GNSS signal and corrections

Product Roadmap

Professional grade correction receiver modules

NEO

12 x 16 mm

NEO-D9S-00B

Q2/19 — Q3/19

- Inmarsat (Sapcorda) differential corrections (SSR)
- With SAW/LNA, Flash
- **Professional Grade**

NEO-D9S-00A

- Inmarsat (Sapcorda) differential corrections (SSR)
- With SAW/LNA, Flash
- -40°C to 105°C
- **Automotive Grade**

NEO-D9C-00B

Q2/19 — Q3/19

- QZSS CLAS differential correction (SSR)
- With SAW/LNA, Flash
- **Professional Grade**

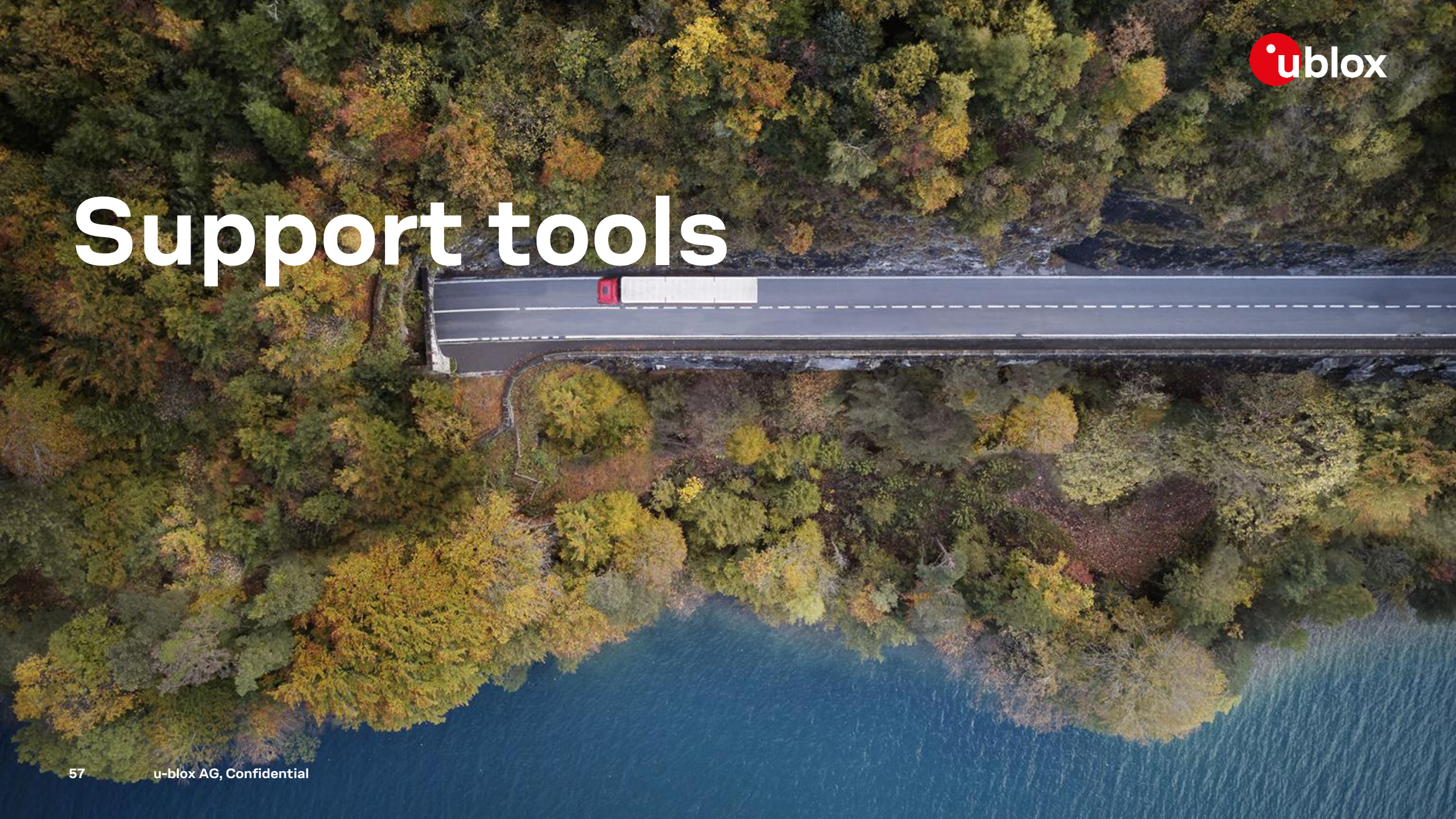
NEO-D9C-00A

- QZSS CLAS differential correction (SSR)
- With SAW/LNA, Flash
- -40°C to 105°C
- **Automotive Grade**

2018 | 2019 | 2020

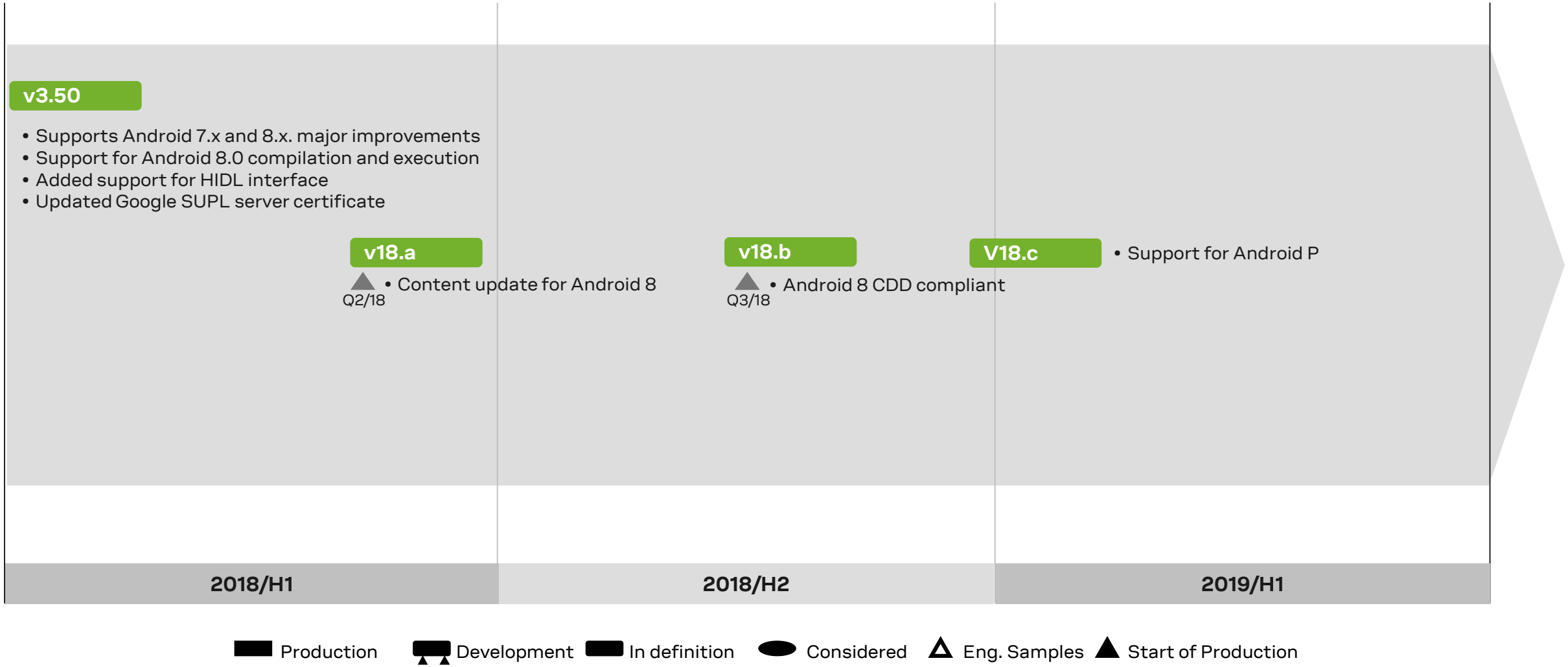
Production | Development | In definition | Considered | Eng. Samples | Start of Production

Support tools



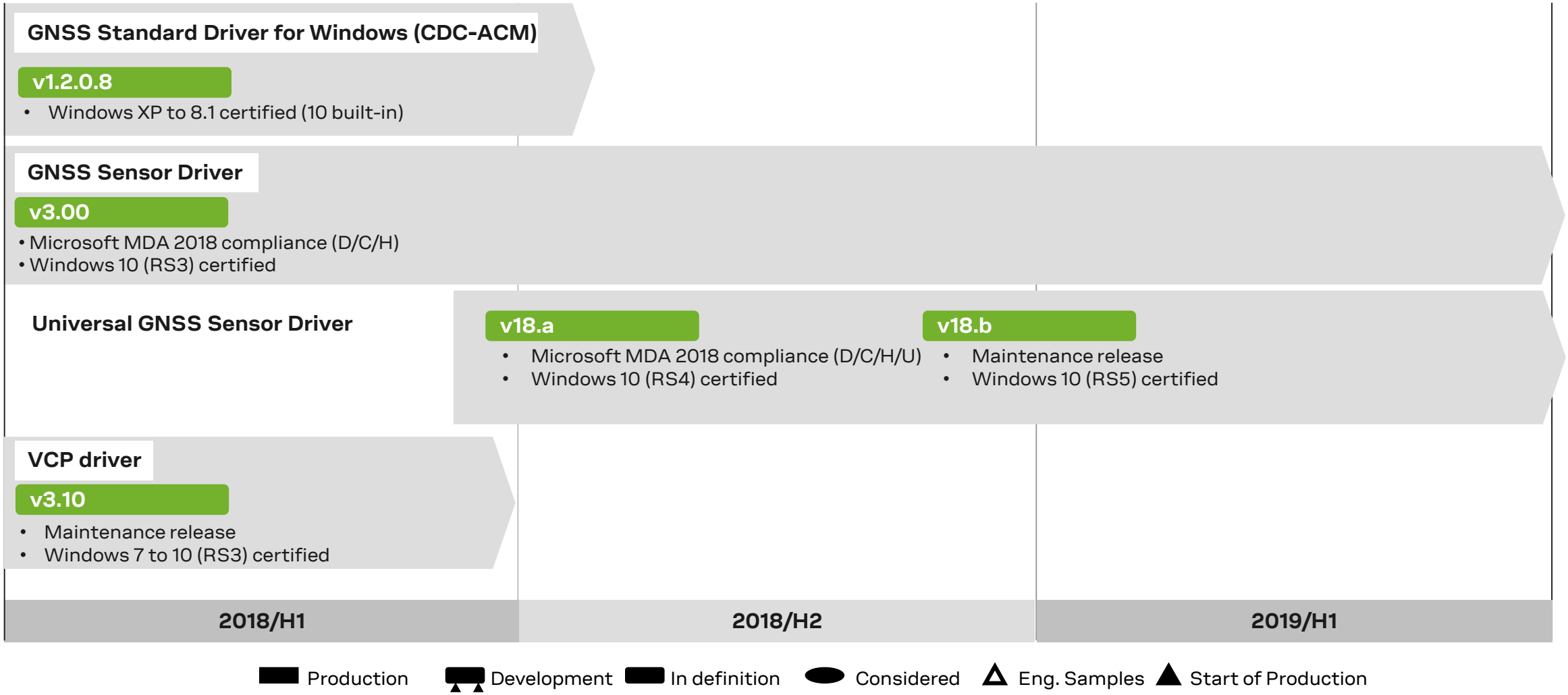
Product Roadmap

Android drivers



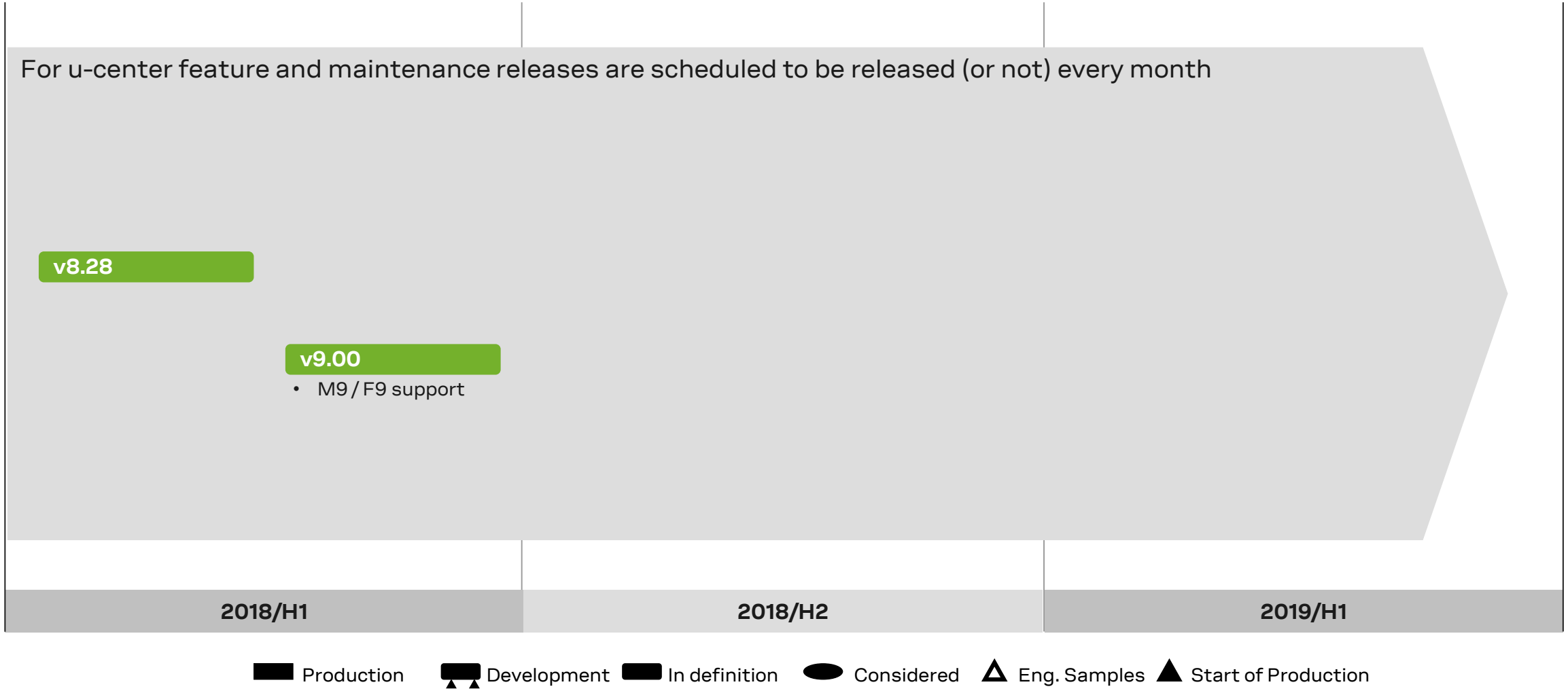
Product Roadmap

Windows deliverables



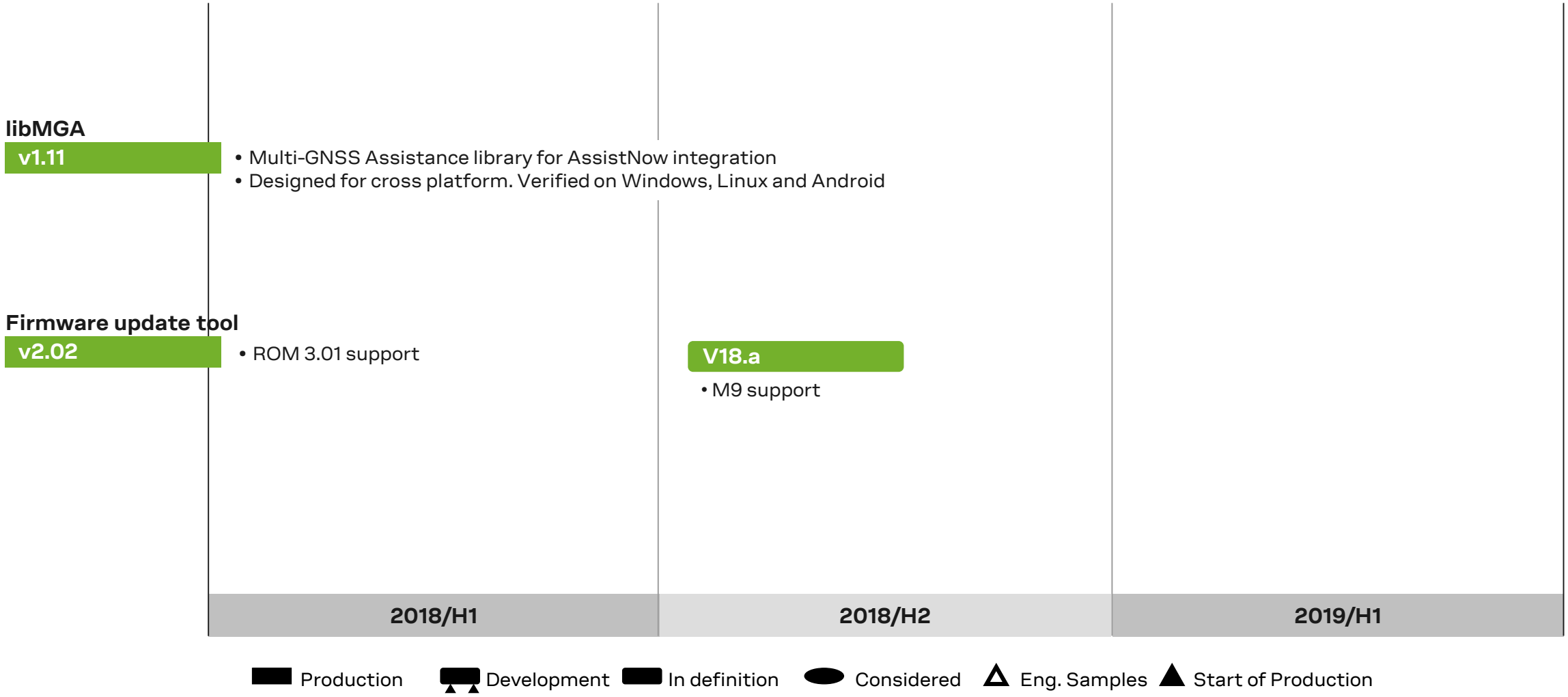
Product Roadmap

u-center (Windows)



Product Roadmap

Supporting tools (SW)



Line Card

GNSS chips

Model	Package	Category				GNSS					Interfaces				Features							Grade		
	Package	Standard Precision GNSS	High Precision GNSS	Dead Reckoning	Timing	GPS / QZSS	GLONASS	Galileo	BeiDou	Number of Concurrent GNSS	UART	USB	SPI	DDC (I²C compliant)	Programmable (Flash)	Data logging	Data batching	RTC crystal	Oscillator	Antenna supply and supervisor	Timepulse	Standard	Professional	Automotive
Standard Precision GNSS chips																								
UBX-M8230-CT	WL-CSP47	•				•	•	c	•	3	•		•	•		S	•	S	T			•		
UBX-M8030-CT	WL-CSP47	•				•	•	•	•	3	•	•	•	•	S	S		S	C/T	S	2	•		
UBX-M8030-KT	QFN40	•				•	•	•	•	3	•	•	•	•	S	S		S	C/T	S	2		•	
UBX-M8030-KA*	QFN40	•				•	•	•	•	3	•	•	•	•	S	S		S	C/T	S	2			•
UBX-G8020-KT	QFN40	•				•	•			1	•	•	•	•		S		S	C/T	S	2		•	
Dead Reckoning chips																								
UBX-M8030-KT-DR	QFN40			ADR, E		•	•	•	•	3	•	•	•	•	•	•		S	C/T	S	2		•	
UBX-M8030-KA-DR*	QFN40			ADR, E		•	•	•	•	3	•	•	•	•	•	•		S	C/T	S	2			•

* = Operating temperature –40 °C to +105 °C

ADR = Automotive Dead Reckoning
E = External Flash required

c = only supported in continuous mode
S = supported, may require ext. components

T = TCXO supported

C/T = Crystal and TCXO supported

Line Card

High Precision GNSS, DR, Timing modules & SiP

Model	Category				GNSS					Supply			Interfaces				Features																Grade		
	Standard Precision GNSS	High Precision GNSS	Dead Reckoning	Timing	GPS / QZSS	GLONASS	Galileo	BeiDou	Number of Concurrent GNSS	1.65 V – 3.6 V	2.7 V – 3.6 V	3.0 V – 3.6 V	UART	USB	SPI	DDC (I²C compliant)	Programmable (Flash)	Data logging	Carrier phase output	Additional SAW	Additional LNA	RTC crystal	Oscillator	Built-in antenna	RTK rover	Moving Baseline support	Base station with survey-in	Built-in sensor	Timepulse	Frequency output		Standard	Professional	Automotive
High Precision GNSS modules																																		
NEO-M8P-0		•			•	•		•	2		•		•	•	•	•	•	•	•	•	•	•	T		•	•			1			•	
NEO-M8P-2		•			•	•		•	2		•		•	•	•	•	•	•	•	•	•	•	T		•	•	•		1			•	
ADR/UDR SiPs and modules																																		
EVA-M8E			UDR		•	•	•	•	3		•		•	•	•	•	E	E				o	T						1			•	
NEO-M8L-0			ADR		•	•	•	•	3		•		•	•	•	•	•	•				•	C					•	1			•	
NEO-M8L-03A			ADR		•	•	•	•	3			•	•	•	•	•	•	•				•	T					•	1				•
NEO-M8U			UDR		•	•	•	•	3		•		•	•	•	•	•	•				•	C					•	1			•	
Timing modules																																		
NEO-M8T				•	•	•	•	•	3		•		•	•	•	•	•	•	•	•	•	•	T						2			•	
LEA-M8T				•	•	•	•	•	3		•		•	•	•	•	•	•	•	•		•	T						2			•	
LEA-M8F				•	•	•		•	2			•	•	•	•	•	•			•	•		V						1	•		•	

ADR = Automotive Dead Reckoning UDR = Untethered Dead Reckoning E = External Flash required o = Optional or requires external components C = Crystal T = TCXO V = VCTCXO

Line Card

Standard Precision GNSS SiPs & modules

Model	Category				GNSS					Supply			Interfaces				Features										Grade		
	Standard Precision GNSS	High Precision GNSS	Dead Reckoning	Timing	GPS / QZSS	GLONASS	Galileo	BeiDou	Number of Concurrent GNSS	1.71 V – 1.89 V	1.65 V – 3.6 V	2.7 V – 3.6 V	UART	USB	SPI	DDC (I²C compliant)	Programmable (Flash)	Data logging	Data batching	Additional SAW	Additional LNA	RTC crystal	Oscillator	Built-in antenna supply & supervisor	Timepulse	Standard	Professional	Automotive
Standard Precision GNSS SiPs																												
ZOE-M8B	•				•	•	c	•	3	•			•			•		E	•	•	•	o	T			•		
ZOE-M8G	•				•	•	•	•	3	•			•			•	E	E		•	•	o	T		1	•		
ZOE-M8Q	•				•	•	•	•	3			•	•			•	E	E		•	•	o	T		1	•		
EVA-M8M	•				•	•	•	•	3		•		•	•	•	•	E	E				o	C		1	•		
EVA-M8Q	•				•	•	•	•	3			•	•	•	•	•	E	E				o	T		1	•		
EVA-8M	•				•	•			1		•		•	•	•	•		E				o	C		1	•		
Standard Precision GNSS modules																												
MAX-M8C	•				•	•	•	•	3		•		•			•						♦	C		1	•		
MAX-M8Q	•				•	•	•	•	3			•	•			•						•	T		1	•		
MAX-M8Q-01A *	•				•	•	•	•	3			•	•			•						•	T		1			•
MAX-M8W	•				•	•	•	•	3			•	•			•						•	T	•	1	•		
MAX-8C	•				•	•			1		•		•			•						♦	C		1	•		
MAX-8Q	•				•	•			1			•	•			•						•	T		1	•		

* = Operating temperature -40 °C to +105 °C

c = only supported in continuous mode

E = External Flash Required

o = Optional, or requires external components

♦ = Yes, but with higher backup current

C = Crystal / T = TCXO

Line Card

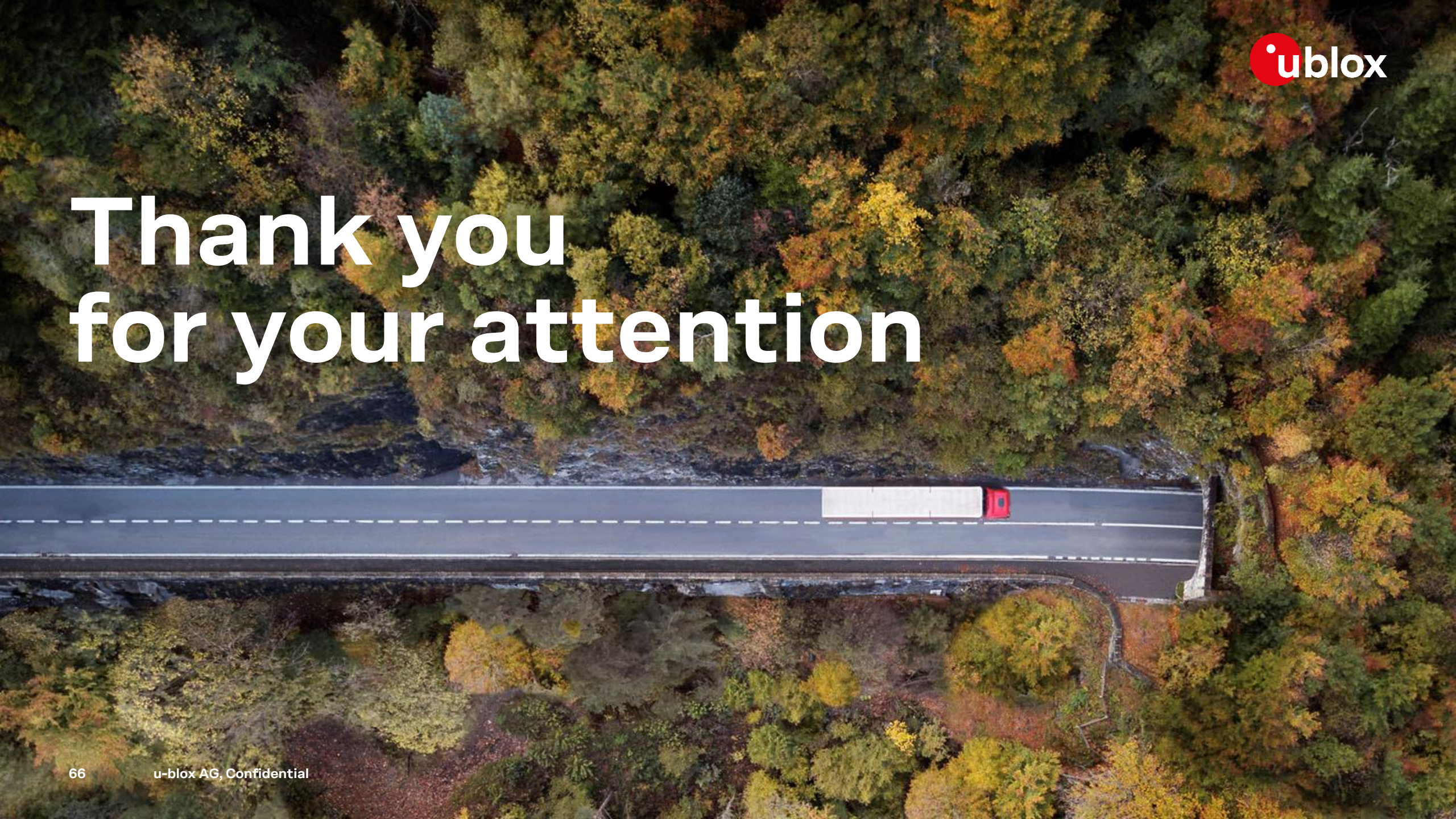
Standard Precision GNSS modules

Model	Category				GNSS					Supply			Interfaces				Features											Grade		
	Standard Precision GNSS	High Precision GNSS	Dead Reckoning	Timing	GPS / QZSS	GLONASS	Galileo	BeiDou	Number of Concurrent GNSS	1.71 V – 1.89 V	1.65 V – 3.6 V	2.7 V – 3.6 V	UART	USB	SPI	DDC (I²C compliant)	Programmable (Flash)	Data logging	Data batching	Additional SAW	Additional LNA	RTC crystal	Oscillator	Built-in antenna	Built-in antenna supply & supervisor	Timepulse		Standard	Professional	Automotive
Standard Precision GNSS modules																														
LEA-M8S	•				•	•	•	•	3		•		•	•		•				•		•	T		•	1		•		
NEO-M8M	•				•	•	•	•	3	•			•	•	•	•						•	C			1		•		
NEO-M8N	•				•	•	•	•	3		•		•	•	•	•	•	•		•	•	•	T			1		•		
NEO-M8Q-0	•				•	•	•	•	3		•		•	•	•	•				•	•	•	T			1		•		
NEO-M8Q-01A *	•				•	•	•	•	3		•		•	•	•	•						•	T			1			•	
NEO-8Q	•				•	•			1		•		•	•	•	•				•	•	•	T			1		•		
Standard Precision GNSS antenna modules																														
CAM-M8C	•				•	•	•	•	3	•			•		•	•				•	•	♦	C	•		1		•		
CAM-M8Q	•				•	•	•	•	3		•		•		•	•				•	•	•	T	•		1		•		
SAM-M8Q	•				•	•	•		3		•		•			•				•	•	•	T	•		1		•		

* = Operating temperature -40 °C to +105 °C

♦ = Yes, but with higher backup current

C = Crystal / T = TCXO


Thank you
for your attention